Electrifying Decisions: Consumer Attitudes and Adoption Drivers in India's EV Boom

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Abstract

This paper will examine how the knowledge of the environment among individuals influences the decision and adoption of Electric Vehicles (EVs). It has been oriented on the positive side of nature and the transition of simple usefulness into eco-friendly usefulness. The primary objective of this piece of work is to learn the level of opinion of the people concerning self driving capabilities and vehicle tracking services. It, too, provides the reasons why individuals embrace new technology and offers simple recommendations to facilitate the global expansion of EVs. Six primary points that include Charging Time, New Technology, Believed Quality, Believed Cost, Knowledge Level, and Comfort were factor analyzed in this research. The results indicate that such aspects as customer loyalty, saving of energy, charging networks, and customer authorization are fairly impactful. This implies that such points play a critical role in determining the way buyers choose to use EVs.

Keywords: *Electric Vehicles, Eco-Friendly, Environmental Concern, Cost, Long-Term Mobility.*

Introduction

Electric cars have been perceived as some of the realistic vehicle technologies to reduce greenhouse gas emission or the consumption of fossil fuels which are associated with the normal cars. Although the advantages of electric vehicles (EVs) are numerous to users, they still have a few issues that prevent their extensive application. Among the issues is the fact that current technology is not comforted by many of the customers. Due to this reason, regulations with high concerns about EVs are bound to emerge. Electric cars (EVs) are in their development and progression. Their application is hindered by the expensive costs and the fear of being unable to travel far. The battery within an EV is a significant factor in determining its price as in this case, the larger this charge, the more expensive the entire EV system becomes. EVs are contemporary and they may contribute to the reduced emission of harmful gases and contribute to the struggle with global warming. Nevertheless, additional advantages, such as reduced pollution and common knowledge is not easily represented in the final cost of EVs, although it may benefit the society. Various communities have performed to address these market issues. We were able to find an extensive number of other social and economic aspects, which may influence the speed of people choosing electric cars, in the course of our study. The manufacturing of EVs has the power of environmental safety. However, the overall acceptance rate of EVs by the populace remains low and hence the market difficulties. This paper uses a survey after which factor analysis and a structural equation model can be used to research the potential points that can influence how the customers accept EVs. The future of gasoline vehicles in the electric cars is also likely to substitute.

The emergence of new technical advances in machines is as a result of transportation problems such as noises, smoke and traffic congestion. New technology in electric engines and driverless cars is a strong factor to the sustainable travel systems (Todorovic et al., 2017). Self-driving cars are also regarded as a more affordable alternative to secure the safety of traveling in cities by decreasing fuel consumption and emission of harmful gases that can lead to health and ecological benefits (Buekers et al., 2014). Numerous nations have established objectives and scheduled to drive the usage of EVs; due to this, EVs can make a big part of an automobile market in the coming years (Bakker & Trip, 2013). The number of new electric car owners has grown around the world, peaked at seven hundred and fifty thousand in 2016, which is an increment

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of six thousand in 2010, and analysts believe that there will be a hundred and fifty million EVs on the roads by 2030 (Cazzola et al., 2017).

Evidently, electric vehicles are an invention that can contribute to solving such environmental issues as global warming due to the increased volume of greenhouse gas emissions. Furthermore, citizens are not ready to embrace EVs without additional incentives such as enforced pollution regulations, rising price of fuel, and subsidies to EV consumers (Eppstein et al., 2011; Shafiei et al., 2012). Government subsidies can be reputed as being of great value when it comes to the acceptance of EVs by individuals consumers (Eppstein et al., 2011; Hidrue et al., 2011). A wrong product supply which is one of the basic economic weaknesses also contributes to a slow adoption. This is due to the fact that the points associated with emission control and sharing of knowledge have negative impact on EV development and acceptance among customers (Rennings, 2000; Struben et al., 2008). The pricing of EVs also differs with those of internal combustion engine vehicles (ICEVs), preventing companies to manufacture more EVs and customers to purchase them as they have market issues. These external costs prevent the ability of EVs in offsetting global warming; according to the old economic theory, the government can intervene to salvage the scenario (Rennings, 2000). Among such activities, such support resources as customer rewards are perceived to be significant at the initial phase of EV market development (IEA, 2013).

