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Perception towards Electric Vehicles in Indian Market

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ABSTRACT

The advent of electric vehicles is a boon to the developing countries like India, they are expected to show a positive inclination towards this technology and the same was expected by the government also but there is a gap between the expectation and reality which is caused due to the difference in expected and formed perception of Indians towards electric vehicles. It is concluded by the researcher that the manufacturers need to work on R&D to improve the impact of range, cost, looks, branding communication and news to make the relation positive hence create a positive perception about electric vehicles in Indian market.

Keywords: Perception, Electric vehicles, consumer behaviour

I. INTRODUCTION

India is a nation with the largest road network and around 60% population of India uses this mode of transportation in order to fulfil their daily travel requirement. The biggest draw back of the use of this road network is the use of internal combustible vehicles used to accomplish this goal, which in turn causes high degree of pollution. As a result of the excessive use of ICV in India today India is a holder of the maximum number of most populated cities in the world. But the results of this disclosure have brought a positive impact in the mindset of Indians, due to which there are chances for the vehicles with alternative fuel to capture good and suitable market in India in case of two and four wheelers. Whereas, in case of three wheeler and buses a lot is being done by the government of India to introduce them as a regular mode of transportation.

The perception is a summation of impression, awareness, and consciousness about the product available in the market. It is perception towards the any new technology which enable the development of attitude followed by intention and actual purchase of any article. In case of electric vehicle, it can be stated that there are many factors that play a vital role in shaping the perception of an Indian individual towards electric vehicles, the one leading in this list is environmental factor, from a general survey it was witnessed that women are more concerned

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about the degradation of environment as compared to men, the basis reason being their concern for the kids and the elderly family members. The other factors that are expected to play a role in the perception development of electric vehicles cost, branding, peer pressure, range, etc. in case of cost electric vehicles are comparatively costly as compared to ICV but the people aware of the operational cost and the impact of its use on environment are expected to pay the price in order to own them.

As per the FAMEII Indian is expected to have maximum coverage of electric vehicles by replacing the ICV with EV, but due to technical problems faced and reported in the EV two wheelers of Okinawa, OLA and Pure EV this still seems to be a far flung dream.

In this study with the help of certain factors random survey is been done to check the interest of individuals in electric vehicles as all the respondents are asked to fill the questionnaire at there free will, thus the entry can become a factor highlighting the interest of individuals towards electric vehicles, and measure the level of perception that they have for current electric vehicle in India.

(A) Literature Review

In the study conducted by Ghasri, Ardeshiri, & Rashidi, (2019) in the city if South Wales, Australia, the researcher has identified vehicle design, impact on environment and safety as three variable that cause an impact on the perception of an individual towards electric vehicles. The researchers made the latent variables' such as price, driving range and body type interact with each latent variable individually and compute their impact on generation X, Y and Z. it was concluded for the research that Generation Y was least sensitive to the price of electric vehicles, as compared to Generation X and Z. With respect to Government norms and subsidies it was stated by the researcher that the initial price incentives have a greater impact towards the perception of Electric vehicles as compared to the incentives reaped on operating cost. Moreover, the rebate in price to consumers had more impact on better perception as compared to the price benefit to manufacturer to reduce the cost.

With an aim to study the perception of consumers towards the sales and services towards electric vehicle the study was carried by Vakil, et al.,(2021), it was concluded through that mostly young people in Coimbatore were interested in the purchase of electric vehicles, where style, value for money, quality, looks and brand played a positive role in the perception building towards electric vehicles, whereas the cost had no impact on the perception of individuals as they all belonged to higher income groups.

It is generally witnessed that people are focusing on attitude and perception of EV and are not

the human needs that are to be fulfilled by the use of EV, in the study conducted by Cui, et al., (2021) to find the needs that impact the purchase decision, the study concluded that environmental concern followed by price consciousness, openness to experience, social influence, and self-esteem influences the purchase motivation. But the main limitation of the study is that it has negated the impact of government policies and incentives which plays a major role in developing the perception and attitude of individuals towards electric vehicles.

He, Zhan, & Hu, (2018) conducted the study based on the personality-perception-intention framework to find out the perception of Chinese people, it was concluded in the study that there are two types of personality such as personal innovativeness and environmental concern, which directly impact the attitude of individual towards electric vehicles by causing a negative or positive attitude towards purchase. It was also concluded that all positive utilities other than perceived environment have a positive effect on perception and similar is true in case of negative utilities also.

