

A Study On Factors Influencing On Purchase Of E-Vehicles With Reference To South India

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Abstract

Everybody wants to live in a pollution-free society, Pollution is primarily caused by automobiles Nevertheless and India's automobile registrations are growing at a rapid pace, Petrol and diesel process are also soaring high As a result, and modes of transportation started becoming more sustainable and environmentally friendly. This made the electric vehicles to create a space but the adoption rate was not more in India, projections by many manufactures are expected in next 5 years. The people who are using Electrical Vehicles were considered as population for the study. In light of this, the research was conducted using a questionnaire amongst 130 individuals, to understand the various factors would influence their purchase of E-vehicles in four major cities i.e., Bangalore, Hyderabad, Chennai and Kochin in South India. This study includes five factors: price difference, charging infrastructure, environmental concern, and speed. This study employed SPSS to conduct ANOVA, Pearson Correlation and Cronbach's Alpha to test the determining factors. Its found that there is positive correlation between the variables. Study concluded that the factors i.e., price difference, charging infrastructure, environmental concern, speed are significantly influence on the purchase of e-vehicles.

Keywords: e-vehicles, environmentally friendly, automobiles, price difference

Introduction

With the global number of motor vehicles surpassing 1.9 billion in 2019 the need for alternative fuel vehicles is growing, in-order to be able to counter the problems caused by internal combustion engine vehicles. Not only are countries heavily dependent on imported foreign crude oil and subject to the associated politics and price instabilities, the world's oil reserves are rapidly depleting too. Moreover, the exhaust emissions of ICEs are harmful to the environment as well as people's health. The Electric Vehicle Initiative aims to surpass 50 million electric vehicles worldwide by 2025.

With claims of one in every six vehicles- sold across the world to be electric by 2025, the shift

to electric vehicles will come faster and in a more pronounced way. This has been fuelled by the diesel demise in Europe, battery technology advancements and regulation in China and Europe. Being one of the biggest contributors of pollution across the world, the Indian government is now exploring several options to curb this issue. One of such options, is the switch to Electric Vehicles over the coming years. The many advantages that this form of transport offers is imminent and holds a high regard amongst officials. For governments worldwide, it is valuable to know which factors major drivers and/or barriers in large scale EV adoption are, and what the magnitude of change in intended adoption is under varying levels of these factors. Moreover, for grid operators it is

of utmost importance to have a clear understanding of the driving forces behind the adoption rate of EVs. This will help grid operators in anticipating on necessary infrastructure upgrades and taking timely actions. Finally, EV manufacturers will benefit from knowing the impact of various factors, thereby allowing them to focus on developing the most crucial features to enable fast adoption.

Instance 1:- Bounce India Allows the customer to buy Ev Vehicle with battery and the cost of the scooter is Rs-68,999...But without battery it cost Rs-36,000.which will put Ev on Equal footing. Same can be leased of Rs849/Month .After that you can swap for Rs 35¹.

Fuel type	BEV Okinawa iPraise+	BEV Ather 450X	Gasoline Honda Activa 6G
Gasoline fueling	N/A	N/A	INR 90 per liter
Residential overnight charging	INR 4.5 per kWh	INR 4.5 per kWh	N/A
Public charging	INR 4.7 per kWh	INR 4.7 per kWh	
Preferential tariff margin for public fast-charging	INR 9 per kWh	INR 9 per kWh	
Battery swapping	INR 34 per kWh	N/A	

1

Source- www.business-standard.com

Government pollution standards, financial and non-financial incentives, government policy, the pricing of electric vehicles, and charging infrastructure are all proven to be key factors of electric vehicle adoption (Singh, V& Vaibhav, S, 2020). In order to encourage the use of electric vehicles, the present Indian government envisions a pollution-free commercial and private transportation system. Customers' participation, experience, and environmental concerns are all essential elements in the adoption of electric vehicles.

