

DOI: 10.5281/zenodo.19286201

INTEGRATING ENVIRONMENTAL AND ECONOMIC DRIVERS OF ELECTRIC VEHICLE PURCHASE INTENTION: AN EXTENDED THEORY OF PLANNED BEHAVIOUR MODEL

Namrata N. Khatri¹, Manish Sidhpuria², Ruchi Singh Maurya^{3*}, Vinita Ramchandani⁴,
Anam Natalwala⁵, Jaydipsinh R. Desai⁶

¹Assistant Professor, Department of Business & Industrial Management, VNSGU, Surat, Gujarat, India.

²Professor and Head, Department of Business & Industrial Management, VNSGU, Surat, Gujarat, India.

³Assistant Professor, Department of Business & Industrial Management, VNSGU, Surat, Gujarat, India.

⁴Assistant Professor, IPS Academy, Institute of Business Management and Research, Indore, M.P., India.

⁵Assistant Professor, Shree Uttar Gujarat BBA College, VNSGU, Surat, Gujarat, India.

⁶Associate Professor, V. M. Patel Institute of Management, Ganpat University, Gujarat, India.

Received: 11/06/2025

Accepted: 13/02/2026

Corresponding Author: Ruchi Singh Maurya
(ruchirewa88@gmail.com)

ABSTRACT

Electric Vehicles (EVs) have become one of the potent means to environmental protection and mitigation of climate change. Its ability to reduce these issues lies, however on its mass adoption. With this under focus, the current research designs and empirically evaluates a conceptual framework derived through an extension of the Theory of Planned Behaviour (TPB) by elucidating the issues that determine the intention of a consumer to purchase an EV. The model assumes that attitude towards EV, subjective norms, and Perceived Behavioural Control (PBC) are first formed by environmental awareness and perceived economic benefits that influence the purchase intention among the Consumers. The moderating influence of education is also investigated in order to determine whether the moderating role of education alters the PBC on purchase intention. The data was collected from 351 respondents and processed with the help of Partial Least Squares Structural Equation Modelling (PLS-SEM). The findings indicate that environmental awareness and Economic benefits are significant predictors of attitude, subjective norms and PBC, which are significant predictors of purchase intention. Furthermore Education is very instrumental in the process of filtering or amplifying such intentions. The research has valuable implications for policymakers and advertisers interested in advertising sustainable transportation via environmental campaigns, granting incentives and creating awareness (and informed messages).

KEYWORDS: Electric Vehicles, Theory of Planned Behaviour, Environmental Awareness, Perceived Economic Benefits, Purchase Intention, Education.

1. INTRODUCTION

Electric vehicles (EVs) have already become an indivisible part of the world sustainability strategy since they can reduce the amount of environmental pollution and reliance on fossil fuels. An International Energy Agency analysis (IEA, 2025), estimates that in 2025, global EV sales will reach 20 million units, which is roughly 25-26 percent of the annual sales in the global automobile market. The adoption patterns remain scattered even with the drastic movement towards electrified mobility. Though the adoption of EVs is gaining momentum in the emerging economies, key markets such as China, Europe, and the US remain at the forefront of this change that is dramatically transforming the international motor industry. Reportedly, the International Council of Clean Transportation (ICCT, 2025) is reinforcing this drive by using policy support, technological improvements, and increasing charging infrastructure.

The behavioural intention of the consumers is also crucial in the adoption of EVs besides the other three factors mentioned above. Such behavioural intention is developed, according to the theory of Planned Behaviour (TPB) (Ajzen, 1991) which comprises three fundamental constructs viz. attitude, subjective norms, and perceived behavioral control (Buhmann et al., 2024). To put it another way the TPB proposes that the combination of assessment of EVs by the individuals, the perceived social pressure, and the belief in their capacity to buy and use EVs will influence the purchase intention (Wang et al., 2016). Moreover, two additional decisive factors of EVs adoption that has been found and often discussed in recent studies include Environmental awareness and perceived economic benefits (Zhang et al., 2018). Environmental awareness is used to show how consumers care about the ecological degradation and appreciate the environmental benefits of EVs (Hasan et al., 2024), and the measure of perceived economic benefit represents the anticipation of cost savings, lower maintenance costs, and government subsidies that may come with owning EVs (Malik and Yadav, 2021). Demographic variables also determine the intention and adoption of EVs, of which most critical driver is education (Zhang et al., 2018). Although education is always treated as controlled variable or background factor but it plays a central role in this process by acting as moderator that shape how individuals interpret perceived control, process information, and translate perceived capability into behavioral intention (Park et al., 2021).

Though ample of studies in sustainable consumption research utilized TPB (Yadav & Pathak, 2016), the focus were always remains limited and myopic. The present study aims to fill those three important gaps. First, it tries to study the combined effect of attitude, subjective norms, and perceived behavioral control on purchase intention which were earlier considered in isolation (Khazaei & Tareq, 2021). Second, the paper integrates Environmental awareness and perceived economic benefits simultaneously within the TPB framework to understand their indirect influence on purchase intention through attitudinal, normative, and control beliefs which were also previously examined independently. Third, it takes into account the conditional impact of education on the connection between the Perceived Behavioural Control (PBC) and purchase intention.