Hoefl, (2021) The government is trying hard to give the momentum to electric vehicles over ICE. The study focuses on the German market and concludes that though the market of EV's is increasing rapidly, still ICE remains the first choice of the customers. The retrofitting of ICE to EV is the call of the hour, and the researcher have proposed a business model for the smooth movement of the same. In the process of developing the business model the researchers have found various problems which are yet to be addressed as electricity production and supply, alternate battery availability, disposal of electric batteries etc. it is to be noted that the researcher has focused that though EV is a sustainable option yet moving towards it has various barriers which needs to be addressed.

Onat, (2022) tries to understand the sustainability impacts of alternative fuel vehicle. In the course of the study the researcher has taken into consideration both EV and ICE. The researcher says that adopting more of EV might reduce greenhouse gas emission but it can impact the water resources. ICE is already having various environmental and societal challenges. The researcher in the process has developed a model using various aspects of sustainability. In the process of the study that researcher has taken into understanding the aspects of resource availability. The researcher has suggested that the in the search of alternative fuel source the aspect which is least considered is the solar energy which can serve as the best alternative fuel option in the future. The study favours the battery vehicles charged through solar energy over any other aspect.

Bhalla, Ali, & Nazneen, (2018) conducted a study to factors that influence the purchase

decision of car buyers like environmental issues, cost, trust, technology advancement, infrastructure, and society acceptance. It is concluded by the researcher that the environmental concerns and consumer trust on technology gives a positive push to the acceptance of electric vehicle among people, whereas factors such as cost, infrastructure, social acceptance are not working in favour of electric vehicles adoption. Thus, in order to make electric vehicles acceptable to people in general it is now the responsibility of government and manufacturers to make product acceptable.

In the study conducted by Krishna, Rokkam, & Venkateshwar, (2020) has established that the client perception of EV plays a crucial role in the sales of EV. The study has also established that client perception of EV and sales of EV are directly proportional to each other. Hence it becomes vital for the automobiles to keep their eye on the client perception as it plays a crucial role in increasing their sales and also helps in maintaining competitive advantage. It is also recommended that the Government should try to penetrate the positive perception of EV among potential customers and also promote electric vehicles as they are the future.

Shareeda, Al-Hashimi, & Hamdan, (2021) conducted a study in Bahrain to check the influencing factors, opportunities and challenges faced by electric vehicles in the course of its acceptance. It was concluded by the researcher that the willingness to pay and the purchasing power had a significant impact on the perception of people towards electric vehicles. But the range and unavailable infrastructure is a challenge in acceptance of Electric vehicles, whereas, the generally talked about range and government incentives support the acceptance of EV among people. It is also stated by the researchers that with reference to the marketing and economical perspective, EVs will have a new market segment and the future of automobile industry.

(B) Statement of Problem

Customer perception is how they interpret different things in different situation. Customer perception is the first step towards or away from the EV that an individual can take. There are many factors such as gender, age, education, occupation, income, residential location of an individual along with Range, Looks, cost, news, brand, social circle views, after sales services, perceived usefulness of an electric vehicle, which form the perception of an individual towards the acceptance of EV. The study is conducted to check the impact of demographic variables on the factors that are causing an impact on the perception of individuals residing in India.

(C) Objectives of the study

- To analyse if Range of EV have an impact on perception of an individual towards electric vehicles.
- To analyse if looks of EV have an impact on perception of an individual towards electric vehicles.
- To analyse if cost of EV has an impact on perception of an individual towards electric vehicles.
- To analyse if news about EV has an impact on perception of an individual towards electric vehicles.
- To analyse if brands of EV have an impact on perception of an individual towards electric vehicles.
- To analyse if after sales services of EV has an impact on perception of an individual towards electric vehicles.
- To analyse if views of social circle have an impact on the perception on an individual towards electric vehicles.

(D) Hypothesis of the study

H₀1: Range of EV does not have an impact on perception of an individual towards electric vehicles.

H₀2: Looks of EV does not have an impact on perception of an individual towards electric vehicles.

H₀3: Cost of EV does not have an impact on perception of an individual towards electric vehicles.

H₀4: News about does not EV has an impact on perception of an individual towards electric vehicles.

H₀5: Brands of EV does not have an impact on perception of an individual towards electric vehicles.

H₀6: After sales services of EV does not has an impact on perception of an individual towards electric vehicles.

H₀7: Views of social circle does not have an impact on the perception on an individual towards electric vehicles.

(E) Scope of the Study

In this study an effort is made to check the factors that are expected to have an impact on the perception of individuals towards electric vehicles, and the extent of the impact caused by those factors with respect to demographic variable.

