International Journal of Accounting and Economics Studies, 12 (6) (2025) 909-918

International Journal of Accounting and Economics Studies

Website: www.sciencepubco.com/index.php/IJAES
https://doi.org/10.14419/xaskvp71
Research paper

Fueling The Future: Understanding Consumer Intention Towards Electric Cars in Selected Cities of Tamil Nadu, India

Shunmathy V [1], Dr. V. Selvam [2] *

[1] Ph.D, Full-Time Research Scholar, Department of Commerce. School of Social Sciences and Languages (SSL), Vellore Institute of Technology (VIT), Vellore - 632014, Tamil Nadu, India
[2] Professor and Dean, Department of Commerce. School of Social Sciences and Languages (SSL), Vellore Institute of Technology (VIT), Vellore - 632014, Tamil Nadu, India.
**Corresponding author E-mail: vselvam@vit.ac.in*

Received: September 2, 2025, Accepted: October 22, 2025, Published: October 27, 2025

Abstract

The study used Extended Theory of Planned Behaviour (eTPB) to explore parameters impacting to purchase electric cars in major cities of Tamil Nadu. The survey was conducted among 350 respondents. The key factors influencing consumers for intention to repurchase are environmental concern, moral norms, perceived behavioral control, subjective norms, and government incentives. However, attitude and government incentives show a negative but significant effect on purchase intentions. The findings highlight the importance of empowering consumers by addressing barriers like inadequate charging infrastructure and strengthening government support. Managerial implications underscore the need for awareness programs and infrastructure improvements to facilitate EV adoption. Although limited to Tamil Nadu in scope and sample, the study offers valuable insights for policymakers and industry stakeholders aiming to promote sustainable transport in developing regions. Future research should broaden the scope and consider additional determinants to deepen understanding of EV purchasing behavior. This research supports strategies to enhance consumer confidence, moral motivation, and infrastructure readiness, crucial for accelerating electric vehicle adoption and achieving sustainable mobility in Tamil Nadu.

Keywords: *Electric Car Adoption, Consumer Purchase Intention, Environmental Concern, eTPB, PLS-SEM.*

1. Introduction

The Transportation sector is the most surging expansion sector globally. Addressing the problems of increasing air pollution and global warming, sustainable energy consumption is an important factor in global policy. According to International Energy Agency (IEA), approximately 23% of the world carbon emissions in 2022 will come from motor vehicle emissions with approximately 12% of the Greenhouse Gas (GHG) emissions are produced by automobiles (Singh & Vivek, 2023). Transportation sector contributes about 22% of GHG emissions (Moataz Mohamed et al., 2016, Tiwari et al., 2023). Growing concerns about climate change and depletion of resources have led the automobile industry to think about more sustainable options like electric car (Asadi et al., 2020). A significant move among consumers is the shift from Internal Combustion Engine (ICE) to electric cars (Degirmenci & Breitner, 2017, Siraj & Mehra, 2023). EVs are crucial for eliminating vehicle noise, airborne pollutants, and the release of greenhouse gases (Brady & O'Mahony, 2011, Hawkins et al., 2012, Dutta & Hwang, 2021). Many countries are setting their goals towards EV because the see the benefits (Coffman et al., 2016, Huang & Ge, 2019). EVs are most cost-effective and eco-friendly vehicles comparing with ICE (Jaramillo et al., 2009; Larson et al., 2014). Green technology is growing fast and we need to solve environmental problems, so EVs are becoming more important. A survey conducted in the year 2020, by the Society of Manufacturers of Electric Vehicles in India and found that barely 1% of automobiles are electric (Sharma et al., 2024). In contrast, Norway have emerged as a global leader, with nearly 2% of the cars are electric. Advocating for electric vehicles requires more than just their benefits. (Li et al. 2017). Although the Indian government is encouraging the use of electric automobiles for utility purposes, there is still resistance to their adoption (Chhikara et al. 2021).

The Government of India is vigorously attempting to cut pollutants from EVs and counterbalance the country's dependency on oil and gas and contaminants in the air (NITI Aayog). The National Electric Mobility Mission Plan (NEMMP) 2013, is an important policy formulated, which has provided the structure for India's power mobility aspirations. This led to the initiation of the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) programme to incentivise electrification of mobility and build a resilient charging system (Government of India, 2015, 2019). Buyers find their way to EVs as they are ecologically conscious, tech savviness, convenience and government policies ((Bian & Panyagometh, 2023, K et al., 2022). They are a deliberate attempt to create an ecosystem for electric vehicles by providing support- fiscal encouragement, R&D support, charging infrastructure etc. (Bhat et al. 2024). A lot of prospective buyers still find the expensive price of electric vehicles to be a significant deterrent, particularly in an economy where budget is a key consideration when

Copyright © Authors. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

acquiring a vehicle (Bansal et al., 2021; Bhat et al., 2024a; Bhat and Verma, 2022; Ghasri et al., 2019). Another challenge is limited driving range of electric vehicles, sometimes known as "range anxiety" (Bansal et al., 2021; Rotaris et al., 2021). (Berkeley et al., 2018; Bhat et al., 2022; Bhat et al., 2024).

The shortage of charging networks deepen fear of insufficiency among electric car consumers and their confidence level diminishes when they try to find available charging stations during travel (Berkeley et al., 2018, Bhat et al., 2022). Adoption is also limited due to concerns about the duration required to power electric cars vs the ease of replenishing traditional four-wheelers.

Tamil Nadu presents a unique context for EV adoption; The state not only have automobile manufacturers but also EV – friendly eco system. Tamil Nadu has been active in promoting electric vehicles by providing necessary infrastructure to promote adoption. The government of Tamil Nadu provides plays a vital role in offering incentives and to establish eco-friendly ecosystem. However, the success of these incentives depends purely on the purchase of electric cars. Consumer acceptance plays a vital role in achieving high environmental benefits of EVs (Hasan et al., 2022).

1.1 Need for Study

Tamil Nadu is rapidly growing and it has the perfect location for EVs manufacturing and adoption in India. The government offers various policies and provide infrastructure support to promote EV adoption. However, despite these positive advantages, the actual consumer adoption of electric car remains limited with challenges such as awareness, charging time, price sensitivity, lack of charging infrastructure, driving range, and convenience affecting willingness to buy.