On the basis of the foregoing deliberations, the current study constructs and empirically focuses on an integrated model of TPB that involves the environmental awareness and perceived economic benefits as antecedents to the attitude, subjective norms, and PBC. Further, the research also addresses the moderate effect of education between the PBC and purchase intention to EVs.

The objectives of this study are:

- To study the influence of environmental awareness on attitude, subjective norms, and PBC
- To study the influence of perceived economic benefits on attitude, subjective norms, and PBC
- To examine the influence of attitude, subjective norms, and PBC on purchase intention towards EVs
- To study the moderating role of education in the relationship between PBC and purchase intention towards EVs

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Existing literature emphasizes that the global shift toward sustainable transportation is largely driven by consumer adoption of EVs. This has led to numerous studies to understand how consumer purchase intentions for EVs are formed. The majority of these studies have considered several factors based on the TPB, including attitudes, subjective norms, and perceived behavioral control (Buhmann et al., 2024). Others have also asserted that environmental awareness is one of the most important factors which moulds the people attitude of conventional Internal Combustion Engine (ICE) vehicles and also the ecological benefits of replacing them with the EVs (Rezvani et al., 2015). These

attitudes are not inherited but arise due to cognitive and biospheric precursors like heightened concern for air pollution, carbon emissions, and excessive energy consumption that further encourages pro-environmental purchasing behavior (Joshi & Rahman, 2015). So the consumers' favourable evaluation of EVs as environmentally superior tools that helps in reducing environmental degradation shapes a strong pro-adoption attitude among consumers (Khurana et al., 2020; Buhmann et al., 2024). To maximize the understanding of behavioural intention, apart from attitude, the second most critical factor as per TPB is subjective norms, which are an individual's perception of the social pressure to perform or not perform a specific behaviour (Spielberger, 2004). Consumer researchers assert that the EV buyers often face heightened social expectations from peers and family to engage in environmentally responsible actions (Lin & Niu, 2018; Xie & Madni, 2023). This suggests that subjective norms are shaped by broader societal environmental awareness and values, which creates direct social obligation for consumers. Environmental awareness not only shapes attitude and subjective norms, but it also empowers consumers. It acts as a catalyst, playing a crucial role in strengthening a consumer's PBC by bridging the gap between knowledge and self-confidence regarding sustainable choices (Maichum et al., 2016). As consumers become more aware of the environmental problems, there are high chances that they may consider the alternatives that are more sustainable, like EVs, and learn more about the location and possibilities of resources, including government subsidies and charging infrastructure. This information develops self-efficacy, which leaves consumers with a more developed sense of being able to adopt and implement environmentally responsible choices (Kim and Lee, 2023; Li et al., 2017). Therefore, environmental awareness is a motivational factor which positively influences the perceived behavioral control by giving the consumer the confidence and ability to make sustainable decisions. The results of the literature indicate that environmental awareness moderately affect the purchase intention based on the effects it produces on the basic constructs of TPB which are attitude, subjective norms and PBC.

H₁: Environmental awareness positively influences attitude toward purchasing EVs.

H₂: Environmental awareness positively influences subjective norms related to EV purchase.

H₃: Environmental awareness positively influences perceived behavioral control over purchasing EVs.

Scholars have identified perceived economic benefit (PEB) as a critical factor affecting EV adoption beyond environmental awareness (Rezvani et al. 2015). PEB refers to consumers' expectations regarding financial advantages of buying EVs such as reduced fuel expenses, lower maintenance costs, and government incentives or subsidies (Malik & Yadav, 2021). This is supported by studies that empirically validated that when consumers perceive the total cost of ownership of EVs to be lower than that of conventional vehicles, their purchase intention increases significantly (Li et al. 2017). Furthermore research emphasized that PEB plays a key role in shaping attitudes, subjective norms, and perceived behavioral control within the TPB framework (Malik & Yadav, 2021). It fosters a favourable attitude by increasing the perceived value and cost-effectiveness of EV ownership (Malik & Yadav, 2021). Additionally, recognizing financial benefits may strengthen subjective norms, as EV ownership is seen as a smart, economically rational choice that is increasingly validated by society (Durmus Senyapar et al., 2023). Owning EV is increasingly viewed by society as a smart and responsible financial decision, gaining approval from peers and family.

Perceived economic benefit also positively influences perceived behavioral control by mitigating financial barriers and enhancing consumers' self-efficacy regarding the affordability and long-term maintenance of EVs (Malik & Yadav, 2021). These economic incentives contribute to higher adoption intentions because the perceived risk and cost-related issues are reduced, and the consumer becomes more confident and able to deal with the switch to electric mobility in a financial sense (Clinton and Steinberg, 2019).

H₄: Perceived economic benefit positively influences attitude toward purchasing EVs.

H₅: Perceived economic benefit positively influences subjective norms related to EV purchase.

H₆: Perceived economic benefit positively influences perceived behavioral control over purchasing EVs.

