STUDY ON CONSUMER'S PERCEPTION TOWARDS ELECTRIC BIKE IN GOA

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<u>DECLARATION</u>

I declare that the present thesis entitled "Study on Consumer's Perception Towards Electric Bikes in Goa" is a consolidation of original work which has been carried out by me under the guidance of Ms. Avina Kavthankar, Assistant Professor of Economics, Goa Business School and the same has not been submitted to any other university or institution for the award of any other degree, diploma or other such titles.

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CERTIFICATE

This is to certify that Ms. Karuna Sanjiv Ballikar has worked on the thesis entitled "Study on Consumer's Perception Towards Electric Bikes in Goa" under my supervision and guidance. This thesis being submitted to Goa University, Taleigao Plateau, Goa for the award of the degree of Masters of economics is a record of an original work carried by the candidate herself and has not been submitted for the award of any degree, diploma, a scholarship or fellowship of this or any other university.

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ABBREVIATIONS

AMOS: Analysis Moment of Structures

CFC: Chlorofluorocarbons

CH_4: Methane

CO_2: Carbon dioxide

COP 26: Conference of the Parties

CSE: Centre for Science and Environment

FAME: Faster Adoption and Manufacturing of Hybrid Electric Vehicles

Gt: Gigaton

HEV: Hybrid Electric Vehicle

ICEV: Internal Combustion Engine Vehicle

IMD: India Meteorological Department

LULUCF: Land Use Land Use Change and Forestry

NITI: National Institution for Transforming India

N_2O: Nitrous Oxide

NEMMP: National electric mobility mission plan 2020

Ni-Cd: Nickel Cadium Batteries

Ni-MH: Nickel-metal-hydride batteries

NA-NiCl: Sodium Chloride and Nickel batteries

Na-S: Sodium Sulfur Batteries

Pb-PbO2: Lead Acid Batteries

PRISMA: Preferred Reporting Items for Systematic Review and Meta-analysis

SPSS: Software Packages for Social Sciences

Zn-Br2: Zinc-bromine batteries

CHAPTER I

1.1 INTRODUCTION

The year 2016 was marked as the warmest year ever in India and it was followed by the year 2009 as the second warmest year. From 2006-2020 i.e., within 15 years, 12 out of 15 years were recorded as the warmest year while 2020 was ranked as 8th in this list. The average temperature in 2020 was around 25.78 degree Celsius, also data provided by India Meteorological Department (IMD) reveals that all heat is observed in all seasons. According to the data provided by Centre for Science and Environment (CSE) Uttar Pradesh, Bihar, Assam, Chhattisgarh, Odisha and Jharkhand which are regarded as the poorest and most populated states are vulnerable to climatic crisis. In 2019, India was regarded as the highest polluter with the emission of 2.88 Carbon dioxide gigatons (Gt) in comparison to China which is the highest polluter in the world. Currently, Carbon Dioxide (CO_2) emission of India is 2.88 Gt and according to the projection made by CSE, the CO_2 generation will increase to 4.48 Gt in 2030 thus India will need to cut this Co_2 level by 1 Gt and the emission in 2030 will come down to 3.48 Gt. Hence, the subcontinent has aimed to cut down the emission by 22 per cent.

India has managed to reduce the carbon emissions by 21% in the year 2020 first (Sunita Narain, November 2021). In 2015, the country had aimed to achieve 40% share of non-fossil fuel-based electricity generating capacity which will be achieved by 2030. As per the report "India: Greenhouse Gas Inventory-2007", the Green House Gas emission in 2007 with Land Use Land Use Change and Forestry (LULUCF) it was 1727.71 million tons of CO_2, from such huge figure CO_2 emission were about 0.24 million tons, Methane (CH_4) emissions were 20.56 million tons and Nitrous Oxide (N_2O) emissions were 0.24 million tons.

The Energy, transport and residential sector emitted 1100.06 million tons, 142.04 million tons and 137.84 million tons respectively from each basis. In order to maintain the temperature below 1.5 degrees Celsius worldwide global carbon dioxide emissions should be 18.22 Gt, this was given in the report by the intergovernmental panel on climate change. More essentially India is reaching this goal and it will reduce its carbon emissions by 2023.

India's share in renewable energy has increased from 11.8% in March 2015 to 25.2% in July 2021. There is a need to grow the economy in order to meet the requirements of people. To decrease and curb the ever-rising Carbon Emission, the subcontinent has promised to cut its emissions to net zero by 2070 in the Conference of the Parties (COP 26) summit for countries add Glasgow. In addition, it was also announced that 500 GW of electricity should be generated from the non fossil electric capacity, the other half of the energy to be generated from the renewables and also a reduction of emissions by 1 billion tons emission intensity of the Gross Domestic Product by 45% by 2030.

According to the Paris Agreement, an international treaty on climate change which comprised of various environmental was adopted by 196 countries on 12th December 2015 but came into force on 4th November 2016. India was among the 196 countries to sign the agreement in 2016. It planned to cut down the carbon emission from 35% to 33% by 2022, India is planning to cut down almost half amount of greenhouse gases by the end of the decade. The agreement was signed in order to increase efforts to reduce the global temperature rise to 1.5 degrees Celsius above pre industrial levels. In accordance to reduce carbon footprints and rising global temperature, the central government has planned to reduce the import of crude oil, which will help to control the level of pollution, as out of 30 most polluted cities in the world India has 22 out of them.

With reference to CoP26 and Paris agreement the Central planning body i.e., National Institution for Transforming India, better known as NITI Aayog had devised a plan to initiate electric energy-based transport systems in India and it has also plan to discontinued the registration of internal combustion engine that is icy by 2023 for three-wheeler and by 2025 for two wheelers. The Centre has signed Rupees 10,000 crore for 3 years till 2022 and has also subsidized the electric vehicles in order to enhance the faster adoption of electric vehicles. Several initiatives were taken up by India in order to promote faster adoption of electric vehicle for example a campaign named EV30@30 which was a clean energy ministerial initiative aimed at the selling of EV to increase by 30% by 2030. India will have to take up increasing measures in order to reduce emissions from the transport sector and industrial sector. In order to control and curb the over rising emissions, the subcontinent at the 26th Conference of Parties

(CoP26) have declared the five-point agenda which would be called as Amrit Tattva. The five commitments include,

a) Increase the non-fossil fuel energy capacity to 500 GW by 2030

b) 50% of the country's energy to be met by using renewable energy by the year 2030

c) By 2030 country's carbon emission will be reduced by one billion tones

d) The carbon intensity of the nation to be reduced by 45% by the same year

e) The final agenda includes the economy will gain net zero emission by 2070 and will become carbon neutral

1.4 STATEMENT OF PROBLEM

The perception of consumer towards electric bike are subjective in nature and there are purchase intentions attached to them, which will positively and negatively affect the demand and supply of electric vehicles in the automobile market. In order to improve the perception of the consumers towards electric bike and to help the manufacturers increase the sales, the Centre and State government have initiated certain promotion policy. In addition, subsidies are provided in order to boost the production and buying of electric bikes but large amount of people do not have accurate knowledge about the promotion policies and thus not benefitted. This study will an attempt to address this problem.

1.5 OBJECTIVE OF THE STUDY

a) To find out the factors that influence consumer's purchase of Electric Bike

b) To identify the awareness level of respondents towards Goa Electric Mobility Policy

1.6 STUDY AREA

Goa, which is located in Konkan region, has the highest Gross Domestic Product as compared to all the other Indian states. As in terms of area, Goa is ranked 28th and has the population of 14,58,545 as of 2011 census. Survey was conducted in both the districts of Goa that is in North Goa and South Goa.

1.7 RESEARCH METHODOLOGY

The study was carried out in both the districts of Goa and the primary data was collected through online survey and telephonic interview. Two sets of questions were made, first was circulated through Google forms to know the perception of people towards electric bike and awareness regarding the state promotion policy and total 100 responses were recorded. The second questionnaire was made for the electric bike buyers to understand their purchase intensions, total 20 respondents were interviewed through phone calls.

All the consumer respondents were from all sorts of professions including students from the age group of mainly 20-30 years and up to 60 years. The data was collected through random sampling for the initial 100 respondents while purposive sampling was followed for the 20 respondents.

Data was collected only from primary source, thus questionnaire was administered through Google forms and analyzed using spreadsheet. Qualitative and quantitative data was collected and quantitative data was analyzed using Gretl and JASP software. Perception was measured using 5-point Likert Scale.

Likert scale is a service scale that represents a set of answers with options which are either numerical or verbal that covers a wide range of options on a topic given and it is always a part of close ended question. The Likert scale his named after American social scientist Rensis Likert, who created this approach in 1932 Likert was interested in measuring people's opinion and attitude along with the perception on a variety of items. It is one of the most trusted ways to measure opinions, perceptions and behavior. Free developed a seven-point bipolar agreement scale and this scale has been widely used apart from the dichotomous yes or no scale.

A Likert scale assumes that the intensity of an attitude or perception is linear or on a progression from strongly agree to strongly disagree and as a result makes the assumption that perception can be measured. Likert scale questions give more granulated feedback as compared to binary questions which will give us only two answer questions this method will let us reveal degree of opinion that could make a concrete differential understanding the feedback we are getting and it also focus is the area where we might want to improve our service or what so ever. Traditionally researchers have opted for a five-point scale that is strongly agree, agree, neutral, disagree and strongly disagree. Other researchers also use six-point scale and also three-point scale which gives options like poor, satisfactory and good. Numerical values are added to the responses like strongly disagree=1, moderately disagree =2, and so on.

