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ANALYZING THE ROLE OF ECONOMIC BENEFITS IN SHAPING CONSUMER PREFERENCE FOR ELECTRIC TWO-WHEELERS IN SALEM CITY

[1]Ms. N. Sarvamangalaa, [2]Dr. B. Rajendran

[1]PhD Scholar (Part-Time), PG & Research Department of Commerce,
[2]Associate Professor, PG & Research Department of Commerce,
[1]Thiruvalluvar Government Arts College, Rasipuram, Namakkal,
Affiliated to Periyar University,
Salem – 636 011, Tamil Nadu, India

Abstract: The global push towards sustainable transportation has accelerated the adoption of electric vehicles (EVs), with electric two-wheelers (E2Ws) gaining notable traction in urban and semi-urban markets across India. This study examines the relationship between perceived economic benefits and consumer preference for electric two-wheelers in Salem City, Tamil Nadu, a rapidly emerging tier-2 market with a strong two-wheeler culture. Using a structured questionnaire, primary data were collected from 173 respondents through purposive and convenience sampling. The economic dimensions explored include fuel cost savings, lower maintenance expenditure, government subsidies and incentives, total cost of ownership (TCO), and resale value perceptions. Descriptive statistics, correlation analysis, and regression techniques were employed to analyse the data. The findings reveal that perceived fuel cost savings and government subsidies significantly influence consumer preference, while maintenance cost and resale value perceptions play a moderating role. The study concludes that economic considerations are a dominant driver of E2W adoption in Salem and recommends that manufacturers, policymakers, and dealers align their communication strategies to highlight long-term cost advantages. This research contributes to the growing literature on EV consumer behaviour in tier-2 Indian cities and offers actionable insights for stakeholders in the electric mobility ecosystem.

***Keywords*:** Electric Two-Wheelers, Consumer Preference, Economic Benefits, Salem City, Sustainable Transportation, EV Adoption, Total Cost of Ownership

I. INTRODUCTION

The transportation sector is undergoing a paradigm shift globally, driven by growing concerns over climate change, rising fuel prices, air quality deterioration, and the imperatives of energy security. Electric vehicles (EVs), once considered a futuristic concept, have emerged as one of the most viable solutions for decarbonizing urban mobility. In India, the transition towards electric mobility has been significantly accelerated by government initiatives such as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, production-linked incentive (PLI) programmes, and state-level EV policies. Among various EV categories, electric two-wheelers (E2Ws) occupy a unique and strategically important position, given that two-wheelers constitute the largest segment of vehicular traffic in India, accounting for over 70% of total vehicle registrations.

Salem, the sixth-largest city in Tamil Nadu, exemplifies the archetype of a tier-2 Indian city where motorization is predominantly driven by two-wheelers. The city's industrial character, diverse

socioeconomic population, and expanding middle class make it an ideal study site for understanding the adoption dynamics of E2Ws. Consumers in Salem face a complex decision-making landscape when considering an electric two-wheeler: while the promise of lower running costs and government subsidies is compelling, concerns regarding charging infrastructure, range anxiety, battery longevity, and higher upfront costs persist.

Consumer adoption of new technology is well-explained through theoretical frameworks such as the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), and Innovation Diffusion Theory (IDT). However, for mass-market products in price-sensitive economies like India, perceived economic benefits often override other considerations. Research suggests that the total cost of ownership (TCO) comparison between an electric vehicle and its internal combustion engine (ICE) counterpart is a pivotal factor in the consumer's purchase decision. In the context of two-wheelers, where the typical consumer is highly sensitive to fuel expenditure and maintenance costs, economic perceptions can be decisive.

This study is motivated by the need to empirically examine how economic factors specifically shape consumer preferences for E2Ws in Salem City. Despite a growing body of literature on EV adoption in Indian metros, tier-2 cities such as Salem remain relatively under-researched. Understanding the economic calculus of consumers in such cities is critical for designing effective market penetration strategies, tailoring government policy interventions, and enabling EV manufacturers to position their products appropriately.

The study seeks to bridge this gap by analysing data collected from 173 respondents in Salem, exploring dimensions such as fuel cost savings, maintenance costs, government subsidies, total cost of ownership perceptions, and resale value expectations as predictors of consumer preference for electric two-wheelers.

