CONSUMER PERCEPTION TOWARDS ELECTRIC VEHICLE

(With special reference to Chennai city)

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Abstract: *Every industry has been modernized through technological innovation. The auto industry is also impacted in a similar way. In order to prevent global warming and climate change, the Indian government mandates that people move from internal combustion to electric automobiles. This is because electric vehicles are the future. The automobile manufacturers slowly shifting their production from tradition automobiles to electric one. By 2030, Government of India plans to have majority of electric vehicle in India. The government also motivate the people by providing incentives and tax benefits. If automobiles are electrified, even the import of fuels will be reduced. The high price of gasoline and environmental concern might be few reasons which intends public to adopt electric vehicle. The present study throws a light on consumer awareness towards electric vehicle and it also tries to identify the factors that influence the consumer perception towards Electric Vehicle. This study uses a descriptive approach to gather information from consumers by using a structured questionnaire. For the purpose of the study, 123 samples are collected from the Chennai city. The information gathered will be then analyzed to determine the expected outcomes of the study. The findings of the study will be beneficial to the government, automotive manufacturers, dealers and marketers.*

Keywords: Electric Vehicle, Consumer Awareness, Consumer Perception, Conducive Factor and Hindering Factor

I. INTRODUCTION

With the advancement of technology, everything has been electrified. In the same way transport system are coming up with electricity. Electric Vehicles were emerged in the 19th century. Later it did not go well because of its cost, speed and shortest range. Initially, there was less demand for Electric Vehicle but after a long period of time there was a sudden rise in sales of Electric Vehicle. This is because fuel vehicles emit lot of smoke which is harmful to the environment and the cost of the fuel also increased. Therefore people showed much interest towards Electric Vehicle at present. This study concentrates on consumer awareness and how the ordinary man's view towards Electric Vehicle.

Consumer awareness is always the first step when something new entered the market. Consumers cannot make a purchase if they are unaware of the product. Therefore, The Government of India initiated a portal known as e-AMRIT (Accelerated e-Mobility Revolution for India's Transportation) for creating awareness about Electric Vehicle among the consumers. It is a joint initiative by NITI Aayog and UK Government. The portal intends to act as a "one-stop platform" for all the data pertaining to India's adoption of electric vehicles. And also, regarding Electric Vehicle recently "Go Electric" Awareness campaign was conducted by Tamil Nadu Generation and Distribution Corporation Ltd. (TANGEDCO). The campaign was took place in Chennai. (The Hindu, Dec 2022).

"World Electric Vehicle Day" was observed in Coimbatore with an EV rally organised by the Society for Smart e-Mobility. To raise awareness among the public, rally participants drove their electric vehicle slowly for about 10 miles. Many of them carried signs outlining the benefits of electric vehicles. *(The Hindu, Sep 2022)*. Even Tamil Nadu government has provided 100% Road Tax exemption on Electric Vehicle registered between January 1, 2023, and December 31, 2025. This step is taken by the Government in order to make Electric Vehicle accessible to everyone.

Consumer perception refers to the thoughts, emotions, and assumptions that consumers have about the product. Each consumers have different opinions about the Electric Vehicle. Some consumers may feel Electric Vehicle is Comfortable but for others it may not. Therefore, this study helps in identifying the factors that influence the consumer perception towards Electric Vehicle.

II. REVIEW OF LITERATURE

Selva J and Arunmozhi R (2020), examined the consumer preference towards electric vehicle and factors affecting them. The survey was conducted in Tamil Nadu with the help of 110 respondents. The majority of the consumer preferred electric vehicle because of its driving range and eco friendliness.

Kumar Shalender and Naman Sharma (2020), made use of extended theory of planned behaviour model to find out the purchase intention of electric vehicle among 326 consumers in India. The study found that consumers are more likely to purchase electric vehicles because of their concern for the environment.

Omkar Tupe et.al (2020), conducted the study to determine consumers perception about electric vehicles. The sample for the study was drawn from 212 respondents in Mumbai. The main factors driving consumer preference for electric vehicles are lower carbon emissions and decreased reliance on fossil fuels.

Elena Higueras et.al (2019), investigated the factors affecting consumer purchase intention towards electric vehicles. The research was conducted in Spain. The findings of the study revealed that the price and emotional value motivated the respondents to adopt Electric Vehicle while other elements like quality and social dimension had little impact on the decision.

Pretty Bhalla et.al (2018), investigated the consumers regarding the factors affecting them while purchasing electric vehicle. For the purpose of the study 233 samples were collected in Saudi Arabia. The study revealed that the consumers consider environmental factor, technology factor and financial factor while adopting to electric vehicle.

Sriram K V et.al (2022), explored the barriers that are influencing the consumer in adoption of electric vehicle. The survey was conducted with the help of 172 respondents in Bangalore city. The researchers came to the conclusion that factors impacting customer acceptance of electric vehicles include its price, charging facilities and performance.

