

Consumer Confidence and Its Influence on Sustainable Transportation Practices: A Study on the Mediating Effect of Electric Vehicle Acceptance

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DOI: <https://doi.org/10.51583/IJLTEMAS.2026.150500212>

Received: 21 May 2026; Accepted: 27 May 2026; Published: 15 June 2026

ABSTRACT

This study examines the relationship between consumer confidence and sustainable transportation practices, focusing on the mediating role of electric vehicle (EV) acceptance. As environmental concerns and carbon reduction goals gain importance, understanding factors influencing sustainable mobility becomes essential. Consumer confidence, reflecting individuals' economic optimism and financial security, may significantly affect their willingness to adopt innovative technologies such as EVs. Using a quantitative research design, data will be collected through structured questionnaires and analysed using mediation analysis techniques. The study aims to provide insights for policymakers and industry stakeholders to promote electric vehicle adoption and encourage sustainable transportation behaviour.

Keywords: Consumer Confidence, Sustainable Transportation, Electric Vehicle Acceptance

INTRODUCTION

The rapid pace of urbanization and industrial development has significantly increased environmental concerns such as air pollution, climate change, and overdependence on fossil fuels. The transportation sector is one of the largest contributors to greenhouse gas emissions, making the transition toward sustainable transportation systems a global priority. Electric-powered vehicles (EVs) have emerged as a viable solution to these challenges due to their lower carbon emissions, higher energy efficiency, and potential integration with renewable energy sources (International Energy Agency, 2023 & Rajeesh Kumar et al. 2025). Despite technological advancements and supportive government policies, widespread adoption of electric vehicles remains largely dependent on consumer acceptance.

Consumer confidence is a critical determinant influencing the acceptance of electric-powered vehicles. Consumer confidence refers to the degree of trust and assurance consumers have regarding a product's performance, safety, reliability, and long-term value (Ajzen, 1991). In the context of electric vehicles, confidence affects consumer perceptions of battery durability, charging infrastructure availability, maintenance requirements, cost efficiency, and environmental benefits. When consumers lack confidence in these aspects, they tend to perceive higher levels of risk, resulting in reluctance to adopt electric vehicles.

Research indicates that perceived uncertainty related to driving range, charging time, high initial purchase costs, and limited public charging infrastructure negatively impacts consumer confidence and slows the adoption process (Egbue & Long, 2012). On the other hand, trust in manufacturers, government incentives, and technological innovation positively influences consumer attitudes and enhances acceptance of electric vehicles (Schuitema et al., 2013). Consumers who possess higher confidence are more likely to view electric-powered vehicles as dependable, economical, and environmentally responsible alternatives to conventional vehicles.

Sustainable transportation focuses on meeting current mobility needs while minimizing environmental degradation and ensuring long-term ecological balance. Electric-powered vehicles support this objective by reducing carbon emissions, lowering noise pollution, and promoting cleaner energy consumption (Rezvani et al., 2015). However, the success of sustainable transportation initiatives is not solely dependent on technological progress but also on consumer willingness to adopt these innovations. Understanding the role of consumer confidence helps policymakers and manufacturers identify barriers to adoption and design strategies to enhance awareness, reduce perceived risks, and build trust.

Thus, examining consumer confidence as a driver of electric-powered vehicle acceptance provides valuable insights into consumer behaviour and decision-making processes. Strengthening consumer confidence through policy support, infrastructure development, and effective communication can accelerate electric vehicle adoption and contribute significantly to the advancement of sustainable transportation systems (International Energy Agency, 2023).

