

Project Dissertation Report on
Consumer Attitude and Perception towards
Electric 2 wheelers

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2K20/DMBA/035

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DECLARATION

This is to certify that I have completed the Project titled “**Consumer Purchase Intention & Perception towards Electric 2 Wheelers**” under the guidance of “**Mr.Rajan Yadav**” (Professor) in the partial fulfillment of the requirement for the award of the degree of “Masters in Business Administration” from “Delhi School of Management, Delhi Technological University.”

It is also certified that the project of ours is an original work and the same has not been submitted earlier elsewhere.

Chhavi Malhotra

(2K20/DMBA/035)

CERTIFICATE

This is to certify that the project titled “**Consumer Purchase Intention & Perception towards Electric 2-Wheelers**” is an academic work done by **Chhavi Malhotra** and is submitted in the partial fulfillment of the requirement for the award of the degree of “Masters in Business Administration” from “Delhi School of Management, Delhi Technological University,” under the guidance and direction of Mr. Rajan Yadav, Professor.

To the best of our knowledge and belief the data and information presented by them in the project has not been submitted earlier elsewhere.

Signature of Guide

Place:

Date:

ACKNOWLEDGEMENT

Words often fail to express one's feelings towards others, still I would like to express my sincere gratitude towards our guide **Mr. Rajan Yadav** (Professor) for his able guidance, continuous support and cooperation throughout our project, without whom the present work would not have been possible.

I would also like to extend our sincere & heartfelt obligation towards all the respondents who helped me in the collection of all the necessary data and information that helped me proceed with this research project and made it a successful task.

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ABSTRACT

The manufacturing and sales of the electric automobiles are being thrust by the concurrent environmental concerns. The Indian Semi-skilled and skilled technological workforce combined with a huge customer base and a place where production and labour costs are low attracted the global sharks like Bosch, AVL, Cummins etc to enter and manufacture electric vehicles.

To study on bias attitude and perception towards electric 2 wheelers, there is a need to study what are the various factors which impact and influences a consumer to invest and purchase these vehicles. Various factors like environmental issues, performance, infrastructure and price sensitivity and an individuals perception of these factors influence the purchase decision of Electric 2-Wheelers.

Price Sensitivity and Infrastructure are the forerunners for the consumer perception about electric 2 wheelers and cost and performance are the factors which act as a blowback to the consumers while they adopt to electric 2 wheelers. Therefore, to encourage and promote electric vehicles, the government has to intervene and contribute as it plays a significant role by creating policies for the environment, providing Infrastructure and subsidizing the cost of vehicles or lowering the interest rates in banks.

As we all know, the 2 wheeler and automobile industry is one of the main environmental offenders due to the amount of CO₂ and other poisonous gas emissions that have a major pact on climate change and pollution scenarios of this planet. Hence it is essential to motivate consumers towards procuring electric vehicles. This study considered four major components that affect the purchase intention of electric two-wheelers- price sensitivity, environmental awareness, infrastructure and performance.

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1. INTRODUCTION

1.1 Introduction to the Automotive Industry in India.

India is one of the fastest growing economies in the world. Since India's independence a tremendous growth has been seen in various industries like textile, agriculture automotive etc. The boost and the progressive growth of these industries is a result of the support they have received from various government and welfare schemes.

One of the most important industry in India is its Automotive Industry and it has flourished so much that this industry has become one of the key drivers of economic growth in the country. Not only this, the industry is showing a continuous increase in participation at the global level. The government has contributed immensely to the growth of the automotive industry which has enabled this sector to form a unique path for itself among the manufacturing sectors.

The Historical Background: Two Wheeler is one of the most important mediums of transportation in India. India witnessed the first two-wheelers long back in 1950s. In 1955, the Government of India ordered the 350 cc 'Bullet' manufactured by the Royal Enfield Company of United for the Indian Army. In the 1970's when the market was opened for new companies like Yezdi and Rajdoot. Then at that time bajaj also debuted in the market with "chetak" which introduced a newer segment of two wheeler in India "scooters".

The automotive industry was deregulated in 1990's due to the spread of liberalisation at that time. After the liberalisation took place there was an increased competition in this sector and the reforms formed at that time made the Indian exports competitive.

In earlier times there were only few models and options that were available to the consumers in the automotive sector. However once liberalisation took place there was a sudden shift and growth that was seen in this sector as there many International players that were entering the market due to the new reforms that were formed. It was seen that many International players started to collaborate with the local manufacturers with an aim to gain market share as per the needs of consumers. This shift and evolution which the automotive industry experiences not only resulted in their increased contribution to the economic growth but also benefitted various

Current Trends: With producing only 40,000 vehicles annually in 1950's, the automotive industry has come a long way. Nowadays there is regular updates and new

launches which are made available to the consumers and the Indian automotive Industry has slowly made its way and emerged as an important part in global automotive industry. In the financial year 2021, 23 million vehicles were produced in India. Apart from this, India has now become the largest producer of 2 and 3-wheeler vehicles, the largest manufacturer of tractors as well as the 2nd largest bus manufacturer across the globe.

With new manufacturing hubs, 100% FDI possible and an improvement in Infrastructure facilities the Electric 2-wheeler industry in India has been rapidly growing. With such a vast population India is offering the Electric 2-wheeler manufactures a vast untapped market with increasing support from the federal government.

1.2 Introduction to Electric Vehicle Industry in India.

It has been an attempt by the Government of India to transform itself as R&D hub as well as a world-class manufacturing sector. Government established the NATRIP which acts as the connector between the government and the industry. After the year 2005, five research and testing labs have been built. Now, it has also proposed grant testing infra after the year structure in the performance certification of the electric vehicle industry." (EV) by NATRIP Implementation Society "as part of the FAME program. Approved was given by the Project Implementation and Approval Committee (PISC) in 2019 the auspicious and ambitious project in which the government has the intention to sell only electric cars in India. Government of India has shortlisted 11 major cities of the country for the presentation of electric vehicles (VE) in its open vehicle frame as part of the FAME (Faster Adoption and Manufacturing of (Hybrid) and Electric Vehicles in India) program which the government quoted a requirement of 10000 crore rupees for the financial year 20–22.