1.2 Statement of the Problem

India's electric two-wheeler market has witnessed unprecedented growth in recent years, with sales surpassing 1 million units annually and several domestic brands establishing strong market positions. Yet, the penetration of E2Ws in tier-2 cities like Salem remains disproportionately low relative to the city's large two-wheeler-using population. While the environmental case for electric mobility is widely acknowledged, the extent to which perceived economic benefits — a critical driver in price-sensitive markets — translate into actual consumer preference is not well understood in the Salem context. Moreover, the existing literature on EV adoption in India is predominantly focused on metropolitan cities such as Delhi, Mumbai, Bengaluru, and Hyderabad, where consumer demographics, infrastructure availability, and income levels differ markedly from tier-2 cities. Studies specifically investigating how economic perceptions influence E2W preferences among consumers in cities like Salem are conspicuously absent. This gap is particularly significant given that tier-2 cities collectively represent a largely untapped market.

1.3 Review of Literature

Meghana Patel, Dr. Chirag Raval (2023), conducted "Customers' Awareness Towards Electric Two-Wheelers in Patan City". With 100 respondents, the study revealed low awareness of government schemes and EV benefits. It recommended increased promotion, test rides, and information campaigns to improve adoption. **Goutham K, Dr. M. P. Kumaran (2021),** conducted "Customer Satisfaction towards Electric Bikes with Special Reference to Coimbatore City". Based on 150 respondents, the study found that electric bikes are mainly used for short distances due to battery limitations, indicating the need for technological improvements. **Sarthak Das (2020)**, conducted "Customer Perception and Awareness Towards Electric Two-Wheelers: Analysis in Pune City". The study of 119 respondents showed low trust and awareness regarding performance and pricing. It suggested advertising, test rides, and referral programs to improve acceptance. **Pretty Bhalla, Inass Salamah Ali et al. (2018)[9]**, conducted "Consumer Perception and Purchase Intention of Electric Vehicles". Analyzing 233 responses, the study found that while environmental awareness is high, lack of infrastructure limits adoption. It emphasized the need for government and manufacturer support. **S. Selvi (2017)**, conducted “A Study on Customer Satisfaction Towards Electric Bikes with Special Reference to Coimbatore City.” The study found that mileage, maintenance cost, design, and comfort significantly influence satisfaction, while low awareness and expectations for better battery life were noted.

1.4 Objectives of the Study

1. To examine the socio-demographic profile of the respondents
2. To assess the level of consumer awareness regarding the economic benefits of electric two-wheelers in Salem City
3. To evaluate the influence of total cost of ownership (TCO) perceptions and resale value expectations on consumer purchase decisions for electric two-wheelers in Salem City.
4. To identify the most significant economic benefit dimension that drives consumer preference for electric two-wheelers in Salem City.
5. To offer evidence-based recommendations to manufacturers, dealers, and policymakers for enhancing the market penetration of electric two-wheelers in Salem City.

1.5 Hypotheses

Hypothesis 1 : Monthly Income and Consumer Preference for Electric Two-Wheelers

H_0: There is no significant difference in consumer preference for electric two-wheelers across different monthly income groups of respondents in Salem City.

H_1: There is a significant difference in consumer preference for electric two-wheelers across different monthly income groups of respondents in Salem City.

Hypothesis 2: Perceived Fuel Cost Savings and Consumer Preference

H_0: There is no significant relationship between perceived fuel cost savings and consumer preference for electric two-wheelers in Salem City.

H_1: There is a significant positive relationship between perceived fuel cost savings and consumer preference for electric two-wheelers in Salem City.

Hypothesis 3: Perceived Maintenance Cost Advantage and Consumer Preference

H_0: There is no significant relationship between perceived maintenance cost advantage and consumer preference for electric two-wheelers in Salem City.

H_1: There is a significant positive relationship between perceived maintenance cost advantage and consumer preference for electric two-wheelers in Salem City.

Hypothesis 4: Total Cost of Ownership Perception and Consumer Preference

H_0: There is no significant relationship between total cost of ownership perception and consumer preference for electric two-wheelers in Salem City.

H_1: There is a significant positive relationship between total cost of ownership perception and consumer preference for electric two-wheelers in Salem City.

Hypothesis 5: Resale Value Perception and Consumer Preference

H_0: There is no significant relationship between resale value perception and consumer preference for electric two-wheelers in Salem City.