1.2 Objective of the Study

The need for this study is to understand the specific factors impacting consumer choice to buy electric cars in Tamil Nadu. This research findings will assist policymakers, manufacturers and stakeholders to come up with better plans to get more people to buy EVs, which will aid the states aim for sustainable transportation and the environment.

2. Literature Review

When individuals begin to enjoy something new, such as an electric car, they read about it, form opinion about it, and then make a decision to purchase or not. Research revealed that today Indian begin to identify new technology brands from young age (Kumar, A., 2019). The sustainable attributes are becoming trendier among young individuals (Gupta and Wadera, 2021), in which media plays a critical role (Vohra et al., 2021). Theory of Planned Behaviour (TPB) (Ajzen, 1991), has been most commonly employed to forecast the behaviour. It has three determinants like Subjective Norms, Attitude and Perceived Behaviour Control (Loengbudnark, 2023). Extended Theory of Planned Behaviour (eTPB) involves new categories like Moral Norms, Environmental Concern and Government Incentives. eTPB demonstrates its strength in predicting energy saving workplace behaviors by adding habitual and cognitive-affective dimensions of attitude, thereby increasing predictive validity (Canova & Manganelli, 2020). Bibliometric assessments by Wang and Witlox (2025), reveal of policy frameworks in G20 and emerging nations reveal a variety of EV adoption tactics. Industrialized nations primarily use a combination of subsidies, strict emission rules, and infrastructural investment, whereas emerging nations focus on fostering financial incentives to increase affordability. While some literature emphasizes the success of packaged policy packages, such as public awareness and renewable energy incentive programs, other perspectives emphasize issues with policy implementation consistency and consumer awareness. These conflicting results show different social, economic and political parameters that impact the expansion of EV in market places. Pamidimukkala (2025), analyzed the EV adoption intention. The study was quantitative in nature. This study examined 379 Chinese respondents and analyzed the result using PLS-SEM. The study result shows that all the constructs have significantly influenced EV adoption intention, while subjective norms had no significant direct effect. Cao et al (2025)., in their study they used PLS-SEM to test with both mediating and moderating variable testing. The study results depicted that attitude and the perceived behavioral control were major predictors, while subjective norms had a relatively weaker impact. Shalender and Sharma (2025) surveyed 326 EV consumers and found that attitude, personal norms and environmental knowledge positively influence consumer's purchase intention towards electric vehicles. Qadir et al. (2024), highlight that charging infrastructure remains one of the most significant considerations for EV adoption. Waseem et al. (2024), highlighted significant advancement in EV battery technology, especially in nanomaterials and solid-state batteries which offer higher energy density, quicker recharging, improved safety, and longer lifespan. These mixed results imply that while battery technology is changing rapidly, economic and supply chain concerns can temper its contribution to mass adoption of EVs. Ahmed et al (2024)., in their study, they surveyed over 300 respondents and their findings reveal that coat-effectiveness, infrastructure access, and EV adoption intention are closely linked. The findings also highlight the need for awareness campaigns, infrastructure expansion, and incentives. Upadhyay & Kamble, (2023) mentions that the research suggests an alternative way of thinking about value - attitude behaviour linkages in pro-environmental action. The questionnaires were administered to 1143 respondents and SEM analysis was applied for the study. Sustainable responsibility has a crucial effect on sustainable attitude and value, which affect the intention to buy electric vehicles. Lee et al., (2023), in this research, SEM analyses were conducted with a sample of 403 respondents and attitude, subjective norms and perceived behaviour control plays an important role in connecting pro-environmental norms to behavioral intentions. Aravindan et al., (2023) says that knowledge, perceived symbol, and technology readiness are positively correlated with electric car purchase intention. Perceived cost is negatively correlated with electric car purchase intention. The data was analyzed using SMART-PLS. Shanmugavel & Balakrishnan, (2022), examined that personal norm has a direct influential role in the formation of purchase intention and environment knowledge has a positive indirect influence on behavioral intention. The theory applied in this research is Extended Theory of Planned Behaviour with 400 sample size respondents. Yeğin & Ikram, (2022), established that attitude, perceived behavioral control, environmental concern, and green trust are positively related to electric vehicle purchase intentions in Turkey. Survey was done using 626 respondents and 5-point Likert scale was employed to quantify the questionnaire. Vafaei-Zadeh et al. (2022), the research utilized the extended C-TAM-TPB model with other variables to have a better explanation of electric vehicle purchase intention. The research indicated that Perceived usefulness and perceived ease of use influence attitude towards people's choice to adopt electric vehicle positively. The data were gathered through SEM analysis with 213 Generation Y consumers in Malaysia. K et al. (2022), says financial constraints, vehicle performance constraints, absence of charging facilities, environmental protection, social perception of electric vehicles serve as a purchase influencer towards EV adoption. The study was carried out using online survey. Adu-Gyamfi et al. (2022), the study employed expanded theory of planned behaviour with perceived benefit and knowledge. 407 respondents from China's Beijing were the data source. Subjective norms, Attitude and Perceived Behaviour Control

directly benefit which drive consumer to adopt electric vehicle. (Gunawan et al.2022) discovered that the constructs of Theory of Planned Behaviour have positive impacts towards interest utilizing in Indonesia. Perceived Functional Risk and Financial Risk negatively impact attitude towards utilize electric vehicles. From the above literature, it is inferred that, the studies have been conducted in various parts of the country and there were only few studies were conducted in Tamil Nadu, India for analyzing the factors that prompts people to choose electric cars. Therefore, this study analyses the factors influencing consumers to adopt electric cars in various cities in Tamil Nadu.

3. Methods & Materials

3.1 Geographical Location

The current study was focused on selected cities of Tamil Nadu. The selected cities are Chennai, Coimbatore, Madurai, Trichy, Salem and Tirunelveli. The researcher chosen these cities in order to capture a wide range of consumer behaviour and Electric Car adoption. Chennai and Coimbatore are perfect for examining early adopters of electric car as they have higher income and are highly aware of new technology. Tier II cities such as Madurai, Trichy and Salem have been identified as the transitional consumer profiles and modest level of urbanization. Tirunelveli is considered as the semi-urban city which was included to represent developing consumption habit outside large metropolitan city. This guarantees that the study covers wide socioeconomic and demographic range, important to electric car uptake in the region.