The combination of all three components of TPB i.e. attitude, subjective norms and the PBC is the major driving force of purchase intention (Afroz et al., 2015; Ajzen, 1991; Durmus Senyapar et al., 2023). Whereas a positive attitude gives the personal drive and social validation by the social norms, PBC lets the consumer believe that he can practically afford to make the purchase. The combination of such elements makes an overall attention toward sustainability a tangible desire to switch to electric mobility, which successfully transfers the gap

between the processes of thinking and purchasing. The positive correlation between these constructs is always supported by the past studies, and the most influential predictors are usually subjective norms, which are regarded as a really powerful predictor of EV purchase intention (Ng *et al.*, 2018). Although the TPB takes the attitude, subjective norms and PBC as independent variables, the existing literature tells that they interact. Specifically, subjective norms act as a predictor of PBC (Woo *et al.*, 2022); when a behavior like EV adoption receives strong social approval, it enhances the consumer's confidence and perceived ease of performing that behavior. In other words, social validation reduces the perceived difficulty, thereby strengthening the individual's sense of control over the adoption process.

H7: Subjective norms positively influence perceived behavioral control over purchasing EVs.

H8: Subjective norms positively influence purchase intention toward EVs.

H9: Perceived behavioral control positively influences purchase intention toward EVs.

H10: Attitude positively influences purchase intention toward EVs.

Within TPB, demographic characteristics, particularly education, are shown as a moderating factor which may not directly determine purchase intention, but influence how individuals process information, evaluate risks, and interpret perceived control over a behavior (Pamidimukkala *et al.*, 2025). By enhancing analytical thinking and decision-making capabilities, the level of education alters the strength of the relationship between perceived behavioral control and purchase intention (Wang *et al.*, 2016). Thus, education has the

potential to conditionally shape how perceived capability translates into behavioral intention in the context of EV adoption (Khazaei & Tareq, 2021).

H11: Education moderates the relationship between perceived behavioral control and purchase intention toward EVs.

The literature review revealed that although prior research has extensively examined EV adoption using the TPB, several limitations remain. Firstly, existing studies often analyze environmental awareness and perceived economic benefits separately and are primarily focuses on their direct effects on purchase intention. Secondly, very limited research has simultaneously integrated both environmental and economic drivers to examine their influence on attitude, subjective norms, and perceived behavioral control. This calls for creation of a more comprehensive structural model to understand how these determinants jointly shape sustainable purchase intention. Moreover, role of education has also been modulated inadequately on empirical basis. Specifically, its conditional impact on the correlation between PBC and purchase intention is not studied well and has theoretical gaps. Finally, much of the existing literature emphasizes explanatory relationships among the factors without adequately assessing predictive relevance. Hence, there is a need for empirical validation using advanced analytical approaches, such as PLS-SEM, to evaluate both structural relationships and predictive capability. To address these gaps, the present study develops and empirically tests integrated TPB model (figure 1) incorporating environmental and economic determinants while examining the moderating role of education.

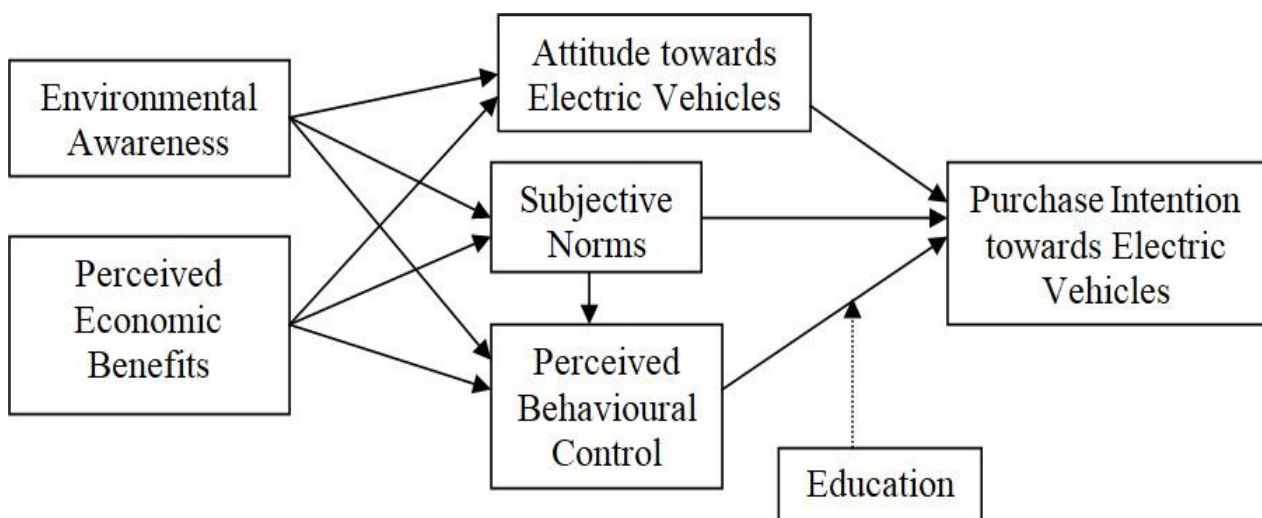


Figure 1: Proposed Conceptual Model.