In our study, we observed that there were numerous written pieces in the past discussing customer happiness, customer choice, etc, largely in developed states. However, there exist cultural peculiarities in developing countries such as India. Interest in such countries among the upper middle-class groups in purchasing EVs at a lower price is also increasing. We aim to discover customer selection and acceptance points of EVs in India and determine whether or not customers recommend EVs to other people after their usage. We have carried out a comprehensive survey, and the findings revealed six predominant purchasing factors of EV. Few studies are concerned with providing recommendations to other individuals on EVs. Buyers exchange information, which promotes the purchase of EV. This is the gap that our research intends to fill in. Particularly, this paper examines the ecological knowledge influence on EV acceptance and utilization, the environmental benefit of EVs, and substitutes the traditional perceived usefulness with green perceived usefulness. It can also be used to comprehend the reason behind acceptance of new technology as well as offer recommendations on the future proliferation of EVs across the world.

Review of the Literature

The increasing number of electric vehicles (EV) industry has been accompanied by many research papers. The existing research is primarily aimed at the propelled customer-driven EVs, government support schemes, delivery services, and innovative technologies. Nonetheless, recent discoveries indicate that there are numerous studies which rely on the same concepts. Heritage of majority of the studies regarding EV demand consists of survey and decision-making tests (Helveston et al., 2015; Wolbertus et al., 2018). Descriptive experiments largely explore the experience of people that already have EVs (Anfinsen et al., 2018), what factors can encourage new customers to purchase EVs (Bjerkan et al., 2016), and what barriers prevent people and companies to adopt EVs (Bergman et al., 2017; Noel et al., 2018)). Simply put, there is little research that discusses the thoughts and reasons of individuals who do not or are not supposed to purchase an EV. Similarly, Hafner et al., (2017) also concluded that there were no descriptive approaches that would relate big surveys to personal thinking and attitude. The same is criticized by Axsen et al., (2011) and Bergman et al., (2017), which state that a lot of EV studies pay too much attention to logic and do not consider actual customer behavior [32]. According to Marsden & Reardon (2017), this work can be used in future research regarding the perceptions of the population toward EV subsidizing, and the transport regulations, and indicates the necessity to conduct more individual research among various customer segments.

Greenhouse gases such as carbon dioxide (Wang et al., 2020) are detrimental to the health of human beings. These gases in large quantities may lead to weather transformation and global warming (Xu et al., 2020). One of the largest sources of carbon emission is because of transport and electricity generation by burning fossil fuels (Fan et al., 2015). As a desire to combat this rise in the amount of carbon in the world, a large

number of governments are now encouraging the use of EVs. Although EVs would lead to positive environmental outcomes, there are some essential, money-specific, and habitual challenges that need to be eliminated before individuals will be able to use EVs extensively. The necessity to develop new automotive technology is driven by the problems with transportation systems. Electric motors and self-driving vehicles have a significant influence on green travel systems (Todorovic et al., 2017). Electric vehicles have the potential of emitting less fuel consumption and gases, which can alleviate the climate conditions and health of people (Buekers et al., 2014). The transport sector generates almost 75 percent of transportation-related carbon dioxide and contributes 23 percent of the total worldwide emissions (Wang et al., 2016). It is rather essential to lower the effect of transport on the emission of CO2 to control the process of global warming (Wang et al., 2017). Thus, the transportation with the help of renewable energy has become necessary (Lai et al., 2015) social advantage. There is great expansion of plug-in EV charging stations, whether at home or in the real world. The fewer the charging points, the less awareness and better opinion of people to EV technology. This could also create a good, environmentally friendly image. Home charging is also an essential factor to be considered by individuals intending to purchase a plug-in EV since cars frequently deplete their battery capacity upon completing their routes (Bakker, 2011). With electric power, people drive further with the assistance of the public charging stations. However, one of the studies was significantly limited due to the limited sample comprised of EV owners, as well as, the study failed to examine the interest of non-EV owners. It is projected by research that the demand of EV can be boosted by nearly half due to a rise in the number of chargers. With a 10 fold increase in charger access, the EV demand nearly doubled and the market share rose by 2.2 to 8.9%. According to other studies, enhancement of access to charging leads to an increase in willingness to purchase, a decrease in search time, personal satisfaction, and likelihood of purchasing an EV (Hoen & Koetse, 2014). Governments worldwide have made a wide effort to encourage EVs, and as of 2015, the sales in the countries were highly divergent. The research has been done on EV incentives in the United States, Canada, the Netherlands, and more (Tanaka et al., 2014). There are those factors that are universal and the country-specific ones. Soiket et al., (2019) examined the EV adoption depending on individual psychological aspects. The dissemination of EVs will vary according to countries and rely on country regulations.