CHAPTER II
ELECTRIC VEHICLES

2.1 INTRODUCTION

Electric vehicles (EV) also referred to as battery electric vehicle are fully or partially operated using electricity which uses battery and electric motor. Electric vehicle uses battery pack which consists of cells to power the electric motor and should be plugged to a charging equipment as it runs on electricity. Electric vehicles do not emit smoke from tailpipe and in all electric vehicle there is no fuel tank. The invention of electric vehicle is traced down the history and the credit has been attributed to various people mentioned below:

Year	Inventor	Place	Invention
1828	Anyos Jedlik	Hungary	Electric motor and small model car
1832-1839	Robert Anderson	Scotland	Crude Electric carriage
1859	Gaston Plante	France	Lead acid battery
1881	Gustave Trouve	France	First Electric car
1884	Thomas Parker	England	Smokeless fuel electric car
1890-1900	Walter Betsey	England	Electric cabs

Source: https:// en.m.wikipedia.org/wiki/History_of_the_electric_vehicle

Historical background

In the beginning of the 20th century car to lose its position in the global market, as by the 1920s the road infrastructure was improved and large petroleum reserve were widely available for affordable gasoline cars also the electric cars was limited only to the urban usage and they provided very slow speed as compared to that of Electric Vehicles. Thus, many metric vehicles stopped their production in 1910s also electric car were sold for almost double that price to that of the gasoline car. Years passed without any match remove Asia with the electric cars and the technology stagnated.

In 1950s Jenney Coachworks maker of Exide batteries started a joint venture to produce new Electric cars. From 1960s to 1990s a large number of companies made electric vehicles but due to high cost and limited range of models, limited works was sold. In the early 1990s the Californian government began with the "clean air agency" in order to control the vehicle emissions and to become fuel efficient thus its goal was to introduce zero emission vehicles like the electric vehicles. In response to the government's decision automakers like the Ford, Honda, Nissan, Toyota started to develop electric models.

In 2004 California electric car maker Tesla Motors begin development and introduced an all-electric car which used lithium-ion battery cells. Since 2008 Tesla sold approximately 2450 Tesla roadster in over 30 countries till December 2012. The Mitsubishi i-MiEV was launched in July 2009 in Japan. In December 2010 Nissan Leaf was introduced in Japan and United States and it became the first modern all electric manufacturer. Mitsubishi i-MiEV held the Guinness World Records for selling more than 10,000 units of Electric cars. The world's top selling all electric cars in 2014 were the Nissan leaf, Tesla model S, BMW i3 and Renault Zoe. In 2015 at the North American international auto show General Motors released the Chevrolet Bolt EV concept car. In December 2017 among the total percent of cars in normal way 5% car are electric. In the first half of 2018 11 millionaire plug in electric cars were sold in Europe. In September 2018 1 million plugin electric car for sold in US while 2 million new energy vehicles were sold in China. In December 2019 one out of two passengers registered car in Norway were plugin electric cars while in March 2020 Tesla became the first auto manufacturer, which produced 1 million electric cars. In April 2020 in Norway 10% of all cars were all electric.

2.2 TYPES OF ELECTRIC VEHICLES

There are four types of electric vehicles as follow:

a) **Batt**ery **Electric Vehicle**

It is also known as all electric vehicle and it totally runs on electric power battery. In order to run the vehicle a large battery pack should be charged which is fitted inside the vehicle the battery back consist of cells. The battery needs to be charged using electricity grid which will then provide power to one or more electric power in order to run the electric.

b) **Hybrid Electric Vehicle**

They have both engine and electric motor and their also known as series hybrid or parallel hybrid. Here the motor gets electricity from the battery while the engine gets energy from the fuel and the transmission is rotted simultaneously by both which will then drive the wheels.

c) **Plug-in Hybrid Electricity Vehicle**

Plug-in hybrid electricity vehicle is also called as series hybrid as they have both engine and motor. a consumer can choose among fuel, conventional fuel or alternative fuel like the biodiesel thus it is powered by a rechargeable battery pack which can be charged externally

d) **Fu**el **Cell Electric Vehicle**

They are also called as the zero emission vehicles and the electricity is generated through fuel cell technology which is then required to run the vehicle and the chemical energy of the fuel is converted into electricity.

2.3 GOVERNMENT POLICIES

2.3.1) NATIONAL ELECTRIC MOBILITY MISSION PLAN 2020 (NEMMP)

National electric mobility mission plan 2020 (NEMMP) was launched by the government of India in 2013. The objective of the policy is to encourage efficient, reliable, in budget electric vehicles that will meet consumers' preference, perception and expectation of price. Government shall collaborate with the automobile industry for the production and promotion of electric bikes, setting

up of required infrastructure, raising consumer awareness and utilizing advanced technology. This will help India to become leader of two- wheeler and three- wheeler electric vehicle market in the world by 2020 with the aggregate sales of 6-7 million units, which will aid Indian automobile industry to become manufacturing leadership and will increase its contribution towards National Fuel Security. The ambitious target of India was to achieve sales of 6-7 million hybrid and electric vehicle from the year 2020 and ahead. In order to kick start the evolving technology, the Government of India had decided to provide Fiscal and Monetary aid, and with this assistance the sales were expected to rise up to 15-16 million by 2020. Thus, this initiative has expected to retain 9500 million liters of crude oil which is equivalent to Rs. 62000 crores savings. A council was set up to initiate the mechanism, the name of the council was National Council For Electric Mobility (NECM) and the National Board For Electric Mobility (NBEM). The NECM is chaired by the Hon'ble Minister for Heavy Industries and Public Enterprise and the NECM includes Ministers from the main Central Ministries and also the renowned representatives from the industry. The council consisted of 25 members.

In order to reduce liquid fuel consumption in India, NEMMP has intended to introduce hybrid and electric vehicle as the first choice for the consumers so as to replace the consumption of conventional vehicles from the automobile sector. The policy is a composite of different policy with includes demand side incentives in order to accelerate buying of hybrid electric vehicles. Research and Development in technology includes battery management system motor system power electronic testing infrastructure and making sure that the industry participation is ensured. The policy also includes promotion of charging infrastructures which is essential part of electric vehicles. National electric mobility policy also includes supply side incentive and encouragement of retro fitment.

Under the National Electric Mobility Policy 2020 the Government of India launched Faster Adoption and Manufacturing of Hybrid Electric Vehicle in India which aimed at promotion of electric and hybrid vehicle Technology it also promoted manufacturing of the same.

2.3.2) FASTER ADOPTION AND MANUFACTURING Of HYBRID ELECTRIC VEHICLE (FAME)

Same India policy is a promotion scheme that encourages faster adoption of electric and hybrid vehicles where the manufacturers of electric vehicle and the infrastructure providers get the incentive in the form of subsidies. Same India scheme comes under the national electric mobility mission plan which was launched by the ministry of heavy industries and public enterprise in 2013. While the same industry has been divided into two phases, where the Phase I was started in 2015 and was functional till 31st March 2019.

On the other hand, Phase II begun in 2019 April and it shall continue till 31st March 2022. In addition, the Government of India had made and decision to exchange further fame India's scheme to Phase II to till 31st March 2014. The primary objectives of the fame India scheme include encouragement of manufacturers of electric vehicle and infrastructure provided in order to produce and support large number of electric vehicles in the subcontinent. The goal also includes the reduction of carbon emission, which is produced by the petrol diesel vehicles so has to decrease the air pollution levels within India. The fame India objective also focuses on establishment of charging infrastructure for electric vehicles and it targets to convert 30% of total transportation into electric vehicles by the year 2030.

The features of the fame India Phase I India scheme include, the first phase focused on the 4 eminent areas which includes a) demand creation, b) pilot project c) technology platform and finally charging infrastructure. The Government of India reflected the success of the FAME India scheme 'Phase 1' through the installation of 427 charging stations. During the Phase 1 the government allotted rupees 895 crores to cover the operation out of which nearly 2.8 lakh electric vehicles we supported with an amount of rupees 359 crore.

The features of fame India scheme Phase II focused on electrification of public and share transport and this scheme was alerted a budget of rupees 10000 crores. With the utilization of the scheme the various department aimed to provide incentive and subsidies to various categories of electric vehicle these are rupees 20000 incentives for 10 lakhs register electric two wheelers. For electric four wheelers, total 35 000 cars with ex factory price of rupees 15 lakh to be given incentive of rupees 1.5 lakh each. For hybrid four wheelers under the FAME scheme the Government of India will provide rupees 13000 to rupees 20000 as a part of incentive to hybrid four-wheeler whose ex-

factory price will be of rupees 15 lakh. When it comes to e rickshaws each e rickshaw of rupees 5 lakhs can get incentive up to rupees 50,000.

The FAME India scheme provides and incentive of rupees 50 lakh for Electric buses whose maximum ex factory price is of rupees 2 crores, while initial 8000 buses shall get this scheme. The development under the second phase of fame scheme includes construction of 200700 charging stations in smart cities hill station and metros across the country and the government also aims to cover the highway for the construction of charging stations for electric vehicles. The charging station shall we constructed on both side of the road and the gap between the two consecutive stations will be of 25 km.

As FAME India scheme is beneficial for the development of the country and its environment, it takes into account the issue of fuel conservation and reduces the fuel dependency of consumers. Under the scheme electric vehicles from different categories will receive different number of subsidies as an encouragement for promotion and production of electric vehicles. The largest mean of transport which is the public transport to be converted into eco friendly mode. The individual can a real benefit of the renewable energy sources with the utilization of the charging station, the benefits of the scheme is applicable to electric vehicle manufacturer and infrastructure provider.

As of 1st March 2022, 491 charging stations have been installed under the second phase of the scheme and for the fiscal year 2023 a total of 2,908 crores and more has been allocated for the faster adoption and manufacturing of hybrid and electric vehicle scheme which is almost 9 times then fiscal year 2021. A total of 3,11,000 battery operated vehicles were registered in India in 2021 as compared to 1,19,000 in the previous year and almost 95% of the registered battery-operated electric vehicles were two-wheeler and three wheelers. In the year, 2022 during the first month the number of electric two wheelers increased to 27,555 units as compared to the earlier here which was 4936 and the increase in sale of electric vehicles in 2022 was due to FAME India scheme Phase II. Around 2 lakh electric vehicles were benefited under the scheme and the subsidies for the last three fiscal years was about rupees 900 crores for electric two and three wheelers. Among the Indian states Karnataka availed the maximum benefit from the scheme which is 25,725 Vehicles, followed by Tamil Nadu and Maharashtra with 19,222 and 13,384 purchase respectively. Uttar Pradesh bought 7,990, Rajasthan 10,010 and Delhi bought aggregate of 8,897 Electric Vehicles.

