



# EMPIRICAL ANALYSIS OF CONSUMER PERCEPTIONS AND PURCHASE INTENTIONS FOR ELECTRIC VEHICLES IN BANGALORE

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**Abstract :** Electric vehicles (EVs) have been developed as an efficient solution to reduce automobile emissions. To ensure the effective diffusion of EVs in current transport systems, it is vital to understand the factors affecting consumers' intentions to purchase EVs. In this view this study mainly aims to assess the socio-economic profile of the electronic vehicle users or customers and identified the relationship between level of satisfaction and type of Electric Vehicles (EV) available in the present market analyses the customer attitude and behavioral intension to buy Electric Vehicles (EV) in Bangalore City. The primary data was collected to issuing of questionnaire to the 100 electronic vehicle users or customers in Bangalore City. Lastly this study results that majority of the customers younger age group they like to buy electronic vehicles and electric vehicles are eco-friendly vehicles and electric vehicles are more convenient for long trips and also performance of electric vehicles are high and speed, therefore majority of the customers are positive attitude and more number of customers used EV cars and EV bikes in Bangalore City.

**IndexTerms - EV Vehicles, Eco-friendly, Large Stations, Chi-square etc..**

## I. INTRODUCTION

Electric Vehicles (EVs) as a component of transportation strategy, their reactions have shifted by their phase of financial development, energy asset enrichments, mechanical capacities, and political prioritization of reactions to environmental change. In India, a specific situation that is helpful for a reasonable portability worldview has set out freedom for speed up the reception of Electric Vehicles (EVs). In excess of 25 Indian urban cities are inside the 100 most contaminated urban areas in the World. The reason of developing air contamination in urban areas is identified with an assortment of sources anyway transport division makes critical commitment. It is essential the discharges from transport segment are limited. The antagonistic impacts of air contamination on human wellbeing and to the economy are well known and in this way to limit the effect on the earth, approach producers are thinking about a few alternatives. Electric vehicles have been viewed as a promising innovation alternative what's more, a few national governments have effectively actualized strategies to advance the innovation. Indian government is quick to advance electric vehicles as a green portability choices what's more, is additionally considering it as a feasible answer for diminish air contamination in urban communities.

Internationally there are a few examples of overcoming adversity and best practices. For instance, China has taken to electric vehicles bigly for bikes and transports. In the UK, urban communities like London are giving motivating forces, for example, awards to buy new electric vehicles, exclusions from blockage charges and free or diminished leaving charges for electric vehicles in numerous districts. In India, electric 3 wheelers have been somewhat fruitful, anyway very little dissemination of electric vehicles has occurred inside 2 wheelers, 4 wheelers and city transport armadas. Techno-financial evaluations anyway demonstrate that electric bikes can turn out to be financially practical by 2020 itself and electric four wheelers can be a noteworthy innovation choice

by 2030, if government gives motivating forces and foundations to charging are accessible. A solid atmosphere approach too propels the reason for electric vehicles. The administration is enthusiastic about advancing electric vehicles. The Minister of Power has even put an aggressive objective of getting to be 100% electric by 2030. Alternate services, especially Minister of Road Transport and Highways, made a solid proclamation at Society of Indian Automobile Manufacturers (SIAM) yearly tradition that has panicked the car business.

## II. LITERATURE SURVEY

**Wang Cha (2014)** in their article entitled “Service innovation model of the automobile service industry” stated that Service innovations in the service industry will improve its ability to compete in maintenance as well as increase the number of customers. Measuring service innovations according to the characteristics of the automobile industry is adopting the hybrid mode and EV vehicles to the society.

**Amudha R, (2016)** in their study on “Assessing service quality in Automobile sector” stated that arrival of new models in the market has made the automotive industry become the huge industry all over the world. They regularly administer changes in the design, development, manufacturing and marketing of their product. Service quality is related to profitability, costs, customer satisfaction and retention. Any service industry cannot survive in this highly competitive environment until it satisfies its customers by providing good quality service.

**Venkata Madhusudan Rao (2017)** in their study on “Two-Wheeler consumers behavior towards customer satisfaction” stated that original exploratory study was to examine the impact of select exogenous and demographic variables on Customer Satisfaction. As per ACMA May month data, top four brands, namely Hero, Bajaj, Honda and TVS brands were selected for study and 600 two-wheeler consumers’ samples collected, using random sampling in Hyderabad.

