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Factors influencing young consumers' purchase intention toward electric two-wheelers as a pathway to sustainable urban mobility in Ho Chi Minh City, Vietnam: The mediating role of attitude under TAM

Tri Cao Le [1]*, Huong Thi Minh Luong [1]

[1] Faculty of Business Administration, Industrial University of Ho Chi Minh City, VIETNAM
***Corresponding Author:** trilc25271@pgr.iuh.edu.vn

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ABSTRACT

Rapid urbanization in developing cities has intensified transportation-related environmental challenges, highlighting the urgent need for sustainable mobility solutions. Electric two-wheelers have emerged as a promising low-carbon alternative for urban transportation, particularly in Southeast Asian cities where motorcycles dominate daily mobility. This study investigates the factors influencing young consumers' purchase intention toward electric two-wheelers in Ho Chi Minh City, Vietnam, with a particular focus on the mediating role of attitude. Drawing on the Technology Acceptance Model and the Theory of Planned Behavior, the research examines the effects of government support, perceived usefulness, perceived ease of use, environmental concern, and social influence on consumer attitudes and purchase intention. A quantitative research design was employed, and data were collected from 346 valid respondents from Generation Z and Generation Y through both online and face-to-face surveys in Ho Chi Minh City. The data were analyzed using SPSS 20.0 and SmartPLS 3 through Partial Least Squares Structural Equation Modeling. The results indicate that technological perceptions, environmental awareness, social influence, and government support significantly shape consumers' attitudes toward electric two-wheelers, which in turn strongly influence purchase intention. Attitude also plays a mediating role in transforming policy support, technological perceptions, and environmental concern into sustainable consumption behavior. These findings provide practical implications for policymakers and businesses in promoting green mobility and accelerating the adoption of electric transportation. The study contributes to the literature by extending the Technology Acceptance Model through the integration of sustainability-oriented and policy-related determinants, thereby offering a more comprehensive framework for explaining electric mobility adoption among young consumers in emerging urban contexts.

Keywords: TAM model, attitude, purchase intention, electric vehicle, electric two wheelers

INTRODUCTION

Climate change, rapid urbanization, and deteriorating air quality have intensified the urgency of transitioning toward sustainable transportation systems, particularly in rapidly urbanizing developing economies. The transportation sector remains a major contributor to greenhouse gas emissions and urban environmental degradation, prompting policymakers to prioritize electric mobility as a strategic instrument for sustainable development (Ahmed et al., 2024; International Energy Agency, 2023). In line with the United Nations Sustainable Development Goals (SDGs), electric mobility has become closely associated with the advancement of sustainable cities (SDG 11), responsible consumption and production (SDG 12), and climate action (SDG 13) (Abdelkareem et al., 2025; Tolani et al., 2025). Consequently, understanding the drivers of electric mobility adoption has emerged as an important research agenda within the broader transition toward sustainable urban transport systems.

Among various electric mobility solutions, electric two-wheelers (E2Ws) represent a particularly relevant yet underexamined pathway for sustainable transport transitions in developing countries. Compared with four-wheeled electric vehicles, E2Ws are more affordable, energy-efficient, and better suited to dense urban environments characterized by congestion and limited road capacity (Haldankar et al., 2024; Yang & Wen, 2023). Their lower lifecycle emissions and reduced spatial requirements contribute directly to improved

urban air quality, reduced noise pollution, and enhanced transport accessibility. As a result, E2Ws can simultaneously support multiple sustainability objectives, including sustainable urban mobility (SDG 11), improved public health (SDG 3), and clean energy transition (SDG 7) (Hassani et al., 2026; Olabi et al., 2023).

Despite their strategic relevance, E2Ws remain relatively underrepresented in sustainable transport scholarship. Existing studies on electric mobility have largely focused on electric cars or electric bicycles, while electric motorcycles—although constituting a dominant transport mode in many Southeast Asian cities—have received comparatively limited theoretical attention (Bakker, 2019; Nguyen et al., 2024). This research gap is particularly notable given that E2Ws account for more than 45 percent of the global electric vehicle stock (International Energy Agency, 2023). These figures suggest that E2Ws are not a marginal technology but a central component of low-carbon mobility transitions, especially in developing economies where motorcycles represent the primary mode of daily transportation.