2.3.3) GOA ELECTRIC MOBILITY PROMOTION POLICY 2021

The vision of the policy is to promote electric vehicles in the state for faster adoption in order to reduce carbon emission and pollution including smart city development and also the promotion of energy conservation and establishment of transport mechanism. The policy came into act in December 2021. Under this policy two main types of charging infrastructure are to be installed that is public charging station and private charging stations. Under the public charging station commercial stations are to be set up at fuel station at the roadside office malls etc. While the public charging infrastructure to be installed at Government buildings at school's bus stops etc. and the second time of charging station that is the private charging infrastructure to be installed at residential localities. Fixed capital investment of more than rupees 250 crores to be allotted to the initial two mega projects for the manufacturing of electric vehicles and the policy will create at least 500 direct employments for the people in the state. The fixed capital investment of rupees 1500 crores is allotted under the ultra mega electric vehicle enterprise for the manufacturing enterprise and it will create 3000 employments.

The objective of the Goa electric mobility promotion policies includes conversion of 50% of fairies in Goa into electric by the year 2025 and to also create direct and indirect employment up to 10000 at least by the year 2025. The policy also aims to promote research and development and skill development in the electric vehicle sector. Under the promotion policy road tax and registration fees are waived off, and different kind of financial incentives like the scrapping incentives, purchase incentives and interest subvention are introduced. And lastly wide range of charging stations to be installed across the state, all these objectives are formed under the policies in order to encourage startups and investment in the field of electric mobility and related sectors. The police operation period is of 5 years.

The policy is applicable to all sorts of electric vehicle including hybrid vehicles battery electric vehicles plugin electric vehicle which are included in the FAME India Phase II Policy. Incentives are given to the units are involved in manufacturing of electric vehicles, batteries and parts of the same. the incentives include capital subsidy of about 20% of fixed capital investment, 100% SGST reimbursement and stamp duty exemption up to 100% and the same is applicable to micro units and small and medium units. Also, no electricity duty up to five years.

The policy distribution among the electric vehicles buyers will be based on battery capacity of the Vehicle that is it will be measured in kWh and maximum subsidy is given up to rupees 30,000 per vehicle depending upon the model, pricing and battery capacity. On the basis of battery capacity, purchase incentive will be given to registered owner and the maximum incentive will be up to rupees 10,000 also the Consumer will be eligible for Scrapping incentive if they deregister and scrap out their existing ICE two-wheeler, and will get incentive of 5,000 rupees. The aim of the state is to become complete electric by 2025 December and in that concern all two wheelers sold in the state beyond 31st December 2030 will be all 100% Electric while the existing ICE Vehicles will be allowed to operate on the roads. According to the policy, charging stations will be construed at every 25 kilometers on highways and within City charging stations to be installed at every 3 kilometers. In order to install charging stations at residential societies, all housing and commercial establishments are required to register with Goa Electricity Department

2.4 CONSUMERS PURCHASE INTENTION

Consumer purchase intention refers to the measurement of consumers attitude and response towards the purchase of a product or an available service that day like or desire to buy. It is the willingness of a consumer to buy certain product or service hence it is considered as a dependent variable as it depends on numerous endogenous and exogenous factors. When it comes to marketing consumer purchase intentions are considered as an essential variable, as the available level of information provided by the consumer helps the seller to make desire changes in order to increase the sale of the product. Having a framework of intention of consumer can assist the marketing and related activities in order to achieve maximum target audience and earn higher profit from higher level of investment from the intentions of consumer which need to be thoroughly studied. In order to on high returns from high investment the producer should create awareness about their product and service through various medium of communication and advertisement.

Purchase intention of consumer can be detected with the help of recorded behavioral data or data can be collected through interaction with consumer when the consumer tries to purchase a product or good some other source of consumer intention data can be found from the search engine marketing and search engine optimization and also from social data. When a consumer visits a

website or an application or browsers social media platform brief detail about the choices can be studied through digital footprint. There are various factors that influence the consumers purchase intentions like the expected outcome, stimulus of the buyers towards considering a product, aspiration, recommendation given by a reliable source or friends and family, emotional attachment towards a brand or product. Other factors that affect the consumer intention include the expected benefit and expected cost of the product and the value of the product.

Further there are three main types of consumer purchase decisions:

- First, nominal decision making which is about the product at the low cost. Here the consumer makes purchase of the familiar product or brand very frequently and it involves low or less search efforts because the consumer is used to them. The disadvantage of nominal decision making is that to frequent advertising or marketing effort can have an inverse or negative impact on consumers as it does not require continuous interaction between the consumer and seller in order to get information regarding what they would like and will not.

- The second type of consumer decisions includes Limited decision making which involves more involvement than the nominal decision-making process does not required any in detailed research about the product or service that the consumer would like to avail although the consumer will have to require little involvement plus some search. Here the producers will require consumer data to understand their decision making which include factors like product quality and availability, packaging style and price. After studying the consumer data, the producers can make changes in their product or promotion activities.

- The third and the last type of consumer decision includes extended decision making which are related about the product at the high cost and the consumer will not make very frequent purchase as it involves lot of research and time. Extended decision-making revolves around brands or products which are unfamiliar and requires time in order to gain confidence of the buyer. In order to gain power in extended decision making the seller should have social presence and interactive guides and tools which will help the buyer to make decision.

2.5 PERCEPTION DEFINITION

Perception is derived from English language which means the feeling or the power of vision awareness, knowledge and observation. Visual view has a specifically completely different understanding hence persons perception on a specific problem object is the same. Perception can be defined as a process by which people organize and explicate their impressions in order to formulate meaningfulness to their environment. According to Rahmat (2005:51) perception is defined as an experience of object or relationship which is obtained by concluding information and interpret message while Slameto (2010:102) define the perception as a process that involves the inclusion of messenger information into the human brain through human perception which is constantly coming in contact with the environment. Have a perception affects our emotion in our emotional behavioral reaction is it also helps to shape our environment. Perception involves both bottom up and top-down processing. Bottom-up processing refers to the fact that perception is built from sensory input while those we interpret sensation is influenced by available knowledge and thoughts this is called as the top-down processing. The process of interpreting the stimulus is usually influenced by the experience and individual learning process. Perception can be measured using magnitude estimation, magnitude production, method of adjustment, forced choice, and Likert scale reporting.

CHAPTER III

3.1 REVEIW OF LITERATURE

Study conducted to understand the electrical vehicle technology research was carried out in many labs by different research teams. Under this paper the Electric bikes and classified into different types ahead of which it speaks about a subsidies and incentives given by the government. In developed economies the government invest in such projects and outcome is seen through increased sales of Electric Vehicles but 95% of the electric vehicles are sold in 10 countries only which includes Sweden, China, USA, United Kingdom, Japan, Germany, France and the Netherlands. In this study ahead, various components of electric vehicles been discussed, the first about the batteries the main concern of the electric vehicle batteries is the increasing cost of batteries in electric vehicles as the battery cost for about 50% of the cost of the total electric bike. As the same of Electric bikes increase the world while production of the batteries has increase up to 66%. Another limitation that comes with the electric bike is the storage difficulty as it represents the amount of energy that can be extracted from the battery. Other characteristics of batteries include charge state, energy density, specific energy, specific power, charge cycle, internal resistance and finally efficacy. The most expensive and vital part of an electric bike is its battery, due to the increased cost of the Electric bikes due to the increase cause of the battery in the manufacturers fear the loss of total sale and hands various alternatives have been introduced. In mostly or electric vehicles manufacturers used identical batteries which are Lithium-ion batteries the other alternatives suggested in the study include lead acid batteries (Pb-PbO2), Nickel cadium batteries (Ni-Cd), Nickel-metal-hydride batteries (Ni-MH), Zinc-bromine batteries (Zn-Br2), Sodium Chloride and nickel batteries (NA-NiCl), Sodium sulfur batteries (Na-S). The specialty of Lithium-ion batteries is that they have reliable and secure operation in a controlled under temperature and are use majorly in electric vehicles and Plugin electric vehicles. Another component of electric vehicle which is the charging and its modes have been discussed under the study, there are four modes of charging and electric vehicle that is mode 1 slow charging, mode 2 semi fast charging, mode 3 fast charging and mode 4 ultra fast charging. Further in the study the authors discuss about the advantages of the connectors. The paper was concluded with considering electric vehicles as the future of the smart cities and they should be given special relevance and

hands issues related to the electric vehicles mainly the battery issue should be resolved in order to increase the sale of an electric vehicle.