LITERATURE REVIEW

Consumer Confidence and Electric Vehicle Acceptance

Electric powered vehicles (EVs) have emerged as a transformative force in the global automotive industry, significantly influencing consumer confidence through technological innovation, environmental benefits, and evolving market perceptions. Research indicates that consumer confidence in EVs is strongly associated with perceived usefulness, environmental consciousness, and economic advantage, all of which shape purchase intention and long-term adoption behavior (Lashari, Ko, & Jang, 2021). Consumers who perceive EVs as environmentally responsible alternatives to internal combustion engine vehicles are more likely to develop positive attitudes and stronger trust in the technology (Malik & Yadav, 2021). Additionally, perceived technological advancement—including improvements in battery efficiency, driving range, and charging infrastructure—enhances consumer confidence by reducing range anxiety and uncertainty about vehicle performance (Ghasri, Ardeshiri, & Rashidi, 2019). Economic considerations also play a crucial role; while the higher initial purchase price may discourage some buyers, awareness of lower operating and maintenance costs over time contributes to increased confidence in the overall value proposition of EVs (Srinivasan & Vadivel, 2025). Social influence further strengthens consumer trust, as positive word-of-mouth communication and visible adoption within communities normalize EV ownership and reduce perceived risk (Malik & Yadav, 2021). Moreover, empirical studies suggest that favorable government policies, incentives, and infrastructure development positively affect consumer perception, thereby reinforcing confidence in the sustainability and reliability of electric mobility (Lashari et al., 2021). Collectively, these findings demonstrate that electric powered vehicles significantly influence consumer confidence by aligning technological performance, environmental responsibility, and economic benefits with consumer expectations, ultimately accelerating the transition toward sustainable transportation.

H1: Consumer confidence (CC) has a significant influence on electric vehicle (EV) acceptance

Relationship Between Sustainable Transportation and Consumer Confidence

Consumer confidence plays a crucial role in shaping economic decisions and behavioral intentions, particularly in the adoption of environmentally responsible practices. In the context of growing environmental concerns and climate change, sustainable transportation has emerged as a significant area of transformation. Sustainable transportation practices, including the use of public transport, carpooling, cycling, and especially electric vehicles, depend heavily on consumer perception, trust in economic stability, and future expectations. When

consumers feel financially secure and optimistic about economic conditions, they are more likely to invest in sustainable alternatives. This study examines the influence of consumer confidence on sustainable transportation practices, considering sustainable transportation as a mediating variable, and seeks to understand how confidence levels significantly impact environmentally responsible mobility behaviour.

John Thøgersen (2012) examined the spillover effect in sustainable consumption and found that positive economic expectations can enhance environmentally responsible purchasing behaviour. The findings suggest that consumer confidence can indirectly promote sustainable transportation adoption through increased willingness to engage in green practices. Naomi Oreskes (2010) discussed public perception of climate change and how economic stability influences environmental engagement. The study indicates that when consumers feel economically confident, they are more likely to support and practice environmentally sustainable behaviours, including transportation choices. Linda Steg & Vlek (2009) emphasized that sustainable transportation choices are influenced by situational factors, economic conditions, and psychological motivations. Their research highlights that perceived financial security (linked with consumer confidence) significantly affects willingness to shift toward sustainable mobility options. Paul C. Stern (2000) proposed the Value-Belief-Norm (VBN) theory, explaining how personal values and beliefs influence pro-environmental behaviour. According to this theory, individuals with strong environmental values and positive outlooks are more likely to adopt sustainable practices. Consumer confidence can strengthen these pro-environmental intentions by reducing financial uncertainty. George Katona (1975) introduced the concept that consumer sentiment significantly influences spending behaviour and economic decisions. His psychological approach to consumer confidence explains that optimistic consumers are more willing to make long-term investments. This theory supports the idea that higher consumer confidence can positively influence sustainable transportation practices, which often require upfront financial commitment.

The reviewed literature consistently indicates that consumer confidence plays a significant role in shaping environmentally responsible behaviour. Economic optimism enhances individuals' willingness to invest in and adopt sustainable transportation practices. The findings support the hypothesis that consumer confidence has a significant influence on sustainable transportation practices. Therefore, strengthening economic stability and consumer trust can serve as a strategic pathway to promote sustainable mobility and environmental sustainability.

H3: Consumer confidence significantly influences sustainable transportation practices.

Relationship Between Electric Powered Vehicle and Consumer Confidence on Sustainable Transportation

Sustainable transportation orientation substantially moderates the relationship between electric vehicle (EV) adoption and consumer confidence by influencing how consumers interpret and value the benefits and risks of EVs. Sustainable transportation orientation indicates the degree to which consumers prioritize environmentally responsible mobility choices that reduce emissions and support ecological preservation.

Consumers with a high sustainable transportation orientation perceive EV adoption more favorably because EVs align closely with their environmental values and ethical consumption goals. For these individuals, EV adoption represents a commitment to climate responsibility and sustainable living, which strengthens their confidence in EV technology despite practical concerns such as charging infrastructure limitations, battery performance, and purchase cost. Their sustainability commitment acts as a buffer against uncertainties and risk perceptions, enhancing positive attitudes toward EV adoption. This orientation leads to greater environmental awareness and appreciation of the long-term benefits of EVs, thereby reinforcing consumer confidence (Bas et al., 2021; Tilly et al., 2024).