Vietnam provides a compelling empirical context in which to investigate this issue. Rapid urbanization, increasing fuel costs, and rising concern over air pollution have placed significant pressure on urban transport systems, particularly in Ho Chi Minh City. Over the past five years, the number of registered E2Ws has increased substantially nationwide, with Ho Chi Minh City emerging as the largest and fastest-growing market (GTJAI, 2025). These dynamics make the city an appropriate setting to examine how sustainability-oriented mobility policies translate into individual adoption intentions in emerging economies.

Within this transition, young consumers represent a particularly influential demographic group. Accounting for nearly 40 percent of Ho Chi Minh City's population, younger individuals tend to exhibit stronger environmental awareness and greater openness toward technological innovation (Nguyen et al., 2024). Empirical evidence indicates that environmentally conscious consumers are increasingly willing to support green products and services (Zhang et al., 2024), and nearly 64 percent of young Vietnamese consumers report a willingness to pay more for environmentally friendly products (NielsenIQ, 2023). However, pro-environmental attitudes do not always translate into actual adoption behavior when green technologies are perceived as risky, inconvenient, or insufficiently supported by infrastructure and policy frameworks. This persistent intention–adoption gap highlights the need to better understand the psychological mechanisms underlying sustainable mobility decisions.

From a theoretical perspective, the Technology Acceptance Model (TAM) (Davis, 1989) and the Theory of Planned Behavior (TPB) (Ajzen, 1991) provide widely recognized frameworks for explaining technology adoption and pro-environmental behavior. TAM focuses on individuals' cognitive evaluations of technological attributes, particularly perceived usefulness and perceived ease of use, which shape attitudes toward technology adoption. In contrast, TPB emphasizes the role of socio-psychological determinants such as attitudes, social norms, and perceived behavioral control in shaping behavioral intentions. While both frameworks have been widely applied in studies of electric vehicle adoption, prior research has often applied them independently or focused primarily on direct technological determinants of purchase intention (Higueras-Castillo et al., 2024; Tong et al., 2024).

More importantly, a theoretical gap persists at the intersection of sustainable development policy and consumer behavior theory. Although electric mobility is frequently framed as a key contributor to SDG 11 and SDG 13 at the macro-policy level, limited research has examined how these sustainability objectives are translated into individual behavioral decisions through micro-level psychological processes. In particular, the role of attitude as a transmission mechanism linking policy signals and environmental values to technology adoption remains insufficiently explored. Behavioral studies suggest that attitudes often exert stronger influence on sustainable mobility decisions than social norms (Napitupulu et al., 2023). However, the extent to which attitudes mediate the influence of government support and environmental concern on adoption intention remains underdeveloped in the literature (Huber & Wicki, 2021; Tolani et al., 2025).

Government support is particularly critical in emerging economies where infrastructural constraints, technological uncertainty, and market risks may hinder green technology adoption. Policy interventions such as financial incentives, charging infrastructure investment, and regulatory commitments can reduce objective barriers while simultaneously shaping consumers' perceptions of credibility, long-term commitment, and environmental responsibility. Understanding whether attitudes mediate the relationship between government support and adoption intention is therefore essential for clarifying how sustainability policies under SDG 11 and climate action initiatives under SDG 13 are translated into individual behavioral change.

To address these gaps, this study develops and empirically tests an extended TAM–TPB framework to examine young consumers' intention to purchase E2Ws in Ho Chi Minh City. Specifically, the study investigates the effects of perceived usefulness, perceived ease of use, environmental concern, social influence, and government support on attitudes toward E2Ws, and evaluates the mediating role of attitude in shaping purchase intention.

By positioning electric two-wheelers as a behavioral mechanism for advancing sustainable mobility transitions, this study makes three key contributions. First, it advances sustainable transport research by conceptualizing E2W adoption as a micro-level pathway through which urban sustainability objectives under SDG 11 can be operationalized. Second, it enriches green consumption literature by clarifying how environmental concern and attitudinal processes translate sustainability values into behavioral intentions, thereby supporting responsible consumption under SDG 12. Third, it extends sustainability policy research by demonstrating how government support influences adoption through attitudinal mediation, thereby strengthening the behavioral foundations of climate action initiatives under SDG 13. Collectively, these insights provide both theoretical and policy-relevant implications for accelerating sustainable mobility transitions in emerging economies.