Table 1: Constructs, Operational Definitions, Measurement Items and Sources.

| Construct | Operational Definition | Measurement Items | Sources |
|---|---|---|---|
| Environmental Awareness (EA) | "The degree to which consumers are concerned about environmental issues and recognize the environmental impact of conventional vehicles and the environmental benefits of EVs" (Mustafa et al., 2024) | <ol style="list-style-type: none"> 1. "I am concerned about air pollution caused by conventional vehicles." 2. "It is necessary to cut down energy and fuel consumption." 3. "EVs produce lower carbon gas emissions than fuel oil." 4. "Driving an EV makes less noise." 5. "EV energy consumption is lower compared to conventional vehicles that burn oil." | Khurana, Kumar & Sidhpuria (2019); Ng, Law & Zhang (2018); Kim et al. (2018) |
| Perceived Economic Benefit (PEB) | "The extent to which consumers perceive financial and economic advantages associated with purchasing and using EVs" (Zhang et al., 2018). | <ol style="list-style-type: none"> 1. "EVs will lower my fuel consumption and expenses." 2. "EVs will reduce my vehicle maintenance costs." 3. "The overall cost of owning an EV will be low due to government incentives (subsidies)." 4. "EVs can improve my travel efficiency." | Lane & Potter (2007); Laroche et al. (2001); Khurana et al. (2019); Langbroek et al. (2016) |
| Attitude toward Purchasing Electric Vehicles (A) | "An individual's overall positive or negative evaluation of purchasing and using an EV" (Buhmann et al., 2024). | <ol style="list-style-type: none"> 1. "I believe using an EV will help reduce wasteful use of natural resources." 2. "I believe buying an EV is a valuable and wise decision." 3. "I think buying an EV will be better for the environment." | Wang et al. (2018); Le & Nguyen (2022); Mohamed et al. (2018); Huang & Ge (2019) |
| Subjective Norms (SN) | "The perceived social pressure from important others to purchase or not purchase an EV" (Buhmann et al., 2024) | <ol style="list-style-type: none"> 1. "The opinions of individuals close to me influence my decision to buy an EV." 2. "My family is supportive of my decision to buy an EV." 3. "Seeing someone in my circle buy an EV motivates me to consider buying one." 4. "People will have a good impression of me if I purchase an EV." | Zhang et al. (2018); Huang & Ge (2019); Shankar & Kumari (2019) |
| Perceived Behavioural Control (PBC) | "The extent to which individuals perceive that they have the ability, resources, and opportunity to purchase and use an EV" (Buhmann et al., 2024). | <ol style="list-style-type: none"> 1. "I believe that I have the capability to purchase an EV." 2. "My knowledge of environmental issues influences my purchase decision." 3. "I have the time and access to information about EVs." 4. "The performance of EVs in terms of speed, safety, and comfort is comparable to conventional vehicles." | Nayum et al. (2016); Zhang et al. (2018); Huang & Ge (2019); Shankar & Kumari (2019); Lv et al. (2016); Kim et al. (2017) |
| Purchase Intention towards Electric Vehicles (PI) | "The degree to which an individual expresses willingness and readiness to purchase an EV in the future" (Buhmann et al., 2024). | <ol style="list-style-type: none"> 1. "I intend to buy an EV for future travel." 2. "If given the option between an ICE vehicle and an EV, I would choose an EV." 3. "When I need to replace my vehicle, I prefer to buy an EV." 4. "EVs are my first choice for future vehicle purchases." 5. "I am willing to purchase an EV for personal use." | Zhang et al. (2018); Huang & Ge (2019); Shankar & Kumari (2019) |

3. RESEARCH METHODOLOGY

A. Research Design

The research design in this study was cross-sectional survey using quantitative research design to test the proposed relationships between the variables of the study. Primary data were gathered through the use of a structured questionnaire which was given to the respondents. Quantitative approach was believed to be suitable to test the

hypothesised relationships as well as evaluate the structural model.

B. Sample and Data Collection

Data were collected from 351 respondents using a structured survey. This sampling approach enabled the collection of responses from individuals representing different age groups, occupations, and educational backgrounds.

Table 2: Demographic Profile.

| Variable | Category | Frequency | Percentage (%) |
|------------|----------------|-----------|----------------|
| Age | 18-27 | 153 | 43.6 |
| | 28-37 | 104 | 29.6 |
| | 38-47 | 64 | 18.2 |
| | 48-57 | 23 | 6.6 |
| | 58 and above | 7 | 2.0 |
| Gender | Total | 351 | 100.0 |
| | Male | 230 | 65.5 |
| | Female | 121 | 34.5 |
| Occupation | Total | 351 | 100.0 |
| | Student | 133 | 37.9 |
| | Professional | 40 | 11.4 |
| | Business | 57 | 16.2 |
| | Service | 121 | 34.5 |
| Education | Total | 351 | 100.0 |
| | Under Graduate | 194 | 55.3 |
| | Post Graduate | 121 | 34.5 |
| | HSC | 28 | 8.0 |
| | Doctorate | 8 | 2.3 |
| | Total | 351 | 100.0 |

The demographic profile indicates that 43.6% of respondents were aged between 18-27 years, followed by 29.6% in the 28-37 age group. Male respondents represented 65.5% of the sample, and 34.5% were female. In terms of occupation, students (37.9%) and service employees (34.5%) formed the largest group. Regarding educational qualifications, 55.3% held undergraduate degrees and 34.5% possessed postgraduate degrees.