**Sierzechula(2019)** Demand studies have explored the financial, technical, essential and political concepts of EVs to help governments and car manufacturers evaluate consumer preferences (Liao et al., 2017). Driving range, refilling time and owning costs have been identified as some of the factors influencing EV purchasing decisions. Some studies have used stated preference techniques to explore heterogeneity in consumer preferences when deciding to purchase an Electric vehicle.

**Jansson Bodin (2020)** Give an overview of EV adoption studies; however, they only focus on individual-specific psychological factors which influence people’s intention for Electric vehicle adoption and only select some representative studies. Our review complements it in the following ways: first, we review a wider range of influential factors in Electric Vehicle adoption other than psychological constructs only; second, we present a comprehensive picture of current research by collecting all the available academic Electric vehicle preference studies.

**Abhishek Patil (2022)** gave importance to advantages of Electric Vehicle as a new way of transportation having no noise, air pollution and an environmentally friendly way to commute. India being a major market, this study was conducted to check the acceptability of people towards electric vehicle and its effect on automobile industry. The study focusses on people opinion and the awareness about the electric vehicle. Today all vehicle producer in the world have at least on electric vehicle in their product portfolio etc.

### Research Methodology:

The primary data was collected through issuing of structured questionnaire to the electronic vehicle users or customers. The total population size for study was only 100 customers selected on simple random sampling basis Bangalore City, which is considered optimum for the study. In the context of secondary data was gathered from different sources such as, Internet, refereed journals, dissertation work and peered journals related on marketing. In the context of statistical tools used in this paper is descriptive statistics, mean, standard deviation, chi square test, correlation analysis and Kruskal-Wallis H Test etc.

## III. OBJECTIVES OF THE STUDY

1. To assess the socio-economic profile of the electronic vehicle users or customers in Bangalore City.
2. To identified the relationship between level of satisfaction and type of Electric Vehicles (EV) available in the present market.
3. To analyses the customer attitude and behavioral intension to buy Electric Vehicles (EV) in Bangalore City.

#### IV. HYPOTHESIS FOR THE STUDY

1. H0: There is no significant variation between socio-economic profile of the electronic vehicle users or customers.  
H1: There is a significant variation between socio-economic profile of the electronic vehicle users or customers.
2. H0: There is no significant variation between level of satisfaction and type of Electric Vehicles (EV).  
H2: There is a significant variation between level of satisfaction and type of Electric Vehicles (EV).
3. H0: There is no significant difference between customer attitude and behavioral intension to buy Electric Vehicles (EV).  
H3: There is a significant difference between customer attitude and behavioral intension to buy Electric Vehicles (EV).

#### v. RESULTS AND OUTCOME

##### Socio-economic background of the electronic vehicle user or customers:

Table No.1 visualizes that overall respondents were numbering, 100 customers out of that 70% respondents are belongs to male category and 30% respondents are belongs female category, this shows majority males are using EV vehicles. In the context of age pattern, majority of the respondents numbering, 40% and 35% customers are belongs to age group of between 25-35 years and up to 25 years respectively, this shows younger age group of the customers used more electronic vehicles. Further the educational background of the respondents majority numbering, 45% and 30% customers were post graduates and graduation respectively In the context of occupation of the customers, majority numbering, 50% and 30% respondents were belongs to business and government employees respectively. Further the monthly income, A vast majority of the customers numbering, 50% and 60% respondents were earn above 30000 per month, this income group and more number of customers are EV cars owners and majority 30% and 25% of the customers preferences TATA Nexon and EV Ather 450 X branded EV cars and bikes used and more popular in selected study area respectively.

