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A Comparative Study On Consumer Awareness And Satisfaction Level Of Electronic Vehicles In Telangana State

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Abstract

The issue of climate contamination it is indeed a pressing global concern with the emissions form gas powered vehicles being a significant contributor. This may transition towards alternative models of transportation with electric vehicles emerging as leading solution in India. The adoption of electric vehicles is gaining momentum and various aspects of this shift are being closely examined. Form the past decade there has been escalating interest enthusiasm for the electronic vehicles is very important of transportation in the coming years. This paper gives the awareness and satisfaction level of Electronic vehicle in India.

Key words: Electric Vehicle , types of Electric Vehicles, consumer perception,

1. Introduction:

The growing air pollution in Indian urban areas has raised concerns for manufacturers, as more than 25 major Indian cities are among the 100 most polluted urban areas in the world. While various sources contribute to the production of air pollution, the transportation sector is a crucial contributor. The detrimental effects of air pollution on human health and the economy are widely known, and therefore, producers are exploring options to reduce their impact on the environment. Electric vehicles are seen as a potential solution, and many national governments, including India, are actively promoting them as a green alternative for transportation.

Electric Vehicle (EV) History

As the technologies advanced with the increase in the income of the people, experimentation with the newer technological transportation started. The concept of an electric car being introduced two centuries ago, in the 19th century. Electric cars are in high demand today for many of the exact reasons they were first known for. Their discovery and evolution are regarded as more of a series of discoveries and creations that would in the end amalgamate into the electric car. Even though the experimentation with the production of separate parts like batteries and the electric motors started in the early 19th century, it wasn't until the early 20th century when people started using EVs as the main source of transportation. In the series of innovations, first came the smaller version of the electric car powered by a new motor by a Hungarian priest and physicist, Ányos Jedlik. It is the first known production of an electric car. Then came the motorized crude electric carriage developed by Scotland's Robert Anderson in the early 1830s. Around the same time in the Netherlands, Professor Sibrandus Stratingh and his assistant Christopher Becker from Germany also built a small-scale electric car that was powered by non-rechargeable cells. In both cases, the main setback was the batteries (galvanic cells) weren't rechargeable. It wasn't until the late 1850s when rechargeable batteries came into light. Around the year 1884, Thomas Parker helped deploy electric-powered trams and electric cars in England. By 1890, a Scottish man - William Morrison living in Des Moines, Iowa had filed for a patent on the electric carriage he had built. a self-propelled vehicle, its 24 battery cells needed recharging every 50 miles. As the 20th century was round the corner, the primary form of transportation was still the horse. People started earning more money and turned to the newly developed motor vehicle which was available in 3 versions - gasoline, steam, and electric. Steam cars weren't developed until the late 1860s, although steam trains and factories were operating over a century ago. Steam vehicles would require a long time to start, hence limiting their range. Then came the gasoline-powered car in the 1800s, which wasn't preferred by the people because changing the gears was difficult, it was noisy, and required a lot of manual effort to drive. On other hand, electric cars didn't have any of the issues; they were easy to drive and required less maintenance. Hence, EVs became quite popular for short trips in the city. Many innovators around the world started improving on the existing model of the car and now as we have it, it is one of the most famous forms of transportation.

Types of electric vehicles:

Battery Electric Vehicles: These are fully Electric Vehicles powered solely by batteries.

Plugin Hybrid Electric Vehicles: These Vehicles can be charged via an external sources and also use a conventional engine.

Hybrid Electric Vehicles: These use both an internal combustion engine and an electric motor but cannot be plugged in to charge.

2. Review of Literature:

Shweta Kishore (2020) The Indian government's initiatives to promote the adoption of electric vehicles (EVs) and ease foreign direct investment norms to boost production The government and manufacturers need to work together to build infrastructure and create a positive environment for EVs. The respondents are aware of global climate conditions and willing to switch to eco-friendly vehicles, but cost remains a crucial factor in their purchasing decisions. Overall, the conclusion emphasizes the need for continued efforts to promote EVs in India to combat pollution and reduce dependence on fossil fuels.

