A Study on Consumers' Satisfaction towards E-Vehicle in Tiruppur City

Dr. P. Janaki
Associate Professor and Head
Department of Commerce (Banking and Insurance)
Vellalar College for Women (Autonomous), Erode

Ms. K. Mounaarthi
Ph.D Research Scholar, Department of Commerce
Vellalar College for Women (Autonomous), Erode

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Abstract

Travel has come a long way from the days of walking to the numerous modes of contemporary transportation used in today's globalized society. India has the 3rd largest road network in the Earth; more than half the average people seem to prefer to travel by road. Now-a-days, the people are using different vehicles that make poisonous gases, dust and leads to global warming. Elevated fuel taxes could educate consumers to purchase electric or fuel-efficient vehicles, or perhaps avoid driving altogether. An environmentally friendly electric bike with power assistance is referred to as an e-vehicle in this context. It is among the cycling industry's fastest-growing technologies. Nowadays, electrified bicycles are used in the majority of nations. Although using a bicycle instead of a car is always better for the environment, the largest green transportation innovation of the past ten years is the electric bike. At some point, the marketplace for electric two - wheelers is anticipated to grow faster. In this situation, the current learning aims to assess a study on consumer fulfillment with e-vehicles. The primary data was gathered in order to reveal the respondents' basic characteristics, degree of satisfaction, and problems that respondents experienced with e-vehicles. Statistical procedures such as weighted average score ranking analysis, the chi - square investigation, and simple percentage study have been used toward assess the original data that was gathered. It was found that 68% of respondents are only moderately satisfied with e-vehicles

Introduction

From the days of walking to the many modern modes of transportation available in today's globalized world, travel has advanced significantly. Travel time has been decreased as a result of the development of transportation. Transportation-related scientific innovations are always developing. Research and development is heavily used in the high-power automobile, bullet train, and aviation industries to improve vehicle performance. Numerous brands and models of automobiles have been utilized for transportation around the nation. Over the past few centuries, a variety of transportation methods have contributed to the acceleration of life.

In India, which has the 3rd - largest road network in the earth, more than half of the average person's choice is to travel by road. People use many cars these days, which contribute to global warming by producing

dust and harmful pollutants. Higher fuel taxes may encourage people to purchase electric or fuel-efficient vehicles or, better yet, to abstain from driving altogether.

An environmentally friendly electric bike with power assistance is referred to as an e-vehicle in this context. It is among the cycling industry's fastest-growing technologies. Our lives have become better with time and technology. Nowadays, electrified bicycles are used in the majority of nations. It is anticipated that the market for electric two-wheelers would eventually grow. All of the two-wheelers currently on the market contribute to pollution, and the cost of their fuel is rising daily. A suitable solution is required to offset the fluctuating fuel prices and reduce the elevated pollutant levels.

Statement of the Problem

Due to the nation's constantly growing population, e-vehicles are essential in the modern day. Consequently, there will be an increased requirement for automobiles, which will increase the need for gasoline. The ongoing consumption of fuel will result in a scarcity. The introduction of e-vehicles is made possible by all of these factors. The fact that e-vehicles don't generate pollutants due to their drivers' lower CO emissions makes them environmentally friendly. Compared to traditional gasoline or diesel automobiles, e-vehicles require less maintenance. Consequently, operating an e-vehicle has a comparatively low annual cost. Due to the absence of an engine, e-vehicles are able to operate silently.

In the current competitive market, producers must take into account the opinions and satisfaction of their customers. The ultimate goal of every company is to satisfy its customers. Consumer happiness is the primary determinant of the business's existence and expansion. The company's objective is to satisfy its customers' wants and requirements. Customer happiness is a key performance indicator and a fundamental way that business strategies differ from one another. The current study aims to analyze A Study on Consumers Satisfaction towards E-Vehicles in this regard. The following queries are addressed in this study:

- How far the respondents have awareness about e-vehicle?
- What are the driving forces behind the consumer's preference for electric vehicles?
- What is the consumer's attitude toward e-vehicles?
- To what extent do consumers feel satisfied with e-vehicles?
- What are the issues that consumers have with e-vehicles?