Deepak Jaiswal et.al (2021), analysed the Indian consumer intention to adopt electric vehicle. To support the study, researcher used the Technology Acceptance Model. It was discovered that utility of the vehicle encouraged consumers to adopt electric vehicles, but the risk component discouraged them.

Omkar Tupe et.al (2020), the factors which create negative impact about the electric vehicle among the consumers were few charging stations and it's charging time.

III. OBJECTIVE OF THE STUDY

1. To find out the demographic profile of the respondents.
2. To analyse the consumer awareness towards Electric Vehicle.
3. To identify the factors that influence the consumer perception towards Electric Vehicle.
4. To determine the significance difference among age group with respect to factors affecting consumer perception towards Electric Vehicle.

IV. RESEARCH METHODOLOGY

Sources of data: Primary and Secondary data were collected and used for this study.

With the help of structured questionnaire primary data has been collected from 123 respondents.

Secondary data has been collected with the help of research articles, journals, reference books.

Research Design: In this study Descriptive Research design has been used.

Sampling Technique: Convenience sampling method is used for this study.

Research Area: Data has been collected from Chennai city.

V. DATA ANALYSIS AND INTERPRETATIONS

Table 5.1. Demographic Profile of the Respondents

Profile		Frequency	Percentage
Gender	Male	15	12.2
	Female	**108**	**87.8**
Age	**18-27 years**	**113**	**91.9**
	28-37 years	5	4.1
	38-47 years	4	3.3
	Above 48 years	1	0.8
Educational Qualification	SSLC	6	4.9
	HSC	33	26.8
	Graduate	**52**	**42.3**
	Post Graduate	28	22.8
	Professional	4	3.3
Occupational status	Student	50	40.65
	Private Employees	64	52.03

	Government Employees	1	0.8
	Self employed	2	1.6
	Home maker	6	4.9
Family's Monthly Income	**Below 30,000**	**54**	**43.9**
	30,001 - 50,000	33	26.8
	50,001 - 70,000	12	9.8
	Above 70,001	24	19.5

Source: Primary Data (Questionnaire)

The above Table 5.1 shows a clear understanding of demographic profile of the respondents. It encloses the descriptive statistics of the Gender, Age, Educational Qualification, Occupational status and Monthly Income. We found that the majority of the respondents are female. Nearly 91.9% of them are 18 – 27 years of age. Majority of the respondents are Under Graduates. Regarding occupational status 52.03% respondents are private sector employees. Majority of the respondent's monthly income are below Rs.30, 000.

Table 5.2. Consumer Awareness towards Electric Vehicle

Consumer Awareness	Frequency	Percentage
Aware	**107**	**87**
Not Aware	16	13

Source: Primary data (Questionnaire)

The above Table 5.2 shows the awareness level of consumer towards Electric Vehicle. The results declared that 87% of respondents were aware about Electric Vehicles and 13% of them were unaware about Electric Vehicles.

Table 5.3. Consumer source of knowledge about electric vehicle

Sources	Frequency	Percentage
Newspaper/Magazine	13	12.1
Television	25	23.4
Social Media	**41**	**38.3**
Friends/Relatives	22	20.6
Others	06	5.6

Source: Primary data (Questionnaire)

Table 5.3 reveals that the majority of the consumer get knowledge about electric vehicle from social media sites. Therefore, social media sites such as Facebook, Instagram, You Tube and Twitter helps in spreading knowledge about Electric Vehicle to the consumers. 23.4% of respondents get to know about Electric Vehicle through Television, 20.6% of respondents get knowledge about Electric Vehicle through Friends & Relatives and the least get to know about Electric Vehicle from Newspaper/Magazine.

Table 5.4. Reliability Test

Cronbach's Alpha	No. of Items
0.883	18

Cronbach alpha is the most widely used method for checking the reliability of scale, and item analysis was conducted for testing validity. It may be mentioned that its value varies from 0 to 1 but satisfactory value is required to be more than 0.6 for the scale to be reliable. In this study reliability statistics for 18 items was 0.883 as shown in Table 4. High reliability indicates that these items are mostly suitable for analysis.

Table 5.5 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	**0.822**
Bartlett's Test of Sphericity Approx. Chi-Square	777.552
Df	153
Sig.	**.000**

KMO measures of sampling adequacy was 0.822 and Bartlett's test showed significance level of 0.000. Therefore, factor analysis could be applied to 18 variables measuring the factors that influence the consumer perception towards Electric Vehicle.

Factor Analysis

Factor analysis were used to determine the factors that influence the consumer perception towards Electric Vehicle.