Pretty Bhalla (2018) The need for electric vehicle manufacturers and the Indian government to invest in the social acceptance of EVs by creating more infrastructure and technology to build consumer trust. The environmental benefits of EVs are well known, and now it is important to focus on creating a positive perception of EVs among consumers by providing the necessary facilities. By doing so, people will be more likely to adopt EVs and help safeguard the future of India from respiratory problems caused by pollution.

Mifzala Ansar (2019) Both EVs and HEVs have their own set of opportunities and obstacles. However, it ultimately depends on the consumer's perception and willingness to maintain a sustainable environment. The study aims to understand the thought process of consumers and determine whether they are willing to contribute towards environmental sustainability by adopting EVs or HEVs. It highlights the importance of consumer behavior in the success of sustainable transportation and emphasizes the need for more research in this area.

Mrinal pandey (2014) The factors that impact the purchase decision of electric cars including government incentives, infrastructure requirements, and charging facilities. The study found that perceived monetary benefits and personal innovativeness significantly influence the intention to purchase electric cars, while factors such as perceived cost, perceived risk, and perceived environmental benefit do not have a significant impact. The study also investigated the influence of gender on the intention to purchase electric cars and found no significant impact. Consumers with higher personal innovativeness and perceived monetary benefits are more likely to purchase electric cars. The findings emphasize the importance of understanding consumer perceptions and motivations to promote the adoption of electric cars.

3. Statement of the Problem

Due to rapid increase in emission caused by the fuel vehicles and extreme fossil fuel usage we are in need to transform to different mode of transport. It 's considered it should be eco-friendly and at the same time provide same features as that of the fuel vehicles. The life of the electric vehicles and the range . it can drive is considered a problem. We don't have enough charging infrastructure to charge the vehicles in the run. The performance of these vehicles and the cost associated with it. We are using beta version of the electric vehicles and there is still a lot of improvement need to be done after gettingreviews from the end user of the vehicle. Lack of standardization and no universal charging methods is not followed by the manufacturers and it makesdifficult to establish charging stations.

4. Objectives of Study:

1. To know the consumer awareness about E Vehicles
2. To analyse the factors effecting buying behavior of consumer
3. To know the satisfaction level of consumers

5. Research Methodology:

5.1Primary Data: The primary data collected survey method using the structured questionnaire. The data was collected by approaching target consumer.

5.2 Secondary Data: secondary data sources are form google scholar

5.3 Sampling Method and Instrument: Random Sampling , Convenience Sampling and questionnaire having dichotomous, , Likert scale quantifiable questions like rating scale and ranking scale. To test the hypothesis a statistical tool SPSS was used.

5.4 Hypothesis:

Chi-square test

The Chi-square test aims to verify the probability that an observed distribution is due to chance. It is also known as the "goodness of fit" statistic, it measures how well the observed distribution of the data fits the expected distribution if the variables are independent. The chi-square statistic is determined by the level of significance.

Ho1: There is no significant factors effecting buying the electronic vehicles

Ha1: There is a significant factors effecting buying the electronic vehicles

Ho2: There is no significant satisfaction level of the electronic vehicles

Ha2: There is a significant satisfaction level of the electronic vehicles

6. Data Analysis:

Reliability Test

Reliability Statistics	
Cronbach's Alpha	N of Items
0.853	10

The reliability of liker scale conducted the study cronbach's Alpha is greater than 0.853 is good for the test.

Table-1 Frequency Distribution of Respondents

Age of Respondents		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25 Yrs	32	26.7	26.7	26.7
	26-35 Yrs	20	16.7	16.7	43.3
	36-45 Yrs	29	24.2	24.2	67.5
	Above 55 Yrs	39	32.5	32.5	100.0
	Total	120	100.0	100.0	
Marital Status		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Maried	53	44.2	44.2	44.2
	Un Married	67	55.8	55.8	100.0
	Total	120	100.0	100.0	
Occupation		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Govt Employee	59	49.2	49.2	49.2
	Private Employee	35	29.2	29.2	78.3
	Business	9	7.5	7.5	85.8
	Student	6	5.0	5.0	90.8
	Home Maker	11	9.2	9.2	100.0
	Total	120	100.0	100.0	
Income level of Respondent		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below 5,00,000	12	10.0	10.0	10.0
	5,00,000 -10,00,000	32	26.7	26.7	36.7
	10,00,000 -20,00,000	39	32.5	32.5	69.2
	20,00,000 -30,00,000	18	15.0	15.0	84.2
	30,00,000 -40,00,000	19	15.8	15.8	100.0
	Total	120	100.0	100.0	