LITERATURE REVIEW

Electric Two-Wheeled Vehicles

Electric two-wheeled vehicles (E2Ws) are personal transportation modes powered by electric motors and rechargeable batteries, offering a sustainable alternative to conventional gasoline-powered motorcycles (Nguyen et al., 2024). Beyond their functional role as a mobility solution, E2Ws embody technological advancement, environmental responsibility, and modern lifestyle values, thereby exerting a significant influence on consumers' attitudes and transportation choices (Tran et al., 2023). One of the key advantages of electric motorcycles lies in their ability to combine mobility convenience with lower operating costs, while simultaneously contributing to the reduction of air pollution and noise in large urban areas. Compared to other electric vehicles such as electric cars, E2Ws offer superior advantages in terms of compactness, maneuverability, and lower initial investment costs, which has facilitated their rapid adoption among younger consumers (Nguyen et al., 2024). The attractiveness of electric motorcycles therefore extends beyond performance and functionality, as they increasingly serve as symbols of green mobility, social responsibility, and sustainable lifestyle orientation.

Purchase Intention and Purchase Intention toward Electric Two-Wheeled Vehicles

Purchase intention (PI) refers to an individual's degree of readiness and commitment to engage in a purchasing behavior for a product or service in the future (Beck & Ajzen, 1991). It reflects consumers' desire to acquire a product to satisfy personal needs and is widely regarded as a key predictor of actual purchasing behavior (Dodds et al., 1991). Consistent with this view, PI captures what consumers plan or expect to buy in the future, and forecasting PI serves as a fundamental basis for predicting actual purchase behavior (Howard & Sheth, 1969). According to the TPB, PI functions as a mediating construct between attitudes, social norms, and actual behavior (Ariyamongkolcharoen et al., 2024). Recent studies suggest that PI is shaped by consumers' cognitive evaluations, affective responses, beliefs, and expectations toward a product. In the context of electric vehicles, PI reflects the extent to which consumers perceive green mobility solutions as compatible with their transportation needs and personal values (Higueras-Castillo et al., 2026).

Attitude toward Electric Two-Wheeled Vehicles

Attitude (AT) toward E2Ws is defined as an individual's overall positive or negative evaluation of using or owning an E2W, reflecting individuals' preference, acceptance, and willingness to adopt this mode of transportation (Yang & Wen, 2023). This attitude is shaped by consumers' perceptions of environmental benefits, cost savings, convenience, user experience, and the social image associated with E2Ws (Zhang et al., 2025). Moreover, AT toward E2Ws is inherently technology-oriented and closely linked to factors such as battery performance, charging infrastructure, and supportive transportation and energy policies. In the context of green mobility research, AT has consistently been identified as a key antecedent that facilitates the transition from internal combustion engine vehicles to electric alternatives (Nguyen et al., 2024).

Technology Acceptance Model (TAM)

The TAM, originally proposed by Davis (1989) and grounded in the Theory of Reasoned Action (TRA), provides a robust analytical framework for explaining individuals' acceptance and use of new technologies. According to TAM, two core constructs Perceived Usefulness (PU) and Perceived Ease of Use (PEU) influence users' AT toward a technology, which subsequently shape behavioral intention and actual usage behavior. Subsequent research has extended the original TAM by incorporating external variables such as Social Influence (SI) and Government Support (GS), demonstrating the model's flexibility and applicability across diverse consumption contexts (Tuan et al., 2022; Zhang & Chang, 2023). In the context of E2Ws, TAM offers valuable insights into how young consumers evaluate the functional benefits and usability of E2Ws prior to forming PI.

Theory of Planned Behavior (TPB)

The TPB, developed by, extends the TRA by accounting for situations in which individuals' behavioral control is incomplete. TPB posits that behavioral intention is determined by three key factors: attitude toward the behavior, subjective norms, and perceived behavioral control. A substantial body of empirical research has demonstrated the strong explanatory power of TPB in predicting environmentally friendly and sustainable consumption behaviors. Within the context of electric E2Ws, TPB helps elucidate how environmental awareness, social influence, and perceived ability to purchase and use E2Ws jointly contribute to the formation of intentions to shift toward green transportation modes.