3.2 Sampling

The research objective is to identify the elements impacting consumers to purchase electric cars by consumers in Tamil Nadu. This study was conducted between January 2025 to May 2025 on a small population in the selected cities of Tamil Nadu. A Quantitative design was applied in this study, incorporating both primary and secondary data. Primary data were gathered using structured questionnaire from both electric and traditional automobile owners, adapted from valid instruments based on extended Theory of Planned Behaviour. The questionnaire includes 9 domains such as attitude, subjective norms, perceived behavioural control, environmental concern, government incentives, moral norms, purchase intention, actual purchase behaviour and economic outcomes each measured by 5 items, for a total of 45 variables. The questionnaire was improved through a pilot study with 50 respondents which results in satisfactory internal consistency with Cronbach's Alpha Coefficients greater than 0.7 for all constructs. Secondary data was gathered from various articles, journals, and so on. The study collected data from both traditional and electric car owners. Convenience sampling method was used in this study. Convenience sampling may lead to selection bias, however, attempts were made to incorporate respondents with diverse demographic characteristics, including age, income, education, to enhance representativeness. This study uses the Extended Theory of Planned Behaviour as a framework to examine the factors that influence consumers to buy electric vehicles.

Structural Equation Modelling (SEM) is sensitive to sample size when analysing multiple latent variables. This study employs 7 construct and each construct is measured by 5 indicators, totalling 35 variables. According to (Hair et al., 2019), the suggested sample size 10 respondents, resulting in minimum of 350 respondents. Questionnaire was circulated through offline mode to a total number of 390 respondents. By rejecting unfilled questions, the total questionnaire collected from respondents are 350. The items of the variable were rated on the 5-point Likert Scale by the respondent, where scale 5 is indicated as "Strongly Agree" whereas scale 1 is indicated as "Strongly Disagree" Singh and Vivek (2023).

3.3 Research Model and Hypothesis Development

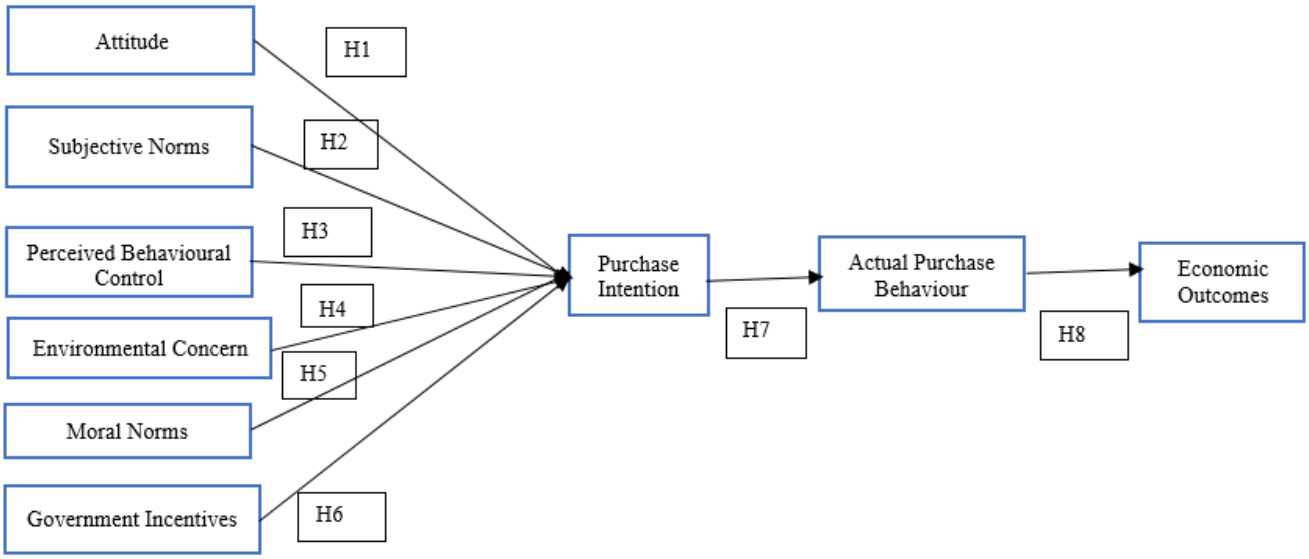

Fig. 1: eTPB Model

H1: Attitude towards electric car significantly influence consumer's purchase intention.
H2: Subjective Norms towards electric car significantly influence consumer's purchase intention.
H3: Perceived Behavioural Control towards electric car significantly influence consumer's purchase intention.
H4: Environmental Concern towards electric car significantly influence consumer's purchase intention.
H5: Moral Norms towards electric car significantly influence consumer's purchase intention.
H6: Government Incentives towards electric car significantly influence consumer's purchase intention.
H7: Purchase Intention towards electric car significantly influences actual purchase behaviour.

H8: Actual Purchase Behaviour towards electric car significantly influences Economic Outcomes.

4. Results & Interpretation

The result of the analysis has been obtained by researchers. For analysing the data, the researcher used PLS-SEM (Partial Least Squares Structural Equation Modelling) software which is used to analyse complex relationship among variables. The variables in the study are Attitude, Subjective Norm, Perceived Behavioural Control, Moral Norms, Government Incentives, Environmental Concern and Purchase Intention which were distributed to 350 respondents.

4.1 Demographic Characteristics

Table 1: Demographic Characteristics

	Category	Frequency	Percentage
Gender	Male	160	45.71
	Female	190	54.29
Age	18 – 25	50	14.29
	26 – 40	97	27.71
	41 – 60	133	38
	Above 60 years	70	20
Educational Qualification	High School	55	15.71
	Under Graduate	94	26.86
	Post Graduate	132	37.71
	Doctoral Degree	42	12
	Others (Diploma)	27	7.72
Place of Residence	Chennai	90	25.71
	Coimbatore	70	20
	Madurai	60	17.14
	Trichy	50	14.29
	Salem	40	11.43
	Tirunelveli	40	11.43

Table 1 explains that 54.29% of the respondents are female. 27.71% of the respondents are between the ages of 26 – 40 years. 37.71% of the respondents are Postgraduates and majority 25.71% of the respondents are from Chennai region.