The Study's Objectives

The following objectives are sought to be achieved in the study:

- To assess the awareness level among potential consumers regarding e-vehicles.
- To determine the factors influencing the consumers intentions to purchase e-vehicles.
- To measure the level of consumer satisfaction regarding e-vehicles.
- To explore the obstacles hindering widespread adoption of e-vehicles.
- To present the findings and provide suitable suggestions.

Research Scope

This study attempts to evaluate Tiruppur City's e-vehicle buyers' satisfaction. The purpose of the study is limited to the analysis of respondents' attributes, satisfaction level, the elements that affect their preferences towards e-vehicles, their level of contentment, and the problems they face with e-vehicles.

Review of Literature

Ishinder Singh Ahulwalia et al.,(2023)1 examined that generation Z partiality towards electric two wheeler : A study on rising nation. The study focused on behavioural intention of the Z generation for the acceptance of new technology products i.e., electric two wheeler and the factors considered to be vital for the purchase of e-vehicle. Common factor analysis [CFA] and structural equational modelling through IBM SPSS 20 was adopted to find the empirical fit with hypothesis framed. It was found that the manufacturers' credibility and the facility conditions influence the purchase decision of buying the electric two wheeler.

Chirag Roval et al.,(2023)2 studied that consumers' awareness towards electric two wheelers in the Patan city. The need for the study were to create awareness among the consumers about the benefits of electric two wheeler which provide long term benefits of less running and maintenance cost and saving the environment. It was found that the maximum numbers of consumers own electric two wheeler, there was no strong awareness about government initiatives towards electric two wheeler and functional benefits of electric two wheeler.

Hypothesis

Based on the above objectives, the following hypothesis has been developed and tested:

Ho1 = The degree of consumer satisfaction with e-vehicles does not significantly correlate with any of the following independent variables: age, gender ,marital status, level of education, occupation, monthly income, type of family, and place of residence.

Research Methodology

Study technique is a systematic approach to explaining research problems. It contains the most typical study design, sampling strategy, data gathering method, and analytic method.

Investigation Area

The studies on consumers' satisfaction towards e-vehicle have been limited to the respondents' in Tiruppur town.

Phase of the Study

Investigation was conducted between January 2024 and March 2024.

Sampling Design

The study uses the convenient sampling method. The sample size is determined by the number of objects chosen from the entire society. 50 respondents were chosen as a sample to conduct the current study in Tiruppur City.

Sources of Data

The study's necessary data was gathered from two sources. They are

1. Basic information
2. Secondary information

Basic Information

Through the use of a questionnaire, information was gathered from e-vehicle consumers in January 2024.

Secondary Information

The secondary information was gathered from various publications, periodicals, and websites in addition to the source data in categorize to showcase e-vehicle.

Limitations of the Study

- Time is a major limitation, the wide-ranging study is not possible mostly due to time constrain
- Data specified by the Participants are inadequate to their own opinion, perception, knowledge, emotion, awareness and feelings.
- Study is limited to the selected sample of Tiruppur city and hence the results of the study cannot be comprehensive.

Socio - Economic Profile of the Respondents - Simple Percentage Analysis

Features of the demography, including marital status, gender, age, educational background, employment grade, monthly family earnings, family type, and dwelling location, were used to divide the responses. The respondents' socioeconomic profile is given away in the Table 1.

Table 1

Gender	**Number of participates**	**Percentage**
Male	27	54
Female	23	46
Total	**50**	**100**
Age	**Number of participates**	**Percentage**
Upto 20 years	15	30
21 - 30 years	17	34
31 - 40 years	9	18
Above 40 years	9	18
Total	**50**	**100**
Marital Status	**Number of participates**	**Percentage**
Married person	26	52
Unmarried person	24	48
Total	**50**	**100**
Educational Background	**Number of participates**	**Percentage**
School Education	6	12
Under Graduate	19	38
Post Graduate	17	34
Others	8	16
Total	**50**	**100**
Occupational Status	**Number of participates**	**Percentage**
Employee	10	20
Businessman	7	14
Professionals	7	14
Others	26	52
Total	**50**	**100**
Monthly Family Income	**Number of participates**	**Percentage**

