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Factors Affecting Electric Car Purchasing Decisions Of Genz In Indian Automobile Industry

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ABSTRACT: The most forward-thinking, competitive, and self-aware shoppers and consumers are those who belong to Generation Z. The biggest influences on decision-making include social media and the social networks that are already present in their environment, such as family, friends, and coworkers. Many complex buying decisions taken by Generation Z members are based on reviews and benefits they receive from their surroundings. Generation Z always tries to explore new alternatives. They are conscious of themselves as well as how their actions affect their environment. Owning a car is a necessity nowadays, but keeping in mind the harmful effects of conventional cars, i.e., air pollution, depletion of important resources and emission of harmful gases, people are moving towards an environmentally friendly idea of electric cars. By gathering and analysing the replies of 98 samples, a study has been conducted to learn more about the attitudes and preferences of Generation Z towards electric vehicles. In this paper, the objective is to know what the factors are which affect the purchasing decision of Generation Z, know the preferred price range of EVs in India and test the effect of subsidies provided by the government and charging station availability on purchasing decisions of Generation Z. It was found that Generation Z prefers more range for electric vehicles and adequate infrastructure for charging stations, which positively affects their EV purchasing decisions. Price expectations as per the Indian market range from 5 to 12 lakhs. Brand also plays an important part, which considers the origin of the brand and the variety or choices of EVs offered by the brand to customers in different segments.

K**eywords:** Generation Z, Consumer Behaviour, Electric Vehicle

INTRODUCTION

Consumer behaviour seeks to know how a buyer, or a group of buyers, chooses, purchases, employs, and disposes of the goods or services to get their needs and wants satisfied. There are five steps in the consumer buying process, i.e., identification of the problem, searching for information, evaluation of available alternatives, purchasing decision, and post-purchase behaviour. This consumer behaviour varies from generation to generation. Defining 'generation' as the mass of individuals who share a similar age group and have similar life experiences in the years they will shape their lives (Hung et al., 2007). There are various names given to different generations, like Baby Boomers (born 1946-1964), Gen X (born 1965-1980), Gen Y (born 1981-1996), and finally Generation Z (born 1997-2012); they were born and brought up with present-day technology. They are digitally orientated, and technology is their identity (Jones et al., 2007). They have different attitudes towards purchasing products as compared to Baby Boomers, Gen X and Gen Y (also called Millennials). Their attributes, traits, demands, likes and views are different as compared to their predecessors (Gaidhani et al., 2019). The Internet Generation, iGen and Centennials are the other names for Generation Z. Some studies reveal that the generation after millennials comprises only teenagers, but actually the oldest members of Generation Z are now at an age of 25 and are currently starting to earn in their lives (Dimock, 2019). As a person starts earning and starts moving up the steps in his income, there is an increase in the demands and requirements, like buying a house, selecting the furniture, and, most essentially, buying a car. It has now become more of a necessity to own a car than a luxury. India is in the fifth position among the largest passenger vehicle countries, after China, the US, Japan, and Germany. The sales of cars increased to 9.24%, i.e., 3.04 million in 2016-17, which is the quickest growth rate noticed since 2010-11. In 2010-11 sales of cars grew to 28.2% (Mathur et al., 2018). It has been found that a 100% foreign direct investment, i.e., FDI, is allowed in this automobile industry, which means the foreign investors can invest and start manufacturing in India without taking any permission from the Indian government (Singh, S. 2019).

Shende et al. (2014) suggested various reasons for the growth of the automobile market in India, i.e., discussed below:

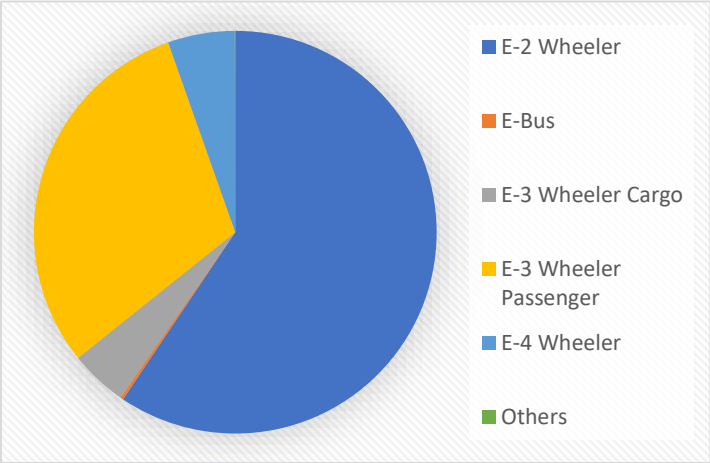
1. With a rise in income, people have more disposable income to invest as well as purchase goods.

2. The current generation travels a lot, be it for leisure or travelling to their offices, so this rise in the need for mobility has boomed the automobile industry.

3. Easy car finance options are now available from renowned financial institutes at a reasonable rate of interest. Nowadays loans can even be applied for through a mobile app, which overall makes financing an easy task.

4. The wide availability of repair centres and spare parts availability in the near vicinity motivates a person to try new cars.

5. Improvement in road infrastructure.



Source: *Vahan Dashboard (Data collected from 1391 RTOs out of 1600 RTOs across India)*

In today's world, consumers do not only consider engine performance a major factor, but they also look for those differentiating parameters through which they can make the choice from one brand to another. The rapid growth of internal combustion engine vehicles (ICEVs) over the last 2-3 decades has resulted in the extensive use of nonrenewable resources, especially the combustion of fossil fuels by petrol- and diesel-powered cars (also called ICEVs), which results in the aggravation of the air quality in cities. Due to the annual growth in automobile traffic, urban areas' air quality is currently a severe issue which needs to be tackled as early as possible. Thus, the consumer now has choices to choose from conventional (diesel and petrol) or electric vehicles (Hooftman et al. 2016). The best alternative for a more environmentally friendly form of transportation is an electric vehicle. Still, the idea of electric vehicles is relatively new and requires more focus from both manufacturers and the government because they are more expensive than conventional vehicles and require more infrastructure and support from the latter to help the market grow (Plakasov 2022). Also, consumers of Generation Z consider ecology an important aspect, and most believe that it will help to improve our environment and move towards sustainable development. As per the data available from the Vahan Portal of the Government of India, there was a total registration of 54,552 vehicles of different classes (E-2 wheelers, E-3 wheelers (cargo & passenger), E-4 wheelers, E-buses and others).