C. Measurement Instrument

The questionnaire was divided into two parts; the first part contained the demographic data, and the second assessed the study constructs with multi-item scales that are based on the work of previous researches. All the items were measured on a five-point Likert scale, where 1 (strongly disagree) was the least and 5 (strongly agree) was the highest.

D. Data Analysis Technique

The analysis was conducted with the help of the Partial Least Squares Structural Equation Modelling (PLS-SEM) through SmartPLS software. The two steps analysis was applied. In the first place, the measurement model was tested to determine its

reliability and validity. Second, the hypothesised relationships were evaluated through the bootstrapping procedure in which the structural model was evaluated to test them. The model explanatory power (R^2) and effect sizes (f^2), collinearity diagnostics and the model fit indices were also discussed.

4. DATA ANALYSIS

A. Measurement Model Assessment

The construct validity and reliability of the measuring model have been examined and the value of Cronbach's alpha and composite reliability is more than 0.70 indicating that the scale is appropriate. The outer loadings and average variance extracted (AVE) was used to check the convergent validity. All the items whose score were more than 0.70 were kept for the analysis. The two items of Purchase Intention (PI3 and PI4) were removed during the iteration process due to the issue of collinearity. Out of the total of 25 items, 23 items were considered for the final analysis as their AVE values were more than 0.50 (Hair et al., 2019), which indicates that the model is fit for measuring data. The table 3 presents the loadings, reliability and convergent validity:

Table 3: Loadings, Reliability and Convergent Validity For The Constructs.

| Construct | Items | Items Loading | Cronbach's alpha | Composite Reliability (rho_a) | Composite Reliability (rho_c) | AVE |
|-------------------------------|-------|---------------|------------------|-------------------------------|-------------------------------|-------|
| Attitude towards EV | A1 | 0.906 | 0.889 | 0.890 | 0.931 | 0.819 |
| | A2 | 0.910 | | | | |
| | A3 | 0.899 | | | | |
| Environmental Awareness | EA1 | 0.853 | 0.890 | 0.897 | 0.919 | 0.695 |
| | EA2 | 0.869 | | | | |
| | EA3 | 0.880 | | | | |
| | EA4 | 0.772 | | | | |
| | EA5 | 0.789 | | | | |
| Perceived Behavioural Control | PBC1 | 0.863 | 0.882 | 0.884 | 0.919 | 0.739 |
| | PBC2 | 0.855 | | | | |
| | PBC3 | 0.914 | | | | |
| Perceived Economic Benefit | PBC4 | 0.804 | 0.877 | 0.880 | 0.916 | 0.731 |
| | PEB1 | 0.874 | | | | |
| | PEB2 | 0.868 | | | | |
| | PEB3 | 0.870 | | | | |
| Purchase Intention for EV | PEB4 | 0.805 | 0.882 | 0.892 | 0.927 | 0.809 |
| | PI1 | 0.868 | | | | |
| | PI2 | 0.911 | | | | |
| Subjective Norms | PI5 | 0.919 | 0.917 | 0.920 | 0.941 | 0.801 |
| | SN1 | 0.898 | | | | |
| | SN2 | 0.926 | | | | |
| | SN3 | 0.894 | | | | |
| | SN4 | 0.861 | | | | |

Heterotrait-Monotrait Ratio (HTMT) bootstrapping was used to examine discriminant validity. In this test, there was no value of 1.0 found for each pair at the 95% confidence interval, which confirms the establishment of discriminant validity.

Even though a number of HTMT values were higher than the normal cutoff of 0.90, the bootstrapped confidence intervals did not contain 1.0, meeting the Henseler et al. (2015) suggesting that this model is considered acceptable.

Table 4: Heterotrait-Monotrait Ratio (HTMT).

| | A | EA | PBC | PEB | PI | SN |
|-----|-------|-------|-------|-------|-------|----|
| A | | | | | | |
| EA | 0.830 | | | | | |
| PBC | 0.942 | 0.945 | | | | |
| PEB | 0.955 | 0.899 | 0.947 | | | |
| PI | 0.912 | 0.872 | 0.915 | 0.933 | | |
| SN | 0.957 | 0.869 | 0.950 | 0.958 | 0.970 | |

The variance inflation factor (VIF) was used to evaluate the collinearity among the predictor constructs. The VIF values were from 1.45 to 3.62 which are lower than the cut off value of 5.0 as per the PLS-SEM standards (Hair et al., 2021). These

findings indicate that multicollinearity is not an issue. The structural model was evaluated to examine the hypothesized relationships as the reliability, validity and collinearity was established.