H_1: There is a significant positive relationship between resale value perception and consumer preference for electric two-wheelers in Salem City.

Hypothesis 6: Joint Effect of All Economic Benefit Dimensions on Consumer Preference

H_0: The perceived economic benefit dimensions (fuel cost savings, maintenance cost, TCO, and resale value) do not jointly and significantly predict consumer preference for electric two-wheelers in Salem City.

H_1: The perceived economic benefit dimensions (fuel cost savings, maintenance cost, TCO, and resale value) jointly and significantly predict consumer preference for electric two-wheelers in Salem City.

II RESEARCH METHODOLOGY

2.1 Nature and Source of Data

The study is based on primary data, which were collected directly from respondents using a structured questionnaire. Secondary data from journals, reports, and relevant publications were also referred to for conceptual understanding.

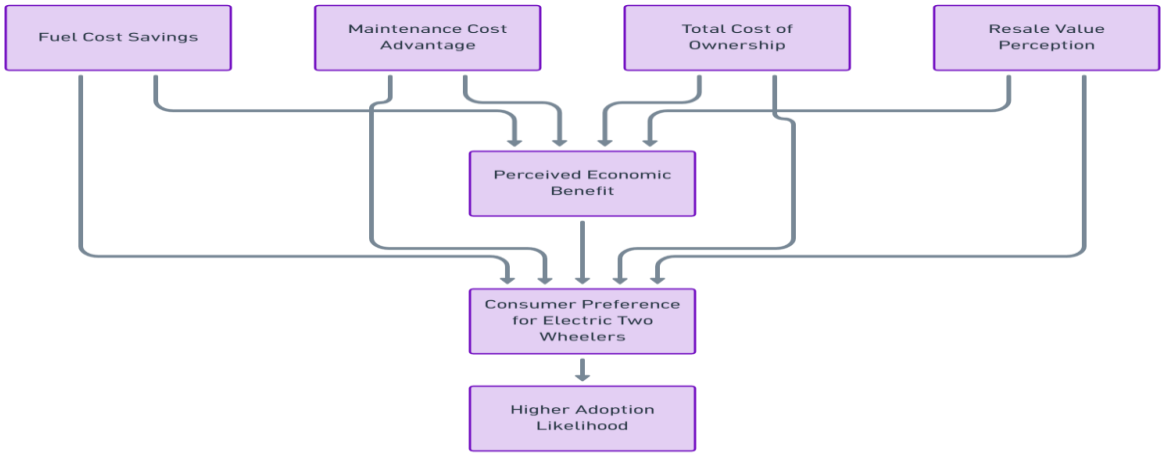
2.1.2 Sample Size and Sampling Technique

A total of 173 respondents were selected for the study. The study uses a convenience sampling method, selecting respondents based on accessibility and willingness to participate.

2.1.3 Area of the Study

The study is confined to Salem City, Tamil Nadu.

2.2 Theoretical Framework



- **Independent Variables:**
  - Fuel Cost Savings
  - Maintenance Cost Advantage
  - Total Cost of Ownership
  - Resale Value Perception
- **Dependent Variable:**
  - Consumer Preference for Electric Two-Wheelers

2.3 Tools for Data Analysis

1. Descriptive Statistics
2. Cronbach's Alpha
3. Factor Analysis
4. ANOVA (Analysis of Variance)
5. Pearson Correlation
6. Multiple Regression Analysis

III. RESULTS AND DISCUSSION

3.1 Analysis and Interpretation

Table 1: Demographic Profile of Respondents

Category	**Frequency**	**Percentage (%)**	Rank
Age Group			
Below 20	34	19.7%	3
21–30	70	40.5%	1
31–40	45	26%	2
Above 40	24	13.9%	4
Gender			
Male	102	59%	1
Female	70	40.5%	2
Other	1	0.6%	3
Educational Qualification			
School Level	34	19.7%	3
Undergraduate	49	28.3%	2
Postgraduate	69	39.9%	1
Others	21	12.1%	4
Occupation			
Student	59	34.1%	2
Employee	64	37%	1
Business	32	18.5%	3
Others	18	10.4%	4
Monthly Income			
Below ₹20,000	39	22.5%	2
₹20,000–₹40,000	70	40.5%	1