LITERATURE REVIEW

Kahawandala and Peter (2020) concluded that Generation Z differ in their characteristics, requirements, attributes and even work style from other generations. They spend around a quarter of their time on the internet, but they make their decisions very selectively and after doing extensive research on different platforms. To serve the increasing demands of Generation Z, the company needs to formulate a proper strategy and, most importantly, investigate the determinant factors, like characteristics and actions of the buyers of Generation Z. Grigoreva, Garifova and Polovkina (2021) stated that consumers of Generation Z mostly do shopping online or by searching reviews on the Internet. Most of Generation Z's time is consumed on the internet, be it working online, taking online classes, using social media for 3-6 hours a day, watching movies and streaming content online, etc. Thus, brands attempt in every possible way to use this as an opportunity for collaboration between businesses and prospective customers. Generation Z is influenced socially before choosing a brand. Social networking apps are becoming the main source of delivering advertisements to an adolescent, focusing on visual content like short videos or infographics. Generation Z consumes on several devices simultaneously. Hameed and Mathur (2020) found that Generation Z in India is the largest in the world, with over 472 million of the whole population. Researchers studied the demographic characteristics of Generation Z regarding their political and social concerns, their workplace preferences, their career aspirations, and the changing consumer attributes. In India, members of Generation Z show common behaviour and preferences similar to those of the other members of the same age in other parts of the world. Members of Generation Z in India have clear thoughts and ideas of how the young generation can contribute to a developing country like India.

Pawar and Naranje (2016) stated that customers look for attributes like brand, safety and price factors while buying a car. According to the study in 2016, it was found that Indian brands lack some features, and they need more focus on various areas like providing better safety features, better technology, and advanced marketing strategies to improve their sales. Mathur et al. (2018) concluded that the buying of cars is mainly dependent on the type and brand image of the manufacturer who is producing the cars. To increase their

market share, they need to maintain their brand images. Advertising plays an important role in maintaining the brand image; if it showcases detailed features that dominate, the potential car buyer/customer gets influenced toward that brand only. Thus, marketing plays a huge role in increasing and influencing buyer choices. Dhanabalan, T., et al. (2018) found that the customer-perceived value was positively influenced by price, brand, design, quality, utility and technical aspects, and all these components have forced the customer to select and buy the car. Mukherjee & Sastry (1996) stated that the Indian automobile industry is experiencing a revolution with the rapid growth of incomes and standards of living of Indians. Still, the demand in various countries like Brazil, China and India is also highly price sensitive. The demand here is more for the small cars because of higher taxes on mid- and large-sized vehicles by the government, which overall gives the small car a big price advantage. Import duties on automotive components signify that the supplier base in the above-mentioned countries needs improvement. The supplier industry could become a congestion for growth.

Dahiya and Gayatri (2018) observed that even in highly complex product categories like automobile, digital marketing can result in demand recognition. The findings showed that consumers have positive attitudes toward digital marketing campaigns of different brands. Consumers also get influenced by other customers' feedback, opinions, and reviews and use digital platforms like social media to communicate their post-purchase emotions and give reviews. But the study also showed that even though customers value using digital channels for their decision-making process, they still don't reserve a car online; rather, they prefer visiting the dealer and then finalising the purchase. Malagi and Ramya (2022) witnessed that with the rapid rise in the depletion of fossil fuels, which are non-renewable energy resources, and increasing prices of petrol and diesel, people are shifting towards electric vehicles. Not only this, but environmental sustainability plays an important role in the rise of sales of electric cars, as petrol and diesel engines produce large amounts of carbon emissions, which leads to polluting the environment as well as increasing health issues for the population. Thus, automobile companies are considering electric vehicles as a solution to all these problems. For this purpose, the understanding and analysing attitude of consumers towards electric vehicles is very important. The study found that the major pollutants and issues are found in metropolitan cities, and that's why the people living in these cities should understand the importance of electric vehicles and know about their benefits in reducing the harmful gases and pollutants.

Tu and Yang (2019) examined the electric vehicle market of China, as it has the largest electric vehicle market in the world. The consumer shifting towards electric cars expects low-carbon-producing, energy-efficient, and intelligent electric vehicles to reduce the environmental impact as well as satisfy the consumer's behavioural attitude. Despite the personal views, the views and suggestions of family members, friends, colleagues, and neighbours significantly affect the attitude of consumers regarding electric vehicles. The factors which influence the purchase decision of electric cars also include their design and development that best suits consumer demands and provides a reference for consumers' choices and purchases. Thus, the government and EV manufacturers should consider launching more electric vehicles with more battery life and charging facilities to attract consumers, publicise the brand and promote the ultimate goal of sustainable development.

Palmer et al. stated that there are different types of electric vehicles, for example, battery electric vehicles (BEVs), hybrid electric vehicles (HEVs) and plug-in hybrid electric vehicles (PHEVs), which emit very low levels of carbon dioxide and very minimal air pollutants as compared to other petrol and diesel cars. Now car manufacturers are launching cars with larger battery capacity and more features like regenerative braking, engine stop-start and intelligent transmission systems. It is also examined that hybrid and electric vehicles have a higher manufacturing cost than conventional vehicles. On the other hand, running costs are often lower with respect to electric cars as compared to fuel costs of conventional cars, and also maintenance plays an important role because petrol and diesel engines need regular maintenance and service, which makes it more costly sometimes. The government also started offering subsidies or reduced taxes for low-emission vehicles to stimulate adoption and increase the sales to move towards a goal of being an environmentally responsible country.

A study by Pandey, Manocha and Saini (2020) concluded that the increase in acceptance rate of electric vehicles depends on several factors, like progress in technology, reduction in cost and maintenance of storing traction batteries, increase in public and government charging equipment and provision of subsidies or incentives. It should be noted that electric vehicles have reached urban traffic, mainly two- and three-wheeled vehicles, which are now becoming the assets of the electric vehicle market. Cost competitiveness and convenience for drivers play an important role in the penetration of electric vehicles. Tricycle manufacturers have already started to manufacture locally produced batteries, which is reducing cost as well as improving the standards of the batteries and overall vehicles. Three-wheeled e-rickshaws are the most successful introduction in the automotive industry, mainly in metropolitan cities which are facing the greatest challenge of cleaner air and easy access to transportation without harming nature. Kim, Rasouli, and Timmermans (2014) examined the consumer attitude with the addition of social influence on consumers while purchasing a hybrid car and found that social influence is not that important, but still, considering the positive public opinions about electric cars, consumers can be influenced and can change the purchasing decision, so the social network of friends plays an important role in purchasing decisions. The intention to purchase an electric car is also influenced by attitudes about environmental concerns and technology acceptance.