This is demonstrated in a number of studies that observe a variety of customer benefits that can influence an individual to purchase an EV. These are usually determined by education, income, cars possessed, environmental consideration, and fascination to new technology. Researchers however differ on the top factors. According to some of the studies, higher education can enhance ownership of EVs (Carley et al., 2013; Hackbarth & Madlener, 2013). A different study also established that education and income did not make any difference to EV adoption among countries (Sierzchula et al., 2014). No evidence on an increase in income as an association with the likelihood of interest in EVs was obtained in Hidrue et al., (2011). A multi-car family might make EVs less interesting to live in (Jensen et al., 2013). The intention to purchase an EV suggests a high probability of owning an EV at some point in the future (Hackbarth & Madlener, 2013). It is also essential to have space which can be used to install a charger (Tanaka et al., 2014). Deficit of personal parking space may be an issue. Graham-Rowe et al., (2012) indicated that individuals preferred home charging as it made them feel free. Movies are also inconclusive regarding whether environmental care encourages EV purchase. There are very little studies that would assist in predicting the long-term EV acceptance.

The studies regarding EV buying processes reveal that the most significant non-financial obstacle is the range of driving. Carley et al., (2013) indicates that among more than 70 percent of respondents, range was a significant drawback. The concern must be greater in rural regions since the research was conducted in urban ones. One of them provides evidence that plug-in hybrids are a more favorable option than battery-only EVs. But Tran et al., (2013) found the opposite. The range fear could be mitigated by making charging stations accessible rather than enhancing battery range. Time that is charged also comes into play (Graham-Rowe et al., 2012). The absence of fast charging makes people more concerned with the range (Dimitropoulos, et al., 2013). The research article has proposed that long trips are still decreased by one-hour charging, whereas 10-minute charging permits the EVs to compete with the gasoline vehicles (Hackbarth & Madlener, 2013). There is a need to have more research on the correlation between driving range, charging time, and infrastructure (Dimitropoulos, et al., 2013). In another study, it was established

that EVs are also more appealing in case home charging is provided (Krupa et al., 2014). People also preferred home charging as more convenient and safer as found out by Caperello et al., (2011).

It is an electric-hydraulic powertrain that incorporates a motor, battery, hydraulic pump/motor, accumulator, reservoir and valves. The hydraulic circuit comprises of a drive and drain circuit. Once the car halts, the oil flows and accumulator stores the energy via the regenerative braking process which makes the car slow down and therefore it conserves power (Yang et al., 2017). This will suit urban driving. Control sensors are used to monitor the wheel torque and pass the generated power to the battery (Malode & Adware, 2016). The braking force depends on hydraulic pressure, and sensors inform the controller about the amount of the power (Setiawan, et al., 2019).