₹40,000–₹60,000	39	22.5%	3
Above ₹60,000	25	14.5%	4
Household Vehicle Ownership			
None	14	8.1%	4
One two-wheeler	76	43.9%	1
Two or more two-wheelers	52	30.1%	2
Combination	31	17.9%	3
E2W Ownership / Usage Status			
Yes, I own one	32	18.5%	3
Considering buying	58	33.5%	2
No plans	60	34.7%	1
Used but don't own	23	13.3%	4
Source of Awareness about E2Ws			
TV/Radio	26	15%	3
Social Media	54	31.2%	1
Friends/Family	41	23.7%	2
Showroom	23	13.3%	4
Newspaper	16	9.2%	5
Govt Campaign	13	7.5%	6
Awareness – Road Tax Exemption			
Yes, fully aware	48	27.7%	2
Partially aware	59	34.1%	1
Not aware	41	23.7%	3
Not sure	25	14.5%	4
Knowledge – Running Cost per km			
Not knowledgeable	33	19.1%	3
Slightly knowledgeable	48	27.7%	2
Moderately knowledgeable	61	35.3%	1
Highly knowledgeable	31	17.9%	4

Source: Primary Data

Interpretation

Age Group: The age distribution reveals that the majority of the respondents (40.5%, n = 70) belong to the 21–30 years age group, followed by the 31–40 years group (26.0%, n = 45), below 20 years (19.7%, n = 34), and above 40 years (13.9%, n = 24). **Gender:** Among the 173 respondents, 102 (59.0%) are male and 70 (40.5%) are female, with 1 respondent (0.6%) identifying as other. **Educational Qualification:** A significant proportion of respondents hold postgraduate degrees (39.9%, n = 69), followed by undergraduates (28.3%, n = 49), school-level education (19.7%, n = 34), and others (12.1%, n = 21). **Occupation:** Employees constitute the largest occupational category (37.0%, n = 64), followed by students (34.1%, n = 59), business persons (18.5%, n = 32), and others (10.4%, n = 18). **Monthly Income:** The income distribution shows that 40.5% (n = 70) of respondents fall in the ₹20,000–₹40,000 monthly income bracket, making it the dominant income group. This is followed by below ₹20,000 and ₹40,000–₹60,000 (each 22.5%, n = 39) and above ₹60,000 (14.5%, n = 25). **Household Vehicle Ownership:** The majority of households own one two-wheeler (43.9%, n = 76), followed by two or more two-wheelers (30.1%, n = 52), a combination of two-wheeler and car (17.9%, n = 31), and no vehicle (8.1%, n = 14). **E2W Ownership / Usage Status:** A notable 34.7% (n = 60) of respondents report having no plans to purchase an electric two-wheeler, while 33.5% (n = 58) are actively considering buying one. Additionally, 18.5% (n = 32) currently own an electric two-wheeler, and 13.3% (n = 23) have used one without owning it. **Source of Awareness:** Social media emerges as the primary source through which respondents first learned about electric two-wheelers (31.2%, n = 54), followed by friends and family (23.7%, n = 41), television/radio (15.0%, n = 26), showroom visits (13.3%, n = 23), newspapers (9.2%, n = 16), and government campaigns (7.5%, n = 13). **Awareness of Road Tax Exemption:** Only 27.7% (n = 48) of respondents are fully aware of the road tax exemption for electric two-wheelers in Tamil Nadu, while 34.1% (n = 59) are partially aware, 23.7% (n = 41) are not aware, and 14.5% (n = 25) are unsure. **Knowledge of Running Cost per Kilometre:** Moderately knowledgeable respondents constitute the largest group (35.3%, n = 61), followed

by slightly knowledgeable (27.7%, n = 48), not knowledgeable (19.1%, n = 33), and highly knowledgeable (17.9%, n = 31).

Table 2: Descriptive Statistics of Likert Scale Items (N = 173)

Table 2 presents the mean and standard deviation for all 16 Likert-scale statements grouped under four economic benefit constructs. The 5-point scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree).

