A Study about the Intension to Purchase Electric Two-Wheelers in the State of Tamil Nadu

N. Deepa [1]*, Dr. S. Paneer Selvam [2]

[1] Research Scholar, Department of Commerce, SPIHER, Chennai, Tamil Nadu, India
[2] Professor, Department of Commerce, SPIHER, Chennai, Tamil Nadu, India
[1] deepa.91n@gmail.com, [2] dr.s.panneerselvam@gmail.com
*Corresponding Author E-mail: deepa.91n@gmail.com

Article History	Abstract
    	Although the market for electric vehicles (EVs) has grown dramatically in recent years, they still make up a very small portion of every new vehicle sold worldwide. Over one percent of all two- wheelers sold in 2023 were electric. Thus, it is necessary to research the adoption of electric two- wheelers (E2W). A behavioral model of electric two-wheeler adoption intention is developed in this study. The goal of the current study was to determine the variables that affect customers' preferences to purchase electric two-wheelers. Using the questionnaire approach, 182 valid answers were gathered. The study hypothesis was tested using partial least squares structural equation modelling (PLS-SEM). *The research findings show that customers' opinions towards electric two-wheelers are strongly influenced by social influence, perceived economic gain, charging infrastructure, and environmental concern. The consumer's intention to buy an electric two-wheeler is also highly influenced by their attitude. It was discovered that the primary factor driving people to buy electric two-wheelers was perceived economic benefits. The results of this study also indicate that women are more likely than males to buy electric two-wheelers. Governments and manufacturers of electric two-wheelers can better understand customer behaviour towards electric two-wheeler purchases with the help of these data.* **Keywords:** *Electric Vehicles, Green Consumption Behaviour, PLS-SEM, Two-wheelers.*

1. INTRODUCTION

The market share of electric vehicles (EVs) has grown dramatically in the last few years, although they still make up a very small portion of all new cars sold worldwide. Although they are still in their infancy in India, electric vehicles (EVs) are revolutionizing the road transport industry. Sales of unique cars reached 10 million worldwide in 2020, yet they made up just 1% of total sales. With 25 million of them, electric two-wheelers (E2W) will be the most popular form of EV in 2020, mostly because of rising demand in Asian nations. Because of emerging nations like China, Japan, and India, the largest market for electric two-wheelers is in Asia. Two-wheelers make up the majority of the Indian automotive market, accounting for over 80% of all sales.

In an effort to lessen air pollution, the Indian government has set an aim that by 2030, thirty percent of all cars sold there would be electric. The SIAM reports that 15,119,387 two-wheelers were sold in India in 2020–2021, with 143,837 of them being electric. Less than 1% of all two- wheelers sold in 2021 were electric. In India, electric two-wheeler (E2W) adoption is quite low, even with a number of government efforts. Inadequate charging facilities, high upfront prices, range anxiety, and expensive battery replacement costs are all contributing factors to India's declining rate of EV two-wheeler adoption.

2. STATEMENT OF PROBLEM

Since vehicles produce no carbon emissions, electric vehicles have grown in favour as a more environmentally friendly option to gasoline-powered automobiles. Electric two-wheelers are far quieter, produce less pollution, and are more efficient than gasoline-powered two-wheelers. However, there is still a long way to go before electric bikes are widely used, and more study is needed to determine whether or not customers would embrace

2570

this new product. The main issues with electric cars are their expensive batteries, which have a restricted driving range because of their limited ability to charge, and their lengthy recharging times. Numerous studies on the subject of consumers' acceptance of hybrid and electric vehicles have been published.

3. REVIEW OF LITERATURE

According to research by Russell A. (2002), the market for motorcycles seems bright, with young people, pensioners, and enthusiastic baby boomers among the prospective customers. The study outlines a potential rental infrastructure as well as some of the present and upcoming models appropriate for the Indian market. Federal law already exists about pedaled. These motorcycles are allowed.