4.2 Reliability and Validity

Table 2: Reliability and Validity

Factors	Cronbach's Alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average Variance Extracted (AVE)
Actual Purchase Behaviour (APB)	0.987	0.987	0.990	0.950
Attitude (ATT)	0.987	0.987	0.990	0.950
Environmental Concern (EC)	0.983	0.983	0.987	0.936
Economic Outcomes (EO)	0.986	0.987	0.989	0.948
Government Incentives (GI)	0.978	0.979	0.983	0.921
Moral Norms (MN)	0.984	0.984	0.987	0.939
Perceived Behavioural Control (PBC)	0.981	0.981	0.985	0.930
Purchase Intention (PI)	0.967	0.967	0.974	0.883
Subjective Norms (SN)	0.986	0.986	0.989	0.948

Inference
Cronbach's alpha (Temme et al., 2010) (Tavakol and Dennick 2011), Composite Reliability (Bacon, Sauer, and Young 1995), and average variance (Dos Santos & Cirillo, 2021) were calculated to assess the reliability and validity of the factors like attitude, subjective norms, perceived behavioural control, government incentives, moral norms, environmental concern, intention to purchase electric cars, actual purchase behaviour and economic outcomes. Table 2 demonstrates that the values are acceptable because as per the literature, Cronbach alpha should lie near to 7.0 or above and here all the variables are above 0.9 which is highly acceptable.

4.3 Outer Loadings

Inference
Outer loadings represent the correlations between each observed indicator. They measure how well an item contributes to its construct with high values. Usually above 0.7 is considered good which strongly represents the latent variable and in Table 3, it displays the loadings above 0.90, which indicates there is an excellent representation and very high reliability. This supports the construct validity and strengthens the creditability of SEM findings.

Table 3: Outer Loadings

	Outer loadings
APB1 <- APB	0.981
APB2 <- APB	0.966
APB3 <- APB	0.985
APB4 <- APB	0.953
APB5 <- APB	0.988
ATT1 <- ATT	0.981
ATT2 <- ATT	0.966

ATT3 <- ATT	0.985
ATT4 <- ATT	0.953
ATT5 <- ATT	0.988
EC1 <- EC	0.957
EC2 <- EC	0.961
EC3 <- EC	0.976
EC4 <- EC	0.980
EC5 <- EC	0.965
EO1 <- EO	0.955
EO2 <- EO	0.984
EO3 <- EO	0.973
EO4 <- EO	0.967
EO5 <- EO	0.989
GI1 <- GI	0.963
GI2 <- GI	0.946
GI3 <- GI	0.977
GI4 <- GI	0.967
GI5 <- GI	0.945
MN1 <- MN	0.967
MN2 <- MN	0.985
MN3 <- MN	0.964
MN4 <- MN	0.982
MN5 <- MN	0.946
PBC1 <- PBC	0.945
PBC2 <- PBC	0.964
PBC3 <- PBC	0.981
PBC4 <- PBC	0.981
PBC5 <- PBC	0.951
PI1 <- PI	0.939
PI2 <- PI	0.914
PI3 <- PI	0.945
PI4 <- PI	0.965
PI5 <- PI	0.935
SN1 <- SN	0.955
SN2 <- SN	0.984
SN3 <- SN	0.973
SN4 <- SN	0.967
SN5 <- SN	0.988

4.4 Discriminant Validity

Table 4: Fornell-Larcker Criterion

	APB	ATT	EC	EO	GI	MN	PBC	PI	SN
APB	0.975								
ATT	0.945	0.975							
EC	0.949	0.949	0.968						
EO	0.962	0.973	0.960	0.974					
GI	0.959	0.960	0.965	0.935	0.960				
MN	0.963	0.964	0.962	0.939	0.925	0.969			
PBC	0.958	0.956	0.954	0.960	0.945	0.954	0.964		
PI	0.972	0.972	0.917	0.956	0.939	0.946	0.956	0.940	
SN	0.988	0.962	0.927	0.952	0.935	0.939	0.960	0.935	0.974

Inference

According to Hamid et al., 2017., Fornell-Larcker criterian evaluates weather the Average Variance Extracted (AVE) for each construct is greater than squared correlations among constructs. It is considered as the test of discriminant validity in Structural Equation Modelling (SEM). The diagonal value are the square roots of the AVE for each construct. This basis of validity makes it possible to understand linkages in the structural model with confidence, guaranteeing that the constructs appropriately represent the theoretical ideas being studied.

4.5 Structural Equation Model

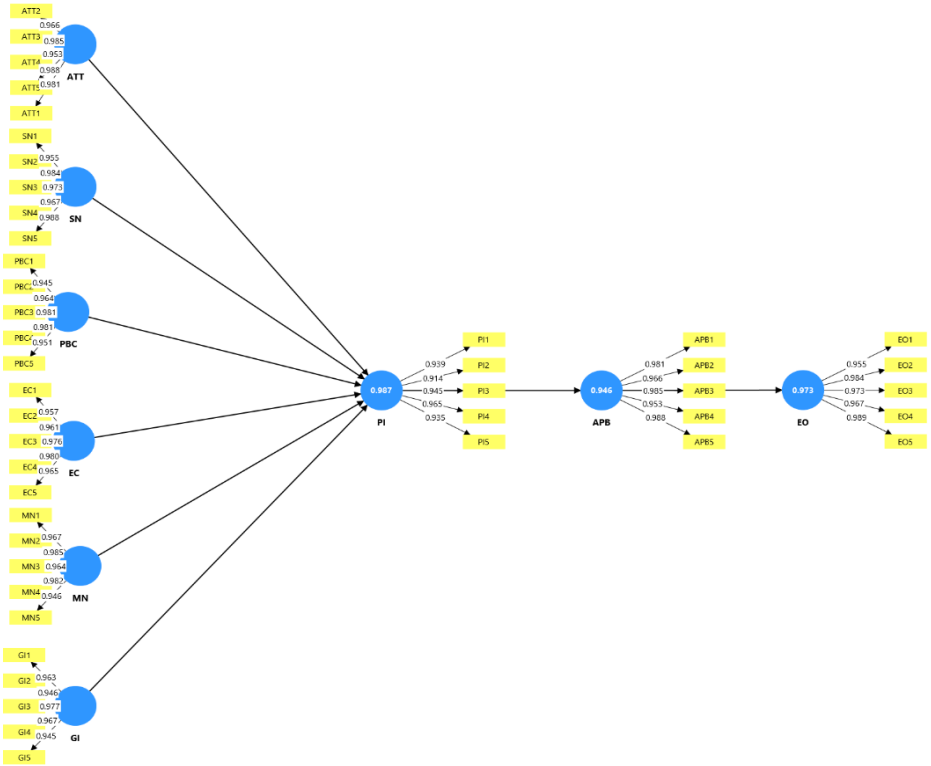

Fig. 2: SEM Model

Inference

Figure 2 shows that Purchase Intention (PI) has a positive influence on Actual Purchase Behaviour (APB) (β = 0.946), which in turn significantly influences Economic Outcomes (EO) (β = 0.973). Moreover, PI is influenced by six constructs with high loading factors ranging from 0.935 to 0.987, which indicates strong measurement reliability. The findings indicate that moral, psychological and environmental factors together influence consumers to purchase electric cars. This intention then leads to actual buying behaviour and positive effects on environment.