Literature Review

Sato (2013) clearly states that utility, constraints, and beliefs are critical elements in the application of RCT into consumer behaviors. Consumers' willingness to purchase can be affected by these elements, such as utility (personal preferences), budget constraints and cultural beliefs. Therefore, to consider RCT, this

study mainly investigates the factors determining the Chinese willingness to consume electric vehicles from three aspects, which are utility, constraints, and beliefs. Under utility, the driving range of electric vehicle is a critical factor to be explored. In terms of constraints, three factors including charging infrastructure, purchase cost, and government financial incentives may also influence the Chinese willingness to adopt electric vehicles. Regarding the belief, the environmental awareness and perceived social influence of individuals have been considered as our research factors.

Green (2020) In the constraints of RCT, consumers are limited by budget, so the relationship between cost and benefit needs to be fully considered before buying, particularly in the current market for electric vehicles because electric vehicles are much more costly than conventional vehicles. It may make consumers prefer to buy conventional vehicles because they have no choice if they do not have a big enough budget. The higher price of electric vehicles is mainly due to the expensive battery pack, but also to the absence of economies of scale.

¹ https://www.business-standard.com/article/companies/bounce-to-set-up-300-charging-stations-for-greaves-in-10-indian-cities-122031500670_1.html

Aguiar and de Francisco (2009) argue, social identity is a set of beliefs about individuals and that, given the social identity beliefs, consumers

make rational choices. Chinese people like to gather and play together, thus, one of the core values and beliefs of the Chinese is to gain

society's recognition and maintain their social face. As a tradition in Chinese culture, consumption is regarded more as a tool to serve higher-order social needs than an activity in its own right. This generates that Chinese people are likely to be influenced by other people's perceptions of consumption decisions. Hence, Chinese culture makes Chinese consumption behavior very special

Argueta R, (2019) the primary motivation for the government's efforts to encourage the use of electric vehicles is to save the environment. Electric vehicles can aid in the improvement of air quality. Government financial incentives, industry growth, and market demand patterns are all important factors in the adoption of electric cars.

Chun Yang, (2019) Energy conservation and environmental preservation are the primary reasons for 40% of people to acquire electric automobiles. Consumers' value pricing above everything else, but they also consider interior trimmings, storage capacity, and car engine performance. Consumers with a higher level of education favour hybrid automobiles in terms of market share.

Pelsmacker (2020) analyzed the factors influencing the intention to use electric vehicles by applying the planned theory of behavior (TPB). As a result, it was found that emotions and perceptions of electric vehicles, followed by subjective norms, influence the intention to use them. In addition, respondents with high intention to use electric vehicles said they had a reflective emotion toward driving behavior in the use of electric vehicles

Objectives of the Study

- To study the demographic profile of the e-vehicles respondents
- To find correlation between the price difference, charging infrastructure, environmental concern, speed and purchase e-vehicles
- To find out the factors influencing on purchase of e-vehicles in South India

Hypothesis

H₁: There is no factors influencing on purchase of e-vehicles

Methodology

The purpose of this research is to examine factors influencing the purchase of electric vehicles in four major cities i.e., Bangalore, Hyderabad, Chennai and Kochin in South India. Data was collected from January- May 2022 the questionnaire is comprised of two sections. The first section of the questionnaire focuses on the respondents' demographic characteristics. The second section of the questionnaire includes questions about the price difference, charging infrastructure, environmental concern speed and purchase Decisions. Present research was conducted using a questionnaire amongst 130 individuals. This study employed SPSS 28 to conduct ANOVA, Pearson Correlation and Cronbach's Alpha to test the determining factors.