As part of the Union Budget for 2019-2020, the government announced an additional annual valuation of 1.5 lakh rupees (US \$ 2,146) on the plot given on the credit taken for purchasing electric vehicles. Venture capital inflows into new electric vehicle companies increased nearly 170% to \$ 397 million in 2019 (to the end of November). Under FAME II, the government has authorized 5,595 electronic transportations in 64 urban areas of 26 states for city-to-city and intra-city operations. As part of the plan, 2,636 charging stations were approved in 62 urban communities in 24 states / UTs.

Electric vehicles (EV) are the future philosophy of the automotive industry in the world. A future whose establishment is posed and unions find a way to make this activity a success. In 2018, global transactions in electric vehicles including BEVs, PHEVs and FCEVs exceeded 2 million units. This figure reflects the growing recognition of these vehicles and the majority have merged this new innovation into their ecosystem. In any case, more than 70% of these transactions took place in the United States, China and Japan. On the world front, India, in spite of everything, still has a long way to go, but the introduction of electric vehicles into the Indian market has been an extraordinary beginning for the excursion.

The largest type of EV with a count of approximately 25 million is Electric 2-wheelers and its demand has been affected due to high demand in Asian countries. India, China and Japan are the major players in the Asian continent which have impacted and increased the demand of electric 2-wheelers.

According to SIAM 2020-21 reports almost 15119387 2 wheelers were sold in India and 143837 units out of these were of electric 2- wheelers. There is low adoption of Electric 2-wheelers in India mainly because of factors like high upfront costs, inadequate charging stations and high battery replacement costs.

Bicycles, mopeds, scooters and motorcycles are basically what the electric 2 –wheeler category comprises of. Out of these the most commonly used electric 2 wheelers in India are electric scooters and motorcycles. These electric 2-wheelers have a portable battery which can be charged with the help of a standard outlet and thus they are more suitable for a country like India.

Another reason of why a developing country like India should adopt to electric motorcycles and 2 –wheelers is because of their high efficiency and cause less pollution and noise.

With new manufacturing hubs, 100% FDI possible and an improvement in Infrastructure facilities the Electric 2-wheeler industry in India has been rapidly growing. With such a vast population India is offering the Electric 2-wheeler manufactures a vast untapped market with increasing support from the federal government.

There have been many research papers and studies related to adoption of electric cars bu consumers however there are very limited studies on Consumer Attitude and Perception towards Electric 2 wheelers. This research focuses on adoption of electric

2 wheelers and identify the factors which impact the consumers intention to buy an electric 2 wheeler.

1.3 Leading Electric 2- Wheeler players in India

100% Electrification is what India aims to achieve by 2030. In order to achieve this goal the government of India is constantly putting efforts and there has been seen a switch towards a cleaner transportation. Major players like Mahindra Electric and Hero Motocorp are constantly putting their R&D into this segment and increasing their presence. Ather Energy, Ola Electric, Okinawa Autotech etc are the startups whose sales have also increased over a period of time now. Between FY22 to FY25 the Electric 2-wheeler Industry is expected to grow at 75-80% compounded annual growth.

Companies	Market share
Hero Electric	36%
Okinawa Autotech	17%
Ampere	14%
Ather	11%
Revolt	4%
Bajaj	4%
Benling	4%
TVS	2%
Others	9%

Figure 1.1 Market Share of Top EV 2-Wheeler Producers

1) Hero Electric

Hero Electric is a subsidiary of Hero Motocorp and has become the largest player in the Electric 2-wheeler segment with a market share of approximately 36% . In 2017, Hero Electric entered this market by launching its first lithium ion battery

based scooter. Since then there has been no turning back for Hero Electric and currently it is present in more than 325 cities, with 600+ dealership networks spread across the country.

By the end of year 2021, the number of electric scooters sold by Hero Electric stood at 46,260 units. Thereafter, the company is planning to scale its operations and deliver approximately 4000 units and to achieve this target the company entered in a partnership with a startup called as BattWheelz Mobility.

2) Okinawa Autotech

Okinawa Autotech is a Haryana based private limited company which manufactures only Electric 2- wheelers in India. To escalate it's operations Okinawa Autotech has planned to spread its business from currently 24 dealerships to 450 dealerships across the country. Currently manufacturing electric scooters, Okinawa Autotech plans to enter into the market of manufacturing E-motocycles as well. In 2021, the company managed to sell almost 29,995 units in the Indian market and has achieved a milestone with sales crossing 100,000 mark.

3) Ampere Vehicles

With a market share of 14%, Ampere Vehicles is a Bengaluru based company and is a part of Greaves Cotton Company. Ampere Vehicles is one of the oldest company in this industry and outsold Ather Energy by selling almost 12, 470 units. This company supports on empowering women and thus has employed 30% women workforce. Reo, Magnus EX, Magnus Pro, Zeal and Reo Elite are some of the electric 2-wheeler that the company offers to the customers.

4) Ather Energy

Founded in 2013, this Bangalore based company accounts for 11% of the market share. Ather 450X and 450 Plus are the 2 models that the company manufactures and with just 2 models it has managed to make a sale of approximately 10,921 units in 2021. However, as the competition in this industry is increasing Ather Energy need to gather fresh funds and scale it's business in order to sustain in the market.

Other than this Revolt, Bajaj and Benling each constitute 4% market share and it can be seen that new competition is constantly entering in this segment.

2. LITERATURE REVIEW

Here we can see that history is repeating itself as EV is again emerging among the Indian transport industry. Electric vehicles were in full swing prior to 1918, but with the introduction of gasoline-powered internal combustion vehicles, the electrical vehicles witnessed a setback. However, 2017 witnessed the re-birth of EV and this time they were being procured for longer distances. Adding to this, the government has also aided in the betterment of the EV's maintenance and support system. Technological adoptions and perceptions give rise to two aspects: beginning with the attribute of technology, followed by the attribute of the adopter. Looking at it through the lens of management, it can be defined as “innovation diffusion theory (IDT) (Rogers, 1962) and subsequent extensions (such as the TOE framework, Tornatzky and Fleischer, 1990). Adoption of new technology is thus in relation to its usefulness (performance expectancy), ease of use (effort expectancy), social influence and facilitating conditions (Venkatesh and Davis, 2000; Venkatesh et al., 2003)”. The above factors prove to be critical before resorting to Electric Vehicles.