Table 5: Structural Model Results (Direct Effects).

| Hypothesis | Path | B | t-value | p-value | 2.5% | 97.5% | Decision |
|------------|----------------------|--------|---------|---------|--------|--------|---------------|
| H1 | EA → A | 0.193 | 4.066 | <0.001 | 0.102 | 0.290 | Supported |
| H2 | EA → SN | 0.281 | 5.799 | <0.001 | 0.190 | 0.381 | Supported |
| H3 | EA → PBC | 0.360 | 6.833 | <0.001 | 0.252 | 0.457 | Supported |
| H4 | PEB → A | 0.690 | 14.285 | <0.001 | 0.590 | 0.781 | Supported |
| H5 | PEB → SN | 0.637 | 14.213 | <0.001 | 0.541 | 0.719 | Supported |
| H6 | PEB → PBC | 0.215 | 3.402 | 0.001 | 0.097 | 0.345 | Supported |
| H7 | SN → PBC | 0.387 | 6.824 | <0.001 | 0.279 | 0.501 | Supported |
| H8 | SN → PI | 0.592 | 9.415 | <0.001 | 0.460 | 0.705 | Supported |
| H9 | PBC → PI | 0.178 | 2.315 | 0.021 | 0.043 | 0.343 | Supported |
| H10 | A → PI | 0.148 | 2.402 | 0.016 | 0.023 | 0.265 | Supported |
| - | Education → PI | -0.049 | 1.784 | 0.075 | - | 0.004 | Not Supported |
| H11 | Education × PBC → PI | -0.064 | 3.109 | 0.002 | -0.110 | -0.028 | Supported |

Table 5 shows the results including the standardised path coefficients (β), t-values, and p-values. The validity of the data is that there is a positive correlation between environmental awareness and perceived economic benefits and the attitude, subjective norms and PBC thus influencing the TPB constructs. The subjective norms have also an effect on PBC that means that social pressure promotes the possibility of individuals to execute the behaviour. It is mentioned in the analysis that the subjective norm is the strongest predictor of the purchase intention of consumers to EVs and education has no direct impact on the purchase intention. The moderating influence of education is however vast on the connection between PBC and purchase intention of EVs. This implies that the more education results in the positive perception of the consumers about the advantages of EVs that causes them to intend to purchase EVs as opposed to those with lower education.

B. Coefficient of Determination (R^2)

The Coefficient of determination (R^2) was used to examine the explanatory power of the model. The table 6 indicates that the R^2 values indicate substantial explanatory power, indicating that the model provides strong predictive capability for the endogenous constructs according to established PLS SEM criteria for the coefficient of determination (Hair et al., 2021).

Table 6: R^2 .

| Endogenous Construct | R^2 | Interpretation |
|----------------------|-------|----------------|
| A | 0.727 | Substantial |
| SN | 0.771 | Substantial |
| PBC | 0.814 | Substantial |
| PI | 0.796 | Substantial |

C. Effect Size (f^2)

Effect size (f^2) helps to evaluate the contribution of each exogenous construct to the endogenous variables. According to Cohen’s (2013) benchmarks (0.02 = small, 0.15 = medium, 0.35 = large), several relationships demonstrate large practical relevance. The effect size indicates that several predictors have significant influence on the decision to purchase an EV.

Table 7: f^2 .

| Path | f^2 | Effect Size |
|-----------|-------|--------------|
| EA → A | 0.049 | Small |
| EA → SN | 0.124 | Small-Medium |
| EA → PBC | 0.360 | Large |
| PEB → A | 0.628 | Large |
| PEB → SN | 0.639 | Large |
| PEB → PBC | 0.349 | Large |
| SN → PI | 0.349 | Large |
| A → PI | 0.021 | Small |
| PBC → PI | 0.029 | Small |

D. Q^2 (Predictive Relevance)

The table 8 indicates that Q^2 predict values for attitude, perceived behavioral control, and purchase intention is substantially greater than zero suggesting that the values indicates strong predictive relevance of the model (Hair et al., 2021). The results reveal that the structural model possesses a good predictive capability.

Table 8: Q^2 (Predictive Relevance).

| Construct | Q^2 predict |
|-----------|---------------|
| A | 0.723 |
| PBC | 0.805 |
| PI | 0.800 |

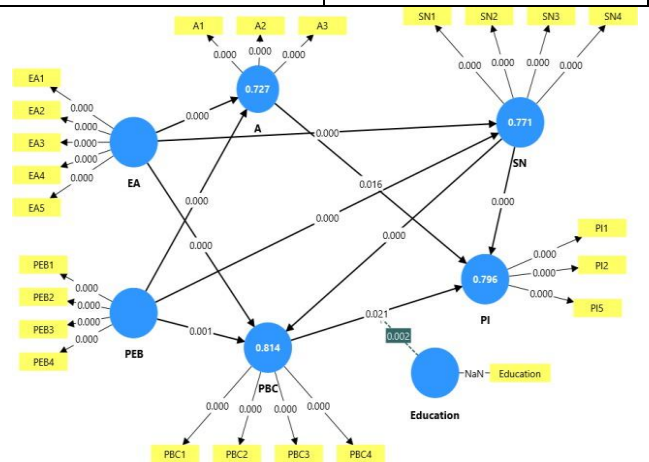


Figure 2: Structural Model Results with Path Coefficients, Significance Levels, and Moderating Effect Education.

