Original Research Article

A key Factor for purchasing Electric two wheeler, An analysis in Coimbatore city

ABSTRACT

Aim: The aim of the study was to examine which factor is influencing to purchase decision of respondents about electric two wheelers. primary data has been collected from 120 respondents through interview using well-structured questionnaire from Coimbatore district of Tamil Nadu. Factor analysis is used to know the clear picture about major influencing factor used as a deciding factor for purchase of electric two wheelers. The conclusion of this study was which factor is influencing to purchase decision of respondent about electric two wheelers. Electric two wheeler are protecting the global from Environmental issues. From this study the respondents will know and they are shifting to battery based vehicles or bikes because some of respondents are concerns about environmental issue and society are stating that the COVID-19 pandemic has heightened awareness and concern about environmental issues.

Key words: Electric two wheeler, factor analysis, environmental issue.

1. INTRODUCTION:

While the rapid expansion of the global economy and technology has advanced human civilization, it has also wreaked havoc on the natural environment around the world [1]. China, as the world's largest oil importer [2], desperately requires alternative energy sources. Solar energy, hydrogen fuel, and nuclear power, on the other hand, are technologically advanced and cannot achieve large-scale production in a short period of time. Electric energy, being a viable energy option at the moment, has the potential to reduce the country's reliance on oil resources to a certain extent [3]. The massive increase in automobile ownership and use [4] is one of the leading causes of environmental pollution. According to the International Energy Agency (IEA), there are approximately 1 billion vehicles on the road today, which consume approximately 60 million barrels of oil per day (roughly 70% of total oil production); private vehicles consume approximately 36 million barrels per day, emitting 14 million tonnes of carbon dioxide [5]. As a result, replacing outdated automobiles with new energy vehicles is one of the solutions to environmental problems [6]. The Chinese government has selected a policy of pure electric driving technology since the publication of the "Energy Saving and New Energy Vehicle Industry Development Plan (2012–2020)" by the General Office of the State Council. The electric car market in China has risen significantly, making China the biggest electric vehicle market in the world [7,8]. Hence, study on the state of electric cars in China is extremely relevant and of reference value for other nations to develop electric vehicles. From an energy standpoint, more plentiful energy sources for automobiles will enhance the dependability and balance of energy use. Coupled with the intelligent development of electric cars, traffic situation and road utilization will be considerably improved [9]. The IEA (2017a) has revealed that, based on vehicle fuel cycle estimates, electric passenger cars in Europe in 2015 released 50 percent less carbon dioxide than gasoline vehicles and 40 percent less carbon dioxide than diesel vehicles. When emissions connected to vehicle production are addressed, carbon dioxide emissions are lowered [10]. In comparison to internal combustion engine vehicles, Ellingsen et al. clearly stated that, when evaluating

the full life cycle of vehicles (manufacture, use, and scrap), pure electric vehicles can reduce greenhouse gas emissions by about 30% under the current European electricity production structure. With the entire life cycle of cars taken into account, the reduction might be much bigger for countries with carbon-intensive power generating infrastructures (such as India and China) [11]. Electric automobiles will become the key development trend of the future automotive industry as a result of the dual pressures of resource reduction and environmental change. As a result, producing low-carbon, energy-saving, and intelligent electric automobiles to reduce environmental impact is a huge challenge. In order to promote the market penetration of electric vehicles and provide benchmark recommendations for future research teams, this article investigates customers' perceptions of electric vehicles in an uncertain world and explores the elements impacting consumers' awareness of electric vehicles.

2. MATERIALS AND METHODS:

Simple random and purposive sampling technique was used to collect the data from the respondent. Primary data has been collected from 120 respondents through online interview using well-structured questionnaire. The survey was carried out in Coimbatore district of Tamil Nadu. The data collected was analyzed using the Statistical Package for Social Sciences (SPSS). To satisfy the objective, Exploratory Factor Analysis (EFA) was used with following statements.

Table.1 List of Variables

Price
References
Beneficial financial or insurance options
Positive environmental effect
New trends
Cheaper in operation
Promotion
Test drives
Low noise level
Limited range
Lack of consumer choice
Unwillingness to change a lifestyle
Price
Lack of trust to new technologies

The responses for the statements were measured using a five-point scale from ''strongly encouraging'' to ''strongly not encouraging'' (Strongly Encouraging=5, Encouraging= 4, Neutral= 3, Not Encouraging=2, Strongly Not Encouraging=1).

3. RESULTS AND DISCUSSION:

Exploratory Factor Analysis was applied in this study using principal component analysis with varimax rotation. The goal of using Exploratory Factor Analysis with Principal Component Analysis is to get as

much variation from the concept as possible. It covers correlation testing with Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity.

Table.2 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.650
Bartlett's Test of Sphericity	Approx. Chi-Square	440.466
	df	91
	Sig.	.000

From **Table 2** the KMO index of sampling adequacy is 0.650, indicating that the data is appropriate for factor analysis. According to Tabachnick and Fidell (2007), values more than 0.5 are appropriate for factor analysis, whereas values less than 0.5 are unsuitable. From the Bartlett's test, the value of chi-square is 440.466 with the degree of freedom is 91 with significance ($p<0.000$) which demonstrating the data is suitable for factor analysis.