H_0: There is no relation between the age and satisfaction on subsidies provided by government on purchase of Electric vehicles

H_1: There is significant relation between the age and satisfaction on subsidies provided by government on purchase of Electric vehicles

H_0: There is no relation between the age and considering charging station availability before buying an electric vehicle.

H_1: There is a significant relation between age and considering charging station availability before buying an electric vehicle.

FACTORS INFLUENCING EV ADOPTION

According to Yong, T., & Park, C. (2017), there are many factors according to which a consumer decides or gets influenced to choose an electric vehicle. As per the current generation (Generation Z), these factors can be classified into

1) Technology factors

2) Policy factors

3) Environmental factors

4) Personal Factors

Technology factors

Technology factors mainly deal with the characteristics of an EV, which include the driving range, charging time and price of the electric vehicle. If the driving range is limited, charging time is long and purchase price is high, then they can be the obstacles to EV adoption by a consumer (Chen et al., 2020). It has been found that the limited driving range of EVs is one of the major barriers in the purchasing decision. Moreover, the electric vehicles taking longer time to charge also add to the barrier to purchasing an electric vehicle, as when internal combustion engine vehicles (ICEVs) are considered, the consumer can easily fuel up the car in less time and can continue the drive. Even the fast charging requires at least 30 minutes. Other

technological features include battery life, trunk space, top speed, and service charges, which can create a positive as well as negative impact on electric vehicles (Ecer, F., 2021).

Policy factors

The electric vehicle industry is still at an early stage of development as compared to the existing petrol and diesel engine vehicles (Brown, S., Pyke, D., & Steenhof, P., 2010). The role of the government's policy and support plays a major factor in the initial market penetration and full-scale acceptability of EVs. Thus, many countries are promoting electric cars by implementing policies such as purchase subsidies to buyers, tax benefits and exemptions, EV deployment targets, free charging and free parking permissions. These policies have a positive effect on the consumer considering purchasing an EV (Chidambaram et al., 2023).

Environmental factors

Environmental factors are those that affect the EV industry indirectly, as they are out of the direct control of EV manufacturers. Environmental factors include rising fuel prices. consumer characteristics, availability of charging stations, and the consumer's perspective toward the environment and pollution (Tran et al., 2013). Moreover, it has been found that fuel prices are the most important factor which affects EV adoption by the consumers and would similarly affect EV adoption depending on the relative price of electricity. Consumer characteristics such as income, education, gender, and level of environmentalism. also affect the purchase of EVs (Coffman, M., Bernstein, P., & Wee, S. 2017).

Personal Factors

There are some other factors which vary from person to person, which include the importance of EV brands and price expectations of customers. Brand plays an important role while purchasing electric vehicles, as buyers are not ready to try new brands which are entering the automotive industry with EVs. There is a concern regarding the reliability of the brand as well as the origin of the brand (Kalwani, M. U., & Yim, C. K., 1992). With various schemes and awareness programmes of the Government of India towards made-in-India products, customers were influenced to differentiate between Indian and international brands, and with this, more customers are now more inclined towards brand as an important factor before buying any product in India. Secondly, the price and budget of the customer also affect the purchase decision of buyers, as electric vehicles are still in the growth stage and many companies and governments are investing huge funds for their research and development as per the Indian roads, customer driving patterns and climatic conditions (Gujarathi, P. K., Shah, V. A., & Lokhande, M. M., 2018). This tends to increase the price of the product in the initial phase, as the company has to incur the invested amount. But this amount should also be suited for the customer, as conventional vehicles start at very low prices, and to motivate the buyer to purchase an EV, pricing should be kept competitive (Li, J., 2019). Thus, price expectations can be analysed for better offerings from the EV makers.

OBJECTIVES

To find out how subsidies provided by the government on the purchase of electric vehicles affect the purchasing decision of Generation Z.

To study how electric vehicle charging station availability affects the purchasing decisions of Generation Z.

RESEARCH METHODOLOGY

Research Area

The research area was Delhi NCR.

Research Instrument

A self-designed survey questionnaire was designed and administered to obtain insights from members of Generation Z about the electric vehicles available in India and to know about the consumer attitude towards them. The statements focused on identifying the respondents' perception of the importance of key roles in buying an electric vehicle based on the factors described in Fig. 1. The questionnaire was designed by taking valuable inputs from the existing literature. The questionnaire was developed on Google Forms with a 5-point scale where I means 'strongly disagree/fully unsatisfied' and V means 'strongly agree/fully satisfied' and sent to likely concerned individuals, i.e., Generation Z, through various channels like social media (WhatsApp, Facebook, etc.), e-mail, and distribution of hard copies.

Sample Size and Sampling technique

The study was conducted using a convenience sampling technique, and overall, 98 responses were collected from the age group 19-26, which lies in Generation Z. The respondents include students, government and private employees, professionals and businessmen.

Statistical Analysis

Two different hypotheses were made and tested by the Pearson chi-square test of independence to evaluate categorical variable correlation with the sample. The chi-square test of independence determines if the two categorical variables in a single sample are independent from each other. In the data analysis, degrees of freedom, expected frequencies, test statistics and P values related to the test statistic are found using the below-mentioned formulas:

Method Used :

$$\textbf{Degree of freedom (DF) = DF = (r - 1) * (c - 1).}$$

r is a variable and c is the level number for the other categorical variable

$$\textbf{Expected frequencies} = E_{r,c} = (n_r * n_c) / n$$

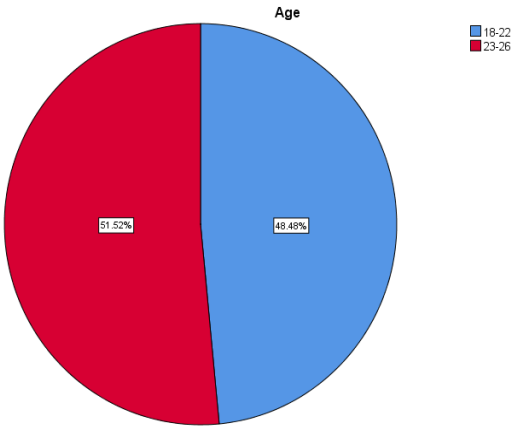
$E_{r,c}$ is the expected frequency number for level r of the variable A and level c of the variable B. n_r is the total sample observation number at the level r of the variable A.