In a study conducted by Ning Ding and K. Prasad reviewed the electric vehicle and its related features and components. The paper gives background about the climate change and global warming issues and how petroleum diesel cars and bikes have a negative impact on environment hands the very attractive characteristics of electric vehicle will be able to substitute the ICEV vehicles in the market. Further electric vehicles have been classified into pure electrical vehicle, hybrid electrical vehicle and fuel cell electrical. The pure electrical Vehicle have battery is its energy source while the Hybrid electric vehicle have battery unit while the fuel cell electric vehicle has the fuel cell as its energy source and our considered as attractive due to zero emissions. The fuel cell is made up of 5 main components that is cathode, anode, anode layer, electrolyte and cathode catalyst layer. The pure electric vehicle also a made zero emissions and reduce air pollution. The technology is of Hybrid electric vehicles are also discussed under this paper which consists of micro and mild Hybrid electric vehicle. In HEV start motor is replaced by integrated starter generator which is located between the engine and the transmission hands the size of the engine is decreased and the design of the integrated starter generator requires both engine and electric motor to operate. The next segment which comes under conventional hybrid electric vehicle is the few full and dual mode Hybrid electric vehicle as it is operated by power splitter and it consists of almost all source of advantages which a Hybrid electric vehicle can have. Dual mode refers to the hybrid system which is required to achieve a high-level performance under the fast acceleration and high speed. The highest advantage of plug in Hybrid electric vehicle is the range extended hybrid batteries as it also composites of extra small size engine which is known as the range extender but the range extenders only help the electric vehicle batteries without providing any propulsion. Energy source, electric power and energy storage are considered as the internal energy components which is used to transfer mechanism. There are three types of energy source mores that can be used which is simple battery Model, mathematical model and dynamic battery model. After the Lithium-ion batteries zinc bromide batteries are widely used in vehicular applications due to its high energy density and life cycle of the zinc bromide batteries is higher as compared to the traditional batteries. Further it is concluded that in order to reduce the pollution levels and to delay the over utilization of nonrenewable resources there is an urgent need to replace the petrol diesel vehicles with the electric vehicles. The plugin Hybrid electric vehicle is

considered as attractive due to the rechargeable battery technology and improved capacity to provide continuous power but the difficulty associated with the plug in Hybrid electric vehicle is the internal resources. The pure electric vehicle and the fuse and electric vehicle has the potential to decrease the road side emission but pure electric vehicle face a criticism due to the battery technology while the fuels are electric vehicle face criticism due to reduce reliability on the other hand plug in Hybrid electric vehicle are considered as the potential vehicle in comparison to the normal petroleum diesel with regards to the factors like driving range fuel economy and etc. but it is also suggested that in order to reduce the total cost of the battery of the battery electric vehicle and plug in electric vehicle substitute for technology and required material should be explode and research to improve the overall efficiency.

In a study conducted by Zeinab Rezvani and Jansson (2015) showcase the solution for the problem of dependency on fossil fuels and the increasing carbon dioxide emission and other environment issues. It said that road transport contributes nearly one fifth of the total emission of carbon dioxide and other prominent greenhouse gases (European Commission, 2012) It also said that government need to take necessary actions in order to reduce the rising pollution and climate changes and many governments have initiated policies for reducing carbon dioxide emission by initializing production and introduction and adoption of electric vehicles (Brady and O'Mahony, 2011). The main and the initial objective of the paper is to present an overview of the driver and problems caused against consumers in the adoption of plug-in electric vehicles. The second objective is to identify limitations in existing research and to suggest a research agenda for the future. In the next section of these paper different types of electric vehicles are discussed that is alternate fuel vehicles which are generally describe as all types of cars that are powered by a fuel or partially powered by fuel like the biofuels and electricity. Other types of electric vehicle discussed year includes plug in Hybrid electric vehicles, extended range battery electric vehicles, battery electric vehicles and Hybrid electric vehicles. Ahead of the paper it also speaks about the theory of planned behaviors and rational choice theory. Theory of plant behavior assumes that people make decisions based on rational evaluation of substances and possible consequences taken and decision made (Ajen, 1991). Important factor of the theory of plant behavior is that the consumer knowledge and experience which will affect the perceived behavioral control and subjective social norms towards the electric vehicle purchase. The paper also speaks about the normative theories and environmental attitude normative theories such as the value belief nor theory which are utilized in

order to explain environmental behavior at the next level with the second part of the concern for the ecosystem. Consumer electric vehicle adoption behavior is also studied in this paper. Consumer behavior like the attitudinal factors, Pro environmental behavior, innovation adoption behavior, emotional behavior and symbolic behavior are mentioned. Under the discussion it is concluded that literature on consumer electric vehicle adoption have methodological limitations which in future research needs to be altered. Limitation of electric vehicle discuss under this paper includes consumers knowledge and skills to calculate and compare and do cost benefit analysis in order to choose between electric vehicle and ICE vehicle. Another limitation discussed under this paper was weather in reality the consumers see a connection between electric vehicles and protecting environment.

A study done by A. Khurana and V.V. Ravi Kumar (2019) shows the mediating role of attitude towards electric vehicle in India. Due to the fuel price hike and its impact of emission on environment there is an urgent need for the changes in the transportation habits and which is less polluting and fulfilled by electric vehicles. This paper discusses different types of electric vehicles like the Hybrid electric vehicles, plug in Hybrid electric vehicles and battery electric vehicles. At the 8th clean Energy ministerial in 2016 a campaign was started with the slogan "The EV30@30" which aimed at attaining total market share of 30% of electric vehicles 10% market share for the respective categories (IEA, 2016) also the economy towards 2013 has prepared itself to reduce the carbon footprints and cut the carbon emission by 37% and reduce the dependency on fuel imports. High cost of the electric vehicles which are result of the high import cost of the batteries which puts a negative effect on the production and sales in order to curb that the government is examining the battery swapping option overcome the electric vehicle adoption. The battery shopping model was first introduced in Israel and China but it met with partial success. The research methodology adopted was through structured questionnaire, the question is used for the study head to parts the first part of the question and focused on the demographic information of the respondents while the second part of the question air measured the model variables. There was four independent and one dependent variable and the pilot study head 26 items for 6 test variables. Structured equation modelling was followed and the article head 214 valid filled. Five-point Likert scale was used to measure the second part of the questionnaire. SPSS version 21.0 and AMOS version 21.0 were used for data analysis. The study aimed to examine factors that may influence electric vehicle adoption. After the data analysis and discussion, it was concluded that electric vehicle Adoption

in India is currently at the primary stage and some people are unfamiliar towards electric vehicle and the preference of electric vehicle with evolve as technology advances and familiarity increases. Important governmental policies on electric vehicles are important and play a prominent role in promoting and manufacturing electric vehicles. Environmental awareness sand functional awareness such as range, speed, batter life and quality need to be done a thorough research upon in order to gain consumer trust.

Study was conducted which specifically spoke about the requirements of charging infrastructure in India and lack of which we need to range anxiety among consumers. Further the charging infrastructure is classified into home charging and public charging and it is concluded that in home charging there are no separate bills while in public charging there are separate meters. Ahead of which the authors write about the research and development in electric vehicle which suggests alternative of battery technology available for electric vehicles which are lead acid battery, nickel metal hybrid battery, lithium-ion battery (Rakesh Kumar, 2018). The paper also speaks about the battery management system and electric motors. The conclusion of the paper is that government should adopt policies in order to encourage and promote electric vehicles also charging infrastructures need to be adequately built and options should be explored. Electric motor and power electronic should be planned according to the weather condition of India in the subcontinent should joined hands with global players to invest in infrastructure.

The objective of a study was to find a commercial viability of electric vehicles and the required charging infrastructure. The author of the paper explored the working of electric vehicle and have put in emphasis on the motor, controller and rechargeable battery. Moving ahead and comparison has been made among internal combustion with regards to the engine hybrid and electric vehicle and thus it is concluded that there is high Lithium battery cost due to the import cause as natural resource Lithium is limited in India and it is very difficult to extract from the Earth surface (Ankit Kumar 2018) The paper puts emphasis on more barriers faced by electric vehicle like the new technologies, high investment and range anxiety. In accordance to this the authors made in research and followed primary and secondary source of data a survey of 30 drivers of e vehicles we made questionnaire and observation was followed by a visit to car manufacturer. The result was a win situation for all the stakeholders and it was concluded that public places must have normal charging facility and the oil companies should provide charging infrastructure also the institution like

government should set up battery technology in India in order to reduce the import cost also it was highlighted that there is a need of subsidies and incentives provided by the government for E charging.

A study was conducted to understand the purchase decisions of the consumer in the presence of information and to help the consumers to accept the electric vehicles. The study also aimed at finding out the factors that influence the consumers purchase intentions of electric vehicle in order to provide framework and background to the developers of the electric vehicle for the better sale of the vehicles. The study of the paper was based on the literature review with stated statistical hypothesis and questionnaire was designed to conduct survey in order to collect a reliable information to find out the factors that influence consumers purchase of electric vehicles. A structural equation model was established and with the help of the data collected confirmatory factor analysis was done in order to verify the statistical hypothesis. EV30@30; campaign was launched in order to increase the market share of electric vehicles to 30% by 2030. Thus, EV30@30 provides a background for governments to stop it more electric vehicle development and plans. According to the data provided by the China auto industry association the sale of electric vehicles has increased from the year 2011 to 2017. In 2011 China sold only 8159 electric vehicles but in 2017 the total sales of electric vehicle in China were 777,000 and due to this rapid change in the electric vehicle industry the researchers and decision makers in China and in other countries have paid more attention to the consumer behaviors and purchase intentions related to the electric vehicle. Further the paper speaks about the Theory of Planned Behavior and Theory of Reasoned Action. The paper is based on the 8 hypothesis which shows the factors that influence consumers purchase intentions. A 7-point Likert scale was used with responses ranging from strongly d agree to strongly agree which were represented with values from 1 to 7 and 120 question is distributed. The questionnaire was distributed people through online mode and two people living in coastal this question was circulated in order to collect information on consumers interest and understanding of electric vehicles. A second type of formal questionnaire was sent to the consumers over interested in electric vehicle and a total of 320 questionnaires were circulated. The paper followed structural equation modelling, second order confirmatory factor analysis, discriminant validity and structural model analysis. Out of 9 hypothesis all hypothesis were found significant except for few. Final finally it was concluded that attitude, subjective noun and self control were the influencing factors of behavior intention and the same have and positive impact

which was proved by the structural equation modelling. Also, the opinion of the people has positive relationship with consumers attitude towards the purchase of electric vehicle but personal innovativeness has and negative impact and interpersonal influences negatively towards the subjective norms of consumers. It was also completed that electric vehicles have and positive impact on environment and Consumers are in support of this objective information on still leave a green life in order to increase Environment protection consumers also believe that charging infrastructure will affect the purchase intention that's it was suggested to the government in order to conduct development plans to construct charging stations enterprise and life of the battery will also affect the decisions of consumer towards electric vehicle therefore it was suggested to the developers to adopt methods to alter the battery technology.