4.6 Structural Model Assessment

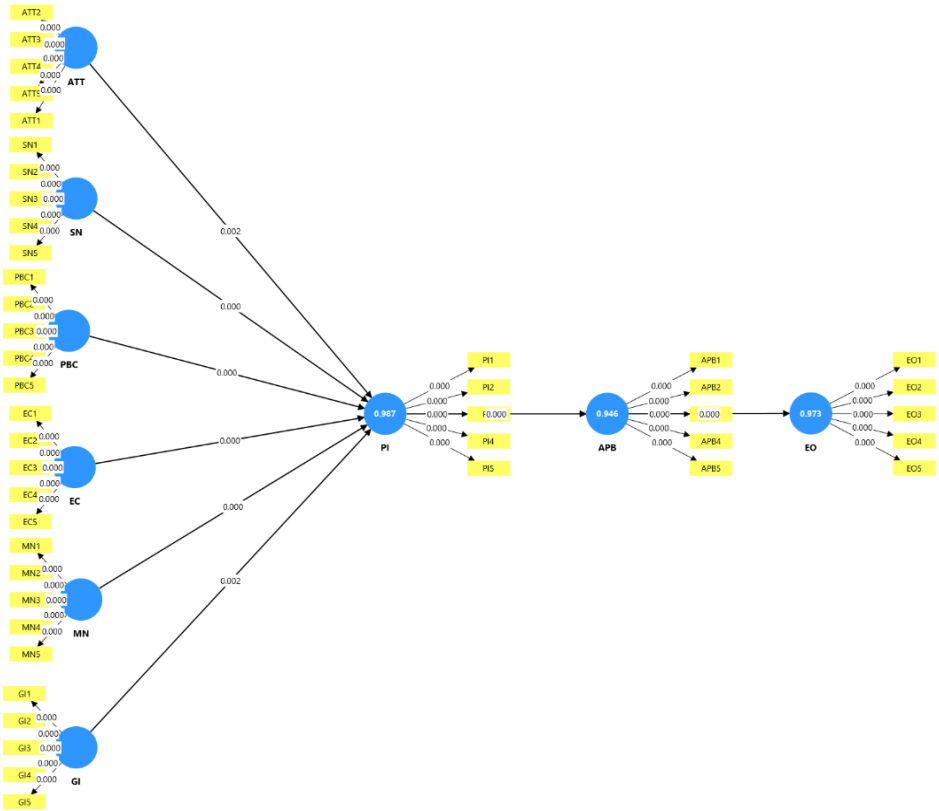

Fig. 3: Structural Model Assessment

Inference

The results of PLS-SEM bootstrapping (Figure 3) indicate that all the path coefficients of the structural model are significant at $p<0.001$, meaning that all the recorded path coefficients were 0.000, indicating that there is high support for the relationships hypothesized (Hair et al., 2019). Structurally, all the purchase intention (PI) predictors (attitude (ATT), subjective norms (SN), perceived behavioural control (PBC), environmental concern (EC), moral norms (MN) and government incentives (GI)) are statistically significant predictors. Further, purchase intention (PI) was a strong predictor of actual purchase behaviour (APB), which was a strong predictor of economic outcomes (EO). The model explains the following variance proportions: 98.7% in purchase intention (PI)=R2, 94.6% in actual purchase behaviour (APB)=R2 and 97.3% in economic outcomes (EO)=R2. The model therefore shows high predictive relevance. findings indicate that higher pro-environmental factors in the structural model show higher purchase intentions resulting in real-life positive behaviours as well as outcomes for the environment. The bootstrapping verifies the best practice in SEM suggested that inspecting for robustness and significance of path estimates (i.e., significance levels, confidence intervals) should be done, (Hair et al., 2019; Henseler et al., 2009).

4.7 Hypothesis Testing

Path analysis, p-value, and path coefficient are all components of hypothesis testing. The path coefficient returns values ranging from +1 to -1. If the results are positive, there is a positive association between the variables; otherwise, the results indicate a negative relationship between the variables (Hair et al., 2018). If the p-value does not exceed 0.05, the hypothesis is accepted; if it exceeds 0.05, the hypothesis is rejected.

Table 4: Results of Hypothesis Testing

Hypothesis ID	Hypothesis Statement	Path	Expected Direction	Result
H1	Attitude towards electric car significantly influence consumer's purchase intention.	ATT -> PI	Positive	Supported (β = -0.195, p = 0.002)
H2	Subjective Norms towards electric car significantly influence consumer's purchase intention.	SN -> PI	Positive	Supported (β = 0.209, p = 0.000)
H3	Perceived Behavioural Control towards electric car significantly influence consumer's purchase intention.	PBC -> PI	Positive	Supported (β = 0.646, p < 0.000)
H4	Environmental Concern towards electric car significantly influence consumer's purchase intention.	EC -> PI	Positive	Supported (β = 0.254, p < 0.000)
H5	Moral Norms towards electric car significantly influence consumer's purchase intention.	MN -> PI	Positive	Supported (β = 0.334, p < 0.000)
H6	Government Incentives towards electric car significantly influence consumer's purchase intention.	GI -> PI	Positive	Supported (β = -0.245, p = 0.002)
H7	Purchase Intention towards electric car significantly influences actual purchase behaviour.	PI -> APB	Positive	Supported (β = 0.972, p = 0.000)
H8	Actual Purchase Behaviour towards electric car significantly influences Economic Outcomes.	APB -> EO	Positive	Supported (β = 0.986, p = 0.000)

Inference

- Attitude (ATT) has a negative but significant effect on Purchase Intention (PI) (β = -0.195), suggesting a complex or possibly inverse relationship.
- Subjective Norms (SN) also positively influence PI (β = 0.209), indicating social factors affect intention.
- Perceived Behavioural Control (PBC) positively and significantly influences PI (β = 0.646).
- Environmental Concern (EC) positively and significantly influences PI (β = 0.254).
- Moral Norms (MN) and Perceived Behavioral Control (PBC) both exert positive and significant effects on PI (β = 0.334 and 0.646 respectively), emphasizing their importance in shaping purchase intentions.
- Government Incentives (GI) show a negative but significant impact on PI (β = -0.245), reflecting nuanced consumer responses.
- Purchase Intention (PI) is a strong predictor of actual purchase behavior (APB), with a β of 0.972.
- Actual Purchase Behavior (APB) strongly and positively affects Environmental Outcomes (EO) with a coefficient β = 0.986, indicating a highly significant relationship.

