SUSTAINABLE BUSINESS MODEL - PERCEPTION ON ELECTRIC VEHICLES AMONG THE USERS WITH REFERENCE TO TWO-WHEELERS

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ABSTRACT

Sustainability is a buzzword around the globe. Business territories are vanishing and the way products and services are marketed has changed drastically through the advent and growth of social media marketing. Equivalently the thought to consume the products optimally through concepts like reduce, reuse and recycle is gaining importance day by day. Vehicles which were used as a mode of transportation is now viewed as a status symbol. Luxury segment cars and two wheeler industry are expanding their market globally. Sophisticated features are added to keep their products more competitive among the rivals. Along with all these innovations, accountability of the vehicle manufacturers is also increased. They have to follow the stringent norms to keep in pace with the environmental standards. The vehicles running using gasoline is a major contributor for environmental pollution. The industry strives hard to align their innovation to develop a sustainable business model. One such innovation is electric vehicles which is acquiring a considerable market share across countries. In India few models are available in cars segment and few in two wheeler segment. They emit less green house gas than gasoline or gas powered vehicles. This paper aims at analyzing the perception of the electric vehicle user in two wheeler segment.

Keywords: Sustainability, Electric Vehicles, Environmental Standards, Greenhouse Gas

INTRODUCTION

The over-a-century-old industry is gearing up for transformation. The fuel price spike and therefore the impact of its emission on the environment have involved a change in individual transportation habits. The sector, propelled by combustion engines, is gravitating gradually towards electric vehicles (EVs).

An electric vehicle (EV) is one that operates on an electrical motor, instead of an internal-combustion engine that generates power by burning a mixture of fuel and gases. Therefore, such

as vehicle is seen as a possible replacement for current-generation automobile, in order to address the issue of rising pollution, global warming, depleting natural resources, etc. Though the concept of electric vehicles has been around for a long time, it has drawn a considerable amount of interest in the past decade amid a rising carbon footprint and other environmental impacts of fuel-based vehicles.

India's commitment to control pollution and reducing carbon footprint is also increasing. The country prepares to shift towards EVs by 2030. The government desires the car manufacturers to migrate to EV production, which will curtail the oil bill by US$60 billion, cut emissions by 37% and reduce the dependence on the imports of fuel, thus acting as a shield from vulnerability against crude prices and currency fluctuations.

The government is examining the battery swapping option model to beat the challenges in EV adoption. The swapping model was introduced in Israel and China met with partial success. The challenges are the battery size and power. These may vary consistent by with manufacturer/models (e.g., Maruti Alto and Honda City). This complicated situation under this model demands a similar vehicle design to accommodate the same battery, which is difficult to achieve. Another alternative could be battery leasing that could reduce the ownership cost. However, the easy availability of charging points across different places in a city remains a significant challenge yet unresolved.

The shift towards EVs in India is imperative within the near future, though not imminent. Several cities are victims of unplanned urbanization and high pollution. They suffer unqualified degradation, with vehicular emission as the primary source.

Electric Vehicles in India

In April 2019, Niti Aayog, the federal think tank, published a report titled "India's Electric Mobility Transformation", which pegs EV sales penetration in India at 70 percent for commercial cars, 30 percent for personal cars, 40 percent for buses, and 80 percent for two- and three- wheelers by 2030. These targets, if achieved, could lead on to a net reduction of 14 exajoules of energy and 846 million plenty of CO_2 emissions over the deployed vehicles' lifetime. Electric vehicles sold until 2030 can cumulatively save 474 million plenty of oil equivalent over their lifetime, worth US$207.33 billion.

E-vehicles sales for Fiscal year ending March 2020

Segments	FY 2019	FY 2020	Change in percentage
Cars	3,600	3,400	-5
Two Wheelers	1,26,000	1,52,000	21
Buses	400	600	50

Source: Quartz/SMEV

Electric Vehicles Policy Measures in Tamil Nadu (Electric Vehicle Policy, 2019)

The Tamil Nadu State Government introduced its first-ever electric vehicle (EV) policy. The Tamil Nadu Electric Vehicle Policy, 2019, provides for various concessions to manufacturers of e-vehicles. Tamil Nadu, known as the Detroit of South India, accounts for 6.4% of the electric vehicles sold in the country as of July 31, 2019. To encourage start-ups in the EV sector, incubation services will be offered in the form of office space, common facilities and mentoring support.

An EV Venture Capital Fund will be created to offer financial support to EV start-ups to enable them to scale up their business.

EV-related and charging infrastructure manufacturing units will be provided 100% exemption on electricity tax till December 2025.

STATEMENT OF THE PROBLEM:

The purpose of this study is to understand the importance of E-vehicles, to know the mindsets of current E-vehicle users, and also to spread awareness about E-vehicles among consumers so that people will start to adapt for them. In the current environment Pollution caused by Gasoline and diesel vehicles is very high, thus introducing E-vehicles into the Market is a huge step in the reduction of pollution. Hence this study helps people to understand the usage of E-vehicles and the problems faced.