The above table-1 revels that out of 120 respondents age group of 18-25 Yrs respondents were 32(26.7%), 26-35 Yrs respondents were 20(16.5%), 36-45 Yrs respondents were 29(24.2%), and above 55 Yrs respondents were 39(32.5%). Marital Status of Married respondents were 53(44.2%) and Unmarried respondents were 67(55.7%). Occupation of Government Employee respondents were 59(49.2%), Private Employee respondents were 35(29.2%), Business respondents were 9(7.5%), Students respondents were 6(5.0%) and Home maker respondents were 11(9.2%). Income level yearly below 500000 respondents were 12(10.0%), 5,00,000 -10,00,000 respondents were 32(26.7%).10,00,000 -20,00,000 respondents were 39(32.8%), 20,00,000 -30,00,000 respondents were 18(15.0%) and 30,00,000 -40,00,000 19(15.8%).

Table-2 **What improvement you expect form E vehicle**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Travel Efficiency	1	.8	.8	.8
	Durability	1	.8	.8	1.7
	Maintenance	48	40.0	40.0	41.7
	All the above	70	58.3	58.3	100.0
	Total	120	100.0	100.0	

The above table-2 revels that the improvement expected form customers that out of 120 respondents travel efficiency were 1(0.8%) , Durability were 1(0.8%) , Maintenance were 48(40.0%) and All the above were 70(58.3%). Hence concludes that the majority of respondents were expects that all the above parameters.

Table-3 **Electric Vetches Can protect from global warming**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	.8	.8	.8
	Neither Agree Nor Disagree	3	2.5	2.5	3.3
	Agree	45	37.5	37.5	40.8
	Strongly Agree	71	59.2	59.2	100.0
	Total	120	100.0	100.0	

The above table-3 revels that EV can protect from global warming out of 120 respondents strongly agree were 71(59.2%), agree respondents were 45(37.5%), hence it conclude that the majority of respondens agreed that EV can protects from global warming.

Table-4 **What suggestion for E Vehicles**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Improve battery Range	1	.8	.8	.8
	Increase Recharge Points	2	1.7	1.7	2.5
	Increase Speed of the Vehicles	2	1.7	1.7	4.2
	improve safety regarding explosion of batteries	57	47.5	47.5	51.7
	Increase the battery life	58	48.3	48.3	100.0
	Total	120	100.0	100.0	

The above table -4 revels that the suggestions for EV manufacturing companies out of the 120 respondents improve battery range were 1(0.8%), Increase the Recharge Points were 2(1.7%), Increase the speed of the vehicles 2(1.7%), Improver safety regarding explosion of batteries were 57(47.5%) and increase the battery life were 58(48.3%) . Hence it concludes that the majority of respondents suggested to improve safety and battery life.

Testing of Hypothesis:

Ho1: There is no significant factors effecting buying the electronic vehicles

Ha1: There is a significant factors effecting buying the electronic vehicles

Table-5 Which Vehicle you purchased and Model infrastructure

		Model infrastructure					
		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total
Which Vehicle you purchased	Electric Car	0	0	8	16	19	43
	Electric Two Wheeler	1	2	15	30	29	77
Total		1	2	23	46	48	120
		Value	df	Asymptotic Significance (2-sided)			
Pearson Chi-Square		2.002[a]	4	.735			

The above table-5 reveals that the pearson chi-square value is 2.002 with d.f 4 the p value is 0.735 is greater then 5% significance level. Hence it concludes that there is no significant the factor model infrastreture not effecting the type of electronic vehicle purchased.