Table 5.6. Factors that influence consumer perception towards Electric Vehicle

Construct	Items	Communalities	Variance (Eigen Value)	Factor Loadings
Conducive Factors	Positive feeling to adopt EV	.707	28.015 (5.043)	.817
	Driving Electric Vehicle would be easy	.656		.810
	Financial incentive policy of government	.658		.802
	Interaction with EV clear and understandable	.590		.745
	Reduce the consumption of natural resources	.580		.739
	Improve my travel efficiency	.486		.696
	Willing to purchase EV in near future	.482		.595
	Use of EV for short distance	.422		.569
	Tax incentives by government	.332		.508
	Make the environment good	.233		.461
Hindering Factors	Purchasing price of EV is high	.640	19.365 (3.486)	.795
	Fear of Financial losses	.600		.762
	High cost of replacing battery	.596		.752
	Performance of EV	.371		.601
	Unknown maintenance cost	.363		.564
	Less charging infrastructure facilities	.354		.517
	Unable to use for longer distance	.269		.419
	Fear of sudden inconvenience	.192		.373

Source: Computed data

The Table 5.6 explains that the 18 factors exhibit of 47.381% total variance with 2 factors and 2 Eigen values i.e. 5.043 and 3.486. All these values are strictly greater than one. This shows the existence of TWO major factors. Individually these factors possess the Variances i.e. 28.015 and 19.365. Among these values the first factor possesses the highest variance and the last factor has the smallest variance. This leads to the conclusion that the factor segregation is perfect and they are named as Conducive factor and Hindering Factor.

Hypothesis

Null Hypothesis: There is no significant difference among Age Group with respect to Factors influencing consumer perception towards Electric Vehicle.

Table 5.7. ANOVA for significant difference among Age Group with respect to Factors affecting consumer perception towards Electric Vehicle

Factors influencing consumer perception	18 -27 years	28 – 37 years	38 – 47 years	Above 48 years	F Value	P Value	Relationship
Conducive Factors	20.32 (6.17)	19.0 (6.188)	17.0 (4.082)	15.0 (6.07)	0.406	0.032*	**Significant**
Hindering Factors	16.46 (4.60)	18.20 (4.32)	14.75 (2.06)	24.0 (4.56)	1.398	0.266	Not Significant

Source: Computed data

Note: 1. The value within bracket refers to SD

    2. * denotes significant at 5% level

Since P value is less than 0.05, null hypothesis is rejected at 5% level with regard to Conducive Factor affecting consumer perception towards Electric Vehicle. Hence there is significance difference among Age Group with respect to Conducive factor affecting consumer perception towards Electric Vehicle. Consumers between the age group of 18 – 27 years are highly influenced by the conducive factors.

Since P value is not less than 0.05, null hypothesis is accepted at 5% level with regard to Hindering Factor. Hence there is no significance difference among Age Group with respect to Hindering factor.

VI. FINDINGS OF THE STUDY:

Percentage Analysis:

In our study, we found that young females were major respondents. Nearly 87% of them were aware about Electric Vehicle and they get to know about Electric Vehicle through Social Media platforms followed by Television, Friends & Relatives.

Factor Analysis:

The First Factor is ***Conducive Factor***. It shows that consumers were motivated by certain factors such as Easy to drive, Environmental Friendliness, Reduced dependence on Fossil Fuels, Government Incentives & Tax Benefits and therefore these variables create positive perception among the consumers to adopt Electric Vehicle.

The Second Factor is ***Hindering Factor***. It shows that the consumers were discouraged by the certain factors such as Lack of charging station, Maintenance cost, Price of the Vehicle, Inconvenience to use for longer distance and these variables create negative perception about Electric Vehicle among the consumers.

ANOVA

The findings revealed that there is significant relationship between age group and the conducive factor affecting consumers' perceptions toward electric vehicles. And found that, Conducive Factor highly influences the young adults followed by other age groups. Since, young adults are the future pillars of the society, they are having positive attitude towards Electric Vehicle and it is believed that they may adopt Electric Vehicle in the future.

VII.SUGGESTIONS

- The Government can still take many initiatives to create awareness and encourage consumers to purchase Electric Vehicle in the future, by providing incentives and tax benefits.
- The consumers mainly look for battery range, charging facility and performance of the vehicle, so the manufacturers must concentrate on these aspects.
- The marketers can make use of social media platforms to promote the product.

VIII.CONCLUSION

India's EV drive will open up a lot of business opportunities in the mobility, infrastructure, and energy sectors if electric vehicle automobiles take off. And now consumers are switching from fuel-powered automobiles to electric vehicles. People believe that the use of Electric Vehicle will reduce the carbon foot prints and fuel cost will also be eliminated. Every coin has the two sides. In the same way, the consumers have both positive and negative view towards Electric Vehicle. This study helps in identifying the consumer awareness and the factors that influence the consumer perception towards Electric Vehicle. Some factors creates positive perception and motivates the consumer and few factors discourages the consumers and act as the hindering factors.

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