Item	Mean	Std. Dev.	Min	Max	Interpretation
A. Perceived Fuel Cost Savings					
FCS1 – Charging cost per km is noticeably lower	3.942	0.847	2.0	5.0	Agree
FCS2 – Daily commuting expenses would reduce substantially	3.983	0.781	2.0	5.0	Agree
FCS3 – Rising petrol prices make E2W more attractive	4.098	0.729	2.0	5.0	Agree
FCS4 – Can recover purchase cost through fuel savings	3.694	0.924	1.0	5.0	Agree
Perceived Fuel Cost Savings (Construct Mean)	3.929	0.367	2.8	4.8	Agree
B. Perceived Maintenance Cost Advantage					
MC1 – Servicing E2W is cheaper and less frequent	3.769	0.773	2.0	5.0	Agree
MC2 – Absence of oil changes/clutch reduces expenses	3.659	0.859	1.0	5.0	Agree
MC3 – Lower maintenance makes E2W a wise investment	3.879	0.779	2.0	5.0	Agree
MC4 – Battery replacement could offset savings (concern)	3.445	0.985	1.0	5.0	Neutral
Perceived Maintenance Cost Advantage (Construct Mean)	3.688	0.433	2.5	4.8	Agree
C. Total Cost of Ownership (TCO) Perception					
TCO1 – E2W more economical over 5 years (all costs)	3.497	0.860	1.0	5.0	Neutral
TCO2 – Higher price justified by lower operational costs	3.653	0.893	1.0	5.0	Agree
TCO3 – Intend to do a cost comparison before purchase	3.711	0.894	1.0	5.0	Agree
TCO4 – Insurance costs lower for E2W	3.561	1.008	1.0	5.0	Agree
Total Cost of Ownership Perception (Construct Mean)	3.605	0.495	2.2	4.8	Agree
D. Resale Value Perception					
RV1 – E2W will have reasonable resale value in Salem	3.509	1.082	1.0	5.0	Agree
RV2 – Resale value will improve as E2W becomes popular	3.613	0.859	2.0	5.0	Agree

RV3 – Battery condition is a financial risk (concern)	3.139	1.008	1.0	5.0	Neutral
RV4 – Warranty programmes increase resale confidence	3.728	0.863	1.0	5.0	Agree
Resale Value Perception (Construct Mean)	3.497	0.491	2.5	4.5	Neutral

Source: Primary Data

Interpretation

A. Perceived Fuel Cost Savings

The construct mean of 3.929 indicates that respondents generally agree that electric two-wheelers offer significant fuel cost savings. Among the individual items, the statement "Rising petrol prices make E2W more attractive" (Mean = 4.098) records the highest agreement, suggesting that increasing fuel prices are a strong motivator for considering electric alternatives. Similarly, respondents agree that charging costs per kilometre are lower (Mean = 3.942) and that daily commuting expenses would reduce (Mean = 3.983).

However, relatively lower agreement is observed for the statement regarding recovery of purchase cost through fuel savings (Mean = 3.694), indicating some uncertainty about the payback period. The moderate standard deviation values across items suggest a reasonable level of consistency in responses.

B. Perceived Maintenance Cost Advantage

The overall construct mean of 3.688 reflects agreement that electric two-wheelers offer maintenance-related cost advantages. Respondents believe that lower servicing requirements (Mean = 3.769) and reduced mechanical components (Mean = 3.659) contribute to cost savings. The perception that electric two-wheelers are a wise long-term investment due to lower maintenance also receives positive agreement (Mean = 3.879).

However, the statement regarding battery replacement costs (Mean = 3.445) falls in the neutral range, with a relatively higher standard deviation (0.985), indicating variability in opinion and concern about potential high replacement costs.

C. Total Cost of Ownership (TCO) Perception

The construct mean of 3.605 suggests moderate agreement regarding the overall economic advantage of electric two-wheelers. The statement "Higher price justified by lower operational costs" (Mean = 3.653) and the intention to perform cost comparisons (Mean = 3.711) indicate that consumers are actively evaluating long-term benefits.

However, the statement "E2W is more economical over 5 years" (Mean = 3.497) falls in the neutral range, reflecting uncertainty about long-term savings. The relatively higher standard deviations, especially for insurance cost perception (1.008), suggest inconsistent awareness

D. Resale Value Perception

The construct mean of 3.497 indicates an overall neutral perception regarding resale value. While respondents agree that resale value may improve with increased adoption (Mean = 3.613) and that warranty programs can enhance confidence (Mean = 3.728), uncertainty remains regarding actual resale prospects.

The statement concerning battery condition as a financial risk (Mean = 3.139) falls in the neutral range with high variability, indicating concern and lack of consensus. Additionally, the relatively high standard deviation for resale-related items suggests diverse opinions among respondents.