**Table No.1 shows Socio Economic Profile of the electronic vehicle user or customers**

Personal Factors	Classification	Frequency
<b>Gender</b>	Male	70%
	Female	30%
<b>Age Pattern</b>	Up to 25 years	35%
	25-35Years	40%
	Above 35Years	25%
<b>Educational Background</b>	Graduation	30%
	Post-Graduation	45%
	Professionals	25%
<b>Brands Preference</b>	TATA Nexon EV	30%
	EV Ather 450 X	25%
	Mahindra XUV 400	20%
	TATA Tigrar Ev	25%
<b>Occupation</b>	Private Employees	20%
	Government Employees	30%
	Business and others	50%
<b>Monthly Income</b>	Below Rs 20000	25%
	Rs.20000-30000	25%
	Above Rs.30000	50%
<b>EV Vehicle Owned</b>	EV Bike	40%
	EV Car	60%

Source: Field Survey.  
Significant level 0.05

To calculate, chi-square test for data of gender profile, age pattern, EV Vehicle owned and brand preference, the P value (Sig 2-tailed) is 0.000, 0.001 and 0.000 which is less than the Alpha value of 0.05, it was found to be significant. Therefore the results indicate that the stated null hypothesis to be rejected and alternative hypothesis is accepted. Further the data of educational background, occupation pattern and monthly income of the respondents the P value (Sig 2-tailed) is 0.652, 0.715 and 0.505, which is more than the Alpha value of 0.05, it was found to be insignificant. Therefore the results indicate that the stated null hypothesis to be accepted and alternative hypothesis is rejected.

**Table No.1 (a)**  
**Socio Economic Profile of the electronic vehicle (Chi-Square Test)**

Attributes	X <sup>2</sup> Value	D.F	P-Value	Sig 2-tail Hypothesis(H0)
Gender Profile	3.785	01	0.000	<i>Significant</i>
Age Pattern	4.521	02	0.001	<i>Significant</i>
Educational Background	3.256	02	0.652	<i>Not Significant</i>
Occupation pattern	2.789	02	0.715	<i>Not Significant</i>
Monthly Income	4.326	02	0.505	<i>Not Significant</i>
EV Vehicle Owned	3.214	01	0.000	<i>Significant</i>
Brands Preferences	2.114	03	0.001	<i>Significant</i>

Source: Field Survey, Significant level 0.05

#### 1. The identified the relationship between level of Satisfaction and type of Electric Vehicles:

Table No.2 Identify the relationship between level of Satisfaction and type of Electric Vehicles (EV) available in the present market in Bangalore City. The averages mean and standard deviation was recorded around 4.88 and 1.975, this values explains the majority of the customers are highly satisfied with usage of EV cars compared to the EV bike because there is lack of knowledge and false information part of the customers are not satisfied with the buying of EV bikes respectively.

Tables No.2 shows that Descriptive Statistics

Level of satisfaction among Customers				
Variables	Mean	S.D	Variance	Skewness
Fully Satisfied	4.88	1.975	1.108	-1.335
Not Satisfied	4.01	1.452	1.174	0.221

Source: Field Survey. Significant Level at 5%.

The correlation matrix applied to identify the relationship between level of Satisfaction and type of Electric Vehicles (EV) available in the present market in Bangalore City. The correlation analysis result shows that fully satisfied *positively correlation of 0.912 (Strong Correlation)* and significantly affected high level of satisfaction of usage of EV cars on various brands. Furthermore some of the customers are opinioned with *negative correlation of -0.241 (Weak Correlation)* they are not satisfied or low level of satisfaction of usage of EV bikes on various brands respectively. Therefore lastly the overall results shows that majority of the customers they satisfied with EV Cars compared to the EV bikes in Bangalore City.



Table No.2 (a) Shows Results of Correlation Matrix

Variables		EV Bike	EV Car
Fully Satisfied	Pearson Correlation	1	<b>0.912**</b>
	Sig.	-	0.000
	N	<b>99</b>	<b>99</b>
Not Satisfied	Pearson Correlation	-0.241**	1
	Sig.	.000	-
	N	<b>99</b>	<b>99</b>

Source: Field Survey. Significant Level at 5%.