EVs are beneficial to the environment, and these vehicles are being attempted to be part of every-day transport by many countries. There are better battery capacities and charges. This needs to be a broad and properly managed infrastructure to address the issue of charging. The latest systems monitor the chargers status, correct issues, and make superior operation plans (Pinto et al., 2015). A smart city-wide network of chargers can be constructed by use of digital controllers. The awareness of the public chargers will provide drivers with the trust to drive further distances (Bailey et al., 2015). EVs are also relevant in the transition to low-carbon energy since they can be charged to accommodate the renewable energy sources. This is based on the importance of digital mobility systems. EVs are able to connect to the power grid and contribute to the balancing of the renewable electricity (Rahmani-Andebili, 2019). This decreases the emissions of transportation, which forms high CO_2 levels. More sustainable and energy efficient performance of the smart buildings is also based on EV technology to minimize pollution. EV ratings are dependent on the quality, performance and perceived quality. Social impact, government support and availability of infrastructure are other critical aspects. Access and affordability are also perceived as influences on the popularity of EVs (Sang & Bekhet, 2015).

Research Methodology

Based on the analysis of the studies provided previously, it is evident that certain aspects influence the process of customer choices to adopt electric vehicles (EVs) in developed countries. Due to this, it is worth studying customer behavior in India, and it is amongst the most crowded nations in the world. To fill the knowledge gap and using previous studies, this project attempts to identify the factors that influence user satisfaction with the use of EVs, and how it impacts their intentions to recommend EVs to other consumers in the Indian EV market that is rapidly expanding. They identified six primary variables, which were named Charging Time (CT), Innovation (IN), Perceived Quality (PQ), Perceived Affordability (PA), Awareness (AW) and Comfort (CM).

The responses have been collected with the help of structured survey form direct discussions with people who live in various big cities. These respondents were both male and female, aged, differing in level of salary and field of occupation such as business, service and other professions (Table 1). Each opinion was set on a scale of five points where 1 indicated strongly disagree and 5 strongly agree. Factor analysis and logistic regression have been used to determine the relationship between the degree of satisfaction and personal information.

Table 1: Sample Demographics of Survey Respondents

Particulars		Frequency	Percentage
Age			
	18–25 Yr	138	35.5
	26–35 Yr	119	30.6
	36–45	75	19.3
	>45 Yr	57	14.7

Gender			
	Male	169	43.4
	Female	220	56.6
Education			
	Upto 12th	27	6.9
	Graduate	78	20.1
	PG	190	48.8
	Others	94	24.2
Occupation			
	Service	108	27.8
	Business	89	22.9
	Student	161	41.4
	Others	31	8.0
Monthly Income			
	Upto 25K	51	13.1
	26–50 K	74	19.0
	51–75 K	138	35.5
	76 K–1 L	84	21.6
	Above 1 L	42	10.8

A convenient sampling method was applied in the study. Sampling or a large population of people or answers is a convenient method of studying any topic. This kind of sample has participants that are easily accessible. In real market environments, convenience sampling is a very common method of gathering information about the buyers. This instrument is used to comprehend thoughts and feelings of an individual. Chhattisgarh state of India is selected as study of area due to its diverse population which is a representation of the entire country. Survey was conducted in Raipur and Bilaspur city which are the major cities of the state. In total, 389 responses were gathered in the current research.

Analysis and Results

Kaiser-Meyer-Olkin (KMO) test will provide an answer to whether the sample is capable of being put under the factor analysis. It is between 0 and 1 and a score above 0.5 is regarded as very good whereas a score nearer to 1 is regarded as completely acceptable. The result of the KMO is 0.867 in the table provided below (Table 2), and that is greater than 0.5. We can move on the factor analysis then. Similarly, Bartlett Test of Sphericity demonstrates the power of the relations between the variables. Based on the same table, we may note that Bartlett test is not in vain since the significance value of this test is below the value that does not exceed 0.05 (0.000). Considering the two tests collectively they satisfy the prerequisites required prior to beginning to perform the factor analysis.

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.867
Bartlett's Test of Sphericity	Approx. Chi-Square	4730.93
	df	276
	Sig.	.000

Each factor has a strength value referred to as eigenvalue, which is presented in the column labeled Total in the column headed Initial Eigenvalues (Table 3). The factors that have eigenvalues that are more than one is advanced further to be studied since they indicate actual relevance.