OBJECTIVES OF THE STUDY:

1. To measure awareness on various electric vehicles brands among users.
2. To study the influencing factors in choosing electric vehicles.
3. To measure the satisfaction towards e-vehicles among users.
4. To identify the problems faced in using e-vehicles

RESEARCH METHODOLOGY

- Source of Data: Primary and Secondary data
- Collection of data: Primary data is collected through questionnaire and Secondary data through websites, journals, magazines, etc.,
- Sample size: 50 respondents
- Sampling Method and technique: Non-probability sampling & Convenient sampling
- Tools applied: Percentage Analysis, Garrett Ranking and Weighted Average

REVIEW OF LITERATURE

Anil Khurana, V. V. Ravi Kumar, Manish Sidhpuria (2019)[1] examined the different factors that affect a consumer's adoption of an EV. The respondents of the study are existing car owners in India. The data were analysed using Structured Equation Modelling (SEM). Attitude (ATT) emerged as a strong mediator, influencing the adoption of electric cars.

Monika B Ashok (2019)[2] in this paper aimed to capture the views, sentiments and perception on the awareness and likeliness to buy the vehicles so that sustainability in environment can be maintained. Data is collected from vehicle users in Bangalore city. The sample size of (n=120) is taken and the responses are fed into SPSS Version 25 for analysis and validation of the statements. Correlation analysis is used to analyze the relationship between awareness levels of customers and their likelihood to purchase and use E-vehicles. The study also analyses the awareness levels of customers on government initiatives for E-transportation in India.

Pretty Bhalla, Inass Salamah Ali, Afroze Nazneen (2018)[3] made an attempt to study about the factors that influence the purchase decision of car buyers are individual perception on dimensions like environmental issues, cost, trust, technology advancement, infrastructure, and society acceptance. The results shows that environmental concerns and consumer trust on technology are antecedent factor for perception about Electric vehicle purchase and the factors which give adoption blow back are cost, infrastructure, social acceptance. Thus to promote sales of electric vehicle government has to play a leading role by creating environmental policy, infrastructure and subsidized cost of vehicle or lower the bank rate of interest rate.

Lane and Potter (2007)[4] studied UK residents, consumers and potential consumers of Electric Vehicle based on theory of planned behavior and value-belief-norm theory He found that performance, ease of use, safety, reliability , energy efficiency of EV are the main contributors

towards increased sale of EV. There was no relevant study that backed the perception and adoption process in Indian Consumers.

Bhaskar M G , Dr. Narahari N S , Dr. C K Nagendra Guptha (2020)[5] in this paper made an attempt to understand the challenges in the mid-segment electric car (E- car) and also consumers buying preferences and concerns. The paper also presents key statistics related to India with respect to pollution, contributors and initiatives through the Government of India (GoI) to tackle the broad goals, set to improve air quality. Further, initiatives from GoI related to electric mobility (E-mobility) have been studied and compared with consumers expectation from EVs. The study also includes feature by feature comparison of two existing EVs. Suggestions towards suitable value proposition for Indian consumers have been provided. Usage trends of primary users and their expectations over the past three different decades have been captured. The results from the preliminary research indicate that mid segment EVs preference considerably increase when it comes to consumers buying a car for secondary purpose owing to the shortcomings of existing EVs in the mid segment. Recommendations for mass adoption of EVs are proposed.

Dr. Bharti Motwani and Abhishek Patil (2019)[6] found that mobility and recharging characteristics were found to be most significant factors while RTO norms was considered to be the least significant characteristic affecting the buying decision of electric cars. The model developed from our study was 88% accurate and hence can be used for predicting the buying behavior of customer. This study is of prime importance to the companies who wanted to launch electric cars in India.

ANALYSIS AND INTERPRETATION

Table:1 Personal Profile of the Respondents

Personal Factor	Constructs	No of respondents	Percentage
Age	18-28 years	28	56
	28 -38 years	15	30
	38-48 years	7	14
	Above 48 years	-	-
Gender	Male	36	72
	Female	14	28
Marital Status	Married	22	44
	Unmarried	28	56

	Student	18	36
Occupation	Employee	15	30
	Professional	9	18
	Businessman	8	16
Family Annual Income	Upto ₹5,00,000	17	34
	₹5,00,000 – ₹7,50,000	22	44
	₹7,50,000 - ₹10,00,000	5	10
	Above ₹10,00,000	6	12
e-Bike Owned	Ather	4	8
	Ultraviolette	-	-
	Revolt	-	-
	Hero	12	24
	BSA	-	-
	TVS	-	-
	Bajaj	-	-
	Ampere	34	68

Out of 50 respondents, 72% of the respondents are male, 56% of the respondents belongs to the age group of 18-28 years, 56% of the respondents are unmarried, 36% of the respondents are students, 44% of the respondents are married, 36% of the respondents are students, 44% of the respondents family income is between 5,00,000 – 7,50,000 and 68% of the respondents own Ampere e-bike.