Table.3 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.007	21.481	21.481	3.007	21.481	21.481	2.331	16.647	16.647
2	2.476	17.688	39.170	2.476	17.688	39.170	2.240	15.997	32.645
3	1.591	11.367	50.537	1.591	11.367	50.537	1.788	12.769	45.414
4	1.050	7.501	58.038	1.050	7.501	58.038	1.767	12.624	58.038
5	.969	6.925	64.963						
6	.925	6.610	71.573						
7	.774	5.528	77.101						
8	.749	5.348	82.449						
9	.567	4.050	86.500						
10	.530	3.789	90.288						
11	.430	3.072	93.360						
12	.394	2.817	96.177						
13	.284	2.029	98.206						
14	.251	1.794	100.000						

Extraction Method: Principal Component Analysis

Table 3 displays the Eigenvalue as well as the proportion of variation. Items with Eigenvalues higher than one are kept for interpretation. The first component accounts for 21.48 per cent of the

variance, the second for 17.68 per cent, the third for 11.36 per cent, the fourth for 7.50 per cent, the fifth for 6.92 per cent, the sixth for 6.61 per cent, and the seventh for 5.52 per cent of the variance, with Eigenvalue more than one for all the factors. As a result, the all seven variables are retained for interpretation, which totally explained 58.038 percent of the variation

Table.4 Rotated Component Matrix

Variables	Component			
	1	2	3	4
Price	.772	-.137	-.011	-.126
References	.720	-.245	-.084	-.364
Beneficial financial or insurance options	.388	.415	.221	.259
Positive environmental effect	.343	-.071	.236	-.645
New trends	.283	.116	.274	.558
Cheaper in operation	-.022	-.580	.033	-.259
Promotion	-.109	.169	.209	.676
Test drives	.267	-.687	.160	-.204
Low noise level	.582	.206	-.029	.426
Limited range	.580	.230	.158	.027
Lack of consumer choice	.253	.668	.073	.145
Unwillingness to change a lifestyle	-.039	.763	.112	-.123
Price	-.113	.083	.849	.199
Lack of trust to new technologies	.175	-.046	.875	-.019

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 4 illustrates the rotated component matrix obtained by employing a principal component analysis technique for variable extraction using the varimax rotation method. It offers the factor loading by rotating the variables, and the higher the loading, the variable is a pure measure factor. The items are

rotated and grouped under a factor that is associated with one another, yielding seven factors with factor loadings greater than 0.3.

Table.5 Components Extracted

Components	Factor Names	Variance explained	Factor Loadings	Variables
1.	Price	21.48	.772	Price
			.720	References
			.582	Low noise level
			.580	Limited range
2.	Promotions, offers and development	17.68	.283	New trends
			-.022	Cheaper in operation
			-.109	Promotion
			.267	Test drives
3.	Consumers needs and Environment concern	11.37	.388	Beneficial financial or insurance options
			.343	Positive environmental effect
			.253	Lack of consumer choice
			-.039	Unwillingness to change a lifestyle
			-.113	Price
			.175	Lack of trust to new technologies

From Table.5, it is concluded that the factor 1 described that price of Electric two wheeler which is named as Price. This factor includes the variables such as “Price”(.772), “References”(.720), “Low noise level”(.582), “Limited range”(.580)

Factor 2 is described as business development services needed at the beginning of the Sales of Electric two wheeler, hence, it is named as Promotions, offers and development. This factor includes the variables such as “New trends”(.283), “Cheaper in operation”(.022), “Promotion”(.109), “Test drives”(.267).

Factor 3 is described as Environmental concerns needed Conventional two wheeler usage in roads, hence, it is named as Consumers needs and Environment concern. This factor includes the variables such as “Beneficial financial or insurance options”(.388), “Positive environmental effect”(.343), “Lack of consumer choice”(.253), “Unwillingness to change a lifestyle”(.039), “Price”(.113) and “Lack of trust to new technologies”(.175).

4. CONCLUSION:

The aims of this study to analyze the consumers’ propensity to buy electric two wheelers. We evaluated the deciding variables including the Price, References, Beneficial financial or insurance options, Positive environmental effect, New trends, Cheaper in operation, Promotion, Test drives, Low noise level, Limited range, Lack of consumer choice, Unwillingness to change a lifestyle, Lack of trust to new technologies. The government’s financial incentives may successfully stimulate the adoption of electric two wheelers by Indian customers. Indian customers have increasing environmental awareness that supports Indian consumers to acquire electric two wheelers as their transportation. The purpose of this study was to find out the factors influencing among customers to purchasing electric two wheeler in Coimbatore city. From this study we can conclude that Factor 1 (Factor value are >0.5) it includes Price, References, Low noise level and limited range, these factors are mostly influenced among customers to purchase electric two wheelers.

5. SUGGESTIONS:

There are various drawbacks in this study: firstly, because to the constraints of resources, we have only evaluated six key possible affecting variables based on RCT. In reality, there are additional elements that may impact the Indian consumers’ buying willingness, for example, fuel savings (Krupa et al., 2014), performance qualities (Wang and Liu, 2015), etc. Secondly, India is a developing nation. It is unavoidable that the difference between the affluent and the poor in various cities is significant, particularly the gap between first-tier cities and other cities. However, in our sample, the share of first-tier cities accounted for 63.9 percent . This may have a little influence on the outcomes. Thirdly, the relationship between purchase cost and government financial incentives are disregarded while researching the key elements of electric car acquisition. Both the buying cost and government financial incentives are not merely monetary variables, but also are restrictions. Obviously, the interacting connections between them may be complex since the availability of financial incentives might lower the cost of purchasing. In addition, the data demonstrate that the Intention of Indian customers to acquire

electric cars has no significant link with the purchasing cost. But the government's financial incentives have a good influence on Indian propensity to acquire electric automobiles. Thus, it is questionable if there are other links between them. Furthermore, this study just focuses on India market, it would also be essential to perform future research on a worldwide scale.

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