A study of residents of the United Kingdoms was conducted by Lane and Potter in 2007, also the study of potential customers of electric vehicles was carried out which was based on two theories, which were: theory of planned behaviour and value belief norm theory. After the study, he concluded that the ease of use, reliability, performance, energy efficiency and safety of the vehicle were the main factors which were affecting the purchase and sales of electric vehicles in a good way. However, there was no study or findings to prove and backup the mentality of consumers of India towards electric vehicles' adoption. There were no relevant studies supporting the perception and adoption process among Indian consumers.

Even with the increase in awareness about green products, green energy, and environmental protectionism, the accurate details of their usage remains uncertain. Most consumers in developed countries are unaware of the environmental benefits that green products can lead to. To state further, people seldom consider themselves responsible for the degradation of our environment. To increase the citizen's participation in saving the environment, it's of utmost importance to incorporate efficient marketing strategies and awareness campaigns. Without proper exposure, the demand for green products will lie on the graph which will result in very few companies venturing into this space. In order to equalise the supply and demand ratio, it is necessary to increase the people's trust in green products “(Sandeem, 2009)”.

Eco-friendly commodities are getting more consideration from buyers. Aside from the customer's obligation towards nature, they like the inclination that individuals take a gander at them distinctively in that they pay more to buy an item as a result of the inspiration to spare the earth and this in turn motivates the consumer to protect the environmental system. (De Craecker and De Wulf, 2009).

Quite a few researches consider cost as being one of the variables that may build the readiness of purchasers to buy green items (De Craecker and De Wulf, 2009). Advertisers should initially think about the business, the nature of the item and the objective clients, and afterward build up a successful valuing methodology. Valuing can positively affect the view of customers in the manner that they accept they are saving money on showing expenses to purchasing an electric vehicle.

The ecological effect turned into the principle thought for customers in their day by day buying choices. Governments have additionally been compelled to give explicit strategies in regards to ecological protection while individuals have begun to accept that it is everybody's obligation to deal with nature and to actually look after the same (Chen, 2010).

As indicated by Oliver and Lee (2010), certain variables, for example, social direction, mental self portrait, and social qualities, impact the individuals who choose to make strides toward environmental friendliness. Moreover, a similar report shows that individuals in Asia practice cooperation more and experience that natural qualities are connected to benevolent and conventional qualities, and this conduct permits customers to pick up data with respect to green items.

Pollution in recent times has increased worldwide, the whole world is experiencing the drastic effects it has been creating all over the globe. To eradicate this problem all the people of the world should come together and start collecting resources for the findings and implications. (Dief and Font, 2010).

A training and education program has to be made which will aware people about the consumer behavior and understand their environmental responsibilities. Consumers should know that the ecological base of ecological products and services is expensive and costly. It has become the need of the hour to make the consumers aware about how necessary it has become to adopt green items which will be beneficial for both the nature as well as their wellbeing, even if they are more costly. Such help for green items may pay overcharges (Eicholtz et al., 2010).

Caperollo and Kurani (2011) worked on a round theory in 36 households on consumer perception and intention to purchase electric vehicles in California, USA, and get to know that electric vehicles. The main reason for not adopting was disturbances in the functioning of the battery, the fact of not finding suitable charging stations nearby, refusal to accept new technologies and driving habits

Today, numerous individuals all around the globe are getting mindful of the environmental issues brought about by modern factories and production units. What's more, organizations presently feel increasingly liable for nature and endeavor to deliver items that regard the earth (Kotler, 2011).

Corporates and analysts have not given enough consideration to purchase intention and expectation to purchase green items in the car business (Rahbar and Abdul Wahid, 2011) as their motivation was limited to the manner in which the item was offered on the basic market. Finding the genuine conduct of buyers towards electric vehicles and the aim of clients is a significant factor in settling on genuine choices. Consumers who are exposed to electric vehicles esteem them more and think about them as a possibility for future buys (Kurani et al., 2016; Larsen, 2014; Gimesi and Viswanathan, 2011).

Vehicle proprietors commonly require a full night charge to completely charge an EV battery at home. The findings of the research showed that clients are eager to pay more for the additional usefulness, and comfort of electric vehicles. For instance, Hidreu, Parsons, Kempton, and Gardner (2011) discovered that clients are happy to pay \$ 35 to \$ 75 for each additional mile of independence. They will pay \$ 425-3250 in return for the hours used to charge electric vehicles.

Shopper fulfillment directly affects purchaser certainty. Most fulfilled clients have a drawn out relationship with the brand and, in this way, it is currently evident that green trust is a significant part of building devotion (Chen and Chang, 2012).

The most extreme number of studies on the selection of EVs rotate around specialized, individual and social parameters. Axsen et al (2012) directed an online review dependent on the hypothesis of way of life practice among 711 delegate families in California, USA, and found that embracing this new VE innovation was an eco-star way of life, an innovation situated way of life. Way of life and depends on a receptiveness to change.

From different studies, clients are increasingly worried about the significant distance that electric vehicles c on a commute in one full battery (DeGermancy and Breitner,

2017); Ebue and Long, 2012) environment friendly items and green advertising are turning out to be increasingly more alluring to enterprises, makers and organizations as they have an incredible chance to grow new items and administrations that fulfill buyer needs as well as a solid domain Requirements of (Hosseini, 2012).

Graham-Roett al (2012) in light of his examined semi organized subjective meeting technique 40 non-business UK and ICE drivers and found that the fundamental main impetus behind buying goals is ecological parameters, vehicle cost, fuel cost, battery gear, power source, execution, security and cutting edge innovation.

The greenness of an item and regard for the earth are not an assurance of the offer of a green item. The apparent green perceived value is significant for building long haul connections among organizations and customers. This significantly affects the upkeep of the client relationship. There is a noteworthy connection between saw worth and goal to purchase green. There are a lot of item qualities that make buyer observation. Along these lines, when buyers have a decent observation about a green item, the estimation of the item will be higher in their brain and they will emphatically spread their mouth to other people, in this way influencing the expectation to purchase purchaser mindfulness. (Chen and Chang, 2012).

Subject to the kind of item, there is a specific pace of cost increment that market individuals should know and consider while deciding the cost of green items. In general, even green buyers may consider less about natural qualities when contrasted and earth amicable items, for example, electric vehicles (Ong and al., 2012).