Table 3: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.272	34.468	34.468	8.272	34.468	34.468
2	1.574	6.559	41.026	1.574	6.559	41.026
3	1.373	5.719	46.746	1.373	5.719	46.746
4	1.152	4.800	51.545	1.152	4.800	51.545
5	1.083	4.512	56.057	1.083	4.512	56.057
6	1.041	4.336	60.394	1.041	4.336	60.394
7	0.917	3.819	64.213			
8	0.868	3.615	67.828			
9	0.812	3.385	71.213			
10	0.767	3.198	74.410			
11	0.665	2.771	77.181			
12	0.638	2.658	79.840			
13	0.631	2.628	82.467			
14	0.585	2.439	84.907			
15	0.545	2.269	87.175			
16	0.510	2.126	89.301			
17	0.471	1.962	91.263			
18	0.410	1.710	92.973			
19	0.380	1.583	94.556			
20	0.329	1.369	95.925			
21	0.304	1.265	97.19			
22	0.255	1.064	98.255			
23	0.225	0.936	99.191			
24	0.194	0.809	100			

It is observed that the variance of Factor 1 (Charging Time) is 8.272, which takes a portion of 34.468 of the overall variances (Table 3). Similarly, Factor 2 (Innovation) has a variance of 1.574, which translates to 6.559 percent of total variance, Factor 3 (Perceived Quality) has a variance of 1.373, which translates to 5.719 percent of the total variance and Factor 4 (Awareness) covers a variance of 1.083, which translates to 4.512 percent of the total variance, Factor 6 (Comfort) has a variance of 1.041 All of these six factors combined explain 60.394 percent of the overall output.

According to Podsakoff et al. (2003), the information gathered by the utilization of self-reported surveys may contain the issue of common method bias, which cannot be completely eliminated. In order to prevent the same, the respondents were assured of privacy and not being identified during the survey phase such that they would provide genuine responses. All variables of the study under analysis were verified during the process of an Exploratory Factor Analysis (EFA) with the SPSS 26.0 to run a single-factor test offered by Harman (1976). When a single factor explains a very large proportion of the variance, this test will indicate that there is common method bias. Our findings indicate that over one factor is evident and the first factor is only able to explain 34.46 of the variance which is lower than the 50% threshold.

The results of the reliability testing are as follows: (Charging Time) Cronbachs Alpha = 0.862, (Innovation) Cronbachs Alpha = 0.851, (Perceived Quality) Cronbachs Alpha = 0.810, (Perceived Affordability)

Cronbachs Alpha = 0.833, (Awareness) Cronbachs Alpha = 0.878, and (Comfort) Cronbachs Alpha = 0.824. The alpha values exceed 0.80 of which all of them are consistent.

Table 4. Rotated Component Matrix and Test of Validity.

	Component							
	1	**2**	**3**	**4**	**5**	**6**	**Tolerance**	**VIF**
CT1	0.714						0.163	6.148
CT2	0.689						0.178	5.618
CT3	0.659						0.105	9.516
CT4	0.594						0.124	8.089
CT5	0.535						0.182	5.488
CT6	0.530						0.154	6.474
CT7	0.516						0.308	3.246
IN1		0.736					0.133	7.495
IN2		0.665					0.143	6.976
IN3		0.580					0.163	6.127
PQ1			0.757				0.294	3.405
PQ2			0.744				0.210	4.752
PQ3			0.465				0.372	2.690
PQ4			0.446				0.153	6.119
PQ5			0.414				0.168	5.317
PA1				0.753			0.110	9.52
PA2				0.596			0.124	8.001
PA3				0.558			0.172	5.407
AW1					0.784		0.149	6.374
AW2					0.648		0.317	3.241
AW3					0.512		0.135	7.415
CO1						0.658	0.153	6.877
CO2						0.557	0.164	6.225
CO3						0.499	0.284	3.415

The items (Table 4) have been designated as Charging Time (CT), Innovation (IN), Perceived Quality (PQ), Perceived Affordability (PA), Awareness (AW) and Comfort (CM). In order to confirm the safety of utilizing these variables in the research, a multicollinearity test was conducted. All the variables were chosen due to the fact that the Variation Inflation Factor (VIF) values were lower than 10.