(F) Research Methodology

Type of Study:

As the researcher will be making all possible efforts to understand and analyse the factors influencing the perception of individuals towards electric vehicles, the nature of the study is exploratory and analytical.

Types of Sampling

According to the requirement of study the data was collected from around India with the help of survey money from the people interested in electric vehicles. Thus, the type of Sampling used in this study is Simple Random Sampling.

Sample Size

The maximum likelihood principle of proportion was taken as a base of sample size. The ratio assumed for the sample size is in the ratio of 20:1 (i.e., 20 subjects for each parameter to be estimated). Thus for 10 variables the sample size of 200 is suitable hence selected.

Data Details

The study is quantitative in nature. As the data is collected through a questionnaire based on Likert Scale in which 1 represents strongly disagree, 2 represents disagree, 3 represents neutral, 4 represents agree and 5 represents strongly agree. The primary data that is to be used for data analysis will be collected from citizen of India. The factors for the analysis were drawn from the detailed secondary study carried out to construct the literature review.

The primary data was collected from men and women with an educational background from 10th to above earning an income of more than 10,000, residing in urban rural or semi urban area, in working positions as private employees, government employees or working professionals.

Data Analysis

The data analysis is carried out using the bar graphs to represent the demographic data and linear regression is carried out to check the impact of various variables on the interests of individuals towards the electric vehicles.

Data Interpretation:

As per the data mentioned in table 1.1 the male responders were 54.5% whereas the female responders were 45.5%. It can be stated that the difference was minimal in nature.

Table 1.1 Demographic responses

		Frequency	Percent
Gender	Female	91	45.5
	Male	109	54.5
	Total	200	100
Age	16-25	19	9.5
	26-35	66	33
	36-45	59	29.5
	46-55	28	14
	55<	28	14
	Total	200	100
Education	10th	29	14.5
	12th	34	17
	Bachelors	44	22
	Masters	53	26.5
	others	40	20
	Total	200	100
Occupation	Private job	57	28.5
	Govt job	76	38
	business/ profession	67	33.5
	Total	200	100
Income	20000-30000	47	23.5

	31000-40000	41	20.5
	41000-50000	35	17.5
	51000-60000	32	16
	60000 and above	45	22.5
	Total	200	100
Residential Location	Urban	57	28.5
	Semi urban	76	38
	Rural	67	33.5
	Total	200	100

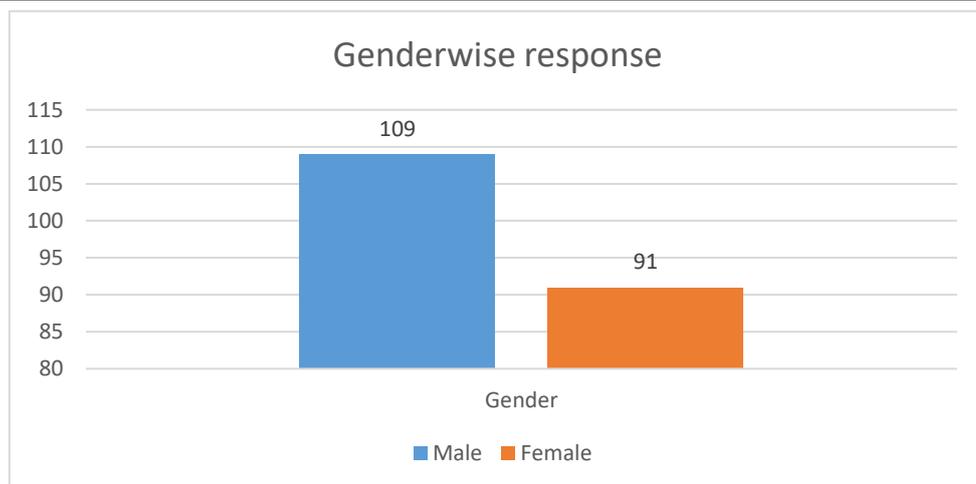


Figure 1.1 Gender-wise response

As per the data mentioned in table 1.1 the responders within the age of 16-25 years are 9.5%, between 26-35 years are 33%, between 36-45 years are 29.5%, between 46-55 years are 14%, and above 55 are 14%.