The TPB, developed by Ajzen (1991), extends the TRA by incorporating perceived behavioral control (PBC) to account for situations in which individuals may face constraints in performing a behavior. According to TPB, behavioral intention is determined by three key factors: attitude toward the behavior, subjective norms, and perceived behavioral control. A substantial body of empirical research has demonstrated the strong explanatory power of TPB in predicting environmentally friendly and sustainable consumption behaviors (Jayasingh et al., 2021; Kariathi & Mayasari, 2024; Tuan et al., 2022). In the context of E2Ws, TPB provides a useful lens to understand how environmental awareness and social influence contribute to the formation of intentions toward green mobility adoption.

However, in this study, PBC is not incorporated into the research model. This is because PBC primarily reflects individuals' perceived access to resources and external facilitating conditions (e.g., financial capability, infrastructure availability), which are considered beyond the central scope of this research. Instead, the study focuses on internal cognitive and attitudinal mechanisms underlying technology adoption.

The integration of TAM and TPB provides a theoretically robust framework for explaining consumer adoption of E2Ws. TAM captures the technology-oriented evaluation process, in which PU and PEU represent consumers' cognitive assessments of the functional value and usability of new

mobility technologies. These constructs are particularly relevant, as adopting electric vehicles involves accepting innovative technological systems. In contrast, TPB contributes socio-psychological dimensions to the model. SI reflects normative pressure from significant others, while environmental concern (EC) captures value-driven motivations associated with sustainable consumption. GS represents institutional signals that reduce uncertainty and enhance consumer confidence in adopting green mobility technologies. AT functions as a central mediating mechanism that translates technological perceptions and socio-environmental factors into PI.

By integrating TAM and selected TPB-related constructs, this study captures both technological evaluation and socio-environmental drivers, while maintaining theoretical parsimony. This approach provides a comprehensive yet focused explanation of consumer adoption behavior in the transition toward sustainable urban mobility and low-carbon transportation systems.

RESEARCH HYPOTHESES AND MODELS

Research Hypothesis

In the context of promoting green transportation, government support plays a pivotal role in shaping consumers' positive attitudes toward electric vehicles. Such support encompasses both financial incentives—such as purchase subsidies, tax exemptions, and investments in charging infrastructure—and non-financial measures, including preferential license plates and free or prioritized parking (Munthe et al., 2024; Panyagometh & Bian, 2021). Empirical evidence indicates that subsidies and tax incentives exert a strong influence on Generation Z's attitudes toward electric motorcycles (Zhang et al., 2025). Similarly, a study conducted in Indonesia by Kariathi and Mayasari (2024) demonstrates that GS reduces perceived risk, thereby enhancing consumers' favorability and acceptance of E2Ws. In the Vietnamese context, Tuan et al. (2022) also confirm that policies promoting green transportation have a significant positive effect on consumers' attitudes.

H1: GS positively affects AT toward E2Ws.

PU originates from the belief that a technology or product can enhance performance and deliver tangible benefits to users (Davis, 1989). PU has been widely recognized as a key determinant of AT and behavioral intentions. Venkatesh and Davis (2000) argue that PU not only directly affects attitudes but also serves as a decisive factor in shaping technology usage intentions. In the context of green consumption, Zhang et al. (2025) find that consumers in Taiwan exhibit more favorable AT toward electric motorcycles when they perceive benefits such as lower operating costs and environmental contributions. Yang and Wen (2023) further identify PU as the most influential factor affecting both AT and intentions toward green mobility solutions. Evidence from Malaysia also supports this view, showing that consumers are more likely to develop positive attitudes when electric vehicles are perceived as useful for daily commuting (Tin et al., 2024). For young consumers in Ho Chi Minh City, perceived usefulness is associated not only with economic benefits but also with alignment with green lifestyle trends.

H2: PU positively affects AT toward E2Ws.

PEU reflects the extent to which consumers believe that using a product requires minimal effort and is free from complexity (Davis, 1989). Kariathi and Mayasari (2024) report that users exhibit more positive AT when electric motorcycles are perceived as easy to operate and convenient to charge. Yang and Wen (2023) emphasize that simplicity in operation, maintenance, and daily use significantly enhances favorable AT among young consumers. In Malaysia, Tin et al. (2024) demonstrate that PEU not only has a direct effect on AT but also indirectly influences PI toward electric vehicles. In the context of Ho Chi Minh City, perceived ease of use helps reduce uncertainty and increases positive perceptions of E2Ws as a practical and sustainable transportation option.