### 3. Customer attitude and behavioral intension towards buy Electric Vehicles (EV) in Bangalore City:

Table No.3 depicts that Customer attitude and behavioral intension towards buy Electric Vehicles (EV) in Bangalore City. According to the **Kruskal-Wallis H Test**, the highest mean values was recorded 4.825 and 4.550, this assigned values indicates majority of the respondents they strongly agree that electric vehicles Eco-friendly vehicles and electric vehicles are more convenient for long trips and performance of electric vehicles are high and speed, therefore majority of the customers are positive attitude and more number of customers used EV cars and EV bikes in Bangalore City. The above statistical inferences Kruskal-Wallis H Test shows that there is a significant relationship between Customer attitude and behavioral intension towards buy Electric Vehicles (EV). From the above all mentioned parameters and variables indicates that p value is 0.000, which is less the Alpha value of 0.05, it was found to be significant. Therefore the results indicate that the stated null hypothesis to be rejected and alternative hypothesis is accepted.

Table No.3 shows Customer attitude and behavioral intension towards buy Electric Vehicles

Customer Attitude	Mean	Standard Deviation	Kruskal-Wallis H Test	P-value	Results
Electric vehicles Eco-friendly vehicles	4.825	1.4334	1.241	0.000	<i>Ho = Rejected</i>
Electric vehicles Cost effective	3.100	1.4493	2.143	0.000	<i>Ho = Rejected</i>
Electric vehicles Less Maintainace Charges	2.150	1.1551	3.114	0.000	<i>Ho = Rejected</i>
Electric vehicles are more convenient for long trips	4.550	1.4691	2.563	0.000	<i>Ho = Rejected</i>
Planning to buy electric vehicles in the future	4.250	1.0454	2.473	0.000	<i>Ho = Rejected</i>
Attitude of respondents towards shifting to electric vehicles	4.375	1.8293	1.513	0.001	<i>Ho = Rejected</i>
Electric vehicles will gain more popularity in future	3.600	1.2838	1.777	0.000	<i>Ho = Rejected</i>
Performance of electric vehicles are high and speed	4.200	1.0321	1.023	0.000	<i>Ho = Rejected</i>
Emission of greenhouses gases is comparatively low	3.400	1.5335	2.741	0.000	<i>Ho = Rejected</i>
Attitude towards Government incentives	4.755	1.2975	3.214	0.000	<i>Ho = Rejected</i>
New drive technology is not susceptible to faults.	3.800	1.5724	2.114	0.000	<i>Ho = Rejected</i>
EV vehicles are noise less	4.250	1.0454	2.31	0.001	<i>Ho = Rejected</i>

Sufficient number of filling stations for alternative fuels in place	3.700	1.3855	5.412	0.000	<i>Ho = Rejected</i>
Tax reductions and lower insurance rates.	3.530	1.5625	4.223	0.000	<i>Ho = Rejected</i>
Reserved driving lane and parking space	4.375	1.8293	3.211	0.000	<i>Ho = Rejected</i>
I have a lot of fear of new technology	4.470	1.1386	3.888	0.001	<i>Ho = Rejected</i>

Source: Field Survey.

## VI. RECOMMENDATIONS FOR THE STUDY

This study suggests that if suggestions as follows, customers should place a greater emphasis on electric vehicles in order to reduce pollution and greenhouse gas emissions. The companies should concentrate on informing the public about new car electric modes and petrol prices are steadily rising. The problem of rising petrol prices can be addressed with electric vehicles. The government's promotion of electric vehicles will aid the country's future progress. In the context of incentives and subsidies should be provided by the government for the purchase of electric vehicles and also reduced tax rates can attract buyers to buy electric vehicles to a certain extent. By lowering the initial cost of electric vehicles, there will be a growing market in the near future.

## VII. CONCLUSION

The current study aimed to explore the factors affecting consumers' intentions to purchase EVs, focusing specifically on users' perception and attitude using survey data. We investigated the effect of this increase in knowledge and conclude that that knowledge has no impact on the level of acceptance for the driving range. Consumers with more knowledge want a car with a higher maximum speed and desire faster charging durations (both slow and fast).as compared to the EV Bikes. If sufficient infrastructure is available, respondents are willing to accept EVs as a future buying option. The initial cost of purchasing, the limited number of charging stations, and the time it takes to recharge the battery are all factors that limit consumer confidence. The government has taken steps to reduce pollution levels by promoting electric vehicles and providing purchasing subsidies. The government has relaxed FDI rules in order to promote output. EVs are being introduced in India by a number of new brands. Governments and manufacturers should work together to construct the infrastructure and create a favorable climate for electric vehicles.

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