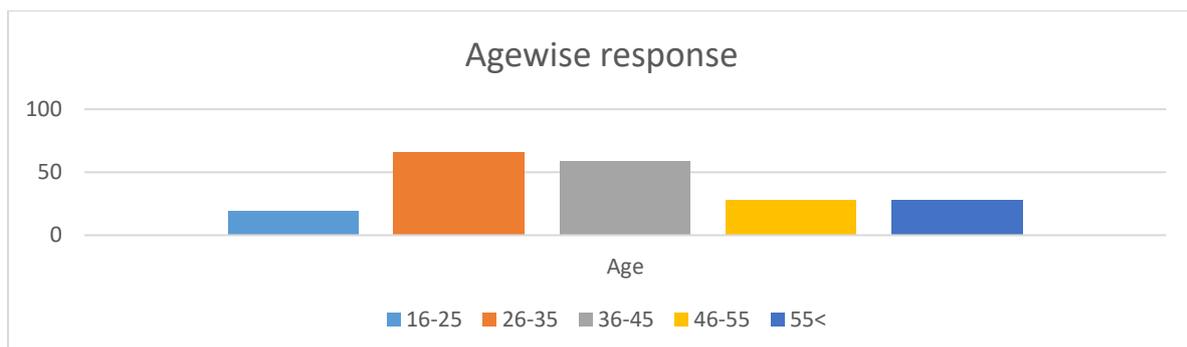


Figure 1.2 Age-wise response

As per the data mentioned in table 1.1 the responders with education till 10th are 14.5%, till 12th are 17, till Bachelors are 22%, till Masters are 26.5%, and others are 20%.

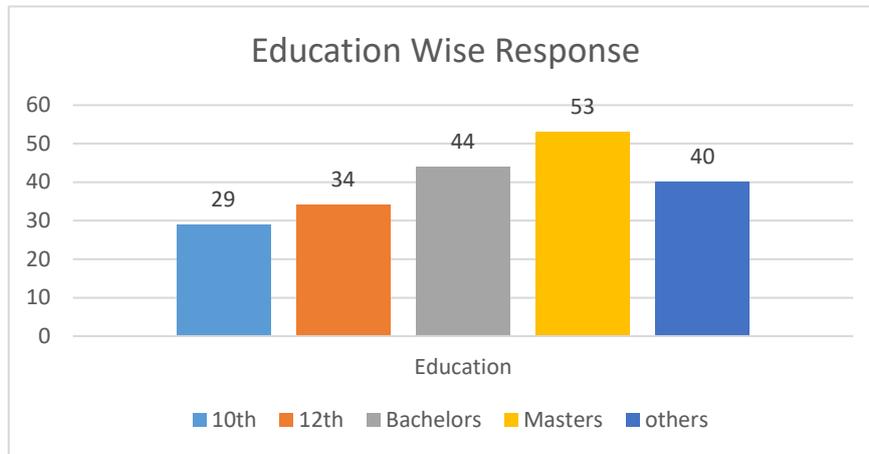


Figure 1.3 Education-wise response

As per the data mentioned in table 1.1 the responders with occupation as private job are 28.5%, with Government job are 38%, with business/professional are 33.5%.

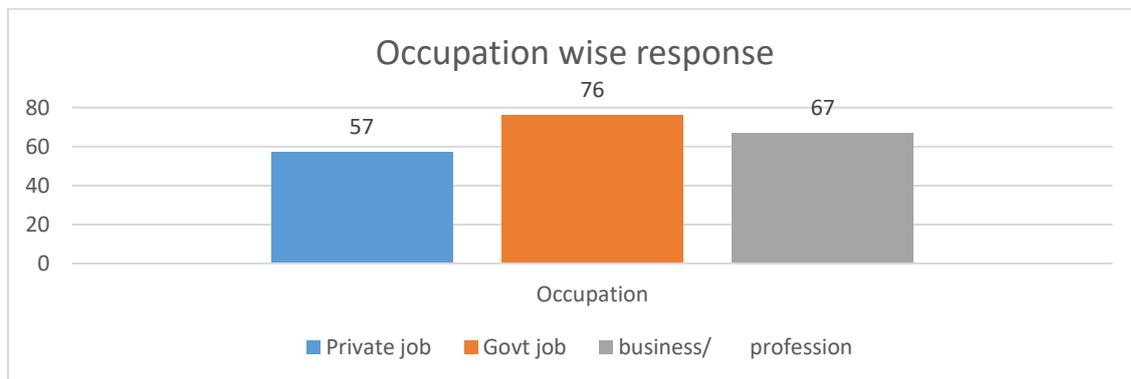


Figure 1.4 Occupation-wise response

As per the data mentioned in table 1.1 respondents earning Income between 20000-30000 are 23.5%, between 31000-40000 are 20.5%, between 41000-50000 are 17.5%, between 51000-60000 are 16%, and 60000 and above 22.5%.