H3: PEU positively affects AT toward E2Ws.

EC reflects individuals' awareness of and concern for environmental issues, as well as their willingness to modify consumption behavior to mitigate negative impacts on ecosystems (Schultz, 2001). Within the sustainable consumption literature, EC has been shown to exert a direct influence on positive attitudes toward green products (Chen & Chao, 2011). Specifically in the context of electric vehicles, individuals with higher levels of EC tend to perceive electric mobility as an effective solution for reducing emissions, thereby forming more favorable attitudes toward such technologies (Tin et al., 2024). Among younger generations, environmental concern plays a particularly salient role, as consumption choices are closely linked to green values and social responsibility (Tuan et al., 2022). In Ho Chi Minh City, where air pollution has become an increasingly critical issue, the adoption of electric two-wheelers is perceived not only as a personal benefit but also as an expression of a sustainable lifestyle and environmental responsibility.

H4: EC positively affects AT toward E2Ws.

SI refers to social pressure, subjective norms, and the influence of friends, family members, and the broader community on individuals' consumption choices (Ruhrort & Allert, 2021). Consumers often seek social approval and tend to avoid decisions that deviate from socially accepted norms (Nguyen et al., 2025). In the context of electric vehicles, social norms have been empirically shown to significantly affect AT and purchasing behavior (Ling et al., 2022). Evidence from Malaysia suggests that social acceptance plays a decisive role in electric vehicle adoption (Tin et al., 2024). Moreover, choosing electric vehicles enables individuals to project an environmentally responsible image within their social circles (Alyousef et al., 2024). When consumers perceive strong support from friends, family, or society, they are more likely to develop positive AT toward E2Ws (Zhang et al., 2025).

H5: SI positively affects AT toward E2Ws.

AT represents an individual's overall positive or negative evaluation of a specific object or behavior, reflecting both affective responses and behavioral tendencies (Eagly & Chaiken, 2007). In the technology acceptance literature, AT plays a central role in predicting the adoption and continued use of new technologies (Taylor & Todd, 1995). Schuitema et al. (2013) find that positive AT toward the sustainability

Table 1. Measurement scales

Construct	Code	Number of observed variables	Source
Government support	GS	4	Tuan et al. (2022)
Perceived usefulness	PU	4	Yang and Wen (2023)
Perceived ease of use	PEU	4	Yang and Wen (2023)
Environmental concern	EC	3	Ariyamongkolcharoen et al. (2024)
Social influence	SI	5	Ariyamongkolcharoen et al. (2024)
Attitude	AT	3	Yang and Wen (2023)
Purchase intention toward two-wheeled electric vehicles	PI	3	Yang and Wen (2023)

benefits of electric vehicles have a direct effect on PI. Similarly, Wang et al. (2016) and Rezvani et al. (2015) confirm that favorable attitudes significantly increase individuals' intentions to own electric vehicles. Among young consumers, AT are often closely associated with green lifestyle values and modern self-image, thereby exerting a strong influence on transportation choices (Hwang & Kim, 2019). Accordingly, a positive AT toward E2Wsis expected to enhance PI among young consumers in Ho Chi Minh City.

H6: AT positively affects PI toward E2Ws.

Based on the hypothesis development and preceding analyses, this study adopts the above factors to construct the research model, which comprises five independent variables-GS, PU, PEU, EC, and SI-one mediating variable (attitude), and the dependent variable, namely PI toward E2Ws.

RESEARCH METHODOLOGY

This study adopted a three-stage research design consisting of research model development, pilot study and data collection, and model testing using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Stage 1: Research Model Development

Based on an extensive review of theoretical foundations and prior empirical studies, this research investigates the mediating role of AT in the relationships between GS, SI, EC, PU, PEU, and PI toward E2Ws. Relevant theories and established models were synthesized to identify research gaps and define the study objectives.

The conceptual framework was further refined through consultations with the academic supervisor, resulting in a research model comprising seven latent constructs measured by 26 observed variables. This framework served as the basis for the development of measurement scales and the design of the survey questionnaire (See **Table 1**).

Stage 2: Pilot Study and Data Collection

The questionnaire items were adapted from previously validated measurement scales. As the original scales were developed in English, the questionnaire was translated into Vietnamese using a translation–back translation procedure to ensure linguistic accuracy and conceptual equivalence. The translated questionnaire was further reviewed by academic experts to confirm clarity and content validity.