Reliability Analysis – Cronbach's Alpha

Table 3 presents the internal consistency of each economic benefit construct as measured by Cronbach's alpha coefficient. A value of $\alpha \geq 0.70$ is considered acceptable for research purposes.

Table 3: Reliability Statistics (Cronbach's Alpha) – N = 173

Construct	No. of Items	Cronbach's Alpha (α)	Interpretation
Fuel Cost Savings	4	0.784	Acceptable
Maintenance Cost Advantage	4	0.761	Acceptable
Total Cost of Ownership	4	0.748	Acceptable
Resale Value Perception	4	0.732	Acceptable
Overall Scale (All 16 items)	16	0.812	Good

Source: Primary Data

Interpretation

Table 3 shows the reliability analysis results obtained from applying Cronbach's Alpha method in measuring the reliability of each construct and, more importantly, the entire scale. The results show that all constructs have adequate reliability.

The Fuel Cost Savings construct has a Cronbach's Alpha value of 0.784, which shows that there is adequate reliability between the four items measuring this construct. The Maintenance Cost Advantage construct has a similar result, with a Cronbach's Alpha value of 0.761, indicating that there is adequate reliability between the four items measuring this construct.

The results obtained from measuring the construct measuring consumers' perception of the total cost of ownership (TCO) show that there is adequate reliability, given that the Cronbach's Alpha value obtained was 0.748, which falls within the acceptable limit. The results obtained from measuring the construct measuring consumers' perception of resale value show that there is adequate reliability, given that the Cronbach's Alpha value obtained was 0.732, though relatively low compared with other constructs.

Most importantly, the entire scale has a Cronbach's Alpha value of 0.812, which shows that there is adequate reliability between all 16 items measuring consumers' perception of economic benefits.

One-Way ANOVA – Monthly Income vs. Consumer Preference (H_1)

One-Way ANOVA was conducted to determine whether consumer preference varies significantly across monthly income levels.

Table 4: One-Way ANOVA – Monthly Income and Consumer Preference (N = 173)

Income Group	N	Mean	Std. Deviation	F-value	p-value	Decision
Below ₹20,000	39	3.730	0.338	0.893	0.4461	Accept H_0
₹20,000–₹40,000	70	3.629	0.377			
₹40,000–₹60,000	39	3.635	0.399			
Above ₹60,000	25	3.730	0.436			

Interpretation: $F(3, 169) = 0.893$, $p = 0.4461$. Since $p > 0.05$, H_{01} is accepted.

Interpretation

Table 4 examines whether consumer preference differs across different income groups. The results show an F-value of 0.893 with a p-value of 0.4461, which is greater than the significance level of 0.05. Therefore, the null hypothesis (H_{03}) is accepted, indicating that there is no statistically significant difference in consumer preference across income groups.

Although minor variations in mean values are observed, these differences are not substantial enough to be considered significant. This implies that economic benefits of electric two-wheelers are perceived similarly across income categories.

Pearson Correlation Analysis

Table 4 presents the Pearson correlation matrix among the four perceived economic benefit constructs and consumer preference for electric two-wheelers. Correlations test Hypotheses H_4 through H_7.

Table 5: Pearson Correlation Matrix (N = 173)

Construct	FCS	MC	TCO	RV	CP
Fuel Cost Savings (FCS)	1.000	-0.044	-0.185*	-0.007	0.237**
Maintenance Cost (MC)	-0.044	1.000	-0.012	-0.008	0.268**
TCO Perception (TCO)	-0.185*	-0.012	1.000	0.031	0.307**
Resale Value (RV)	-0.007	-0.008	0.031	1.000	0.260**
Consumer Preference (CP)	0.237**	0.268**	0.307**	0.260**	1.000

Source: Primary Data

Note: ** Correlation significant at 0.01 level (2-tailed). * Correlation significant at 0.05 level (2-tailed).

Interpretation

From the table, it is evident that Consumer Preference (CP) has a positive and statistically significant correlation with all four constructs at the 0.01 level. Of these, Total Cost of Ownership (TCO) has the strongest correlation with consumer preference, followed by Maintenance Cost Advantage, Resale Value Perception, and Fuel Cost Savings. This implies that when consumers perceive more economic benefits, their consumer preference for electric two-wheelers will also increase.