According to research by Weinert, Jonathan X. (2007), advancements in the technology of rechargeable valve-regulated lead-acid (VRLA) batteries, the main battery type for e-bikes, have contributed to the expansion of e-bikes. Future market expansion for this form of transportation in China and elsewhere will be impacted by technological advancements and the switch from VRLA to Li-ion (Li-ion) batteries. To determine whether switching from VRLA to Li-ion battery e- bikes is feasible, the cost and performance of the batteries for these two varieties are contrasted. The specifications for e-bike batteries are evaluated.

According to Cherry, Christopher (2010), electric bikes are becoming more and more popular worldwide, and some have even stated that shared electric bikes might offer an even better quality of service than current models. The electric-assisted range, the protocol for recharging, and the bike and battery checking processes are some of the particular difficulties that come with shared electric motorcycles. With an emphasis on system design, operational principles, and battery management, this paper describes the system requirements needed to create and implement an electric bike sharing system successfully.

According to Ramachandran Alamelu (2015), e-bikes use around 18 times as much energy as SUVs, 13 times as much as sedans, and 6 times more than train transportation. They are also thought of as an upgraded version of traditional bicycles. It is an economical innovation approach that contributes to health rehabilitation programmes and offers a safe, carbon-free environment. To balance the energy environment, societal, economic, political, and infrastructural systems must work together.

4. OBJECTIVES OF THE STUDY
1. To know the consumer intention about the Electric Bikes
2. To study about the majority preference while buying Two-wheelers.
3. To analyze the consumer perception while purchasing Electric Bikes

5. HYPOTHESES OF THE STUDY

● Environmental awareness has a beneficial impact on consumers' perceptions of electric two-wheelers.
Both primary and secondary data are used in this investigation. Using a questionnaire, the owners of electric two-wheelers provided the key data. The secondary data were gathered from newspapers, books, journals, magazines, records, bulletin boards, and the internet.

Both of the original data and secondary data have been examined by the application of SPSS. This research is limited to Tamil Nadu. 275 sample respondents were chosen using the most practical sampling technique. The study's primary focus is on Tamil Nadu's young who possess electric two-wheelers. India is among the locations where the demand for electric two- wheelers is particularly strong. Most likely, the information was gathered from the variety of college students arriving on electric bikes.

For the study, a single set of questions was created. Customers who have previously purchased electric two-wheelers were the subject of the respondents' research, which also measured their reasons for their purchase. The study project includes a non-probability convenience sampling approach. 275 respondents' worth of data were gathered online with the use of Google forms.

6. ANALYSIS

A statistical technique called Exploratory Factor Analysis (EFA) is be used to determine the underlying structure of a sizable collection of variables. Here, the data has been condensed into a smaller collection of summary variables, allowing for the exploration of the phenomenon's underlying theoretical framework. Due to the lack of a preliminary hypothesis on the causes or patterns of the observed variables, this approach was employed.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.647
Bartlett's Test of Sphericity	Approx. Chi-Square	1587.210
	df	48
	Sig.	.000

Communalities

	Initial	Extraction
brand reliability	1.000	.767
good braking system	1.000	.857
headlights and visibility	1.000	.821
engine kills with and es	1.000	.777
cheap maintenance cost	1.000	.718
engine pick up	1.000	.762
goods mileage	1.000	.776
availability of genuine parts	1.000	.783
innovative product features	1.000	.756
looks and styles	1.000	.747
employee performance management	1.000	.757

Extraction Method: Principal Component Analysis All the eleven elements have the communalities values of more than 0.7.

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	3.155	35.245	30.876	4.349	36.535	47.743	4.662	46.788	25.546
2	2.543	46.017	48.748	3.411	24.637	55.645	3.474	24.557	43.657
3	2.026	27.579	66.637	2.560	12.768	64.455	2.385	13.435	85.778
4	.435	5.909	84.464						
5	.567	4.469	93.285						
6	.356	3.892	91.496						
7	.367	3.748	63.867						
8	.389	3.257	52.647						
9	.386	2.587	44.577						
10	.257	2.158	66.489						
11	.174	1.763	100.000						

Extraction Method: Principal Component Analysis

The total variance explained value percentage is 85.887 that shows that the study explains it validity more than 85 percent level.