A pilot study was subsequently conducted with 62 Gen Y and Gen Z respondents, of which 56 valid responses were retained for reliability assessment using Cronbach's Alpha in SPSS 20.0. The pilot results confirmed the internal consistency of the measurement scales and supported their use in the main survey.

For the main survey, data were collected using a non-probability convenience sampling approach. This method was adopted because a comprehensive sampling frame of young consumers who are potential E2W users in Ho Chi Minh City is not publicly available. Moreover, the exploratory nature of this study emphasizes understanding behavioral mechanisms rather than generating population-level estimates.

To mitigate potential sampling bias, the questionnaire was distributed through multiple channels, including universities, workplaces, and online communities related to urban mobility and technology adoption. A total of 362 responses were collected, of which 346 valid responses were retained for analysis after excluding incomplete or ineligible questionnaires. The study targeted young consumers living in Ho Chi Minh City who are familiar with two-wheeled transportation modes. Respondents not residing in Ho Chi Minh City, outside the targeted age group, or providing incomplete responses were excluded from the final dataset.

Stage 3: Model Testing Using PLS-SEM

In the final stage, the proposed research model was tested using PLS-SEM. Following the commonly applied "10-times rule," the minimum sample size should be at least ten times the maximum number of structural paths directed toward a single latent construct (Hair et al., 2022). In the proposed model, the construct AT has five incoming structural paths, implying a minimum required sample size of 50 observations. The final sample of 346 respondents therefore far exceeds this requirement and is considered sufficient for reliable model estimation.

PLS-SEM was selected because it is appropriate for analyzing complex models and does not require strict assumptions of multivariate normality (Hair et al., 2022). The analysis followed the recommended two-step procedure, consisting of the evaluation of the measurement model and the structural model. The measurement model was assessed in terms of internal consistency reliability and convergent validity using Cronbach's alpha, composite reliability (CR), outer loadings, and average variance extracted (AVE). Discriminant validity was evaluated using the Heterotrait–Monotrait ratio (HTMT) (Hair et al., 2019; Henseler et al., 2015).

Finally, the demographic profile of respondents is broadly consistent with the characteristics of young urban consumers in Ho Chi Minh City reported in recent demographic statistics,

Table 2. Descriptive statistics of respondents

Position	Frequency (n)	Percentage
Gender		
Male	216	62.43%
Female	130	37.57%
Occupation		
Students	55	15.9%
Office workers	199	57.5%
Teachers	12	3.5%
Business owners	54	15.6%
Freelancers	26	7.5%
Age		
18 to under 29 years	268	77.5%
29 to under 45 years	78	22.5%
Monthly income		
Below VND 5 million	48	13.9%
VND 5–under 10 million	189	54.6%
VND 10–under 20 million	71	20.5%
Above VND 20 million	38	11.0%

suggesting that the sample reasonably reflects the target population of potential E2Ws users.

RESEARCH RESULTS

Descriptive Statistics

Table 2 summarizes the demographic characteristics of the respondents. Among the 346 valid observations, male respondents accounted for 62.43% (216 respondents), while female respondents represented 37.57% (130 respondents). Regarding age distribution, respondents aged 18 to under 29 years (Generation Z) constituted the majority of the sample (77.5%), followed by those aged 29 to under 45 years (Generation Y) at 22.5%.

In terms of occupation, office workers represented the largest group (57.5%), followed by students (15.9%), business owners (15.6%), freelancers (7.5%), and teachers (3.5%). With respect to monthly income, the largest proportion of respondents reported earnings between VND 5 million and under VND 10 million (54.6%), followed by VND 10 million to under VND 20 million (20.5%), below VND 5 million (13.9%), and above VND 20 million (11.0%).

Notably, the dominance of respondents within the VND 5–10 million income range suggests that affordability considerations may influence PI toward E2Ws. Given that the price of E2Ws may represent a relatively substantial financial investment for consumers in this income group, price sensitivity and perceived value are likely to play an important role in their evaluation of electric mobility options.

Table 3. Cronbach's alpha reliability results

Code	Cronbach's Alpha	Number of items
GS	0.805	4
PU	0.822	4
PEU	0.824	4
EC	0.815	3
SI	0.842	5
AT	0.810	3
PI	0.772	3

Consequently, the findings of this study may primarily reflect the behavioral tendencies of moderate-income young consumers, and caution should be exercised when generalizing the results to higher-income segments with potentially different purchasing capacities.