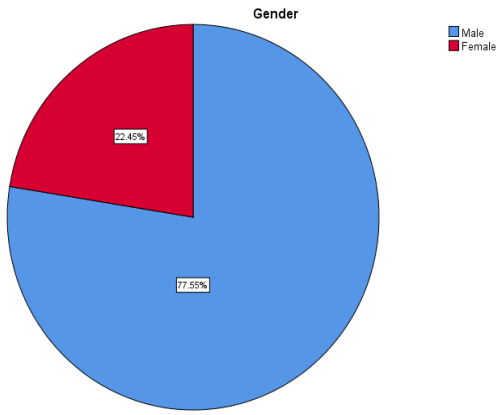
$$\textbf{Pearson Chi-square} = X^2 = \Sigma [(O_{r,c} - E_{r,c})^2 / E_{r,c}]$$

$O_{r,c}$ is the observed frequency number at the level r of the variable A and the level c at the variable B. $E_{r,c}$ is the expected frequency number at the level r of the variable A and the level c of the variable B.

FINDINGS

The questionnaire was completed by a number of 98 respondents of the 18-26 age group, which comes under Generation Z; it can be established that the confidence interval is lower than the maximum accepted threshold of 5% (4.02%) at a 95% confidence level. Thus, it can be appreciated that this sample is representative. Regarding the demographic component of the questionnaire and the structure of the sample, the main classification is represented in Figure 1.



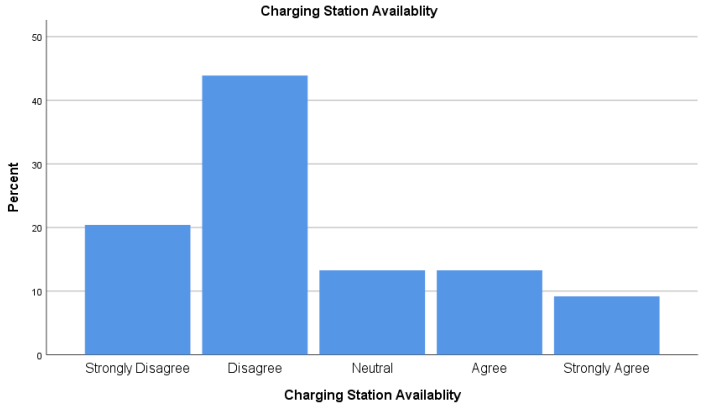


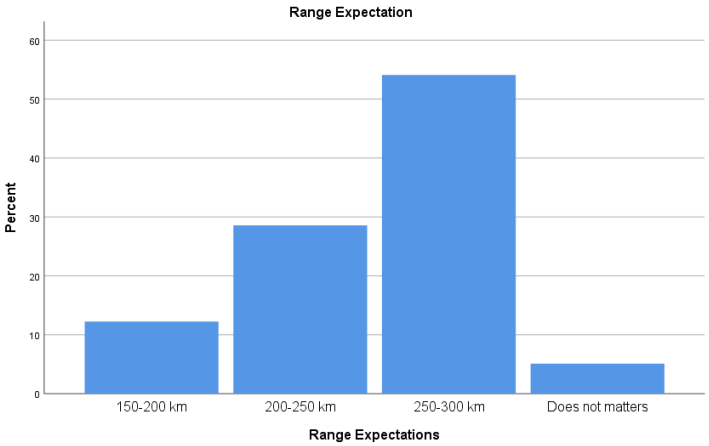
Statistics			
		Age	Gender
N		98	98
Mean		1.00	1.22
Median		1.00	1.00
Mode		1	1
Std. Deviation		.000	.419
Variance		.000	.176
Range		0	1
Minimum		1	1
Maximum		1	2
Percentiles	25	1.00	1.00
	50	1.00	1.00
	75	1.00	1.00

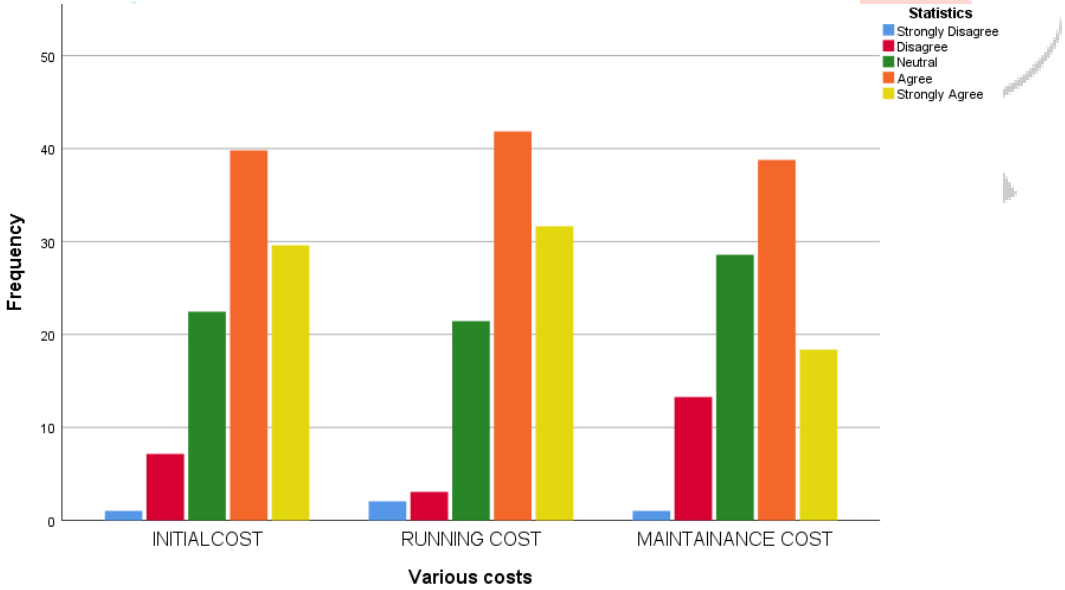
Technological Factors

According to the analysis, respondents don't agree that there are enough EV charging stations available in India. Range is first and foremost an important factor, as it is the distance an electric vehicle (EV) can travel on a single charge. In addition, the availability of fuel pumps nearly every three to four kilometers for ICEV vehicles makes the charging infrastructure a critical factor in the buying choice. Thus, a long range means more consideration from consumers, and as per the survey, a minimum of 250–300 km is the ideal EV range for Generation Z consumers. After range and charging station availability, another factor which affects the buying of an EV is the various types of cost, starting from purchase cost to maintenance and service cost, and results showed that 40% of respondents voted that the initial cost of EVs is higher than that of ICEVs. It is important to note that 40% of respondents believe that an EV has cheaper operating/running costs than an ICEV. But the majority of people think that electric vehicles require more maintenance and after-sales service costs are higher than ICEV cars.