Latest investigations have noticed that in New Zealand, 84% of customers are worried about environmental issues and this influences their buying conduct and their usage. What's more, numerous buyers accept that on the off chance that they are set up to address a greater expense, they desire better highlights and usefulness of the item or administration, and it isn't simply regard for the item's condition that It makes a difference. (Yusuf et al., 2013). By buying green items individuals feel that they are answerable for the earth and they accept this duty as a functioning job in the general public.

Research by Jansen et al (2013) on 369 Danish drivers proposes that the adequacy of EVs relies upon viable experience, cost of procurement, cost of fuel, range and speed likewise the lead of EV. Researchers accept that the principal objective of marketing ought to be to improve the nature of human life and advertisers ought to endeavor to

advance individuals' buying expectations with the correct promoting procedure. Personal satisfaction isn't just identified with the fulfillment of necessities, requests, and wants, and fulfillment isn't just occupied by the nature of products and ventures, in light of the fact that the earth we live in must have a specific degree of value (Faraj et al. , 2013).

Bergsagel (2013) conducted qualitative research, which was based on the model of adopting electric vehicles in 50 drivers with personal vehicles in the United Kingdom and found that the main factors for purchase are technical costs, personal and social factors.

Carly et al. (2013) researched and found 2,302 people with a driver's license in the United States Adoption and perception varied according to education, , age, gender, experience, education, environmental notions, and pointed out that numerous factor that reduce the sales of electric vehicles are traditional vehicle cost factors, non-existence of infrastructure, and recharge time. He based his study on the basis of the principle of rational choice.

Green trust is “how much a consumer is ready to rely on the green products as a result of its capability and reliability in terms of green performance (Chen, 2010). Self-confidence has a prominent effect on consumers' buying intentions. Green confidence is influenced by respect for the environment of environmental friendly products (Chen and Chang, 2013). If businesses do not meet environmental requirements or increase the greenery of their products, mistrust will arise between consumers and businesses.

Buyers have a positive impact of low prices, and some customers prefer promotions presented in the form of discounts. Value addition has an important effect on the deal valuation of consumers and can help increase sales (Rahman and Mate, 2013).

Biological information is basically information about the assessment of the item's effect on the general condition. At the point when individuals know about nature, they start to survey an item dependent on its natural advantages or hindrances, called environmental information. Shoppers' aims to purchase green items can be impacted by their knowledge of the environment(Dehghanan et al., 2014).

Since the 90s, concerns about nature experienced a significant turn of events and have become one of the most significant subjects of discussion among social orders the world over, colleges and governments. It went past air contamination and reusing, and developed into conduct and goal.

Some created nations, for example, the United States and some European nations, just as some Asian nations, for example, Japan, have started to understand the significance of the earth as far as customers' buying goals, which is related with green advertising (Chahal et al., 2014 A).

Another performance factor for the purchase of an electric vehicle presenting longer charge times. Regarding the autonomy problem, EV customers may feel anxious and unsafe at the point when they need to drive EVs for significant distances from charging stations (Lim et al., 2014).). In rundown, execution factors are related with an EV live buy in self-sufficiency, charging time and wellbeing and dependability issues.

Kupra et al (2014) gave another virtue to the development of research from the political landscape by studying 911 residents of the United States. They found that the acceptance of EVs would greatly increase political confidence, energy independence and being a concern for climate change..

Significant pollution warning signs and use of natural resources are obvious to humans. Due to future results there should be equal efforts in all parts of the world. In around 1990, a different type of marketing began to gain momentum as people were getting more aware of the "green".

Awareness towards the environment increased as counter to past and considerable changes occurred in the end of 20th century to generate a green ecosystem (Chahal et al, 2014a).

Previous studies suggest that intention to buy green does not have a direct connection with perceived green value (Jaafar et al., 2012). For taking perceived green value to optimum level, brands try to enhance consumers information about products(Huang et al., 2014).

Brand mentality has an effect on consumers' purchasing intent in the manner in which a brand exhibits its concern for being respectful to the environment, thus providing a better probability of getting picked by its customers.Compared to its rivals (Huang et al., 2014). According to the same research, consumer's positive attitude toward a green product, which may directly increase purchase intention are among the factors which influence the buying intention.

As per an research led in 2014, the degree of greenery is the degree to which "buyers would want to pick a green item as opposed to an ecologically friendly item when every single other thing are the equivalent" (Razak et al.) 2014).

With natural issues turning out to be increasingly more significant for individuals, organizations are expanding enthusiasm for green advertising and green items to deal with their social duty. In the mid 1980s, advertisers attempted to distinguish and advance the components that drive customers to buy earth well disposed items (Vedava, 2014).

Research on EVs and adoption has increased significantly in recent years. In a recent research, Rejwani et al (2015) explored taking a shot at the appropriation of electric vehicles utilizing different hypothetical systems, they received a blend, conduct like conduct of purchasers' electric vehicles from different hypothetical points of view. Arranged and representative.

The connection between the marketing and the environment is portrayed by various terms, which are environment advertising or green marketing, which includes customers, organizations, and governments. The primary job of green marketing is to make mindfulness about pollution and the related worries that makes it progressively extreme (Kumar, 2015).

Green customers are influenced by information about greenness, which consequently influences their conduct. unfortunately, a great many people have no or less information about natural issues, and, henceforth, they don't act dependably (Harvey, 2015).

Electric Vehicles' purchasers are additionally worried by its charging time (Egbue and Long, 2012). For instance, for one hour of charging at a home attachment, the Ford Focus Electric can travel 22 miles while the Chevy Volt can travel barely 11 miles (Schaal, 2016). This distinction influences the purchaser recognition towards purchasing EVs.

Many studies have shown that the environmental concerns of car buyers have a positive effect on the intention to buy EVs (Bauer et al., 2014; Das et al., 2011; Heyvaert et al., 2015; Jensen et al., 2013). Consumers which are environmentally sensitive and have identified themselves as an environment-friendly human would be more likely to adopt EVs (Barbarossa et al., 2017; Krause et al., 2013). Moreover, people who are concerned with environmental issues and take part in environmental

organisations are likely to adopt EVs (Krishnamurthy & Kriström, 2016). For example, Erdem, Şentürk and Şimşek (2010) studied the willingness to buy.