Overall, the sample characteristics indicate that young, working-age consumers with moderate income levels dominate the dataset, which aligns with the target population of potential users of E2Ws in Ho Chi Minh City.

Reliability Testing Using Cronbach's Alpha

Table 3 reports the results of the Cronbach's Alpha reliability analysis. All constructs achieved Cronbach's Alpha values exceeding 0.7, and all observed variables exhibited corrected item–total correlations greater than 0.3. Therefore, all 26 observed variables measuring independent variables, the mediating variable, and the dependent variable were retained for subsequent factor analysis. These results confirm that the measurement scales demonstrate high internal consistency reliability, ensuring the suitability of the data for further analysis using EFA and PLS-SEM.

EFA was conducted to assess the dimensionality and construct validity of the measurement scales prior to structural modeling. As shown in **Table 4**, the Kaiser–Meyer–Olkin (KMO) value for the independent variables is 0.842, indicating excellent sampling adequacy, while Bartlett's Test of Sphericity is statistically significant (Sig. = 0.000), confirming that the data are suitable for factor analysis.

Five factors with Eigenvalues greater than 1 were extracted for the independent variables, explaining 66.275% of the total variance. The factor loadings range from 0.645 to 0.829, indicating strong correlations between the observed items and their respective constructs.

For the mediating variable (AT) and the dependent variable (PI), the EFA results reveal clear unidimensional structures. Specifically, AT explains 72.514% of the variance, while PI explains 68.705%, with all factor loadings exceeding 0.80. Overall, these results confirm the factorial validity of the

Table 4. Exploratory Factor Analysis (EFA)

	Factor	KMO	Significance	Total variance explained	Factor loading
Independent variables	Social Influence (SI)	0.842	0.000	66.275%	0.645-0.780
	Perceived Ease of Use (PEU)				0.734-0.823
	Perceived Usefulness (PU)				0.666-0.815
	Government Support (GS)				0.730-0.817
	Environmental Concern (EC)				0.733-0.829
Mediating variable	Attitude (AT)	0.713	0.000	72.514%	0.834-0.861
Dependent variable	Purchase Intention toward E2Ws (PI)	0.695	0.000	68.705%,	0.804-0.846

Table 5. Measurement model evaluation (Outer model)

Construct	Outer Loadings	Cronbach's Alpha	Composite Reliability (CR, ρc)	Average Variance Extracted (AVE)
GS	0.760-0.822	0.805	0.872	0.631
PU	0.773-0.841	0.822	0.882	0.651
PEU	0.776-0.842	0.824	0.881	0.650
EC	0.797-0.906	0.815	0.889	0.728
SI	0.723-0.821	0.842	0.888	0.614
AT	0.847-0.857	0.810	0.888	0.725
PI	0.817-0.838	0.772	0.868	0.687

Table 6. HTMT discriminant validity results

	AT	EC	GS	PEU	PI	PU	SI
AT							
EC	0.565						
GS	0.450	0.257					
PEU	0.389	0.114	0.159				
PI	0.426	0.340	0.500	0.181			
PU	0.548	0.526	0.387	0.269	0.380		
SI	0.603	0.575	0.270	0.394	0.258	0.455	

Table 7. Hypothesis testing results

Relationship	Standardized Path Coefficient(β)	Mean (M)	Standard Deviation (STDEV)	t-statistic	Bootstrapping Confidence Interval (CI)	VIF	Conclusion
GS → AT	0.186	0.189	0.047	3.976	[0.083 – 0.266]	1.134	Accepted
PU → AT	0.167	0.167	0.065	2.555	[0.037 – 0.285]	1.390	Accepted
PEU → AT	0.171	0.171	0.045	3.767	[0.085 – 0.259]	1.168	Accepted
EC → AT	0.246	0.251	0.058	4.265	[0.135 – 0.363]	1.452	Accepted
SI → AT	0.220	0.218	0.063	3.483	[0.100 – 0.347]	1.507	Accepted
AT → PI	0.339	0.347	0.060	5.639	[0.216 – 0.456]	—	Accepted

measurement scales and justify their inclusion in the subsequent PLS-SEM analysis.