Table 2: Awareness towards e-bike:

E-bikes	Very High Awareness	High Awareness	Neutral	Low Awareness	Very Low Awareness	Weight
	5	4	3	2	1	
Ather	43	7	-	-	-	4.86
Ultraviolette	28	12	-	-	10	3.96
Revolt	20	18	-	8	4	3.84
Hero	45	5	-	-	-	4.9
BSA	42	8	-	-	-	4.84

TVS	24	14	-	12	-	4
Bajaj	40	10	-	-	-	4.8
Ampere	50	-	-	-	-	5

Overall, we can see that of the five level of awareness, Ampere rated most highly, with an average weighted score of 5 followed by Hero, Ather, BSA, Bajaj, TVS, Ultraviolette and Revolt.

Table 3: Factors influencing respondents towards e-bike

Factors	1	2	3	4	5	6	7	Total	Rank
	78	65	57	50	42	34	22		
Low fuel cost	45	5	0	0	0	0	0	50	
	3510	325	0	0	0	0	0	3835	1
Environmental friendly	0	33	2	5	4	6	0	50	
	0	2145	114	250	168	204	0	2881	2
High performance	0	8	22	10	8	2	0	50	
	0	520	1254	500	336	68	0	2678	4
Less maintenance	0	0	0	0	4	5	41	50	
	0	0	0	0	68	170	902	1140	7
Easy to operate	5	0	24	14	7	0	0	50	
	390	0	1368	700	294	0	0	2752	3
Cheaper to service	0	4	0	11	19	7	9	50	
	0	260	0	550	798	238	198	2044	5
Advanced features	0	0	2	10	8	30	0	50	
	0	0	114	500	336	1020	0	1970	6

The above table shows that all the respondents given the rank for all factors influencing towards using e-bike. The ranks have obtained with the help of Garret ranking method. Low fuel cost got the 1st rank, followed by Environmental friendly, Easy to operate, High performance, Cheaper to service, Advanced features 2nd , 3rd, 4th, 5th, 6th, 7th ranks respectively.

Table 4: Satisfaction towards factors influencing respondents towards e-bike

Factors	Highly satisfied	Satisfied	Neutral	Dissatisfied	Highly dissatisfied	Weight

	5	4	3	2	1	
Low fuel cost	46	4	-	-	-	4.92
Environmental friendly	41	9	-	-	-	4.82
High performance	32	8	10	-	-	4.42
Less maintenance	18	12	8	8	4	3.56
Easy to operate	35	10	5	-	-	4.6
Cheaper to service	28	12	6	4	-	4.28
Advanced features	23	11	6	10	-	3.94

Overall, we can see that of the five level of satisfaction, Low fuel cost rated most highly, with an average weighted score of 4.92 followed by Environmental friendly, Easy to operate, High performance, Cheaper to service, Advanced features and Less maintenance.

Table 5: Overall satisfaction of the respondents towards e-bike

Overall Satisfaction	No of respondents	Percentage
Highly satisfied	26	52
Satisfied	13	26
Neutral	-	-
Dissatisfied	7	14
Highly dissatisfied	4	8

The above table shows that 52% of the respondents are highly satisfied with their e-bike followed by 26% are satisfied, 14% are dissatisfied and 8% of the respondents are highly dissatisfied.

Table 6: Problems faced by the respondents

Problems faced	No of respondents	Percentage
Yes	17	34
No	33	66

It is clear from the above table that 66% of the respondents does not faced any problems with their e-bike.

If yes,

Problems	No of respondents	Percentage
Recharging time	5	29
Lack of charging infrastructure (proper charging points)	10	59
Limited vehicle choice	-	-
Difficulty in find a mechanic	2	12
Higher cost	-	-

Out of 17 respondents faced problem in using e-bike, 59% faced lack of charging infrastructure followed by 29% faced long recharging time and 12% faced difficulty in finding a mechanic.

SUGGESTIONS

- Most people lack awareness towards e-vehicles. Awareness can be created among the public by advertising in internet, newspaper, television, etc.,

- Duration of recharging can be reduced

- Proper infrastructure like recharge stations can be introduced.

- Importance of sustainability by using e-vehicles can be educated.

- Knowledge of subsidies available for purchasing e-vehicles can be spread.

CONCLUSION

E-vehicles are the future of automobile industry. This study brings insight regarding the awareness of electric vehicle brands among users. Very less percentage of users use E-vehicles in India, hence more awareness should be created among the public towards the benefit of using e-bike.

Government is taking initiatives to encourage the use of e-vehicles. Proper infrastructure becomes essentials for such new initiatives. In country like India which has a huge potential for growth use of e-vehicles would bring a considerable change on the economy.

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