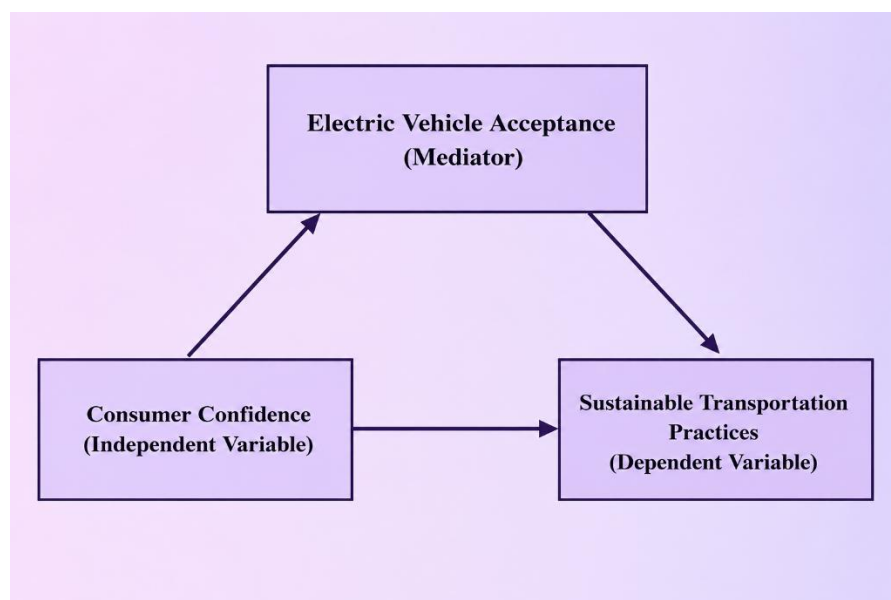
Conversely, consumers with low sustainable transportation orientation tend to evaluate EV adoption predominantly through utilitarian factors such as cost savings, convenience, driving range, and maintenance. Without environmental values driving their motivation, their confidence in EV technology depends more critically on overcoming practical and economic barriers, which can weaken the positive impact of EV adoption on their consumer confidence. Perceived risks may dominate the evaluation process for these consumers, limiting confidence formation in EVs as sustainable transportation options (Alzoubi et al., 2025; Kongklaew et al., 2021).

The effect of sustainable transportation orientation also intersects with other factors influencing EV adoption, including technological familiarity, environmental awareness, and infrastructure visibility. For instance, advancements in charging infrastructure, battery efficiency, and government policies can further influence consumer confidence but do so differentially depending on the sustainability orientation of consumers. Individuals strongly oriented towards sustainability tend to have higher willingness to adopt EVs, as they internalize both environmental and social benefits alongside practical considerations (Abudu et al., 2024; Limpasirisuwan et al., 2024).

In sum, sustainable transportation orientation acts as a significant moderator by shaping the value-driven lens through which consumers assess EV adoption. It amplifies consumer confidence when sustainability values align with the adoption decision and mitigates risk perceptions. Without a strong sustainability orientation, practical barriers and perceived risks hold more weight, attenuating the positive relationship between EV adoption and consumer confidence. Therefore, strategies to boost EV adoption should emphasize enhancing sustainability values alongside addressing economic and infrastructure constraints, to strengthen consumer confidence across diverse consumer segments.

H2: Electric vehicle acceptance significantly influences sustainable transportation practices.

H4: Electric vehicle acceptance mediates the relationship between consumer confidence and sustainable transportation practices.



METHODOLOGY

Pilot Study, Data Collection and Respondent Profile

This study was conducted among consumers, commuters, working professionals, and environmentally conscious citizens situated across four major districts of Kerala, namely Palakkad, Kozhikode, Ernakulam, and Thrissur. Following a successful pilot study involving 100 respondents, the final structured questionnaire was distributed using WhatsApp groups, Google Forms, and online consumer networks.