Upto 20,000	15	30
Rs.20,001 – Rs.50,000	10	20
Rs. 50,001-1,00,000	17	34
Above 1,00,000	8	16
Total	**50**	**100**
volume of the Family	**Number of participates**	**Percentage**
Upto 3 members	11	22
4-6 members	23	46
Above 6 members	16	32
Total	**50**	**100**
Area of residence	**Number of participates**	**Percentage**
Rural	19	38
Semi-urban	24	48
Urban	17	34
Total	**50**	**100**
Source of understanding	**Number of participates**	**Percentage**
Advertisement	14	28
Social media	14	28
Friends/Relatives	16	32
Others	6	12
Total	**50**	**100**
Reason for the selection	**Number of participates**	**Percentage**
Economical	17	34
Environment friendly	16	32
Government Incentives	10	20
Others	7	14
Total	**50**	**100**
Place to purchase	**Number of participates**	**Percentage**
Showroom	23	46
Direct second hand	8	16
Online apps	15	30
Others	4	8
Total	**50**	**100**
Brand owned	**Number of participates**	**Percentage**
Revolt	11	22
Hero electric	10	20
Ather electric	10	20
Bajaj electric	10	20
Ola electric	6	12
Others	3	6
Total	**50**	**100**

Price Range	Number of participates	Percentage
Rs.50,000 – Rs.1,00,000	14	28
Rs.1,00,001 – Rs.1,50,000	25	50
More than Rs.1,50,000	11	22
Total	**50**	**100**
Features	**Number of participates**	**Percentage**
Acceleration	4	8
Quiet Operation	8	16
Cost Saving	14	28
Environmental impact	12	24
Advanced Technologies	12	24
Total	**50**	**100**
Using	**Number of participates**	**Percentage**
Less than 1 year	20	40
1 – 3 years	14	28
More than 3 years	16	32
Total	**50**	**100**
Maintenance cost	**Number of participates**	**Percentage**
Lower	15	30
Similar	22	44
Higher	13	26
Total	**50**	**100**
Mileage	**Number of participates**	**Percentage**
60 – 80km	5	10
80 – 100km	17	34
100 – 120km	15	30
Above 120km	13	26
Total	**50**	**100**
Charging Infrastructure	**Number of participates**	**Percentage**
Home charging	15	30
Public charging	11	22
Both	18	36
Others	6	12
Total	**50**	**100**
Charging Time	**Number of participates**	**Percentage**
2 – 3 hours	11	22
2 – 5 hours	14	28
5 – 7 hours	15	30
above 7 hours	**10**	**20**
Total	**50**	**100**

Source: Basic information

The Socio - economic profile of the respondents indicates that,

- The common of respondents (54%) are men.
- The greater part of respondents (34%) is between the ages of 32 and 30.
- Most of the participates (52%) are married.
- Most of the participates (38%) have an undergraduate degree.
- Of the respondents, the majority (52%) are others.
- The monthly income of the bulk of respondent families (34%) falls between Rs. 50,001 and Rs. 100,000.
- Four to six members make up the majority (46%) of the respondents.
- Most of the participates (48%) live in semi-urban areas.
- According to study-related characteristics, the respondents' profile shows that,
- Most respondents (32%) learned about it from friends or family.
- Economical considerations account for the majority of respondents' (34%) reasons for choosing electric vehicles.
- The common of participates (46%) prefer to buy in-store, while the greater part of respondents (22%) drive Revolts.
- Most respondents (50%) said that the pricing range for an electric vehicle is between Rs. 100,001 and Rs. 150,000.
- One notable characteristic mentioned by the majority of responders (28%) is quiet operation.

•Most of the respondents (40%) have been using electric vehicles for a smaller amount than a year.

- The majority of participates (40%) judge that the maintenance costs of electric and conventional vehicles are comparable.
- The majority of respondents (34%) said they preferred an electric vehicle with a range of 80 to 100 kilometers.
- Most respondents (36%) said that they prefer charging infrastructure that is both.
- Three to five hours is the preferred charging time for the majority of respondents (30%).

Factors Influencing the Consumer Towards Electric Vehicle – Weighted Avaerage Score Ranking Analysis

For the study purpose , the factors influencing the customers towards electric vehicles have been identified and are ranked as increased fuel cost, high performance, and concern for the environment, low maintenance, financial incentives, growing trends, tax benefits, lower insurance premiums, and lower registration costs. It has been analyzed in Table 2 by using the weighted decision matrix.