Figure 2. *Charts and table show the technological factors*





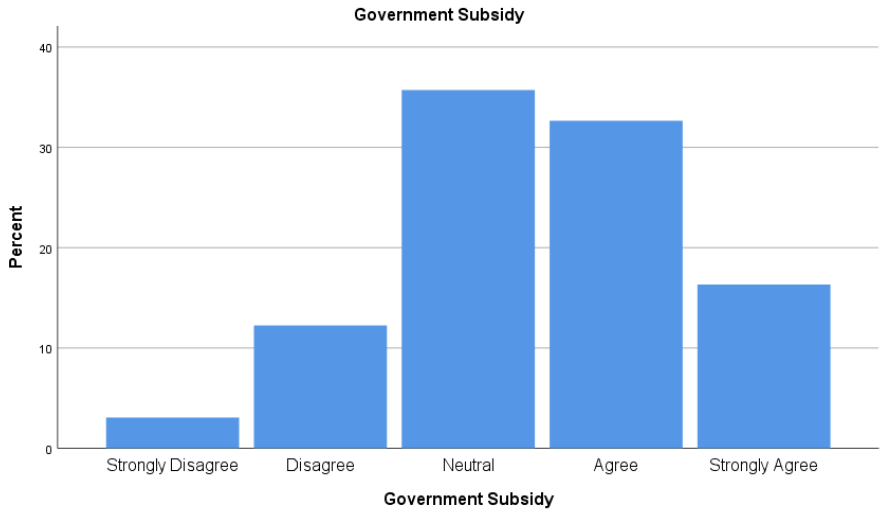


Statistics				
		Range Expectation	Costing	Charging station availability
N		98	98	98
Mean		2.52	3.8265	2.47
Median		3.00	4.0000	2.00
Mode		3	4.00	2
Std. Deviation		.776	.64966	1.220
Variance		.603	.422	1.489
Range		3	2.67	4
Minimum		1	2.33	1
Maximum		4	5.00	5
Percentiles	25	2.00	3.3333	2.00
	50	3.00	4.0000	2.00
	75	3.00	4.3333	3.00

Policy Factors

Results indicated that individuals are neutral towards the satisfaction they get with government subsidies offered on the purchase of EVs. The subsidies provided by government is not being properly implemented. In India, many state government is not providing subsidies to EV buyers and those providing, are delaying the disbursal of the subsidy amount to buyers. Thus, there is a neutral attitude of respondents about satisfaction from subsidies. To enhance and increase the sales of EV in Indian market, government should implement subsidies on pan India level and also fast track the process of providing on time subsidies to EV buyers. This will motivate more and more consumers to buy EVs.

Figure 3. *Charts and table show the Policy factors*

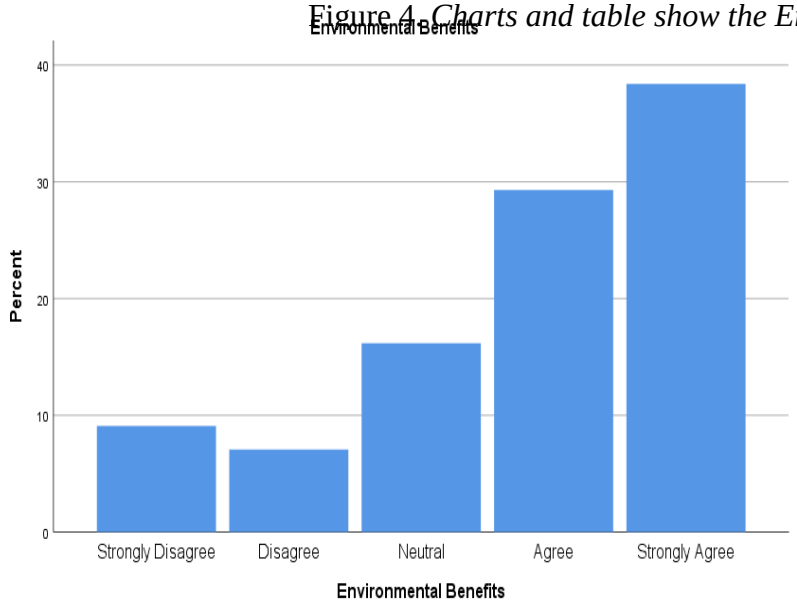


Statistics		
Government Subsidy		
N		98
Mean		3.47
Median		3.00
Mode		3
Std. Deviation		1.007
Variance		1.015
Range		4
Minimum		1
Maximum		5
Percentiles	25	3.00
	50	3.00
	75	4.00

Environmental Factors

When asked whether electric vehicles had any positive effects on the environment, the majority of respondents said they do agree that they also help to lessen a variety of negative effects on the environment. Thus, as far as environmental benefits are considered, people are aware of the consequences of the ICEVs and show a positive attitude towards the EVs because of the lesser number of harmful effects as compared to conventional cars which run on petrol- or diesel-powered engines.

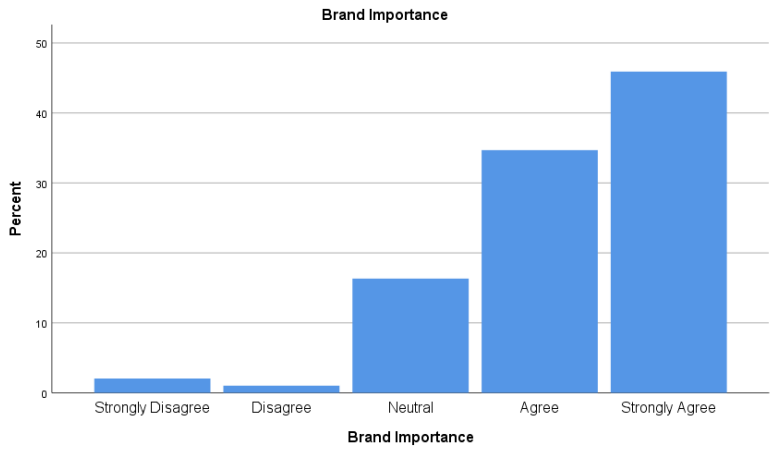
Figure 4. Charts and table show the Environmental factors