A study was done is to explore the difficulties and opportunities which are related to the benefit of four-wheeler, two-wheeler and hybrid electric vehicles in this particular paper a comparative analysis was done in order to understand the difficulties and driving forces for the adoption of different types of electric vehicles in the developing countries. Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guidelines were utilized in order to form the methodology for the review of literature. It was highlighted that EVs are out of reach of the middle-class common people due to its high ownership cost. EV provide less contribution to greenhouses gases like CO_2, CO, O_3, SO_2, NO_3, CFC and CH_4. A study conducted by Zhou and coworkers highlighted that electric four wheelers' sales 35% more energy when compared to gasoline vehicles while the hybrid electric vehicles sales approximately 20% more energy than the ICEV cars. Thus, at the end of the literature review of energy saving it was concluded that the developing countries should mostly go for electric two wheelers more as it consumes less energy, they are small in size and decreases congestion issue in large cities and do not require any heavy infrastructure when compared to electric four wheelers or HEV or any petrol-based vehicle. According to a study done by Weiss the large cost of infrastructure can be eliminated in China if they substitute electric four wheelers with electric two wheelers. A study done in UK it was concluded that Electric two wheelers operational cost was 24% better in comparison to the best-selling motorcycle. From the study conducted by Krupa it was analyzed that consumers by less EV due to the absence of recharging stations and high sticker price, also it was founded that there is a positive relationship between people purchasing EV and government's awareness policy. The range anxiety can be addressed is there is presence of accurate charging station that communicates

within the network (Carley). Though EV reduce carbon emission but release harmful emission of PM10, SO2. A study done by Jochem showcased that accident cost of ICEV is equivalent to that of EV also a study done by Dill and Rose said that additional weight and fear of flat tire of the electric vehicle was a problem faced by the half percentage of the consumer. And it was concluded that with proper government policy and initiative the propaganda of HEV and an electric two wheelers can be successful in developing countries.

Another study was conducted in Europe in new order to find out the factors that influence the consumers car type choices and aim of the survey was to find out the familiarity of drivers towards electric vehicles and investigate consumers interest in the purchase of electric vehicles and find the lead priorities of the car owners in improving he features of electric study was conducted in the year 2017. The study was based on the stated preference and the respondents were asked to choose between two or more alternatives. The consumers were firstly made to choose between two and labelled car types and secondly, they were to choose between a range of different car types the aim of this experiment was to provide information on relative importance of different car type factors and to understand their preference for different kind types. Questionnaire was formed of 23 question which included questions based on the consumer attitude, demographic information and lifestyle characteristics of the respondents, 1248 respondents answered the questionnaire from France, Germany, Italy, Poland, Spain and UK. The result of the survey and experiment was that in the second experiment almost half of the respondents did not choose the electric or fuel cell car option and the key reason to this was due to the high prices of the electric vehicles it was also reflected that purchase or second-hand cars put a negative impact towards the sale and purchase of electric vehicle. Overall, the reason the consumers cave for not buying an electric car was high purchase prices, lack of charging infrastructure, range anxiety and less model choices

For study was conducted to understand the preference of women in India for Electric bikes, under the navigate research report it was predicted that by the year 2018 the sale of election vehicles in India will reach to 17%. The review of literature done under this study revealed that carbon dioxide emissions at worldwide level was expected to be 40 million metric ton by the year 2030 in the report given by the Energy Information Administration of the US government. Hatwar et al. (2013) use of fresh approach in order to design electric bike which consisted of hybrid system of battery and increasing speed in order to avoid range anxiety. Ji et al. 2013; Xu et al.2013 have spoke about

the environmental concern and have compared the Electric bikes with the transit mode and have prove that Electric bikes have an impact on the environment. A study conducted by Abdullah et al. (2013) address is views in regards with the consumer purchase intention and said that their preference is dependent upon price, service and branding. In another study it was concluded that the social marketing campaign for creating environmental awareness and the Electric bikes were sold by the manufacturer with features of zero emission reduce noise level power efficient. Was that the study was based on descriptive analysis and the primary data was collected for testing the hypothesis for the collection of primary data of structure formal questionnaire was prepared and data was collected for the per period of two months from first April 2013 to 31st May 2013. The study was conducted in Madurai which is considered as the agricultural industrial and educational hub in South Tamil Nādu also Madurai is a home to various automobile industry. The aim of the study was to find out the choice of women bikers towards electric by and find the factors that influence the purchase of their bikes. The objective of the paper was to understand the ion is level of consumers towards Electric bikes in the city of Madurai to find out the factors that influence reference of the respondents towards electric by and to find out their satisfaction level towards electric bikes. The primary data waste using frequency analysis, Chi square test and Friedman 2-way annova. Thus, it was concluded that if more charging stations and carrying capacity along with the subsidy would have provided to the consumers then the sale of the electric maker would have increased also it was suggested that warranty for the spare parts of two wheelers should have sustain for longer duration and the manufacture should offer long term guarantee. The battery technology should have focused on the cancellation of range anxiety and affordability. The female respondents of the study showed their preference towards the scooter styled bike as they were considered as light and more comfortable. There is an opportunity for new market for women Electric bikes with extensive advertisement, exclusive showroom, trendy model with different capacities and colors.

3.2 RESEARCH GAP

In this study, the intention of the study was to adopt an electric bike and to see the consumer purchase intention and it was considered as the dependent variable, there has been various studies made on consumer purchase intentions and perception of consumer towards electric bike but no

study has been conducted on the consumers of Goa. There is absence of research or study made on the consumer behavior and purchase intention of people towards electric bikes or General Electric vehicles. Another limitation is that there is no literature available on the Goa Electric Mobility Promotion Policy 2021. There has been limited study made on consumer's environmental behavior towards electric vehicles.

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

As the country is experiencing rapid urbanization, increased level of industrial sectors and there is rapid growth of population there is an upward demand for resource consumption. As the population is growing at a fastest speed the stock of non-renewable resources is getting exhausted and also there is increased level of pollution due to high production and consumption activity. Due to which there is a need to reduce the carbon emission level. The country has faced high level of pollution mainly due to the carbon emitted from the petrol and diesel vehicles hence there is a need to reduce the carbon emission to sustain the environment for present and future. One way to reduce the vehicular carbon emission is by adopting electric vehicle which is also known as the battery-operated vehicle. Although the electric vehicle technology and neutralization is in its primary and infant stage that are chances that it will receive set backs from the consumers. The market for the electric vehicle is micro segmented. Another reason for adopting electric vehicles is due to the rising fuel prices across the country which are causing a big hole to the pocket of the middle-class people as the fuel prices are increasing day by day.

By the year 2018 the total sales of electric vehicles in India will increase by 17%. From the period of January to December 2021 the sale of electric vehicles in India has increased by 132% as compared to the year 2020 although the low-speed electric bikes have seen a negative growth in last two quarters of 2021 also the low-speed e-bikes are not subsidized under the FAME. The electric bikes are divided into three segments that is low speed, city speed and high speed.

The study was conducted in the region of Goa in both the talukas, for the age group of 20-30 years of all professions. The data analysis part is divided into two part 1) responses from consumers who bought electric bike and 2) responses from general consumers to study their perspective and consumer intentions.

4.2) Responses from Electric Bikes buyers

4.2 (a) Frequency Table for Age of the Respondent				
Age	Frequency	Percent	Valid Percent	Cumulative Percent
20-30	6	30.000	30.000	30.000
30-40	4	20.000	20.000	50.000
40-50	7	35.000	35.000	85.000
50-60	3	15.000	15.000	100.000
Missing	0	0.000		
Total	20	100.000		

Source: Primary Data

The about table shows the age of the respondents. It can be seen that the maximum respondents are from the age group of 40 to 50 which constitutes of 35% followed by 30% in the age group of 20 to 30 years, 20% which fall in the age group of 30 to 40 years and 15% which is seen as the minimum responding from the age group of 50 to 60 years hence it can be concluded that majority of the respondents fall in the age group of year 40 to 50 years

4.2 (b) Reasons for Buying Electric Bike

Reason for buying Electric Bike	Frequency		Percent		Valid Percent		Cumulative Percent	
Environmental concern	4		20.000		20.000		20.000	
Experience	1		5.000		5.000		25.000	
Rising Fuel Prices	15		75.000		75.000		100.000	
Missing	0		0.000					
Total	20		100.000					

Source: Primary Data

The above-mentioned frequency table shows the reason of the consumers for buying electric bike, out of 20 respondents 15 respondents opted E-bike for rising fuel prices as the main reason for buying bike, followed by other reasons like environmental concerns and preference and experiences given by family and friends, some respondents were of the view that they bought electric bike due to both environmental concerns and rising fuel prices. Hence it can be concluded that 75% of the consumers bought electric bike due to the hike in fuel prices in Goa which

4.2 (c) Cross Tabulation for Annual Income and Ownership of Electric Bike							
Do you personally own an Electric Bike?		**Annual Income**		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Yes		Below 1,20,000		4	20.000	20.000	100.000
		1,20,001-2,00,000		4	20.000	20.000	20.000
		2,00,001 - 4,00,000		3	15.000	15.000	35.000
		4,00,001-6,00,000		4	20.000	20.000	55.000
		6,00,001 - 8,00,000		4	20.000	20.000	75.000
		Above 10,00,001		1	5.000	5.000	80.000
		Missing		0	0.000		
		Total		20	100.000		

Source: Primary Data

From the above cross tabulated data, we can see that data has been combined for annual income of the consumer and ownership of electric bike. As purposive sampling was followed for the 20 respondents all of them owned an electric bike. 20% of the respondents had an annual income below 120,000 and similar frequency was noted in other income groups of 1,20,001 to 200000, 4,00,001 to 6,00,000 and 6,00,001 to 8,00,000 each with 20% of percentage. Three out of 20 respondents had an annual income of 2,00,001 to 4,00,000.