Rotated Component Matrix[a]

	Component		
	1	2	3
headlights and visibility	.942		
good braking system	.854		
brand reliability	.860		
engine kills with and es	.877		
engine pick up		.856	
goods mileage		.845	
cheap maintenance cost		.776	
availability of genuine parts		.744	
looks and styles			.861
employee performance management			.846
innovative product features			.830

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

The Kaiser-Meyer-Olkin measure of Sampling Adequacy is a statistic that indicates the proportion of variance in variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis may be useful with the data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful. KMO values between 0.50 and 1 indicate the sampling is adequate.

The null hypothesis is accepted, the 11 items are grouped under 3 constructs.

Reliability Statistics

Cronbach's Alpha	N of Items
.735	11

	Mean	Std. Deviation	N
brand reliability	3.57	1.554	279
good braking system	3.47	1.453	279
headlights and visibility	3.67	1.344	279
engine kills with and es	3.36	.526	279
cheap maintenance cost	3.63	1.654	279
engine pick up	3.34	1.777	279
goods mileage	3.67	1.446	279
availability of genuine parts	3.76	1.766	279
innovative product features	3.33	.433	279
looks and styles	3.64	.665	279
employee performance management	3.75	1.443	279

A Study about the Intension to Purchase Electric Two-Wheelers in the State of Tamil Nadu

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
56.24	46.660	4.844	11

Reliability Statistics

There are the values showed that all the items are having the cronbach's alpha value of more than 0.7, all the items are having enough validity to continue the research.

Cronbach's Alpha	N of Items
.943	4

Items Statistics

	Mean	Std. Deviation	N
brand reliability	3.55	1.156	279
good braking system	3.43	1.086	279
headlights and visibility	3.66	1.036	279
engine kills with and es	3.47	.985	279

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
brand reliability	11.57	7.676	.775	.874
good braking system	11.66	8.064	.816	.857
headlights and visibility	11.74	7.886	.845	.858
engine kills with and es	11.52	8.457	.775	.964

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
16.46	14.469	2.434	4

Reliability Statistics

Cronbach's Alpha	N of Items
.846	4

Item Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
cheap maintenance cost	10.65	8.872	.667	.795
engine pick up	11.33	7.753	.745	.736
goods mileage	11.64	7.646	.665	.765
availability of genuine	11.77	8.565	.545	.817

parts				

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
14.54	13.656	3.656	4

Reliability Statistics

Cronbach's Alpha	N of Items
.757	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
innovative product features	7.54	3.467	.575	.745
looks and styles	7.34	3.245	.664	.675
employee performance management	7.56	3.065	.676	.707

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
11.45	6.543	2.436	3

7. IMPLICATIONS

The demand for transport is growing more and more urgent. The greatest option given the increasing strain on the public transit system is personal mobility, which makes e-bikes the perfect choice. As a result, producers of e-bikes ought to design their models with the demands and preferences of their customers in mind. Put simply, the growing consumer demands for automobiles with minimum maintenance and battery efficiency will determine the fate of many producers. The recommendations made in the article will assist the producers in producing E- bikes that meet consumer demands.

The survey shows that when it comes to purchasing e-bikes, preference patterns are significant. However, men see things differently than women do, and they are more interested in two- wheelers. Explanatory research is conducted to investigate the understudied segment of E-Bike users, with a particular emphasis on the youth population in Tamil Nadu. The owners of E-bikes who participated in the research helped us understand why they were purchasing E-bikes and showed us how important preference patterns are. The market for electric bikes will lean more towards the extra features, which are considerably more likely to be pollution-free and environmentally good.

References

Francisco Manzano-Agugliaro (2018), The Research Gate, The Electric Bikes: Worldwide Research Trends, pp 354-435

Pramod Wadate (2019), The Research Gate, A Study of Electric Bikes – Future Needs 5(2) pp 1023-5433

John MacArthur (2021), trec.pdx.edu: E-Bikes Incentive Programs and Research 1 (2) pp 345 987

Elliot Fishman (2016), Science Direct: E-Bikes in the Main Stream; Reviewing the decade of Research 2 (2) pp 567-098

Leonard Arning (2023), Sage Journals: Review of Current Practice and Research on E-Bikes in Transport Models Vol II pp 745-075