Table 2 Factors Influencing the Customers Towards Electric Vehicle

Weighted Points (w)	score	9	8	7	6	5	4	3	2	1	Total score (xw)	Weighted average score (∑wx)	Rank
Rank		I	II	III	IV	V	IV	VII	VIII	IX			
Factors													
Increased fuel cost	X	3	2	7	4	4	2	5	12	11	194	4.31	IX
	W X	27	16	49	24	20	8	15	24	11			
High Performance	X	3	4	4	5	9	4	5	9	8	219	4.86	VIII
	W X	27	32	28	30	45	16	15	18	8			
Concern for Environment	X	6	9	6	3	7	8	2	6	3	274	6.08	IV
	W X	54	72	42	18	35	32	6	12	3			

Low Maintenance	X	6	5	5	4	3	6	4	8	10	230	5.11	VI
	W X	54	40	35	24	15	24	12	16	10			
Financial Incentives	X	5	7	8	6	4	3	8	3	5	260	5.77	V
	W X	45	56	56	36	20	12	24	6	5			
Growing Trends	X	4	5	1	8	5	7	7	6	7	224	4.97	VII
	W X	36	40	7	48	25	28	21	12	7			
Tax benefits	X	5	9	10	3	9	4	4	2	4	286	6.35	II
	WX	45	72	70	18	45	16	12	4	4			
Lower Insurance premium	X	9	6	4	8	5	8	8	2	0	290	6.44	I
	WX	81	48	28	48	25	32	24	4	0			
Lower Registration Cost	X	9	3	5	9	6	7	7	2	2	279	6.2	III
	WX	81	24	35	54	30	28	21	4	2			
Total		50	50	50	50	50	50	50	50	50			

(**Note :** X= The Number of participant ; W = Weighted Score Point)

From analysis, it is clear that the lower insurance premium, tax benefits and lower registration cost are the most important factor that influence the customers towards electric vehicle

Total Satisfaction Level of the Respondents

The respondents' degree of satisfaction has been gauged using a three-point rating system. Additionally, the responders are divided into three levels: low, middle, and high. Table 3 displays it.

Table 3 Total Satisfaction Level of the Respondents

Stage of Satisfaction	No. of Respondents	Percentage
Low	10	20
Medium	34	68
High	6	12
Total	50	100

Source: Basic information

- 12 percent of those surveyed are very satisfied with e-vehicles.
- 68 percent of those surveyed are only moderately satisfied with e-vehicles.
- 20 percent of the participants express low satisfaction with e-vehicles.

Satisfaction Level of the Respondents towards E-Vehicle

Table 4 uses the Chi-Square Analysis at the 5 percent significant level to identify the degree of satisfaction with electric vehicles as Low, Medium, and High based on a variety of parameters.

Table 4

Variables	Level of Significant	Degrees of Freedom	Table value	Calculated Value	Result
Gender	5%	2	5.991	4.446	Accepted
Age	5%	6	12.592	7.424	Accepted
Marital Status	5%	2	5.991	0.38	Accepted
Educational Qualification	5%	6	12.592	5.293	Accepted

Occupational status	5%	6	12.592	2.424	Accepted
Monthly income	5%	6	12.592	9.279	Accepted
Size of the family	5%	4	5.991	13.178	Rejected
Place of residence	5%	4	9.488	7.443	Accepted

There is no significant correlation between respondents' fulfillment with electric vehicles and their level of education, gender, age, married status, monthly earnings, and occupation, as well as their family size and place of residence.

Problem Faced by the Consumer Towards Electric Vehicle – Weighted Avaerage Score Ranking Analysis

Customers' issues with electric vehicles have been identified and ranked for the study's purposes. These issues include the possibility of a fire accident, low mileage, short battery life, a lack of charging stations, expensive maintenance and repairs, high temperatures, and a limited selection of models. Table 5 presents the results of a weighted average score ranking analysis.