Consumers tend to trust the products and intend to buy Electric 2-wheelers only when they are assured and aware that they cause less harm to the environment and the products are recyclable.

A study by the Consumer Federation of America (CFA, 2015) uncovered that more noteworthy buyer information about electric vehicles and their longing to buy one are identified with one another. In any case, just 21% of the respondents said they know a "considerable lot" about electric vehicles, and far less revealed knowing a "lot" about them.

3. OBJECTIVES AND RESEARCH METHODOLOGY

3.1 Objective of the study

1. To study the factors that affect consumer's intention to buy electric 2 wheelers
2. Discover the impact of these factors on each other.
3. To find out the most important factors in a customer's purchase intention.

Primary Goal:

Discover the factors that affect consumer's intention to buy an electric 2 wheeler

3.2 Hypothesis

H0: Price sensitivity does not have a positive impact on the electric 2-wheeler purchasing intention.

H0: Environmental awareness does not have a positive impact on the electric 2-wheeler purchasing intention.

H0: Performance factors do not have a positive impact on the electric 2-wheeler purchasing intention.

H0: Infrastructure factors do not have a positive impact on the electric 2-wheeler purchasing intention.

H1: Price sensitivity has a positive impact on the electric 2-wheeler purchasing intention.

H2: Environmental awareness has a positive impact on the electric 2-wheeler purchasing intention.

H3: Performance factors have a positive impact on the electric 2-wheeler purchasing intention.

H4: Infrastructure factors have a positive impact on the electric 2-wheeler purchasing intention.

3.3 Variables

3.3.1 Independent Variables

1. Price sensitivity
2. Environmental awareness
3. Infrastructure
4. Performance factor

3.3.2 Dependant Variable

Intention to buy an electric 2 wheeler

3.4 The Conceptual Model

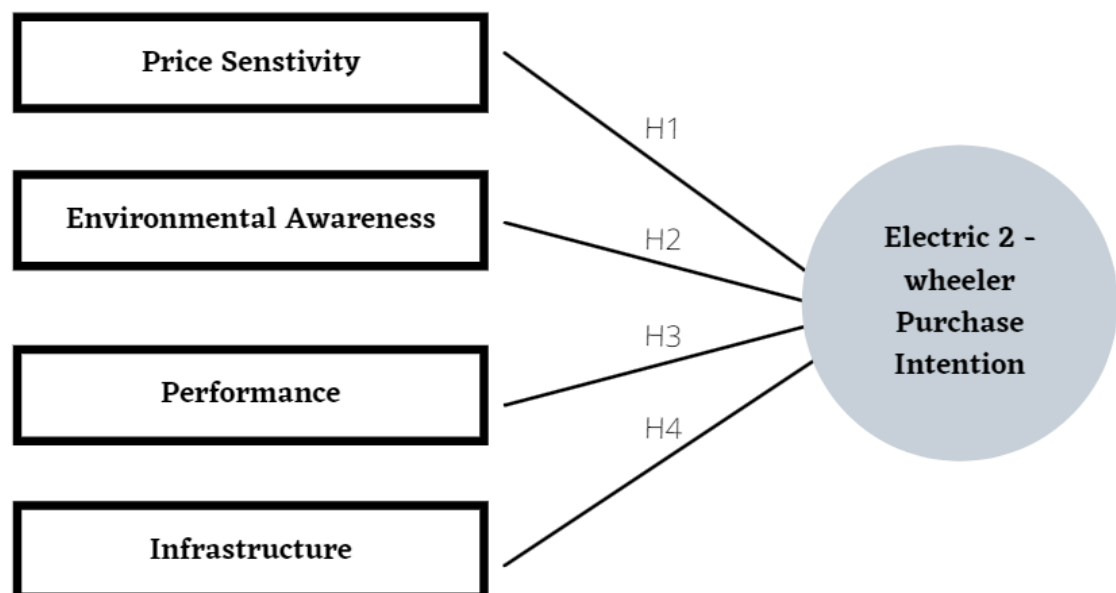


Figure 3.1 Research Framework

3.5 Research Methodology

It is characterized as the procedure used to gather data and information to settle on business choices. The system may incorporate research distributions, meetings, studies, and other research methods.

3.6 Research Design

Research Design is a quantitative research that has been assessed by disseminating questionnaires to targeted research samples. To break down and audit the information, SPSS was utilized, which helps in surveying the information produced and deciding the outcomes.

4. DATA ANALYSIS AND INTERPRETATION

4.1 Demographics

Table 4.1 Demographics

Gender	Female	72
	Male	143
Age	25 or younger	138
	26-35	48
	36-45	15
	46 or older	14
Occupation	Employed	92
	Student	88
	Unemployed	27
	Retired	8
Yearly Income	Less than 1,00,000	67
	1,00,000 – 5,00,000	82
	5,00,000 – 10,00,000	39
	More than 10,00,000	27
Total Respondents		215

4.2 Methodology adopted for Analysis

Correlation and regression analysis to be carried out in order to test the hypothesis stated above and thereby to identify the significance level between dependent and independent variables.

After carrying out correlation and regression analysis the next step is to find the most reliable factor in this research and for this , Reliability Analysis is to be carried out thereafter

4.3 Reliability Test

Cronbach's alpha is a known and a very common measure of reliability. It implies how closely elements in a series or group are related to each other. When the value is closer to one, it means that the reliability of internal consistency is high. The reliability below 0.60 is considered weak, while 0.70 is considered to be acceptable (Cronbach & Shevelson, 2004).

Internal Consistency Reliability: When multiple elements are added in order to obtain a total score and when the reliability of a pairs scale needs to be measured then at that time internal consistency reliability is used. The internal consistency of the elements constituted in the scale is considered when the scale of reliability in reliability analysis has to be found and measured.

4.3.1 Reliability Test for Purchase Intention: Dependant variable

The reliability statistics table below shows that the value for Cronbach's alpha is greater than 0.70 thus, it can be said that the data collected for analysis is reliable.

Table 4.2 Reliability Statistics for Purchase Intention

Reliability Statistics	
Cronbach's Alpha	N of Items
.815	4

Dependant variable:

-Intention to buy an electric 2-wheeler

4.3.2 Reliability Test for Environmental Awareness: Independent Variable

The reliability statistics table below shows that the value for Cronbach's alpha is greater than 0.70 thus, it can be said that the data collected for analysis is reliable.