Table 9. Model Fit.

| Fit Index | Saturated | Estimated |
|-----------|-----------|-----------|
| SRMR | 0.062 | 0.071 |
| NFI | 0.796 | 0.786 |

The SRMR and the NFI criteria were used to examine the model fit. The model is acceptable as the SRMR value is 0.071, which is less than the standard criterion of 0.08 (Henseler et al., 2015). Conversely, the NFI value is 0.786 (which is less than 0.90), and this is because of the complexity of the model and the sample size also have an impact on this (Hair et al., 2021). As the SRMR value is within the specified criterion, the model is considered to be overall fit.

5. DISCUSSION

The given study concludes the variables that influence the decision of the consumers to make a purchase on EVs based on the TPB model. The environmental awareness and perceived economic benefits positively affects attitude, subjective norms and PBC, and thus, the above factors are relevant to the intention of the consumers to buy EVs. That observation implies consumers that are

more aware of environmental issues and ecological benefits of owning EVs are more susceptible to social pressures and control to buy EVs. Thus, there is the need of environmental campaigns to create favourable perception and social pressure on consumers to go for EVs. Attitude, subjective norms, and PBC are highly predicted by the perceived economic benefit. It had a considerable impact on the attitude and the subjective norms meaning that the role of money is a major factor in the attitude of consumers and social pressure to purchase EV. Attitude and PBC are also positively related to purchase intention, but the level of relationships is less than the subjective norms. This demonstrates the fact that the subjective norms are rather more influential in determining the purchase intention of consumers to buy EVs. The subjective norms that indicate that social influence shapes preparedness and decision of consumers to purchase EVs directly influence the purchase intention of consumers towards EVs. It is also observed that subjective norms influence the PBC; this indicates that subjective norms are among influential factors that predict the intention of consumers to buy electric vehicles. The education effect on the relationship between the PBC and purchase intention was moderating one, which was predetermined by the fact that, with higher education levels, consumers are more certain and willing to purchase EVs. When compared to that, education is not directly impacting the purchase intention, which implies that the impact of education is through PBC. There is a high explanatory power of the model since the values of the R^2 are high and the effect size is high such that the perceived economic benefits and subjective norms can be viewed as critical predictors of the purchase intention of consumers to the electric vehicles. Thus, the findings show that raising environmental awareness, economic benefits, and using social influence and the education interventions may be employed to enhance the intention to purchase EVs among the consumers.

6. IMPLICATIONS

There are some positive theoretical, practical and policy implications of the study as regards adoption of EVs. The study provides a contribution to the TPB by introducing the environmental awareness and perceived economic benefits as critical elements in achieving the attitude, subjective norms, and PBC modification. The moderation effect of education has a significant position between the PBC and

the purchase intention. Practically, marketers should pay attention to environmental and economic benefits of EVs by emphasising the messages that mention that there is a reduction of costs, incentives, and environmental sustainability with social pressure that will strengthen subjective norms. The policymakers need to come up with environmental awareness initiatives, make sure they inform them of the economic benefits, arrange the programs according to the level of education, use subsidies, tax benefits, and upgraded infrastructure to counteract the obstacles and boost the consumer confidence in the use of the EVs.

7. FUTURE SCOPE OF RESEARCH

Further studies can be expanded to include the psychological and social factors like perceived risk, technological trust and individual innovativeness to examine the consumer purchase intention. Given that the longitudinal studies can be conducted to evaluate environmental awareness, perceived economic benefits and TPB constructs over time and to evaluate their effects on actual purchase behaviour, as opposed to purchase intention alone. The research may be conducted by incorporating the other moderating variables like age, income, etc. The research studies may be conducted to determine the driving forces as well as the obstacles to sustainable transport.

8. CONCLUSION

The current work examines the variables that have an impact on the intention to purchase EV using an integrated TPB framework. This result indicates that the perception of economic benefits and awareness of the environment is important in molding attitude, subjective norms, and perceived behavioural control, which affects the intentions of consumers to purchase EVs. The highest predictor was the subjective norms since it revealed that social factors are a potent force that will determine whether the consumers make a purchase decision towards sustainable consumption. The moderating role of education on the perceived behavioural control and purchase intention relationship contributes to the TPB framework because it demonstrates the significant role played by education. This model is fit since the R^2 and Q^2 are substantial. The findings can be helpful to policy-makers and practitioners that strive to promote the application of sustainable transportation and the use of EVs more often.