Table 5

Weighted Points (W) Score		**7**	**6**	**5**	**4**	**3**	**2**	**1**	**Total score (ΣW)**	**Weighted Average Core (XW)**	**Rank**
Rank		I	II	III	IV	V	VI	VII			
Factor											
Chances of fire accidents	**X**	10	7	9	5	8	6	5	218	7.78	I
	W X	70	42	45	20	24	12	5			
Lack of mileage	**X**	13	6	5	7	6	6	7	217	7.75	II
	W X	91	36	25	28	18	12	7			
Not long lasting battery life	**X**	4	6	6	7	5	10	13	170	6.07	VII
	W X	28	36	30	28	15	20	13			
Insufficient charging station	**X**	5	10	7	4	7	6	9	183	6.53	VI
	W X	30	60	35	16	21	12	9			
High maintenance and repairs	**X**	7	8	5	6	11	8	5	200	7.14	IV
	W X	49	48	25	24	33	16	5			
High temperature	**X**	6	6	9	7	8	8	6	197	7.03	V
	W X	42	36	49	28	24	16	6			
Limited models	**X**	4	9	8	14	5	5	5	208	7.42	III
	WX	28	54	40	56	15	10	5			
Total		50	50	50	50	50	50	50			

(Note : X= The Number of Participates; W = Weighted Score Point)

The analysis is clear that a maximum of the respondents are facing problems towards e-vehicles, such as chances of fire accidents, lack of mileage, and limited models

Suggestions

- It is inferred from analysis that most of the customers have spent Rs. 100,000 to Rs. 150,000 for purchasing e-vehicles. Hence, it is suggested that there is demand for affordable options in this price range, and the manufacturers should focus on producing e-vehicles within this price range with features that supply to the wants and preferences of potential buyers.
- It is found from the examination that the most of the respondents are purchasing the e-vehicle in showroom. Therefore, it is suggested that the dealers should significant reliance on physical interaction and experiential shopping and in order to increase the sales, they should create interactive displays, offering test drives and providing knowledgeable staff to assist consumers.
- From the research reveals the highest proportion of the buyer are awake of e-vehicle all the way through friends / relatives. Hence, it's recommended that the word-of-mouth marketing and personal recommendation in promoting e-vehicle and also investing in social media campaigns and community engagement initiatives can help to increase awareness among potential buyers.
- It is establish from the investigation that mass of the buyer have middle stage of fulfillment towards e-vehicle. Therefore, it is recommended that consider enhancing the charging infrastructure, offering incentives, improving battery technology for longer ranges and increasing education about the benefits of e-vehicle.
- From the analysis, it is inferred that the lower insurance premium is the most main factor that influences the customer towards e-vehicle. Hence, it is suggested that to attract more consumers, the government to implement supportive policies, taxes to make more affordable and increasing awareness about the environment benefits of e-vehicle.
- From the study most of the respondents are facing the problems towards e-vehicle. Hence, it is recommended that in order to decrease the danger of fire accidents consumer, the manufacturers must prioritize safety in battery design and construction by implementing thermal management systems.

Conculsion

The majority of buyers who are considering purchasing an electric vehicle do so out of concern for the environment and the pollution that internal combustion engines produce. Increases in the price of gasoline also worry them, which is one of the main reasons they want to switch to electric vehicles. Customers who are inclined to purchase an e-vehicle are also inclined to do so if the company allows them to trade in their existing vehicle for an e-vehicle. Additionally, they think that charging an e-vehicle is far less expensive than fueling a car that runs on gasoline or diesel. However, it also seems frantic to charge e-vehicle.The primary drivers of e-vehicle purchases are a lack of infrastructure and charging stations, as well as a lack of customer knowledge of e-vehicles. Improved infrastructure, awareness-raising initiatives, and e-vehicle marketing will undoubtedly aid this sector in breaking into the auto industry.Given the increasing levels of greenhouse gases in the surroundings, advancements in the e-vehicle industry in recent years are therefore both greatly welcomed and required.The economic, social, and environmental study sections demonstrate that the benefits of e-vehicles well exceed the drawbacks. Additionally, the development and success of this industry depend heavily on the global populace, and it is believed that education about the environment and mass marketing would empower and inspire people to drive electric cars. Every person can make a difference, so go electric and contribute to improving our environment.

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