4.2 (d) Cross Tabulation to know consumers awareness and beneficiary of Goa Promotion Policy							
Are you aware of Goa's new Electric Vehicle policy named as ""Goa Electric Mobility Promotion Policy 2021""		Are you a beneficiary of ""Goa Electric Mobility Promotion Policy 2021""?		Frequency	Percent	Valid Percent	Cumulative Percent
Maybe		No		1	100.000	100.000	100.000
		Yes		0	0.000	0.000	100.000
		Missing		0	0.000		
		Total		1	100.000		
No		No		6	100.000	100.000	100.000
		Yes		0	0.000	0.000	100.000
		Missing		0	0.000		
		Total		6	100.000		
		No		4	30.769	30.769	30.769
Yes		Yes		9	69.231	69.231	100.000
		Missing		0	0.000		
		Total		13	100.000		

Source: Primary Data

The above table shows the crossed tabulation between the awareness about the Goa's electric vehicle promotion policy and also try to find out of 20 electric vehicle uses how many were the beneficiary of the same. Respondents out of 20, 9 had the knowledge about the Goa electric mobility promotion policy 2021 and from among those 9 all of them were the beneficiary of the policy, which accounted for 69.23%. The other six respondent neither had the awareness about the policy not they were beneficiary of the same.

It is concluded that since the policy was introduced on 4th December 2021, not many consumers have knowledge about the policy and the buyers of EV either make a thorough research about the policy or they are informed by the EV dealers at the showroom.

4.2 (e) Consumers opinion on limited choice available in E-vehicles

Chart with y-axis labeled "Counts" (0 to 5) and x-axis labeled "EV have limited choice of models" with values 1 to 5. Bar heights: 1 = 5, 2 = 4, 3 = 4, 4 = 3, 5 = 4.
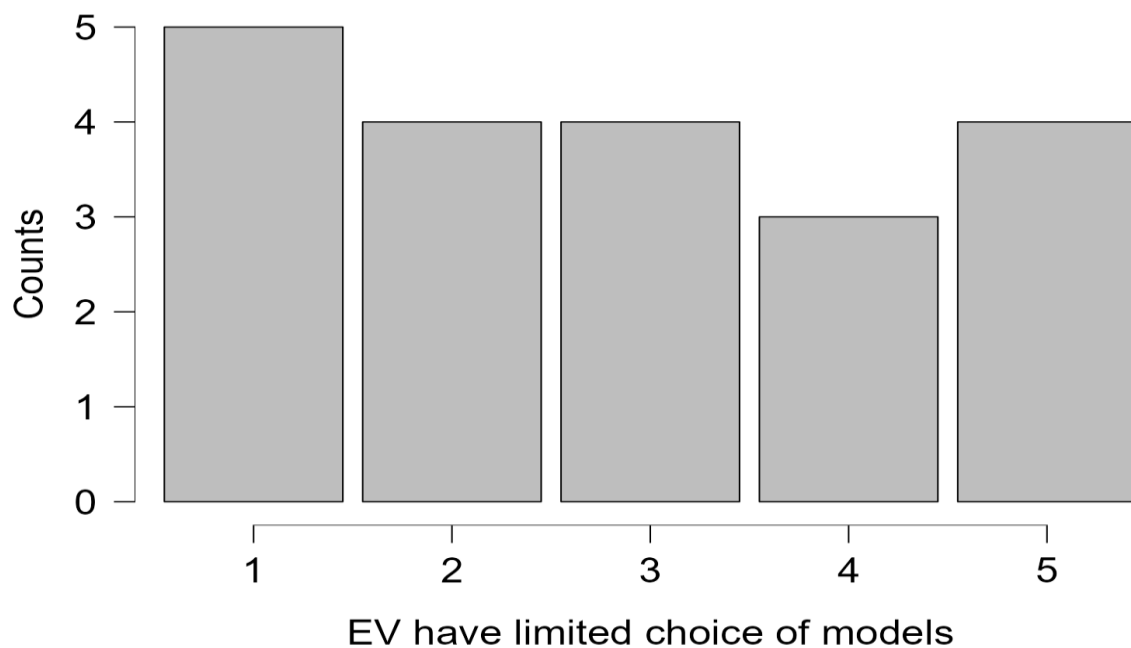
1- **Strongly Disagree**   Source: Primary Data
2- **Moderately Disagree**
3- **Neutral**
4- **Moderately Agree**
5- **Strongly Agree**

It can be seen from the above graph that consumers strongly disagreed then there is limited choice of models when it comes to buy Electric bikes. The respondents were given 5-point Likert scale to express their views. The highest number of responders strongly disagreed that there is limited choice of models followed by consumers which believe that there was Limited choice of models the race respondents were in the same count and had mixed response. It was studied during the survey that consumers visit the online website of the showroom to book their desire model well in

advance and this they get the model that day desire for all the three registration of the model takes a longer period of time arranging from 15 to 30 days. Also, the consumers are given pamphlets or asked to visit their online store to choose their models as on their website detailed information about the model is shared.

4.2 (f) Range Anxiety

Frequencies for Range Anxiety				
Range Anxiety	Frequency	Percent	Valid Percent	Cumulative Percent
1	1	5.000	5.000	5.000
2	6	30.000	30.000	35.000
3	7	35.000	35.000	70.000
4	3	15.000	15.000	85.000
5	3	15.000	15.000	100.000
Missing	0	0.000		
Total	20	100.000		

Source: Primary Data

Range Anxiety is a wide fear among consumers, it refers to anxiety driver haves when the battery charge is low and the charging points are unavailable. It creates a fear that the driver might get strangled somewhere there no adequate charging facility. In research done by Jung and Steiner, they aimed to explain the experience of consumers with electric vehicle influence the range anxiety. Both the authors provided 73 participants who had an experience of 19 miles and they concluded that low starting state of charge, also high doubtfulness of user interface have significantly important influence on range anxiety. In another research done by Rauh et al. [16] the author concluded that range anxiety is particularly for long term electric vehicle owner but the research did not answer whether the range anxiety can be reduced or not.

In the survey conducted for the 20 electric bike drivers, the respondents were questioned whether e-bike can be used for longer distance or not and 5-point Likert scale was provided to express their view, it was concluded that 35% consumers chose neutral option and said that e-bike can be used for shorter distance and not for far distance while, 5% and 30% respondents strongly and moderately disagreed that e-bikes are used for shorter distance. Rest 15% each strongly and moderately agreed that e-bikes can be used for shorter distance only and thus suffer from range

anxiety. It was observed that consumers buy bike from higher price range which provide more range as compared to low price range bikes. Also, other 35% respondents said that they bought e-bike for shorter distance only.

4.2(g) High Cost of Ownership

Frequencies for High cost of ownership				
High cost of ownership	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
1	2	10.000	10.000	10.000
2	2	10.000	10.000	20.000
3	7	35.000	35.000	55.000
4	4	20.000	20.000	75.000
5	5	25.000	25.000	100.000
Missing	0	0.000		
Total	20	100.000		

Source: Primary Data

The lowest price of electric bike in India starts from rupees 25000 which gives 50 km per charge and is sold by Avon E plus. High price bikes are bought for longest range electric two wheelers in India due to the lack of charging infrastructures consumers leg interest in buying electric scooters hands a number of consumers nowadays are going for high price electric bike the price of such bikes can go up to anywhere between 1 lakh to 1,80,000. Ola S1 Pro provides a range of 181 km per charge and the charging our required is it hours and 30 minutes while its price starts from rupees 1,36,750.

The survey which was done for the 20 respondents recorded the data that 35% of the respondents what electric bike from the price range of 1,30,001 to 1,50,000 while 25% of the respondents what electric bright from the price range of 90,001 rupee to 1,10,000. Further 15% of the respondents but bike from the price range of 50001 to 70000. People who bought Electric bikes from high price range were from the age group of 40 to 50 and hence all of them were employed with occupations such as cell phone business like contractor or government servant. It could be concluded that 30% of the self-owned businessman what Electric bikes from high price range that is above 130,000

and they had an annual income of 1,20,000 to 4 lakh. The rest 25% of the respondents were government servant and they fell into the same income bracket.

When the same respondents were asked whether electric vehicles have initial high ownership cost,45% of the responding moderately agreed while 15% of the respondents strongly disagree and strongly agreed while other 15% gave a neutral answer.

4.2 (h) Limited Choice of E-Bike Model

Frequencies for limited choice of models				
limited choice of models	Frequency	Percent	Valid Percent	Cumulative Percent
1	5	25.000	25.000	25.000
2	4	20.000	20.000	45.000
3	4	20.000	20.000	65.000
4	3	15.000	15.000	80.000
5	4	20.000	20.000	100.000
Missing	0	0.000		
Total	20	100.000		

Source: Primary Data

There are many models of Electric Bikes in Goa starting from Aura, Retrosa, Hero Electric Atria, Ola S1 and others, but the availability of the model is limited in nature. After the promotion Policy was announced in Goa on 4th December 2021 many electric vehicle dealers' showrooms have emerged in Goa but since electric vehicles are new in Bike market the demand for which is fluctuating hence the models are limited.

But in case the consumer needs a specific model they will need to do pre booking and the required model arrives within 15 to 30 days. 25% responded strongly disagree inside that there are enough models. While 20% of the respondents moderately disagreed were neutral and the rest 20% strongly agreed and accepted that there are limited choices of models while 15% of the responding said that they were limited choices.