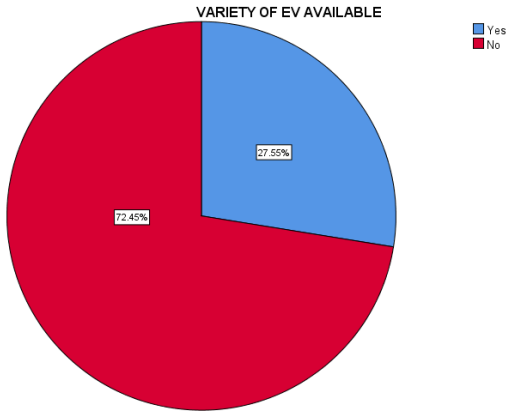
Statistics		
Environmental Benefits		
N		98
Mean		3.8081
Median		4.0000
Mode		5.00
Std. Deviation		1.27517
Variance		1.626
Range		4.00
Minimum		1.00
Maximum		5.00
Percentiles	25	3.0000
	50	4.0000
	75	5.0000

Personal Factors

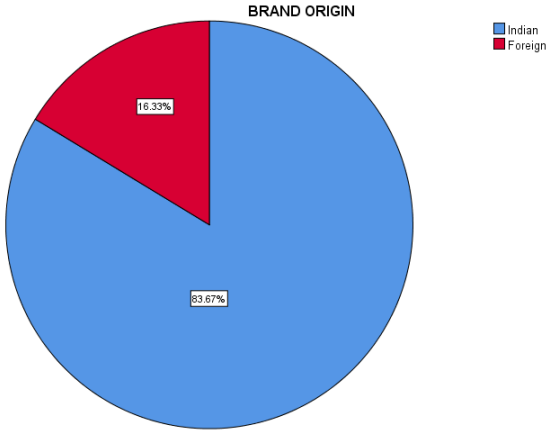
As per the analysis, 73% of respondents believe that there aren't many options available when selecting an EV. With more product options accessible, consumers may select the one that is ideal for them by taking their budget, preferences, needs, and other factors into consideration. In the EV market, several new firms are emerging and posing a serious technological threat to established players, and as per investigation, 50% of the sample size agrees that brand plays a significant role in purchase decisions. A new brand needs time to get into consumers' minds, but on the other hand, an old brand can easily earn consumers' consideration. Further scanning of the responses showed that. 83% of people preferred Indian brands (such as TATA MOTORS and Mahindra & Mahindra) as compared to foreign brands (Hyundai, Kia, and MG). This makes a clear image towards the current scenario of the EV market in India: people prefer Indian brands more as compared to foreign brands, and customers still need more options to help them make a wiser purchase decision of buying an EV.



Statistics	
BRAND IMPORTANCE	
N	98
Mean	4.21
Median	4.00
Mode	5
Std. Deviation	.900
Variance	.809



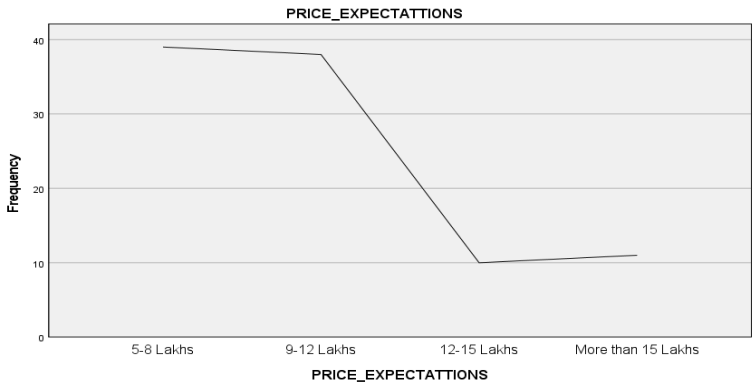
Statistics	
VARIETY AVAILABLE	
N	98
Mean	1.72
Median	2.00
Mode	2
Std. Deviation	.449
Variance	.202



Statistics	
BRAND ORIGIN	
N	98
Mean	1.16
Median	1.00
Mode	1
Std. Deviation	.372
Variance	.138

Price Expectations of Generation Z

When respondents were questioned about the anticipated price range that suits the budget, the results revealed that the price expectation ranges from 5 lakh to 12 lakh, as 80% of the participants felt that an EV should only be purchased in this price range. This attribute leads to the following conclusions: Currently the majority of the participants do not own an electric vehicle, but they still intend to purchase one within the next three to five years, between the price range of 5 and 12 lakhs. There is a majority of persons who have a positive attitude towards EV purchasing decisions.



Statistics	
N	98
Mean	1.93
Median	2.00
Mode	1
Std. Deviation	.977
Variance	.954
Minimum	1
Maximum	4

CHI SQUARE TEST

Age * Government Subsidy Cross tabulation								
			Government subsidy					
			Fully Unsatisfied	Unsatisfied	Neutral	Satisfied	Fully Satisfied	Total
Age	18-22	Count	0	5	16	17	9	47
		Expected Count	1.4	5.8	16.8	15.3	7.7	47.0
	23-26	Count	3	7	19	15	7	51
		Expected Count	1.6	6.2	18.2	16.7	8.3	51.0
Total		Count	3	12	35	32	16	98
		Expected Count	3.0	12.0	35.0	32.0	16.0	98.0

From the Table, we can infer the age-wise rating of consumers on a 5-item scale of 1 to 5 (where 1-Strongly disagree and 5-strongly agree) based on satisfaction on subsidies provided by government on purchase of Electric vehicles. Table Shows the actual and expected count of different variables. The chi-square value (3.80) and the p-value (0.43) does not fall below 0.05, null hypothesis is not rejected.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.005[a]	4	.557

Age * Charging Station Availability Cross tabulation								
			Charging stations available					
			Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Age	18-22	Count	7	23	7	7	3	47
		Expected Count	9.6	20.6	6.2	6.2	4.3	47.0
	23-26	Count	13	20	6	6	6	51
		Expected Count	10.4	22.4	6.8	6.8	4.7	51.0
Total		Count	20	43	13	13	9	98
		Expected Count	20.0	43.0	13.0	13.0	9.0	98.0