Table 4.3 Reliability Statistics for Environmental Awareness

Reliability Statistics	
Cronbach's Alpha	N of Items
.725	4

4.3.3 Reliability Test for Infrastructure: Independent Variable

The reliability statistics table below shows that the value for Cronbach's alpha is greater than 0.70 thus, it can be said that the data collected for analysis is reliable.

Table 4.4 Reliability Statistics for Infrastructure

Reliability Statistics	
Cronbach's Alpha	N of Items
.742	4

4.3.4 Reliability Testing for Price Sensitivity: Independent Variable

The reliability statistics table below shows that the value for Cronbach's alpha is greater than 0.70 thus, it can be said that the data collected for analysis is reliable.

Table 4.5 Reliability Statistics for Price Sensitivity

Reliability Statistics	
Cronbach's Alpha	N of Items
.768	4

4.3.5 Reliability Testing for Performance: Independent Variable

The reliability statistics table below shows that the value for Cronbach's alpha is greater than 0.70 thus, it can be said that the data collected for analysis is reliable.

Table 4.6 Reliability Statistics for Performance

Reliability Statistics	
Cronbach's Alpha	N of Items
.744	2

4.4 Regression Analysis

4.4.1 Calculation of Mean Price sensitivity and Mean Purchase Intention

H1: Price sensitivity has a positive and significant impact on the electric 2-wheeler purchasing intention.

Table 4.7 Model Summary of Mean Price Sensitivity and Mean Purchase Intention

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.596 ^a	.355	.352	.57381
a. Predictors: (Constant), Mean Price Sensitivity				

Interpretation: The above table shows that the value of R= 0.596 and the value of R square = 0.355. It is known that the value of R square depicts what proportion of variance of a dependent variable is explained by the independent variable. In this case, 0.355 variance has been seen which shows that 35% of a consumers purchase intention to buy an electric 2-wheeler is explained by Price Sensitivity.

Table 4.8 Calculation of Anova

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38.577	1	38.577	117.163	<.001 ^b
	Residual	70.131	213	.329		
	Total	108.708	214			
a. Dependent Variable: Mean Purchase Intention						
b. Predictors: (Constant), Mean Price Sensitivity						

Table 4.8

Interpretation: We received the value (p) < 0.001 Since, p value is under 0.05 therefore it can be said and concluded that the relationship is significant.

Table 4.9 Calculation of Coefficients

Coefficients^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.860	.101		8.541	<.001
	Mean Price Sensitivity	.604	.056	.596	10.824	<.001

a. Dependent Variable: Mean Purchase Intention

Thus, the regression equation obtained from this will be : $Y = 0.860 + 0.604 * X$, wherein, Y represents Consumer's Purchase Intention of buying an Electric 2-wheeler which is considered as the dependent variable and X represents Price Sensitivity which is an independent variable.

4.4.2 Calculation of Mean Environmental Awareness and Mean Purchase Intention

H2: Environmental awareness has a positive and significant impact on the electric 2-wheeler purchasing intention.

Table 4.10 Model Summary of Mean Environmental Awareness and Mean Purchase Intention

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.489 ^a	.240	.236	.62296

a. Predictors: (Constant), Mean Environmental Awareness

Interpretation: The above table shows that the value of R= 0.489 and the value of R square = 0.240. It is known that the value of R square depicts what proportion of variance of a dependent variable is explained by the independent variable. In this case, .240 variance has been seen which shows that 24% of a consumers purchase intention to buy an electric 2-wheeler is explained by Environmental Awareness.

Table 4.11 Calculation of Anova

ANOVA^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.047	1	26.047	67.118	<.001 ^b
	Residual	82.661	213	.388		
	Total	108.708	214			
a. Dependent Variable: Mean Purchase Intention						
b. Predictors: (Constant), Mean Environmental Awareness						

Interpretation: We received the value (p) <0.001. Since, p value is under 0.05 therefore it can be said and concluded that the relationship is significant.

Table 4.12 Calculation of Coefficients

Coefficients^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.923	.122		7.544	<.001
	Mean Environmental Awareness	.585	.071	.489	8.193	<.001
a. Dependent Variable: Mean Purchase Intention						

Thus, the regression equation obtained from this will be : $Y = 0.923 + 0.585 * X$, wherein, Y represents Consumer's Purchase Intention of buying an Electric 2-wheeler which is considered as the dependent variable and X represents Environmental Awareness which is an independent variable.

4.4.3 Calculation of Mean Performance and Mean Purchase Intention

H3: Performance factors have a positive effect on the electric 2-wheeler buying goal.

Table 4.13 Model Summary of Mean Performance and Mean Purchase Intention

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.576 ^a	.332	.329	.58392
a. Predictors: (Constant), Mean Performance Factors				

Interpretation: The above table shows that the value of R= 0.576 and the value of R square = 0.332. It is known that the value of R square depicts what proportion of variance of a dependent variable is explained by the independent variable. In this case, .332 variance has been seen which shows that 33.2% of a consumers purchase intention to buy an electric 2-wheeler is explained by performance.

Table 4.14 Calculation of Anova

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.082	1	36.082	105.822	<.001 ^b
	Residual	72.626	213	.341		
	Total	108.708	214			
a. Dependent Variable: Mean Purchase Intention						
b. Predictors: (Constant), Mean Performance Factors						

Interpretation: We received the value (p) <0.001. Since, p value is under 0.05 therefore it can be said and concluded that the relationship is significant.

Table 4.15 Calculation of Coefficients

Coefficients^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.747	.116		6.462	<.001
	Mean Performance Factors	.651	.063	.576	10.287	<.001

a. Dependent Variable: Mean Purchase Intention

Thus, the regression equation obtained from this will be : $Y = 0.746 + 0.651 * X$, wherein, Y represents Consumer's Purchase Intention of buying an Electric 2-wheeler which is considered as the dependent variable and X represents Performance which is an independent variable.

4.4.4 Calculation of Infrastructure and Mean Purchase Intention

H4: Infrastructure has positive impact on the electric 2 wheeler buying goal.