The system will continue predicting YES in the model since the number of customers recommending EVs is significantly large while the number of customers who said no is relatively low (210 vs. 40, in the first column of the Customer Recommendation). According to the overall accuracy row, this form of prediction is accurate 84.0 percent of the time. The value of Wald (Table 5) is significant and high at the point of 0.000, which is indicative of the effects of independent variables to the response. The goodness of fit Hosmer and Lemeshow test (Table 6) indicates that also the model is fits well as the p-value of 0.637 exceeds the p-value of 0.05. This goes to verify that this model is appropriate.

Table 5: Variables in Equation

		B	**S.E.**	**Wald**	**Df**	**Sig.**	**Exp(B)**
Step 0	Constant	−1.658	0.173	92.391	1	0.000	0.190

Table 6: Hosmer and Lemeshow Test

Step	Chi-Square	Df	Sig.
1	6.088	8	0.637

Table 7: Block 1 - Method Enter Classification Table[a]

Observed			Predicted		
			Customer_Recommendation		Percentage Correct
Step 1			Yes	No	
	Customer_Recommendation	Yes	407	20	85.3
		No	40	10	20.0
	Overall Percentage				91.0
	[a]The cut value is 0.500.				

It is more beneficial in the classification table (Table 7). This table is similar to the table in Block 0 (Table 5), except that this time the explanatory variables are used to make the prediction. As can be seen, the model is now able to make an accurate prediction 91.0 percent against the previous 84.0 percent cases. Although the model itself seems to be weak, it is still powerful and effective.

Thus, in conclusion it is possible to say that this relationship is significant. Table 8 gives the output of the logistic regression. Since the System is insignificant with Charging Time of less than 0.05, but Wald of greater value; it implies that Charging Time has a strong influence on the choice of customers in regard to utilizing virtual platforms. There is also a significant influence on customer preference by the factors Innovation and Mixed Learning, as the values of their significance are less than 0.05 and Wald is understandable. Conversely, the Perceived Quality or Cognizance does not demonstrate a high influence due to the level of significance exceeding 0.05 and Wald having low score. The logistic regression equation is shown below:

Log (p/1-p = 0.890 0.890 Constant + 1.729 1.729 Perceived Quality + 0.567 0.567 Charging Time + 0.208 0.208 Innovation.

This paper illustrates the correlation of the variables Charging Time, Innovation, Perceived Quality, Perceived Affordability, Awareness, and Comfort in the notion of Customer Satisfaction associated with the purchase and usage of EVs. Plug-in electric car charging in the contemporary society has two significant outcomes. To begin with, it enhances the availability of electric cars and more knowledge concerning the high-tech realm, and this could form a green and progressive culture by the community. Second, home charging is a significant aspect to be considered by the buyers who are intending to have an electric car. Drivers might experience less power after travel due to lack of an easy access to a charging point, a factor that makes many users to have range anxiety. The fear of charging the battery and realizing that you cannot get to a charger before the battery has to be replenished is the range anxiety. Knowledge of charging spots can assist the drivers to drive in the distance safely.

This study established that more individuals would buy plug-in electric vehicles in a case a robust and well-established network of charging stations exist. It also noted that in a higher percentage of increase in availability of charging stations, the demand would also increase in plug-in EVs at an average of 50 percent. It means that the improved charging infrastructure can move more individuals in the direction of EV adoption. The paper also talks about the trends in sales of electric vehicles in different nations. Although the use of EVs is being encouraged by a number of governments, the level of adoption varies across countries. These variations can be informed by policy options, culture of the consumer, and localities. Furthermore, we cannot say that our research gave consistent findings regarding the residence in multi-car families and the desire to use EVs. Among the findings was that living in a property with more than one

car lowered the enthusiasm towards electric cars. The other observation was that a place where a charger can be placed is extremely important among individuals that live in apartments or in shared accommodations. This indicates that the consumer interest can also depend on the living conditions.