Table shows the age-wise rating of consumers on a 5-item scale of 1 to 5 (where 1-Strongly disagree and 5-strongly agree) based on considering charging station availability while purchase of Electric vehicles. The chi-square value (3.005) indicated that there was no statistically significant difference between the observed and expected values according to age group. Since the null hypothesis is supported by the data and the p-value (0.55) does not fall below 0.05, the null hypothesis is not rejected.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.809[a]	4	.433

DISCUSSION AND CONCLUSION

Technological factors, which included factors like charging station availability, range expectations and costs, are studied by descriptive analysis. The range of electric vehicles plays an important role, as the long range offered by the automobile maker means more consumers are attracted towards EVs, and as per the survey, 250–300 km is the ideal EV range for Generation Z consumers to make a purchasing decision (Plötz et al. 2014). Publicly available charging stations and infrastructure are particularly crucial because there are still few charging stations in large cities, which makes customers afraid of getting stranded in an emergency (Schmidt, M., Staudt, P., & Weinhardt, C., 2020). In terms of costs, EVs are also falling behind ICEVs because people have a negative perception of the true cost of operating, maintaining, and servicing them since they believe EVs are complex to own and require more caution than regular automobiles. To tackle this, the government is offering subsidies, which come under policy factors. The results showed that Generation Z has a mixed response regarding governmental subsidies, as no proper information is available to the customer, which indicated that disbursement of subsidies should be quick and communicated well to the public at the time of purchasing itself (Caulfield et al. 2022). The third factor includes environmental benefits which motivate the young generation to choose EVs instead of ICEVs. The consumer believes that electric vehicles have a positive impact on environmental protection. This helps them to believe that they are saving the environment while driving an EV (Holland et al. 2016). The last factors which are left are consolidated under 'Other factors'. Here aspects related to brand importance, origin and variety of choices available to consumers in the current period are studied. Consumers of Generation Z find that more choices should be available, mainly of Indian brands, to let them move toward electric vehicles. Brand is really important for this generation of consumers, as they prefer a reliable and stable brand before making a huge investment in an EV. A brand can be domestic, i.e., an Indian or foreign company that is operating in India, so people prefer domestic brands more than foreign brands. In terms of expected price range, consumers are focusing on a budget that is affordable, starting at 5 lakhs and going up to 12 lakhs. Above 12 lakhs, only a few respondents are preferring electric vehicles because they are a premium segment. Since there aren't many options available at this price point, whereas ICEVs start at around 4-5 lakhs, consumers choose to prefer those vehicles instead of EVs (Nykvist, B., Sprei, F., & Nilsson, M., 2019). As of the current date, India’s market of EVs is at an initial phase, and that’s the reason its initial cost is high. As the number of consumers and competitors will increase, prices will go down.

After applying the Pearson chi-square test, the null hypothesis is accepted and the alternative hypothesis is rejected, which signifies that age and satisfaction with government subsidies offered after the purchase of electric vehicles are not significantly correlated and have no similarity. In another case also, the alternative hypothesis is rejected, which means before purchasing an electric vehicle, the availability of charging stations does not have a substantial relationship with the age group of Generation Z.

RECOMMENDATIONS

1. In order to alter consumers' perceptions, broaden the influence of electric vehicles, and improve consumers' awareness of electric vehicles, it is advised that EV manufacturers increase consumers' opportunities by launching more cars at an affordable price range without compromising with the necessary features required by today’s generation, i.e., Generation Z.

2. Manufacturers of electric vehicles currently promote their products mostly on the basis of product characteristics, which are readily disregarded in this tough competition. It is advised that EV producers promote the idea of environmental preservation and living sustainably in order to raise consumers' awareness and preference for EVs.

3. In order to alleviate the difficulty of charging electric vehicles, it is advised that the government execute a pilot layout of charging heaps in key cities as a model and then attract investment from relevant businesses through subsidies.

LIMITATIONS

1. This study focuses on electric cars. Future research can be done on a variety of fresh substitutes for conventional gasoline and diesel vehicles, including hydrogen, biofuel, and ethanol-powered vehicles, and how they affect consumer demand.

2. As it only takes into account customer demand and factors influencing their purchase decisions, this study is based on a business perspective. The technologies connected to electric vehicles are not the focus of this study. Future research that connects the commercial and industry perspectives of electric vehicles is advised.

3. This study only gathered questionnaires from the Delhi NCR and a few locations in Uttar Pradesh due to time and resource constraints. People in other regions of India, however, can have different ideas about the subject of this study due to the variations among the various regions of India. Future academics might investigate the circumstances in various areas to provide examples for the government and manufacturers to support the use of electric vehicles.

REFERENCES

1. Caulfield, B., Furszyfer, D., Stefaniec, A., & Foley, A. (2022). Measuring the equity impacts of government subsidies for electric vehicles. Energy, 248, 123588.
2. Chillakuri, B., & Mahanandia, R. (2018). Generation Z entering the workforce: the need for sustainable strategies in maximizing their talent. Human Resource Management International Digest.
3. Dahiya, R., & Gayatri. (2018). A research paper on digital marketing communication and consumer buying decision process: An empirical study in the Indian passenger car market. Journal of Global Marketing, 31(2), 73-95.
4. Dhanabalan, T., Subha, K., Shanthi, R., & Sathish, A. (2018). Factors influencing consumers' car purchasing decision in Indian automobile industry. International Journal of Mechanical Engineering and Technology, 9(10), 53-63.
5. Dimock, M. (2019). Defining generations: Where Millennials end and Generation Z begins. Pew Research Center, 17(1), 1-7.
6. Gaidhani, S., Arora, L., & Sharma, B. K. (2019). Understanding the attitude of generation Z towards workplace. International Journal of Management, Technology and Engineering, 9(1), 2804-2812.
7. Grigoreva, E. A., Garifova, L. F., & Polovkina, E. A. (2021). Consumer Behavior in the Information Economy: Generation Z. International Journal of Financial Research, 12(2), 164-171.
8. Hameed, S., & Mathur, M. (2020). Generation Z in India: Digital natives and makers of change. In The new generation Z in Asia: Dynamics, differences, digitalisation. Emerald Publishing Limited.
9. Holland, S. P., Mansur, E. T., Muller, N. Z., & Yates, A. J. (2016). Are there environmental benefits from driving electric vehicles? The importance of local factors. American Economic Review, 106(12), 3700-3729.
10. Hooftman, N., Oliveira, L., Messagie, M., Coosemans, T., & Van Mierlo, J. (2016). Environmental analysis of petrol, diesel and electric passenger cars in a Belgian urban setting. Energies, 9(2), 84.
11. Hung, K. H., Gu, F. F., & Yim, C. K. B. (2007). A social institutional approach to identifying generation cohorts in China with a comparison with American consumers. Journal of international business studies, 38(5), 836-853.
12. Jisana, T. K. (2014). Consumer behaviour models: an overview. Sai Om Journal of Commerce & Management, 1(5), 34-43.