Data Analysis

Table 1: Demographic Profile

		Frequency	Percent
Age	Below 20 Years	10	7.6
	20-30 Years	44	33.8
	30-40 Years	36	27.6
	40-50 Years	30	23.0
	Above 50 Years	10	7.6
	Total	130	100.0

Gender	Male	85	65.3
	Female	45	34.7
	Total	130	100.0
Marital Status	Married	98	75.3
	Unmarried	32	24.7
	Total	130	100.0
Educational Qualification	Diploma	22	16.9
	Under Graduate	88	67.6
	Post Graduate	30	23
	Total	130	100.0
Occupation	Business	55	42.3
	Salaried	70	53.8
	Home Maker	5	3.84
	Total	130	100.0
Income	Below 10000	12	9.23
	10001-20000	43	33.0
	20001-30000	39	30
	Above 30000	36	27.6
	Total	130	100.0

In table 1, among the sample size drawn from the population, 65.3% of sample occupied by Male respondents and 34.7% of the respondents were females. Also, it is observed that, out of 130 respondents, 98 were married and 32 were unmarried. Majority of the respondents i.e., 67.6% have completed graduation and 23% respondents possess post-graduation followed by diploma holders with 16.9%.

Results are portraying frequency distribution of the respondents with respect to Monthly Income. Out of 130 respondents, 43 (33.1%) are having their income between 10001-20000/-, 39 (30%)

respondents are earning in the range between 20001 - 30000/-. The respondents whose income is in the range of above 30000 are 36 (27.6%). Just above 9.23% of the respondents were recorded as below 10000 income.

Cronbach's Alpha

Cronbach's Alpha reliability test was done to check the reliability of each dimension of price difference, charging infrastructure, environmental concern, speed and purchase decisions.

Table 2 Reliability Test

Reliability Statistics	
Cronbach's Alpha	No. of Items
.813	5

The alpha coefficient for the items is .813, suggesting that the variables have relatively high internal consistency. Since the calculated Cronbach's alpha values are higher than 0.7, the

research can rely on the collected data for testing the research hypotheses.

Table 3: Correlations

Correlations					
		Price Difference	Charging infrastructure	Environmental concern	Speed
Price Difference	Pearson Correlation	1			
	Sig. (2-tailed)	.000			
	N	130			
Charging infrastructure	Pearson Correlation	.861**	1		
	Sig. (2-tailed)	.000			
	N	130	130		
Environmental concern	Pearson Correlation	.943**	.843**	1	
	Sig. (2-tailed)	.000	.000		
	N	130	130	130	
Speed	Pearson Correlation	.696**	.488**	.714**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	130	130	130	130
**. Correlation is significant at the 0.01 level (2-tailed).					

The above table 3 explains about the co-relation between the price difference, charging infrastructure, environmental concern, speed and purchase decisions. There is a positive correlation of 0.586 between price difference

and charging infrastructure. There is a strong and positive co-relation of 0.943 between environmental concern and price difference. A positive co-relation of 0.696 was found between price difference and speed.

Factors Influencing on Purchase of E-Vehicles

measure the factors, the regression model is applied.

Present research paper is attempting to find the factor influencing on purchase of e-vehicles. To

Table 4: Model Summary

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	0.681	.837	.213		3.65523

The regression model summary shows that the R value is 0.681 and adjusted R square value is 0.837 (83%). This indicates that 21.3% of the variation of purchase of e-vehicles explained by

price difference, charging infrastructure, environmental concern, speed. The result of ANOVA test is given below.

Table 5: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	293.294	4	199.714	117.873	0.000
	Residual	177.561	125	2.913		
	Total	470.855	129			

The ANOVA table shows the fitness of the model. The calculated F value (117.873) from the ANOVA test shows fitness of the model (p-0.000). The significance values are less than 0.05. Hence, the null hypothesis is rejected. Study concluded that the factors i.e., price difference, charging infrastructure, environmental concern, speed are significantly influence on the purchase of e-vehicles.

Conclusion

The present study covered factors influencing on purchase of e-vehicles in South India. The model which the researcher had taken in the present study is taken with literature support. It found that there is positive correlation between the variables. From the study it was observed that maximum number of respondents are aware of e-vehicles but still they are not convinced

enough to buy it. So various promotional activities need to be taken in order to increase the awareness level & thereby increase the sales. Study concluded that the factors i.e., price difference, charging infrastructure, environmental concern, speed are significantly influence on the purchase of e-vehicles.

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