Table 4.16 Model Summary of Mean Infrastructure and Mean Purchase Intention

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.557 ^a	.311	.308	.59309

a. Predictors: (Constant), Mean Infrastructure

Interpretation: The above table shows that the value of R= 0.557 and the value of R square = 0.311. It is known that the value of R square depicts what proportion of variance of a dependent variable is explained by the independent variable. In this case, .311 variance has been seen which shows that 31.1% of a consumers purchase intention is explained by Infrastructure.

Table 4.17 Calculation of Anova

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.784	1	33.784	96.045	<.001 ^b
	Residual	74.924	213	.352		
	Total	108.708	214			
a. Dependent Variable: Mean Purchase Intention						
b. Predictors: (Constant), Mean Infrastructure						

Interpretation: We received the value (p) <0.001. Since, p value is under 0.05 therefore it can be said and concluded that the relationship is significant.

Table 4.18 Calculation of Coefficients

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.793	.117		6.802	<.001
	Mean Infrastructure	.643	.066	.557	9.800	<.001
a. Dependent Variable: Mean Purchase Intention						

Thus, the regression equation obtained from this will be : $Y = 0.793 + 0.643 * X$, wherein, Y represents Consumer's Purchase Intention of buying an Electric 2-wheeler which is considered as the dependent variable and X represents Infrastructure which is an independent variable.

4.4.5 Other factors that influence consumer's electric vehicle purchase intention

From what sources did you get the most of your knowledge about Electric 2 Wheelers? (1-the most informative, 5-the least informative)

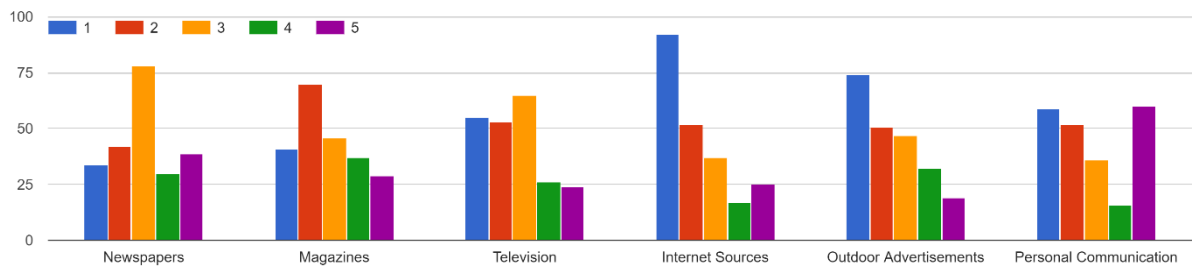


Figure 4.1 Sources of getting most knowledge about Electric 2- Wheeler

Interpretation: The above graphical chart depicts the sources of knowledge about the electric 2 wheelers that consumers usually get to know from. It shows most of the consumers' knowledge source is from the Internet, followed by Outdoor Advertisements and then Personal Communication.

Below are some statements about the benefits of EV. For each statement, please indicate if this would persuade you to purchase an Electric 2 Wheeler

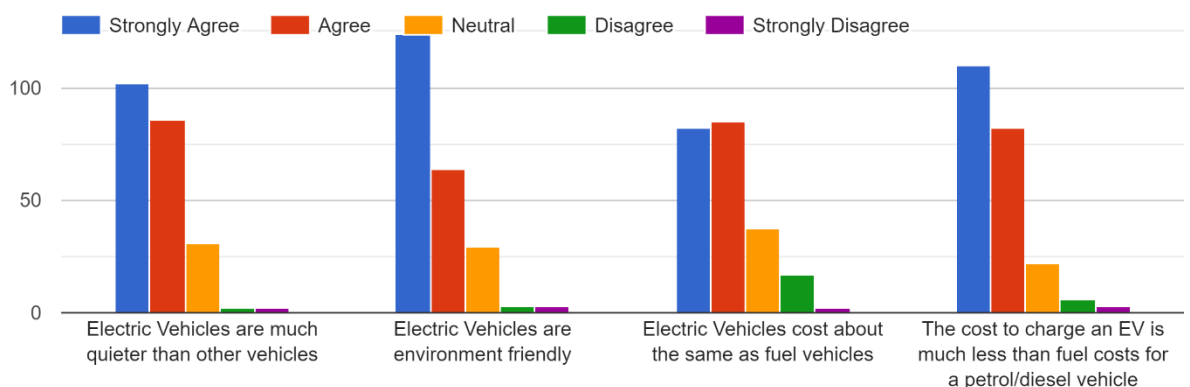


Figure 4.2 Benefits of Electric Vehicle

Interpretation: The above bar chart depicts the benefits of electric vehicles that consumers usually think of as an important factor before purchasing an electric 2 wheeler. It shows that majority of the consumers prefer to strongly agree with the benefits of an EV.

Out of the following list of costs, what would put you off to buy an Electric 2 Wheeler *

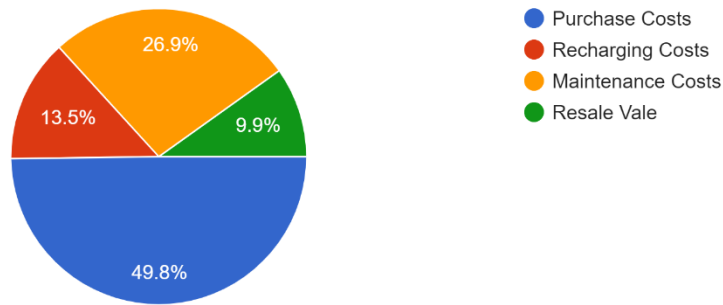


Figure 4.3 Costs which put off a customer to buy an Electric 2- Wheeler

Interpretation: The above Pie chart depicts the list of costs that would put consumers off from buying an electric 2 wheeler. It shows that the majority of the consumers consider purchase cost to be the factor that puts them off of buying an electric vehicle, followed by maintenance costs and then recharging costs and resale value.

5. MANAGERIAL IMPLICATIONS

There are brands that have been making efforts towards environmental cognizance. They believe that the 'greenery' factor is itself enough for an item to sell in the market. Although, to observe, the Electric vehicle industry has begun implementing green marketing in a different light. They've tried to formulate and execute a green strategy that persuades consumers into buying electric vehicles. Although the study states that the 'greenery of EV' isn't enough reason that encourages the consumers among many other factors to purchase green auto products.