All the paths are statistically significant as per p-values below (0.05). This model shows that behavioural, psychological and external factors play a pivotal role in shaping consumers buying decisions.

5. Discussion

The study demonstrates that, both personal and external factors influence consumers to adopt electric cars. Among the key elements, perceived behavioural control was the most influencing variable, indicating that when consumers believe that they have the ability and knowledge to make a purchase, they are more likely to do so. Feeling confident reduces hesitations in buying decisions. This shows that perceived behavioural control plays a key role in boosting purchase decisions. Moral Values and Environmental Concern also have positive influence towards adoption. People's moral belief make them to feel responsible to protect the environment which leads to prefer eco-friendly products. Subjective Norms refer to the social pressure from important people to do or not do something. So, the opinions of the family, friends, and society influence their choices in purchasing a product. If people think buying an electric car is accepted and supported by others, they are more likely to follow through with their intention to buy. However, attitude and government incentives had negative but significant effects. The unexpected result about attitude could be influenced by local factors such as high price, limited charging infrastructure, maintenance costs, which could weaken the impact of their positive attitude. These barriers reduce the connection between linking EVs and actual purchasing. Likewise, government incentives sometimes reduce people willingness to buy EVs because they doubt about policies or they don't find the incentives are enough to purchase. This shows that, incentive programs to be conducted to build trust and encourage consumers to make purchases. Purchase intention strongly influence actual purchase behaviour, which in turn significantly influence economic outcomes. This shows that when people decide to buy something, it leads to real purchases, which brings financial

benefits and positive effect on environment. The shows that the model has the strong accuracy with 98.7% of purchase intention, 94.6% of actual purchase behaviour, and 97.3% of economic outcomes, indicating strong reliability.

6. Conclusion

The present study explores the key factors that encourage consumers to purchase electric car in selected cities of Tamil Nadu. The result identifies that subjective norms, moral norms, perceived behaviour control and environmental concern act as a key factor influencing consumers intention to buy electric car in Tamil Nadu. While attitude and government incentives had a negative but noticeable influence, this is mostly due to local challenges. Purchase Intention strongly influence actual buying behaviour, which positively impacts economic outcomes. To boost adoption, it is necessary for both manufacturers and government need to provide middle income purchasers with targeted subsidies. Enhance charging infrastructure through Public-Private Partnerships (PPP). They should create awareness or promotional campaigns aimed at informing consumers about long term cost savings and environmental benefits. Encouraging companies to shift to electric cars and building charging stations help EVs adoption to grow factor. Supporting corporate fleet switching and renewable energy powered charging network will accelerate growth. These measures fit ESG goals by reducing emissions, and increasing social awareness and assuring good governance. Overall, boosting consumer trust, moral values and infrastructure will help Tamil Nadu reach its goal for sustainable transportation.

However, this study has limitation such as limited geographical coverage in Tamil Nadu.

Future research could investigate covering other parts of Tamil Nadu and they can add a greater number of factors which influence consumers to purchase electric cars. Increased sample size results in more generalised results and findings.

Author's Contribution

Shunmathy V carried out the study, gathered and examined the information, and wrote the first draft of the manuscript. Dr. V. Selvam contributed to the final version, oversaw the research, gave conceptual assistance, and critically evaluated the article. The final manuscript has been read and approved by both writers.

Statement of Disclosure

Regarding the publishing of this work, the authors state that they have no conflicts of interest.

Declaration of Funding

This research received no external funding.

Data Disclosure Statement

Upon reasonable request, the corresponding author will provide the data supporting the study's conclusions.

References

[1] Adu-Gyamfi, G., Song, H., Nketiah, E., Obuobi, B., Adjei, M., & Cudjoe, D. (2022). Determinants of adoption intention of battery swap technology for electric vehicles. Energy, 251, 123862. https://doi.org/10.1016/j.energy.2022.123862

[2] Ahmed, U., Fida, B. A., Thumiki, V. R. R., & Marhoobi, S. S. H. A. (2024). Electric vehicles adoption challenges in Oman: a comprehensive assessment and future prospects for sustainable cities. Frontiers in Sustainable Cities, 6. https://doi.org/10.3389/frsc.2024.1360203

[3] Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-t

[4] Aravindan, K. L., Izzat, M. A., Ramayah, T., Chen, T. S., Choong, Y. V., Annamalah, S., Ilhavenil, N., & Ahmad, A. B. (2023). Determinants of electric car patronage intention. International Journal of Technology, 14(6), 1393. https://doi.org/10.14716/ijtech.v14i6.6624

[5] Asadi, S., Nilashi, M., Samad, S., Abdullah, R., Mahmoud, M., Alkinani, M. H., & Yadegaridehkordi, E. (2020). Factors impacting consumers' intention toward adoption of electric vehicles in Malaysia. Journal of Cleaner Production, 282, 124474. https://doi.org/10.1016/j.jclepro.2020.124474

[6] Bacon, D. R., Sauer, P. L., & Young, M. (1995). Composite reliability in structural equations modeling. Educational and Psychological Measurement, 55(3), 394–406. https://doi.org/10.1177/0013164495055003003

[7] Bajpai, S., Abbas, H., & Mishra, V. (2024). The influence of socio-economic factors on electric vehicle adoption in Uttar Pradesh. Lloyd Business Review, 1–17. https://doi.org/10.56595/lbr.v3i2.27

[8] Bansal, P., Kumar, R. R., Raj, A., Dubey, S., & Graham, D. J. (2021). Willingness to pay and attitudinal preferences of Indian consumers for electric vehicles. Energy Economics, 100, 105340. https://doi.org/10.1016/j.eneco.2021.105340

[9] Berkeley, N., Jarvis, D., & Jones, A. (2018). Analysing the take up of battery electric vehicles: An investigation of barriers amongst drivers in the UK. Transportation Research Part D Transport and Environment, 63, 466–481. https://doi.org/10.1016/j.trd.2018.06.016