- Total questionnaires distributed: 460
- Responses received: 435 (Response rate: 94.6%)
- Valid responses analyzed: 410 (Validity rate: 94.3%)

Category	Sub-category	Frequency	Percentage
Gender	Male	238	58.0
Gender	Female	172	42.0

Gender Total		410	100.0
Age Range	18–30	124	30.2
Age Range	31–45	169	41.2
Age Range	46 and Above	117	28.6
Age Range Total		410	100.0
Occupation	Private Employees	148	36.1
Occupation	Business/Self-employed	136	33.2
Occupation	Government Employees	126	30.7
Occupation Total		410	100.0
Residential Area	Urban	182	44.4
Residential Area	Semi-Urban	128	31.2
Residential Area	Rural	100	24.4
Overall Total		410	100.0

Measures

The study examined the relationship between Consumer Confidence (CC) and Sustainable Transportation Practices (STP), with Environmental Awareness (EA) acting as a mediating variable.

- Consumer Confidence (CC): Adapted 6-item scale measuring trust in sustainable mobility systems, consumer willingness toward eco-friendly transportation, and confidence in sustainable transport infrastructure. Cronbach's Alpha: 0.874.

- Sustainable Transportation Practices (STP): Adapted 6-item scale measuring public transport usage, carpooling, electric mobility adoption, and low-carbon transportation behavior. Cronbach's Alpha: 0.861.

- Environmental Awareness (EA): Adapted 6-item scale measuring awareness regarding climate change, sustainable transportation, carbon emissions, and environmental responsibility. Cronbach's Alpha: 0.889

Data Analysis and Statistical Results

The final valid sample of 410 respondents was analyzed using Structural Equation Modeling (SEM). Prior to hypothesis testing, the data were examined for normality, reliability, convergent validity, discriminant validity, and overall model fit.

Normality Test with Skewness and Kurtosis

Normality was assessed using skewness and kurtosis values. All values were within the acceptable range of ± 2 , confirming acceptable normality for SEM analysis.

Construct	Skewness	Kurtosis	Interpretation
Consumer Confidence (CC)	-0.724	0.914	Acceptable normality

Sustainable Transportation Practices (STP)	-0.658	1.028	Acceptable normality
Environmental Awareness (EA)	-0.583	0.846	Acceptable normality

Reliability and Convergent Validity

Reliability and convergent validity were assessed using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). All values exceeded recommended thresholds.

Construct	Cronbach's Alpha	CR	AVE	Result
Consumer Confidence (CC)	0.874	0.901	0.604	Accepted
Sustainable Transportation Practices (STP)	0.861	0.892	0.579	Accepted
Environmental Awareness (EA)	0.889	0.918	0.651	Accepted

Discriminant Validity (Fornell-Larcker Criterion)

The Fornell-Larcker criterion confirmed discriminant validity, as the square root of AVE values exceeded inter-construct correlations.

Construct	CC	STP	EA
Consumer Confidence (CC)	0.777		
Sustainable Transportation Practices (STP)	0.544	0.761	
Environmental Awareness (EA)	0.612	0.497	0.807

Model Fit Indices

The model fit indices indicate satisfactory fit of the structural model.

Fit Index	Obtained Value	Recommended Value	Interpretation
SRMR	0.056	< 0.08	Good fit
NFI	0.927	> 0.90	Acceptable fit
CFI	0.948	> 0.90	Good fit
RMSEA	0.044	< 0.08	Good fit
Chi-square/df	2.138	< 3.00	Acceptable fit

Hypothesis Test Results

The hypothesis testing results revealed significant relationships among the study variables.

Hypothesis	Relationship	Beta	t-value	p-value	Result
H1	CC -> STP	0.482	9.214	< 0.001	Supported
H2	CC -> EA	0.536	10.481	< 0.001	Supported
H3	EA -> STP	0.294	6.116	< 0.001	Supported
H4	CC -> EA - > STP	0.158	4.392	< 0.001	Mediation supported

FINDINGS

The findings indicate that Consumer Confidence significantly influences Sustainable Transportation Practices among respondents. Consumers with stronger confidence in sustainable mobility systems demonstrated greater willingness to adopt environmentally friendly transportation methods such as public transport, carpooling, and electric mobility. Environmental Awareness was also found to significantly enhance sustainable transportation behavior and mediate the relationship between Consumer Confidence and Sustainable Transportation Practices.

CONCLUSION

The study concludes that Consumer Confidence and Environmental Awareness play a significant role in promoting Sustainable Transportation Practices. Strengthening public confidence in sustainable transportation infrastructure, improving environmental education, and implementing supportive transportation policies can significantly contribute toward reducing transportation-related carbon emissions and achieving environmental sustainability goals.

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