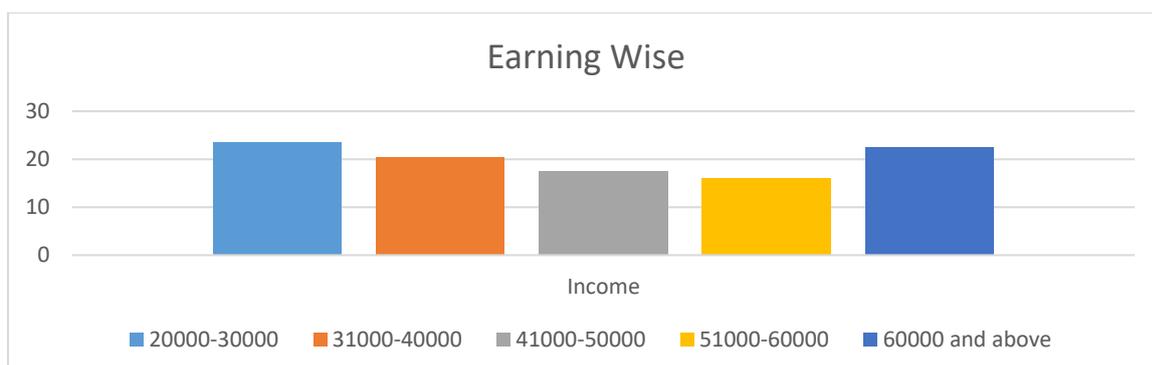


Figure 1.5 Income-wise response

As per the data mentioned in table 1.1 respondents living in urban location are 28.5%, Semi Urban Location are 38% and in rural location are 33.5%.

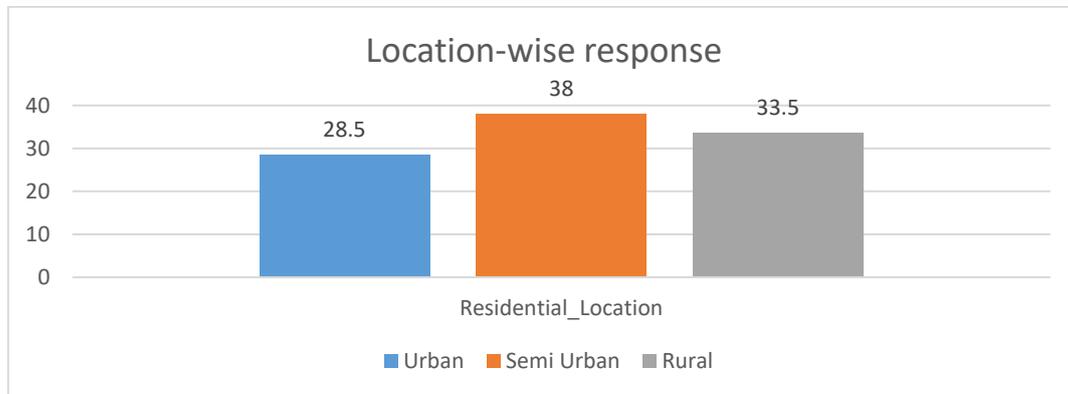


Figure 1.3 Location-wise response

In order to check the impact of different variable on the perception towards electric vehicles the correlation between the variable and the factors was computed as mentioned in Table 1.2.

Table 1.2 Pearson Correlation

Variables	Pearson Correlation with Perception towards EV	Sig (2-tailed)
Range	-0.082	0.247
Looks	-0.044	0.54
Cost	-0.054	0.451
News	-0.019	0.784
Brand	-0.028	0.694
Social circle views	-0.018	0.805
After sales services	0.003	0.971

From the computed results of Pearson's correlation, it can be proved that there is a correlation between different factors and Perception towards EV. It is concluded that Range Looks Cost News and Brand are currently having a negative correlation with the perception of Individuals towards EV. Whereas, after sales services and social views are positively correlated with perception of Individuals towards EV. When the values of correlation are between +1 and -1 the

value of correlation are acceptable. Thus, all the null hypothesis are rejected hence we accept the alternat hypothesis stating that there is positive or negative relation between different variable and perception of individuals towards EV.

As stated above the range is having a negative correlation as it is lower as compared to expected one, the cost is discouragingly high, the looks are still not so unique and smart, the brands are not properly communicated to individuals and the news itself is negative in the market causing negative perception. Whereas nowadays people are worried about environment thus are having a positive perception towards EV.

II. CONCLUSION

Form the study it is concluded by the researcher that the manufacturers need to work on R&D to improves the impact of range, cost, looks, branding communication and news to make the relation positive hence create a positive perception about electric vehicles in Indian market.

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