4.2 (i) Regression Analysis

Model 1: OLS, using observations 1-20					
Dependent variable: Consumer Satisfaction					
	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	0.684564	0.661904	1.034	0.3174	
Reduces Pollution	0.347664	0.166287	2.091	0.0540	*
Choice of Models	0.263834	0.139097	1.897	0.0773	*
Save Money	−0.773570	0.265625	−2.912	0.0107	**
Ownership Cost	1.01685	0.231753	4.388	0.0005	***
Mean dependent var	3.550000	S.D. dependent var		1.145931	
Sum squared resid	9.549629	S.E. of regression		0.797898	
R-squared	0.617249	Adjusted R-squared		0.515182	
F (4, 15)	6.047501	P-value(F)		0.004191	
Log-likelihood	−20.98647	Akaike criterion		51.97294	
Schwarz criterion	56.95160	Hannan-Quinn		52.94483	

Source: Primary Data

This regression analysis shows the impact of various features like reduced pollution, ownership cost, monetary savings and model choices of electric bike on consumer satisfaction. From the study it can be said that "consumer satisfaction" is influenced by many socio-economic factors. Factors such as reduced pollution, choice of models, ownership cost and cost of charging has an impact on consumer satisfaction. The model is explained with the help of Ordinary Least Square method which is also known as simple regression analysis. The following is the form of equation which will show the regression;

Consumer Satisfaction= $\beta_0 + \beta_1$Reduces Pollution+β_2Choice of Models+β_3Saves Money

+β_4Ownership Cost +u

The coefficients β_1, β_2, β_3, β_4 and β_5 are the regression values which indicates the impact of changes in corresponding independent variables on the consumer satisfaction.

From the above table we can say that the impact of change in independent variables on the probability of respondents to consumer satisfaction and the exponential values of beta coefficients represents the magnitude of impact on participation. β_1 Reduces Pollution is positive and also significant, it refers to other factors are constant then with one unit increase in reduced pollution feature of electric bike will increase the consumer satisfaction up to 0.347664 units. β_2 Choice of

Models is positive also significant and it shows a positive impact on the dependent variable, keeping other factors constant if there is one unit increase in choices of model then the consumer satisfaction will increase to 0.263834 units, which showcase that if manufacturers increase the range of electric bike models, then there will be more people buying electric bikes and also people will be having wide range of available choices of models to choose from. β_3 Saves Money shows negative but significant effect in the model, it means that one unit increase in money saving will decrease the consumer satisfaction by −0.773570 units. The effect is negative but significant because although an electric bike will save the money of the consumer but it will reduce the satisfaction due to reasons like range anxiety, less speed of the bike as compared to ICE bikes, range calculation, longer charging time, more weight of the bike, lower resale value and other issues. β_4 Ownership Cost is positive and is highly significant which means that one unit increase in ownership cost of electric bike will increase the consumer satisfaction by 1.01685 units. The consumers were of the view that higher ownership cost gives better and high features of the bike, also high-priced bike give more range to a bike and they can travel more distance hence increased cost was not an issue as consumers were satisfied with the features. The $R^{2\ of\ th}$e above regression analysis is 61.72 percent, which shows that the said variables are affecting the consumer satisfaction. The model is considered as satisfactory.

4.3) General responses from the consumer to understand the perspective of respondents towards electric bike and their purchase intentions.

Online survey was carried out using Google forms in order to find out the perspective of people towards Electric bikes and promotion policy of Goa. Random sampling was followed and data was collected and analyzed through JASP software. The first part of the question consisted demographical questions while the other half of the question is the respondent about their views and opinions regarding electric bike and to check the level of awareness about the policy and bike in the society.

Total 100 responses recorded and the respondents belong from 22 to 60 years of age and respondents between 20-30 years answer the question there most. This online survey was conducted in both the districts of Goa.

4.3(a) Frequency for current occupation

	4.2(a) Frequency for current occupation				
Age	**What is your current occupation?**	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
20-30	Employed	25	35.714	35.714	35.714
	Others	2	2.857	2.857	38.571
	Prefer not to say	2	2.857	2.857	41.429
	Self Employed / Free Lancer	4	5.715	5.714	45.714
	Student	29	41.429	41.429	88.571
	Unemployed	8	11.429	11.429	100.000
	Missing	0	0.000		
	Total	70	100.000		
30-40	Employed	7	53.846	53.846	53.846
	Housemaker	1	7.692	7.692	61.538
	Self Employed / Free Lancer	4	30.769	30.76	84.615
	Student	1	7.692	7.692	100.000
	Missing	0	0.000		
	Total	13	100.000		
40-50	Employed	4	80.000	80.000	80.000
	Self Employed / Free Lancer	1	20.000	20.000	100.000
	Missing	0	0.000		
	Total	5	100.000		
60 and above	Others	1	100.000	100.000	100.000
	Total	1	100.000		
Below 19	Student	11	100.000	100.000	100.000
	Missing	0	0.000		
	Total	11	100.000		
Source: Primary Data					

From the above table data has been extracted and choose the frequency for age and current occupation of the responding people below 19 years were all students, while respondents from the age group of 20 to 30 were students and it represented 4.42% while 11.42% per unemployed but 35.71% were employed. The response from the age group of 3240 years were employed at the rate of 53.84% while 30.76% was self-employed. 4 respondents out of 100 in the age group of 40-50 were employed. Hence it can be concluded that 36 out of 100 respondents were employed while 41 out of 100 were students from the age group of 20-40 years.

4.3(b) Frequencies for the reason why you will buy an Electric bike rather than buying Petrol-diesel bike

4.2(b) Frequencies for the reason why you will buy an Electric bike rather than buying Petrol-diesel bike				
State the reason why you will buy an Electric bike rather than buying Petrol-diesel bike	Frequency		Valid Percent	Cumulative Percent
Environmental aspect	24		24.000	24.000
I will not buy	8		8.000	32.000
Others	7		7.000	39.000
Requires less maintenance	3		3.000	42.000
Rising Fuel Prices	58		58.000	100.000
Missing	00			
Total	100			

Source: Primary Data

The above table provides information why a consumer will buy an electric bike rather than buying and petrol diesel bike, as the fuel prices are hiking day by day 58% of the response set the table by electric bike due to the rising fuel prices while 24% people goodbye electric bike due to environmental aspects while 3% of the people said that it requires less maintenance while remaining it said that will never by an electric bike. Hence it is concluded that the cost of charging and electric bike is much less is compared to the cost of petrol as a result majority of the respondents will opt for electric bike due to the average fuel prices. Also, the price of ownership of electric bike is much higher but its later requires less maintenance and therefore many people buy electric bike as it requires less maintenance in comparison to the petrol bikes and the servicing is provided by the showroom after every 3000 to 5000 km depending upon the model of the bike at a much lower cost. People with environmental centric will always opt for an electric bike because it emits zero carbon emission or any other harmful greenhouse gases also it does not make any noise pollution

4.3(c) Frequencies for How much per month do you typically spend on gas or diesel?

What is your Annual Income?	How much per month do you typically spend on petrol or diesel?	Frequency	Percent	Valid Percent	Cumulative Percent
Above 10 lacs	1500 – 3000	1	33.333	33.333	33.333
	3000 – 6000	1	33.333	33.333	66.667
	6000 – 9000	0	0.000	0.000	66.667
	Above 10,000	1	33.333	33.333	100.000
	Below 1500	0	0.000	0.000	100.000
	No, I do not own any vehicle	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	3	100.000		
Less than 1,20,000	1500 – 3000	13	43.333	43.333	43.333
	3000 – 6000	4	13.333	13.333	56.667
	6000 – 9000	1	3.333	3.333	60.000
	Above 10,000	1	3.333	3.333	63.333
	Below 1500	4	13.333	13.333	76.667
	No, I do not own any vehicle	7	23.333	23.333	100.000
	Missing	0	0.000		
	Total	30	100.000		
Not applicable	1500 – 3000	7	31.818	31.818	31.818
	3000 – 6000	4	18.182	18.182	50.000
	6000 – 9000	1	4.545	4.545	54.545
	Above 10,000	0	0.000	0.000	54.545
	Below 1500	6	27.273	27.273	81.818
	No, I do not own any vehicle	4	18.182	18.182	100.000
	Missing	0	0.000		
	Total	22	100.000		
1,20,001-2 lac	1500 – 3000	5	25.000	25.000	25.000
	3000 – 6000	8	40.000	40.000	65.000
	6000 – 9000	1	5.000	5.000	70.000
	Above 10,000	1	5.000	5.000	75.000
	Below 1500	2	10.000	10.000	85.000
	No, I do not own any vehicle	3	15.000	15.000	100.000
	Missing	0	0.000		
	Total	20	100.000		
2,00,001-5 lac	1500 – 3000	7	53.846	53.846	53.846
	3000 – 6000	2	15.385	15.385	69.231
	6000 – 9000	0	0.000	0.000	69.231
	Above 10,000	1	7.692	7.692	76.923
	Below 1500	1	7.692	7.692	84.615
	No, I do not own any vehicle	2	15.385	15.385	100.000
	Missing	0	0.000		
	Total	13	100.000		
5,00,001-10 lac	1500 – 3000	6	50.000	50.000	50.000
	3000 – 6000	0	0.000	0.000	50.000
	6000 – 9000	4	33.333	33.333	83.333
	Above 10,000	1	8.333	8.333	91.667
	Below 1500	1	8.333	8.333	100.000
	No, I do not own any vehicle	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	12	100.000		

The above table shares the information about how much the respondent earns annually and how much they typically spend on petrol or diesel. People from the income group of less than 120000 spells around 1500-3000 monthly on petrol this was the highest group of people who spend around 3000 per month on petrol or diesel. From the annual income group of 120001 to 2 lakh 40% of the people spend around 3 to 6000 on petrol or diesel. Only one person from the income racket of about 10 lakhs spend around 30000 monthly on petrol or diesel 18% of the people say that day did not own any kind of vehicle. Hence it is concluded that the lowest income bracket that is of less than 10000 spends the most on petrol and diesel that is up to 3000

4.4 DISCUSSION

(a) Objective 1: To find out the factors that influence consumer's purchase of Electric Bike

Descriptive Statistics						
	Valid	Missing	Mean	Std. Deviation	Minimum	Maximum
Reduces Pollution	20	0	3.700	1.625	1.000	5.000
Affordable	20	0	3.400	1.273	1.000	5.000
less maintenance	20	0	3.350	1.309	1.000	5.000
Save money	20	0	3.400	1.465	1.000	5.000
Cost of charging	20	0	3.450	1.669	1.000	5.000

Source: Primary Data

From the above table we can see that descriptive analysis have been done for factors that influence consumer purchase intention towards electric bike. The highest mean percent score was recorded towards Electric bikes helps in reducing pollution and carbon emission. Consumers of the view that electric vehicles definitely help in reducing the carbon emission and devil by electric vehicle for a green economy. Some other responders believed that electric vehicles were affordable and fits into the budget of the people as they believed that higher the battery capacity and higher the range that means the price of the modern would also be more and therefore, they were ready to pay a higher price because majority of the people believe that as compared to the fuel prices the charging cost was much lower. Around 3.4% of the people believe that electric vehicle helps to save money, are affordable and the cost of charging is much lower Electric vehicle require little or

no servicing at frequent intervals and also the servicing cost is much lower as compared to the normal petrol diesel vehicle but the respondents who were also the buyers of the electric vehicle had no adequate information regarding this. The data was analyzed using mean and standard deviation as mean takes into account the correlation between variables high standard deviation value indicates that values are spread out over a wider range.