Table- 6 Which Vehicle you purchased and Low Price

		Low Price					
		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total
Which Vehicle you purchased	Electric Car	0	0	3	22	18	43
	Electric Two Wheeler	1	2	9	36	29	77
Total		1	2	12	58	47	120
		Value	df	Asymptotic Significance (2-sided)			
Pearson Chi-Square		2.523[a]	4	.641			

The above table-6 reveals that the pearson chi-square value is 2.523 with d.f 4 the p value is 0.641 is greater then 5% significance level. Hence it concludes that there is no significant the factor low price not affecting the type of electronic vehicle purchased.

Table-7 Which Vehicle you purchased and High Mileage

		High Milage					
		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total
Which Vehicle you purchased	Electric Car	0	0	2	15	26	43
	Electric Two Wheeler	2	1	10	19	45	77
Total		2	1	12	34	71	120
		Value		df		Asymptotic Significance (2-sided)	
Pearson Chi-Square		4.627[a]		4		.328	

The above table-7 reveals that the pearson chi-square value is 4.627 with d.f 4 the p value is 0.328 is greater then 5% significance level. Hence it concludes that there is no significant the factor high mileage not effecting the type of electronic vehicle purchased.

Table-8 Which Vehicle you purchased and Low Maintanance Cost

		Low Maintanance Cost				
		Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total
Which Vehicle you purchased	Electric Car	0	1	14	28	43
	Electric Two Wheeler	2	2	20	53	77
Total		2	3	34	81	120

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.604[a]	3	.659

The above table-8 reveals that the pearson chi-square value is 1.604 with d.f 3 the p value is 0.659 is greater then 5% significance level. Hence it concludes that there is no significant the factor Low maintenance Cost not effecting the type of electronic vehicle purchased.

Table-9 Which Vehicle you purchased and Low Noise

		Low Noise				
		Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	Total
Which Vehicle you purchased	Electric Car	0	2	13	28	43
	Electric Two Wheeler	3	3	19	52	77
Total		3	5	32	80	120

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.057[a]	3	.561

The above table-9 reveals that the pearson chi-square value is 2.057 with d.f 3 the p value is 0.561 is greater than 5% significance level. Hence it concludes that there is no significant the factor Low Noise not effecting the type of electronic vehicle purchased.

Ho2: There is no significant satisfaction level of the electronic vehicles

Ha2: There is a significant satisfaction level of the electronic vehicles

Table- 10 Satisfaction Level of Customers of Electric Vehicles Purchased

		Satisfaction level of Electic Vechels					
		Highly Dissatisfied	Dissatisfed	Neutral	Satisfied	Highly Satisfied	Total
Which Vehicle you purchased	Electric Car	0	6	4	20	13	43
	Electric Two Wheeler	3	12	9	34	19	77
Total		3	18	13	54	32	120

	Value	df	Asymptotic Significance (2-sided)

Pearson Chi-Square	2.223[a]	4	.695

The above table-10 reveals that the pearson chi-square value is 2.223 with d.f 4 the p value is 0.695 is greater then 5% significance level. Hence it concludes that there is no significant the satisfaction lvel of customers and the type of electronic vehicle purchased.

7.Conclusion:

The research study leads us to the future of E vehicles adoption in India. Upcoming years public procurement is anticipated to play a significant role in driving growth through the acquisition of three and four wheeler vehicles for public transportation as well as buses for government offices. It is also anticipated that the investments made by certain operators of food delivery services together with fleet operators like Ola and Uber will accelerate the early rise of two and four wheeled electric cars. The potentiality of two and four wheelers may potentially reach a turning point in the next decade of charging technology. In the above analysis through chisquare test we can conclude that the we fail to reject null hypothesis. It means we have to accept the null hypothesis. The null hypothesis suggest that more and more people are preferring E vehicles. Most of the respondents agree that electric cars can replace the regular cars in terms of satisfying consumer needs for reducing the pollution. Most of consumers expect changes like travel efficiency, comfort, maintenance, and durability form the E Vehicles. The majority respondents suggested to improve the safety of cars and battery life.

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