REFERENCE

1. Afroz, R., Rahman, A., Masud, M. M., Akhtar, R., & Duasa, J. B. (2015). How individual values and attitude influence consumers' purchase intention of electric vehicles—Some insights from Kuala Lumpur, Malaysia. *Environment and Urbanization ASIA*, 6(2), 193-211.
2. Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
3. Al Shurideh, M., Alzoubi, H. M., Al Kurdi, B., Hamadneh, S., Ahmed, G., Al-Sulaiti, K., ... & Ozturk, I. (2025). Consumer and economic influences on electric vehicle adoption: The mediating role of attitudes and the moderating effect of demographics. *International Journal of Energy Economics and Policy*, 15.
4. Buhmann, K. M., Rialp-Criado, J., & Rialp-Criado, A. (2024). Predicting consumer intention to adopt battery electric vehicles: Extending the theory of planned behavior. *Sustainability*, 16(3), 1284.
5. Clinton, B. C., & Steinberg, D. C. (2019). Providing the Spark: Impact of financial incentives on battery electric vehicle adoption. *Journal of Environmental Economics and Management*, 98, 102255.
6. Durmus Senyapar, H. N., Akil, M., & Dokur, E. (2023). Adoption of electric vehicles: Purchase intentions and consumer behaviors research in Turkey. *Sage Open*, 13(2), 21582440231180586.
7. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, 31(1), 2-24.
8. Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer international publishing.
9. 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*, 5(2), 196-216.
10. Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
11. International Council on Clean Transportation. (2025). *Global electric vehicle market monitor for light-duty vehicles in key markets: 2025 H1*. <https://theicct.org/publication/global-ev-market-monitor-for-ldvs-in-key-markets-2025-h1-sept25/>
12. International Energy Agency. (2025). *Global EV outlook 2025*. <https://www.iea.org/reports/global-ev-outlook-2025>
13. Joshi, Y., & Rahman, Z. (2015). Factors affecting green purchase behaviour and future research directions. *International Strategic management review*, 3(1-2), 128-143.
14. Khazaei, H., & Tareq, M. A. (2021). Moderating effects of personal innovativeness and driving experience on factors influencing adoption of BEVs in Malaysia: An integrated SEM–BSEM approach. *Heliyon*, 7(9).
15. Khurana, A., Kumar, V. R., & Sidhpuria, M. (2020). A study on the adoption of electric vehicles in India: the mediating role of attitude. *Vision*, 24(1), 23-34.
16. Kim, N., & Lee, K. (2023). Environmental consciousness, purchase intention, and actual purchase behavior of eco-friendly products: The moderating impact of situational context. *International Journal of Environmental Research and Public Health*, 20(7), 5312.
17. Lin, S. T., & Niu, H. J. (2018). Green consumption: Environmental knowledge, environmental consciousness, social norms, and purchasing behavior. *Business Strategy and the Environment*, 27(8), 1679-1688.
18. 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.
19. Maichum, K., Parichatnon, S., & Peng, K. C. (2016). Application of the extended theory of planned behavior model to investigate purchase intention of green products among Thai consumers. *Sustainability*, 8(10), 1077.
20. Malik, C., & Yadav, S. (2021). Environmentally conscious consumers and electric vehicle adoption behaviour: moderating role of perceived economic benefit. *Academy of Marketing Studies Journal*, 25(1), 1-16.
21. Ng, M., Law, M., & Zhang, S. (2018). Predicting purchase intention of electric vehicles in Hong Kong. *Australasian Marketing Journal*, 26(3), 272-280.

22. 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.
23. Park, J., Hong, E., & Le, H. T. (2021). Adopting autonomous vehicles: The moderating effects of demographic variables. *Journal of Retailing and Consumer Services*, 63, 102687.
24. Rezvani, Z., Jansson, J., & Bodin, J. (2015). Advances in consumer electric vehicle adoption research: A review and research agenda. *Transportation research part D: transport and environment*, 34, 122-136.
25. Spielberger, C. (2004). *Encyclopedia of applied psychology*. Academic press.
26. Wang, S., Fan, J., Zhao, D., Yang, S., & Fu, Y. (2016). Predicting consumers' intention to adopt hybrid electric vehicles: using an extended version of the theory of planned behavior model. *Transportation*, 43(1), 123-143.
27. Woo, S. K., LePage, B., Chiang, Y. T., & Fang, W. T. (2022). Predicting the protective behavioral intentions for parents with young children that possess different levels of education in Hong Kong using the theory of planned behavior for air polluted with PM2. 5. *BMC Public Health*, 22(1), 761.
28. Xie, S., & Madni, G. R. (2023). Impact of social media on young generation's green consumption behavior through subjective norms and perceived green value. *Sustainability*, 15(4), 3739.
29. Yadav, R., & Pathak, G. S. (2016). Young consumers' intention towards buying green products in a developing nation: Extending the theory of planned behavior. *Journal of cleaner production*, 135, 732-739.
30. Zhang, X., Bai, X., & Shang, J. (2018). Is subsidized electric vehicles adoption sustainable: Consumers' perceptions and motivation toward incentive policies, environmental benefits, and risks. *Journal of Cleaner Production*, 192, 71-79.