(b) Objective 2: To identify the awareness level of respondents towards Goa Electric Mobility Policy

Frequencies for Are you aware of Goa's new Electric Vehicle policy named as ""Goa Electric Mobility Promotion Policy 2021"					
Are you aware of Goa's new Electric Vehicle policy named as ""Goa Electric Mobility Promotion Policy 2021""		Frequency	Percent	Valid Percent	Cumulative Percent
Maybe		13	13.000	13.000	13.000
No		54	54.000	54.000	67.000
Yes		33	33.000	33.000	100.000
Missing		0	0.000		
Total		100	100.000		

Source: Primary Data

The above frequency table shows the awareness level of people towards the Goa's new electric vehicle policy which was named as Goa electric mobility promotion policy, it was introduced in the year 2021 on 4th December. About 54% of the people are not aware about the policy while the 33% are aware about this policy the rest 13% do not have an accurate knowledge or are not sure about the policy. It can be concluded that as the policy is new in the economy not everyone is having an adequate level of knowledge towards this policy also people are also very unsure if they want to buy an electric vehicle over and normal petrol diesel Vehicle. The information regarding the policy to the consumer are given mostly by the showroom or by their dealer. Others go on social media applications are websites to study in such about the policy and see if they are eligible for the model or not. As the electric vehicles are divided into 3 modes the lowest more that is the low-speed mode of electric vehicle are not eligible for such kind of policies. It can be concluded that with this survey and data analysis we have cover both the objectives on the study.

CHAPTER V

SUMMARY, FINDINGS AND CONCLUSION

5.1 Summary

The main objective of the study was to find out the factors that influences consumers purchase of electric bike and to identify the awareness level of respondents towards Goa electric mobility policy. This was achieved through simple primary data collection. Two sets of questionnaires were made for the general respondents to collect the information why or why not they will be willing to buy an electric bike over and normal petrol diesel bike. The first set of questionnaires was made to study the consumers perception and Consumers purchase intention towards the electric bike. The second set of questionnaires was made for the respondents who already old and electric bike, the second set of questionnaires was made with an aim to get an inside of the technical issues that the wires of the electric vehicle go through and also to find out the main reason for their purchase of the bike. The first set of questionnaires was circulated throw online mode and data was collected using random sampling method and all together 100 responses over recorded while the second set of questionnaires was circulated through offline mode and personal telephonic interview was followed to collect the information hence purposive sampling method was followed and all together 20 responses were collected. The collected data was analyzed using frequency and descriptive method of interpretation also the bar graphs were used. Another method used to analyze the data was through Ordinary Least Square method under Gretl, the variance between the dependent and the independent variable was shown and significant and the model was 61.72% significant. Under this model, cost of ownership was considered as high significant. The main reason for buying an electric vehicle was due to the rising fuel prices and environmental concern, while 32% people said that they will never by an electric vehicle. Also, the people who had not bought an electric vehicle were of the view that if they had to buy, they will make a purchase due to the environment aspect or due to the rising fuel prices. Consumers believe that there is a positive impact of electric vehicles on environment as a result there is a positive relationship between the environmental concern and sale of the electrical also there is a positive relationship between the rising prices and the electric vehicle as the fuel prices keeps on rising people will automatically switch to Electric bikes. Other factors like the low maintenance cost and affordability also plays

an important role. But the limitations associated with the electric vehicle includes the range anxiety, high ownership cost. High ownership cost will lead to reduced number of purchases of electric vehicles but the cost of the electric vehicles is high due to the installation of the lithium-ion battery, as it costs almost 45 to 50% cost of the bike. Lithium-ion batteries also have a negative impact on the environment. The developing countries do not have the technology to very use the Lithium-ion batteries as these batteries only have the warranty of 3 years only and we do not have technology to reuse that as a result it will lead to wastage in the environment. Also, the extracted lithium is very limited in India and has to be imported from other countries which results in higher cost of the batteries and overall cost of the electric vehicle. Due to the higher import cost and difficulty of extracting lithium from the Earth surface many authors have suggested alternatives for lithium-ion batteries.

5.2 Findings

- From the study it was observe that the respondents normally do not face and range anxiety, as the accepted that they what the electric bike either for shorter distance at low price or bought the bike at high price for longer distance
- From the second type of questionnaire that was prepared for the buyers of the electric vehicle it was studied that maximum amount of responding what electric drive from the price range of 130000 to 150000 which prove that high ownership cost is not the issue or the set back for the consumers as the expect better performance from the money that they have spent
- 45% of the people have moderately Agreed that the electric vehicles have high initial ownership cost while 15% of the respondents strongly disagreed with the statement
- People had mix responses when they were asked about the limited choice of models that were present at the showroom and they believe in pre booking of the desired model
- The buyers of the EV accepted that they buy the electric bike mainly due to the rising fuel prices and environmental concern

- Under the regression analysis, it was founded that independent variables like the cost of ownership, choice of models and reduced pollution are significant and one unit increase in them brings about positive change in the dependent variable.

- Another independent factor that is save money is highly significant but negative because as money saving of consumer increases by one unit the consumer satisfaction reduces by -0.773570 units as the consumer does not get same satisfaction which would get from the petrol-diesel bike.

- When it came to general responses of the people 3/4th of the respondents was aware about the electric vehicles but large number of people as till an aware about the Goa electric promotion policy.

- The non buyers will buy electric bike due to reasons like environmental concern, rising fuel prices and reference given by family or friend

- Consumers get the information about the Goa electric promotion policy mainly from the dealers or from the showroom

- Respondents believe that there is a positive effect on the increase utilization of electric vehicle and environment also there is positive relationship between arising fuel prices and purchase of electric bike

- 40% of the people will buy Electric bikes incoming 5 years while 9% of a people will not buy rest 49% are answer if they want to buy electric bike or not

- 70% of the people agree that electric vehicles are a perfect substitute to petrol diesel

- Out of 20 respondents 9 of them what the beneficiaries of the Goa electric mobility promotion policy but none of them have received the subsidy amount yet.

5.3 Suggestions

- The suggestion offered under this study is that the government should build more charging infrastructure in order help public to charge their electric bikes

- Charging infrastructure should be offered at the places like the park, offices, educational centers, malls, residential areas, etc.

- Battery swapping technology should be adopted in order to reduce range anxiety among people.

- Awareness regarding subsidies and incentives from center and state government should increase so that maximum people can benefit from the policies.
- Batteries and motors should be manufactured in India so that battery import cost is reduced and the total cost of electric bike is reduced.
- Used batteries should be recycled in order to reduce waste in the environment
- People should be made aware about the green economy and rising pollution so that more people can buy electric bikes

5.4 Conclusion

With the rapid growing industrialization India is becoming increasingly dependent upon non renewable and conventional source of energy like the coal and fossil fuel and the increasing utilization of such non renewable resources have led to increase in the admission of greenhouse gases like the Carbon dioxide, Carbon monoxide, Methane, Chlorofluorocarbon, Nitrogen dioxide, Sulphur dioxide, etc. Thus, it is a national priority to reduce such greenhouses gases and regular emission of gases and in order to develop the transport sector towards a greener economy and diversification in fuel management is essential and vital measures are required which focuses on road transportation with clean energy. The findings of this study suggests that people are very conscious about the environmental aspect and are taking steps towards the greener economy but their awareness level about the policy is very low as a result awareness campaigns and programs should be initiated by the government to improve their knowledge level about the e- bikes and e - policy.

The respondents of the study ranked environmental concern and as the top most priority for buying electric vehicle followed by rising fuel prices. For the people who are unwilling to buy Electric bikes or are not having accurate knowledge about the same, the government should work together to create awareness and increase the understanding of how traditional vehicles are contributing towards creation of carbon emission and how it has an impact on the environment. The study also found out that factors like range anxiety, ownership cost, range of models, subsidies, reference of trusted one have also played an important part in consumer purchase intention and their choices are influenced by such variables. As such, attitude of the consumer towards their product is proved to be and important part of purchase intention. The information gained under the study will put a light on policy maker and manufacturers in crafting energy and transport policy. This research will

also provide guidance to manufacturers of the Electric bikes and will also help them to study the consumer purchase intention. The cost of the electric bike can be reduced by reducing the import of batteries from other countries and other exploring other alternatives using renewable resources which are available in India. The government should work with global investment players and oil companies to established charging infrastructure and electric bike related infrastructure in India which will held to create abundance of direct and indirect employment. Installation of charging stations at adequate distance will help consumers to reduce range anxiety and as a result increase sale of electric bikes. Also recycling units should be installed in order to reduce battery wastage and related problem.

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