Table 8: Variables in Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1a	Charging Time	0.567	0.331	5.071	1	.000	0.727
	Innovation	0.208	0.169	1.367	1	.040	0.529
	Perceived Quality	0.252	0.165	2.337	1	.126	0.777
	Perceived Affordability	1.729	0.184	88.047	1	.000	0.177
	Awareness	0.467	0.231	4.079	1	.430	0.627
	Comfort	0.137	0.215	0.403	1	.526	0.872
	Constant	0.89	0.227	15.392	1	.000	0.411

a Variable(s) entered on step 1: Charging Time, Innovation, Perceived Quality, Perceived Affordability, Awareness, and Comfort

Conclusion and Managerial Implications

Among the most significant factors to consider when evaluating the popularity of modern cars, one should mention the attractiveness of its electronic options. This is one of the most effective reasons that many researchers have highlighted. The research is grounded on the gathered information using a Descriptive Research approach across various categories of respondents. To substantiate the analysis, a factor analysis was conducted to analyse six key factors which comprise Charging Time, Innovation, Perceived Quality, Perceived Affordability, Awareness, and Comfort. This paper expounds on these six areas. The findings indicate that the moderating influence is made by customer loyalty, energy efficiency, the charging system, and user acceptance, which implies that these factors strongly affect the satisfaction of individuals with electric vehicles. Such findings will assist car manufacturers to develop improved strategies and consider various alternatives that would lead to increased approvals of EVs by ordinary people.

The use of Internal Combustion Engine (ICE) automobiles has now been replaced by electric ones (EVs) as a result of rising environmental concerns. Nevertheless, reliance on EVs should not be limited itself. Another highly significant factor when it comes to the use of these cars is the Electric vehicle Charging Stations (EVCS). Charging points of the electric cars present a number of challenges since all EVs rely entirely on electricity. Previously, there existed the problems of congestion of electricity networks and demand forecasting. The other issue was in controlling traffic and congestion at charging points.

This paper provides an introductory description of charging platforms, their types, and kinds. In an effort to deal with such hurdles, firms have embraced various approaches, including calcium-ion charging and Battery Management Systems (BMS). The Indian government has been keen on creating clean and sustainable future. Lessening greenhouse gas emissions that are related to vehicles is one of its primary objectives. It is because of this reason that the use of EV and the installation of EV charging infrastructure should be highly encouraged. It is less complicated because the government is currently lowering taxation on EVs and is also providing incentives on installing charging stations.

The next generation vehicles can appear quite different since technical characteristics of EVs differ radically compared to cars that operate internal combustion engines (ICEVs). The electric motor transforms a lot of characteristics of sound, including loudness, vibrations and harsh sound. This offers a chance of developing exclusive sound footprint on various need resulting in customer enhancement and enjoyment. This study can help in comprehending the detectable shift in the sound of electric drivetrain and the impact it had on the quality judgment of people towards the vehicle.

Another potential area of our work is the comparison between the financial and environmental advantages of electric vehicles (EVs) and hybrid electric vehicles (HEVs) and conventional automobiles. The HEVs which do not have plug-in charging can also be costed like ordinary vehicles even with the support of government, but only in the situation when they are never charged up. The variable of fuel increases with the use of plug-ins, so costs are decreased. Studies indicate that a full electric vehicle can be affordable over its lifetime, and its prices do not exceed 5-percent more expensive than standard cars, particularly when backed by government subsidies. The sole distinction is plug-in hybrid models that have an approximate range of 35 miles of rechargeability.

Developed countries and developing countries have significant perception and behavioral differences. We constructed our assumptions based on those differences. Our findings provide valuable new information to the existing literature since no prior studies in this area have concentrated on similar psychological and behavioral perspectives. Another fact that is interesting to note is on families owning more than one car. As our findings have indicated, individuals with multi-car families are less attracted to EVs. Conversely, having a charging point in the home environment is highly significant to individuals living in apartments or shared dwellings. Previous research studies recorded in developed countries had failed to look at these aspects.

The work has several limitations, which can be better handled by future studies. As the survey was conducted in just the few Indian metropolitan areas, such a survey can be conducted on more towns. The other countries can also have a greater number of users providing the researchers with more data. The contribution of other independent factors such as age, gender and work type can also be investigated in the future.

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