[10] Bhat, F. A., & Verma, A. (2022). A bibliometric analysis and review of adoption behaviour of electric vehicles. Transportation in Developing Economies, 9(1). https://doi.org/10.1007/s40890-022-00175-2

[11] Bhat, F. A., Seth, Y., & Verma, A. (2024). Beyond conventional: Analysing the factors affecting the adoption of electric four-wheelers in an Indian metropolis. Transportation Research Part D Transport and Environment, 131, 104200. https://doi.org/10.1016/j.trd.2024.104200

[12] Bhat, F. A., Tiwari, G. Y., & Verma, A. (2024). Preferences for public electric vehicle charging infrastructure locations: A discrete choice analysis. Transport Policy, 149, 177–197. https://doi.org/10.1016/j.tranpol.2024.02.004

[13] Bian, X., & Panyagometh, A. (2023). The influence of perceived ESG and policy incentives on consumers' intention to purchase new energy vehicles: Empirical evidence from China. Innovative Marketing, 19(4), 187–198. https://doi.org/10.21511/im.19(4).2023.15

[14] Brady, J., & O'Mahony, M. (2011). Introduction of electric vehicles to Ireland. Transportation Research Record Journal of the Transportation Research Board, 2242(1), 64–71. https://doi.org/10.3141/2242-08

[15] Canova, L., & Manganelli, A. M. (2020). Energy-saving behaviours in workplaces: Application of an extended model of the theory of planned behaviour. Europe's Journal of Psychology, 16(3), 384–400. https://doi.org/10.5964/ejop.v16i3.1893

[16] Chhikara, R., Garg, R., Chhabra, S., Karnatak, U., & Agrawal, G. (2021). Factors affecting adoption of electric vehicles in India: An exploratory study. Transportation Research Part D Transport and Environment, 100, 103084. https://doi.org/10.1016/j.trd.2021.103084

[17] Coffman, M., Bernstein, P., & Wee, S. (2016). Electric vehicles revisited: a review of factors that affect adoption. Transport Reviews, 37(1), 79–93. https://doi.org/10.1080/01441647.2016.1217282

[18] Degirmenci, K., & Breitner, M. H. (2017). Consumer purchase intentions for electric vehicles: Is green more important than price and range? Transportation Research Part D Transport and Environment, 51, 250–260. https://doi.org/10.1016/j.trd.2017.01.001

[19] Dutta, B., & Hwang, H. (2021). Consumers Purchase Intentions of green electric vehicles: The influence of consumers technological and environmental considerations. Sustainability, 13(21), 12025. https://doi.org/10.3390/su132112025

[20] Ghasri, M., Ardeshiri, A., & Rashidi, T. (2019). Perception towards electric vehicles and the impact on consumers' preference. Transportation Research Part D Transport and Environment, 77, 271–291. https://doi.org/10.1016/j.trd.2019.11.003

[21] Government of India, 2015. FAME-I: Scheme for faster adoption and manufacturing of (hybrid &) electric vehicles in India.

[22] Government of India, 2019. Publication of notification in Gazzette of India (Extraordinary) regarding Phase II of FAME India Scheme.

[23] Gunawan, I., Redi, A. a. N. P., Santosa, A. A., Maghfiroh, M. F. N., Pandyaswargo, A. H., & Kurniawan, A. C. (2022). Determinants of customer intentions to use electric vehicle in Indonesia: an Integrated model analysis. Sustainability, 14(4), 1972. https://doi.org/10.3390/su14041972

[24] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate Data Analysis (8th ed.). Cengage Learning.

[25] Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2018). When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2–24. https://doi.org/10.1108/ebr-11-2018-0203

[26] Hamid, M. R. A., Sami, W., & Sidek, M. H. M. (2017). Discriminant Validity Assessment: Use of Fornell & Larcker criterion versus HTMT Criterion. Journal of Physics Conference Series, 890, 012163. https://doi.org/10.1088/1742-6596/890/1/012163

[27] Hasan, F., Kirmani, M. D., Zaidi, N., & Rehman, A. (2024). Environmental concern and price value in electric vehicle adoption: Examining intentions of Indian consumers. Journal of Sustainable Marketing, 1–21. https://doi.org/10.51300/jsm-2024-131

[28] Hawkins, T. R., Singh, B., Majeau-Bettez, G., & Strømman, A. H. (2012). Comparative Environmental Life cycle assessment of conventional and electric vehicles. Journal of Industrial Ecology, 17(1), 53–64. https://doi.org/10.1111/j.1530-9290.2012.00532.x

[29] Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In Advances in international marketing (pp. 277–319). https://doi.org/10.1108/s1474-7979(2009)0000020014

[30] Huang, X., & Ge, J. (2019). Electric vehicle development in Beijing: An analysis of consumer purchase intention. Journal of Cleaner Production, 216, 361–372. https://doi.org/10.1016/j.jclepro.2019.01.231

[31] Jaramillo, P., Samaras, C., Wakeley, H., & Meisterling, K. (2009). Greenhouse gas implications of using coal for transportation: Life cycle assessment of coal-to-liquids, plug-in hybrids, and hydrogen pathways. Energy Policy, 37(7), 2689–2695. https://doi.org/10.1016/j.enpol.2009.03.001

[32] K, S., V., Michael, L. K., Hungund, S. S., & Fernandes, M. (2022). Factors influencing adoption of electric vehicles – A case in India. Cogent Engineering, 9(1). https://doi.org/10.1080/23311916.2022.2085375

[33] Larson, P. D., Viáfara, J., Parsons, R. V., & Elias, A. (2014). Consumer attitudes about electric cars: Pricing analysis and policy implications. Transportation Research Part a Policy and Practice, 69, 299–314. https://doi.org/10.1016/j.tra.2014.09.002

[34] Lee, S. S., Kim, Y., & Roh, T. (2023). Pro-environmental behavior on electric vehicle use intention: Integrating value-belief-norm theory and theory of planned behavior. Journal of Cleaner Production, 418, 138211. https://doi.org/10.1016/j.jclepro.2023.138211

[35] Li, W., Long, R., Chen, H., & Geng, J. (2017). A review of factors influencing consumer intentions to adopt battery electric vehicles. Renewable and Sustainable Energy Reviews, 78, 318–328. https://doi.org/10.1016/j.rser.2017.04.076

[36] Loengbudnark, W. (2023). Understanding human behavior to improve demand-side energy management. In University of Technology Sydney, Thesis [Thesis]. https://opus.lib.uts.edu.au/bitstream/10453/173572/1/thesis.pdf

[37] Mohamed, M., Higgins, C. D., Ferguson, M., & Réquia, W. J. (2018). The influence of vehicle body type in shaping behavioural intention to acquire electric vehicles: A multi-group structural equation approach. Transportation Research Part a Policy and Practice, 116, 54–72. https://doi.org/10.1016/j.tra.2018.05.011

[38] NITI Aayog, 2023. Annual Report: 2022-23.