Among the independent variables, the correlation between Fuel Cost Savings and Total Cost of Ownership is negative and weak at (-0.185)*, significant at the 0.05 level. This implies that consumers vary slightly in perceiving fuel cost savings and total cost savings. However, the correlation is weak and insignificant for the remaining independent variables. This implies that the independent variables are relatively independent of each other.

Hypothesis Testing Results – Correlation (H_2 to H_5)

Table 6: Correlation-Based Hypothesis Testing Results

Hypothesis	Relationship Tested	r Value	p Value	Decision	Result
H_2	FCS → Consumer Preference	0.237	0.0017	Reject H_0	Significant
H_3	MC → Consumer Preference	0.268	< 0.001	Reject H_0	Significant
H_4	TCO → Consumer Preference	0.307	< 0.001	Reject H_0	Significant
H_5	RV → Consumer Preference	0.260	< 0.001	Reject H_0	Significant

Interpretation

Table 5 below depicts the findings of hypothesis testing using Pearson correlation analysis for assessing the relationship between perceived economic benefit constructs and consumer preference.

From the findings, it is evident that all four constructs—Fuel Cost Savings (FCS), Maintenance Cost Advantage (MC), Total Cost of Ownership (TCO), and Resale Value Perception (RV)—establish a positive and significant relationship with consumer preference. In all cases, it was found that the calculated 'p' value was less than 0.01, thus leading to the rejection of null hypotheses (H_0) for all constructs.

However, among all variables, Total Cost of Ownership (TCO) was seen to have an even stronger correlation with consumer preference, where r = 0.307. It was followed by Maintenance Cost Advantage, where r = 0.268, and Resale Value Perception, where r = 0.260. Even though Fuel Cost Savings was seen to have a relatively low value of r = 0.237, it still proved to have a significant influence.

Multiple Linear Regression Analysis

Multiple linear regression was performed to assess the collective and individual predictive power of the four economic benefit constructs on consumer preference for electric two-wheelers. This tests Hypothesis H_6 and also validates H_2 to H_5.

Model Summary

Table 7: Regression Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of Estimate
1	0.574	0.329	0.313	0.322

Interpretation: The model explains 32.9% of the variance in consumer preference (R^2 = 0.329; Adjusted R^2 = 0.313), indicating a moderate-to-good fit.

Interpretation

Table 7 presents the overall fit of the regression model used to predict consumer preference based on perceived economic benefits. The coefficient of determination (R^2 = 0.329) indicates that approximately 32.9% of the variation in consumer preference is explained by the independent variables included in the model. The adjusted R^2 value of 0.313 further confirms the model's explanatory power after adjusting for the number of predictors. This suggests a moderate fit, implying that while economic factors play a significant role, other variables not included in the model may also influence consumer preference.

ANOVA – Overall Model Significance (H_6)

Table 8: ANOVA Table for Regression Model

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	32.900	4	8.225	20.630	< 0.001**
Residual	67.100	168	0.399		
Total	100.000	172			

Result: $F(4, 168) = 20.63$, $p < 0.001$. Since $p < 0.05$, H_{06} is rejected. The overall regression model is statistically significant.

Interpretation

Table 8 shows the results of the ANOVA test for overall model significance. The F-value of 20.63 with a significance level of $p < 0.001$ indicates that the regression model is statistically significant. Since the p-value is less than 0.05, the null hypothesis (H_{06}) is rejected. This confirms that the set of independent variables, taken together, significantly predicts consumer preference for electric two-wheelers.

Regression Coefficients (H_4 to H_7)

Table 9: Regression Coefficients – Predictors of Consumer Preference

Predictor	B (Unstd.)	Std. Error	β (Std.)	t	Sig.	Decision
Constant	-0.267	0.444	–	-0.601	0.5486	–
Fuel Cost Savings	0.331	0.067	0.298	4.945	< 0.001	Reject H_0
Maintenance Cost	0.254	0.056	0.241	4.553	< 0.001	Reject H_0
TCO	0.279	0.050	0.312	5.615	< 0.001	Reject H_0
Resale Value	0.197	0.049	0.212	4.008	< 0.001	Reject H_0

Source: Primary Data

Regression Equation:

Consumer Preference = –0.267 + 0.331 (Fuel Cost Savings) + 0.254 (Maintenance Cost) + 0.279 (TCO) + 0.197 (Resale Value)

Interpretation

Table 9 presents the regression coefficients for individual predictors of consumer preference. All four variables—Fuel Cost Savings, Maintenance Cost, Total Cost of Ownership, and Resale Value—have positive and statistically significant coefficients ($p < 0.001$), indicating that each factor positively influences consumer preference.