This study helped to identify and indicate that factors like environmental awareness, infrastructure and performance are what influences a consumer to buy Electric 2 – Wheelers.

Additionally, the price factor can act as a blowback that affects a consumers intention to purchase the Electric 2 –wheelers . It is necessary to form and implement a strategy that falls as per sustainable consumer demand. This strategy has various advantages that not only includes generating revenue but also manages to work towards reducing research and development costs. Nowadays there are various companies which use green marketing and they may be able to contribute and impart a better perspective towards potential consumers. A brand that works towards protecting and sustaining the environment, gathers eminence and goodwill more than its competitors.

6. LIMITATIONS OF THE STUDY

Each search has its limitations. Although the intention should be as specific as possible, some limitations have been identified, due to the nature and methodology used:

- The total number of respondents to this study is 215 only. Thus the conclusions are not a representation or a reflection of the entire population of India which may affect the results and findings about the consumer's perception county wide
- In this study the majority of the respondents were males i.e. there were 143 male respondents out of the total 215 respondents.
- The questionnaire made for collecting the data was circulated only to those people who were readily available. Added to this some respondents didn't fill the complete questionnaire and only a specific group participated. Thus, the data collected might be different for different regions.
- Some respondents might have manipulated the data because of misinterpretation or their personal biasness.
- Furthermore, it can be said that since the entire population and their opinion was not considered thus the conclusions obtained from the research cannot be generalised.

7. CONCLUSION

Studying the consumer's attitude and purchase intention was the main aim of this research. Factors like Price sensitivity, Environmental awareness, Infrastructure and Performance were taken into account and investigated after analysing various research papers in the literature study.

After conducting reliability test for all the variables it was seen that the results of all of them were above 0.70 and thus, the data collected for analysis was reliable for further study and analysis. After this, regression analysis was carried out and with the help of ANOVA it can be concluded that since the value of p was less than 0.05 for all the factors thus, the relationship of the dependent and the independent variable is significant. While calculating regression it was seen that Price Sensitivity accounted for 35% of variance , Performance accounts for 33.2%, Infrastructure accounts for 31.1% of variance followed by Environment which accounts for 24% of variance in electric- 2 wheeler purchasing intention. The significance value of all the independent variables was less than 0.05 and thus it can also be said that that alternative hypothesis is true and all the independent variables have a significant impact on purchase intention.

The findings of this study can also be used for formulating marketing strategies by the producers of Electric 2-wheelers. If proper awareness is created among the consumers and India starts to adopt Electric 2 –wheelers instead of gasoline 2-wheelers, then the air quality will also enhance and there will be environmental benefits as well. The study also shows that the consumers are in the early stage of adopting electric vehicles and thus consider various factors before buying them.

According to this research study, electric vehicles' producers and the Government of India need to spend and contribute more on social acknowledgment of the vehicle by establishing more infrastructure, with greater emphasis on performance that can build confidence in electric 2-wheelers. The result unmistakably delineates that the populace is very much aware of the natural advantages, but it will not be enough for consumers to buy electric vehicles. It will be combined with the responsibility of the government and manufacturers, with investment in vehicle manufacturing, consumer perception should be built by providing the above facilities to make the dream a reality, people are starting to adopt electric vehicles and pollution Many are protecting India's future from respiratory diseases, which is a big concern for the world at this time.

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ANNEXURE- QUESTIONNAIRE

4/26/22, 11:08 AM

Study on Attitude and Perception towards Electric 2 Wheelers

Study on Attitude and Perception towards Electric 2 Wheelers

***Required**

1. Name

2. Age *

Mark only one oval.

25 or younger

26-35

36-45

46 or older

3. Gender *

Mark only one oval.

Male

Female

Prefer not to say

4. Occupation *

Mark only one oval.

- Employed
- Unemployed
- Student
- Retired
- Other: _____

5. What is your approximate yearly income? *

Mark only one oval.

- Less than 1,00,000
- 1,00,000-5,00,000
- 5,00,000-10,00,000
- More than 10,00,000

Study on Attitude and Perception towards Electric 2 Wheelers

6. From what sources did you get the most of your knowledge about Electric 2 Wheelers? (1-the most informative, 5-the least informative) *

Mark only one oval per row.

	1	2	3	4	5
Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Magazines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Television	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Internet Sources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Outdoor Advertisements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal Communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Out of the following list of costs, what would put you off to buy an Electric 2 Wheeler *

Mark only one oval.

- Purchase Costs
- Recharging Costs
- Maintenance Costs
- Resale Vale
- Other: _____

8. Below are some statements about the benefits of EV. For each statement, please indicate if this would persuade you to purchase an Electric 2 Wheeler *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Electric Vehicles are much quieter than other vehicles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electric Vehicles are environment friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electric Vehicles cost about the same as fuel vehicles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The cost to charge an EV is much less than fuel costs for a petrol/diesel vehicle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Performance Factors *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I would buy an Electric 2 Wheeler if maintenance cost is lower for EV's as compared to fuel 2 wheelers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would buy an Electric 2 Wheeler with excellent acceleration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would buy an Electric 2 Wheeler if increased interior volume within the vehicle is provided	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would buy an Electric 2 Wheeler if increased driving range is provided	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Environmental Awareness Factors *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
EV's are environmental friendly because they have zero emissions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EV's motivate consumers such as yourself, to save environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EV ownership improves social image as it contributes to sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shift towards cleaner fuel is a must because climate change is real	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Infrastructure Factors *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I would buy an Electric 2 Wheeler if there is at least one service station in every city	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would buy an Electric 2 Wheeler if an Electric fuel option is provided at every gas station	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would buy an Electric 2 Wheeler if availability of charging stations are increased	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would buy an Electric 2 Wheeler if accessibility to efficient charging stations were enough	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Price Sensitivity *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Price is significant factor for not buying an Electric 2 Wheeler	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'd purchase an Electric 2 Wheeler if it's cost is approximately same as petrol 2 vehicles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Purchase Intention *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I would want to buy an Electric 2 Wheeler in future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I intend to buy an Electric 2 Wheeler	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would consider buying an Electric 2 Wheeler if everyone else is using it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I admire people who have an Electric 2 Wheeler	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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