13. Jones, V., Jo, J., & Martin, P. (2007, February). Future Schools and How Technology can be used to support Millennial and Generation-Z Students. In ICUT 2007 (Proc. B), 1st Int. Conf. Ubiquitous Information Technology (pp. 886-891).
14. Kahawandala, N., & Peter, S. (2020). Factors affecting Purchasing Behaviour of Generation Z. IEOM Society International, Proceedings of the International Conference on Industrial Engineering and Operations Management Dubai, UAE, March.
15. Kim, J., Rasouli, S., & Timmermans, H. (2014). Expanding scope of hybrid choice models allowing for mixture of social influences and latent attitudes: Application to intended purchase of electric cars. Transportation research part A: policy and practice, 69, 71-85.
16. Korombel, A., & Ławińska, O. (2021). Building Brand Trust in Managing Relations Between the Company and the Representatives of Generation Z. Trust, Organizations and the Digital Economy: Theory and Practice, 258.
17. Malagi, A. K., & Ramya, S. (2022). Consumer Awareness and Perception towards Electric Vehicles with Specific Reference to Bengaluru City. Journal of Positive School Psychology, 6(2), 115-129.
18. Mathur, D., Bhardawaj, A., Pandey, A., Oberoi, A., & Rani, D. (2018, January). Consumer buying behaviour of cars in India-a survey. In 1st International Conference on New Frontiers in Engineering, Science & Technology, New Delhi, India (pp. 468-473).
19. Mathur, D., Bhardawaj, A., Pandey, A., Oberoi, A., & Rani, D. (2018, January). Consumer buying behaviour of cars in India-a survey. In 1st International Conference on New Frontiers in Engineering, Science & Technology, New Delhi, India (pp. 468-473).
20. Mukherjee, A., & Sastry, T. (1996). Automotive industry in emerging economies: A comparison of South Korea, Brazil, China and India. Economic and Political Weekly, M75-M78.
21. Nihan, S. T. (2020). Karl Pearsonâ€™ s chi-square tests. Educational Research and Reviews, 15(9), 575-580.
22. Nykvist, B., Sprei, F., & Nilsson, M. (2019). Assessing the progress toward lower priced long range battery electric vehicles. Energy policy, 124, 144-155.
23. Palmer, K., Tate, J. E., Wadud, Z., & Nellthorp, J. (2018). Total cost of ownership and market share for hybrid and electric vehicles in the UK, US and Japan. Applied energy, 209, 108-119.
24. Pandey, D., Manocha, D., & Saini, D. (2020). A study on an automobile revolution and future of electric cars in India. International Journal of Management (IJM), 11(3).
25. Pawar, S., & Naranje, S. (2016). 'A Study on Factors Influencing on Buying Behaviour of Customers'.
26. Plakasov, M. (2022). How To Increase Sales Of Electric Cars in Russia To Millennials To Solve Air Pollution Issue.
27. Plötz, P., Schneider, U., Globisch, J., & Dütschke, E. (2014). Who will buy electric vehicles? Identifying early adopters in Germany. Transportation Research Part A: Policy and Practice, 67, 96-109.
28. Qazzafi, S. H. E. I. K. H. (2019). Consumer buying decision process toward products. International Journal of Scientific Research and Engineering Development, 2(5), 130-134.
29. Schmidt, M., Staudt, P., & Weinhardt, C. (2020). Evaluating the importance and impact of user behavior on public destination charging of electric vehicles. Applied Energy, 258, 114061.

30. Shende, V. (2014). Analysis of research in consumer behavior of automobile passenger car customer. International Journal of Scientific and Research Publications, 4(2), 1-8.
31. Singh, S. (2019). Foreign direct investment (FDI) inflows in India. Journal of General Management Research, 6(1), 41-53.
32. Tu, J. C., & Yang, C. (2019). Key factors influencing consumers' purchase of electric vehicles. Sustainability, 11(14), 3863.
33. Yong, T., & Park, C. (2017). A qualitative comparative analysis on factors affecting the deployment of electric vehicles. Energy Procedia, 128, 497-503.
34. Chen, C. F., de Rubens, G. Z., Noel, L., Kester, J., & Sovacool, B. K. (2020). Assessing the socio-demographic, technical, economic and behavioral factors of Nordic electric vehicle adoption and the influence of vehicle-to-grid preferences. Renewable and Sustainable Energy Reviews, 121, 109692.
35. Ecer, F. (2021). A consolidated MCDM framework for performance assessment of battery electric vehicles based on ranking strategies. Renewable and Sustainable Energy Reviews, 143, 110916.
36. Brown, S., Pyke, D., & Steenhof, P. (2010). Electric vehicles: The role and importance of standards in an emerging market. Energy Policy, 38(7), 3797-3806.
37. Chidambaram, K., Ashok, B., Vignesh, R., Deepak, C., Ramesh, R., Narendhra, T. M., ... & Kavitha, C. (2023). Critical analysis on the implementation barriers and consumer perception toward future electric mobility. Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering, 237(4), 622-654.
38. Tran, M., Banister, D., Bishop, J. D., & McCulloch, M. D. (2013). Simulating early adoption of alternative fuel vehicles for sustainability. Technological Forecasting and Social Change, 80(5), 865-875.
39. Coffman, M., Bernstein, P., & Wee, S. (2017). Electric vehicles revisited: a review of factors that affect adoption. Transport Reviews, 37(1), 79-93.
40. Kalwani, M. U., & Yim, C. K. (1992). Consumer price and promotion expectations: An experimental study. Journal of marketing Research, 29(1), 90-100.
41. Gujarathi, P. K., Shah, V. A., & Lokhande, M. M. (2018). Electric vehicles in India: Market analysis with consumer perspective, policies and issues. Journal of Green Engineering, 8(1), 17-36.
42. Li, J. (2019). Compatibility and investment in the us electric vehicle market. Unpublished manuscript, MIT.