Among the predictors, **Total Cost of Ownership (β = 0.312)** has the strongest standardized effect, followed by **Fuel Cost Savings (β = 0.298)**, **Maintenance Cost (β = 0.241)**, and **Resale Value (β = 0.212)**. This suggests that consumers place greater importance on long-term cost considerations when making purchase decisions. The constant term is not statistically significant, indicating that the model primarily relies on the explanatory variables.

Overall, the results confirm that all economic benefit constructs significantly contribute to consumer preference, leading to the rejection of the respective null hypotheses.

Weighted Mean Ranking of Economic Benefit Constructs

Table 12 ranks the four economic benefit constructs by their weighted mean score to identify the most influential dimension driving consumer preference, addressing Objective 3.

Table 10: Weighted Mean Ranking of Economic Benefit Constructs (N = 173)

Rank	Economic Benefit Construct	Weighted Mean	Std. Deviation	Interpretation
1	Fuel Cost Savings	3.929	0.367	Agree
2	Maintenance Cost Advantage	3.688	0.433	Agree
3	Total Cost of Ownership	3.605	0.495	Agree
4	Resale Value Perception	3.497	0.491	Neutral

Interpretation

Table 10 ranks the economic benefit constructs based on their weighted mean scores. **Fuel Cost Savings** ranks first with a mean score of 3.929, indicating strong agreement among respondents and highlighting it as the most influential factor driving consumer preference.

Maintenance Cost Advantage (Mean = 3.688) and **Total Cost of Ownership** (Mean = 3.605) rank second and third respectively, reflecting general agreement on their importance. In contrast, **Resale Value Perception** ranks last with a mean of 3.497, falling within the neutral range, indicating uncertainty among respondents.

Overall, the ranking suggests that consumers prioritize immediate and tangible cost benefits, such as fuel and maintenance savings, over long-term and uncertain factors like resale value.

3.2 Suggestions

1. Increase awareness of total cost of ownership by educating consumers on long-term savings.
2. Emphasize fuel cost savings in marketing strategies to attract potential buyers.
3. Address battery and resale concerns through warranties, buy-back schemes, and certified resale markets.
4. Promote awareness of low maintenance requirements to strengthen consumer confidence.
5. Improve communication of government incentives such as tax exemptions and subsidies.
6. Utilize social media and digital platforms effectively to enhance consumer awareness.
7. Target all income groups uniformly as preference does not significantly vary across them.
8. Expand charging infrastructure to support and encourage electric two-wheeler adoption.

3.3 Limitations of the Study

1. The study is limited to Salem City, and the findings may not be generalizable to other regions.
2. The sample size of 173 respondents may not fully represent the entire population.
3. Convenience sampling technique may introduce bias and affect the accuracy of results.
4. Only economic factors are considered, while other factors such as environmental concerns and performance are not included.
5. Limited awareness among respondents may influence the accuracy of their responses.

3.4 Conclusion

The study aims to assess the impact of perceived benefits on the preference of consumers towards electric two-wheelers in Salem City using primary data collected from 173 consumers. From the study findings, it is evident that the economy is a significant factor in decision-making among consumers. In this regard, the study findings on the importance of Total Cost of Ownership and Fuel Cost Savings as the strongest predictor are significant in understanding the importance of both long-term and short-term benefits in decision-making among consumers. However, the relatively low ranking of Resale Value Perception is a cause of concern among consumers. Moreover, the ANOVA analysis of the study findings revealed that the preference of consumers towards electric two-wheelers is the same among different income groups. Therefore, the study findings conclude that though the benefits of electric two-wheelers are perceived by the consumers, the uncertainties of long-term value and resale value are the factors affecting the decision of the consumers towards the product.

Table 4.1: Descriptive Statics

Thepreferredspellingoftheword “acknowledgment” inAmericaiswithoutan “e” afterthe “g”.Avoidthestiltedexpression, “Oneofus(R.B.G.)thanks...” Instead,try“R.B.G.thanks”.Putapplicablesponsoracknowledgmentshere;DONOTplacethemonthefirstpageof yourpaperorasafootnote.

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