[39] Pamidimukkala, A., Kermanshachi, S., Rosenberger, J. M., & Hladik, G. (2025). Utilizing extended theory of planned behavior to evaluate consumers' adoption intention of electric vehicles. Green Energy and Intelligent Transportation, 100258. https://doi.org/10.1016/j.geits.2025.100258

[40] Qadir, S. A., Ahmad, F., Al-Wahedi, A. M. a. B., Iqbal, A., & Ali, A. (2024). Navigating the complex realities of electric vehicle adoption: A comprehensive study of government strategies, policies, and incentives. Energy Strategy Reviews, 53, 101379. https://doi.org/10.1016/j.esr.2024.101379

[41] Rotaris, L., Giansoldati, M., & Scorrano, M. (2020). The slow uptake of electric cars in Italy and Slovenia. Evidence from a stated-preference survey and the role of knowledge and environmental awareness. Transportation Research Part a Policy and Practice, 144, 1–18. https://doi.org/10.1016/j.tra.2020.11.011

[42] S, S. R., Venugopal, P., V, R., Alhelou, H. H., Al-Hinai, A., & Siano, P. (2022). Analysis of Electric Vehicles with an Economic Perspective for the Future Electric Market. Future Internet, 14(6), 172. https://doi.org/10.3390/fi14060172

[43] Santos, P. M. D., & Cirillo, M. Â. (2021). Construction of the average variance extracted index for construct validation in structural equation models with adaptive regressions. Communications in Statistics - Simulation and Computation, 52(4), 1639–1650. https://doi.org/10.1080/03610918.2021.1888122

[44] Shalender, K., & Sharma, N. (2020). Using extended theory of planned behaviour (TPB) to predict adoption intention of electric vehicles in India. Environment Development and Sustainability, 23(1), 665–681. https://doi.org/10.1007/s10668-020-00602-7

[45] Shanmugavel, N., & Balakrishnan, J. (2022). Influence of pro-environmental behaviour towards behavioural intention of electric vehicles. Technological Forecasting and Social Change, 187, 122206. https://doi.org/10.1016/j.techfore.2022.122206

[46] Sharma, V., Sharma, D., & Sharma, H. (2024). Understanding the factors behind consumers' purchase intention toward electric cars in India. Review of Integrative Business and Economics, 13(4), 1–17.

[47] Singh, K., & Vivek, D. (2023). Review on Factors Influencing Adoption of Electric Vehicles. Journal of Emerging Technologies and Innovative Research (JETIR), 10(8).

[48] Siraj, F., & Mehra, P. (2023). Factors affecting Two-Wheeler EV adoption in Delhi NCR. In Practice, progress, and proficiency in sustainability (pp. 292–322). https://doi.org/10.4018/978-1-6684-7620-8.ch014

[49] Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International Journal of Medical Education, 2, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

[50] Temme, D., Kreis, H., & Hildebrandt, L. (2009). A comparison of current PLS path modelling software: Features, Ease-of-Use, and performance. In Springer eBooks (pp. 737–756). https://doi.org/10.1007/978-3-540-32827-8_32

[51] Tian, S., Geng, Y., Huang, L., Li, S., Wang, Q., & Su, X. (2023). Fundamental and perspectives of thermo-responsive materials for dehumidification and water harvesting. Journal of Cleaner Production, 412, 137446. https://doi.org/10.1016/j.jclepro.2023.137446

[52] Tiwari, D.K., Tandon, U. & Mittal, A. Analysing adoption of eVehicles among Indian consumers: a novel approach towards sustainable transport. Environ Dev Sustain 26, 22997–23023 (2024). https://doi.org/10.1007/s10668-023-03587-1

[53] Upadhyay, N., & Kamble, A. (2023). Examining Indian consumer pro-environment purchase intention of electric vehicles: Perspective of stimulus-organism-response. Technological Forecasting and Social Change, 189, 122344. https://doi.org/10.1016/j.techfore.2023.122344

[54] Vafaei-Zadeh, A., Wong, T., Hanifah, H., Teoh, A. P., & Nawaser, K. (2022b). Modelling electric vehicle purchase intention among generation Y consumers in Malaysia. Research in Transportation Business & Management, 43, 100784. https://doi.org/10.1016/j.rtbm.2022.100784

[55] Vohra, J., Ghuman, M. K., & Soni, P. (2021). Nature and extent of advertisements broadcast on Indian TV - implications for society and media. International Journal of Indian Culture and Business Management, 22(3), 326. https://doi.org/10.1504/ijicbm.2021.114086

[56] Wang, Y., & Witlox, F. (2025). Global trends in electric vehicle adoption and the impact of environmental awareness, user attributes, and barriers. Energy Reports, 13, 1125–1137. https://doi.org/10.1016/j.egyr.2024.12.054
[57] Waseem, M., Lakshmi, G. S., Sreeshobha, E., & Khan, S. (2024). An Electric Vehicle battery and Management Techniques: Comprehensive review of important obstacles, new advancements, and recommendations. Energy Storage and Saving. https://doi.org/10.1016/j.enss.2024.09.002
[58] Yeğin, T., & Ikram, M. (2022). Analysis of Consumers' electric vehicle purchase Intentions: An expansion of the theory of planned Behavior. Sustainability, 14(19), 12091. https://doi.org/10.3390/su141912091
[59] Zhao, X., Li, X., Mao, Y., & Sun, J. (2024). Electric vehicle industry and sustainable economic growth: A measurement, coupling and causal analysis. Sustainable Futures, 8, 100242. https://doi.org/10.1016/j.sftr.2024.100242
[60] Zheng, C., Sun, D., Khamarudin, M., Ahmad, A., Wei, H., & Xu, J. (2025). Integrating customer-based brand equity and the theory of planned behavior to predict electric vehicle adoption in China: The moderating role of perceived price. PLoS ONE, 20(7), e0329224. https://doi.org/10.1371/journal.pone.0329224