To further ensure the robustness of the data, Harman's single-factor test was conducted to assess the presence of common method bias. The results indicate that the first factor accounts for 27.973% of the total variance, which is below the recommended threshold of 50%. This suggests that no single factor dominates the variance, and therefore, common method bias is not a serious concern in this study.

The measurement model was evaluated in terms of internal consistency reliability and convergent validity. As reported in **Table 5**, all indicator outer loadings exceed the recommended threshold of 0.70, indicating satisfactory indicator reliability. Cronbach's Alpha values range from 0.772 to 0.842, while CR values vary between 0.868 and 0.889, demonstrating strong internal consistency across all constructs. In addition, the AVE values range from 0.614 to 0.728, exceeding the recommended threshold of 0.50 and confirming adequate convergent validity. Overall, these findings indicate that the measurement model meets the recommended reliability and validity criteria and is therefore suitable for subsequent structural model evaluation.

Discriminant validity was evaluated using the HTMT ratio, which is considered a robust method for assessing construct distinctiveness. As shown in **Table 6**, all HTMT values are below the conservative threshold of 0.85 recommended by (Henseler et al., 2015). This result confirms that the constructs are empirically distinct from each other and that the measurement model demonstrates satisfactory discriminant validity.

To test the proposed hypotheses, a bootstrapping procedure with 5,000 resamples was conducted, and the results are presented in **Table 7**. The findings indicate that all hypothesized relationships (H1–H6) are statistically significant at the 5% significance level, providing empirical support for the proposed conceptual framework. Among the predictors of AT, EC (β = 0.246) exhibits the strongest effect, followed by SI (β = 0.220) and GS (β = 0.186), while PEU (β = 0.171) and PU (β = 0.167) also show significant positive influences. Furthermore, AT significantly affects PI (β = 0.339), highlighting its central role in shaping consumers' intention to adopt E2Ws. In addition, all Variance Inflation Factor (VIF) values are below the threshold of 5, indicating that multicollinearity is not a concern in the structural model.

Mediation Analysis

The mediating role of AT was examined using bootstrapping procedures, and the results are reported in **Table 8**. The findings indicate that all indirect effects are statistically significant, confirming that AT partially mediates the relationships between the independent variables and PI. Among the indirect effects, EC (β = 0.083) exhibits the strongest mediation effect, followed by SI (β = 0.075) and GS (β = 0.063). These results suggest that technological perceptions, environmental values, and social influences influence consumers' PI primarily through the formation of positive AT toward E2Ws.

Table 8. Indirect effect (mediation) results

Relationship	Standardized Indirect Effect (β)	Mean (M)	Standard Deviation (STDEV)	t-statistic	Bootstrapping Confidence Interval (CI)	Conclusion
EC → AT → PI	0.083	0.085	0.027	3.075	[0.041 – 0.146]	Accepted
GS → AT → PI	0.063	0.065	0.021	2.940	[0.025 – 0.110]	Accepted
PEU → AT → PI	0.058	0.059	0.017	3.460	[0.027 – 0.093]	Accepted
PU → AT → PI	0.057	0.057	0.023	2.479	[0.015 – 0.104]	Accepted
SI → AT → PI	0.075	0.075	0.025	2.924	[0.032 – 0.132]	Accepted

Table 9. Coefficient of determination (R^2)

Construct	Coefficient of Determination (R^2)	Adjusted R^2
AT	0.427	0.418
PI	0.115	0.112

Coefficient of Determination (R^2)

The explanatory power of the structural model was assessed using the coefficient of determination (R^2). As presented in **Table 9**, the model explains 42.7% of the variance in AT (R^2 = 0.427; Adjusted R^2 = 0.418), indicating a moderate level of explanatory power. In contrast, the explained variance for PI is relatively modest (R^2 = 0.115; Adjusted R^2 = 0.112), suggesting that additional contextual factors—such as economic conditions, infrastructure availability, or policy incentives—may also influence consumers' purchase intention toward electric two-wheelers in developing urban environments.

Effect Size (f^2)

Effect size (f^2) was examined to evaluate the relative contribution of each predictor variable to the model. As shown in **Table 10**, EC, GS, PU, PEU, and SI exhibit small effect sizes on AT (f^2 ranging from 0.035 to 0.073). However, AT demonstrates a moderate effect size on PI (f^2 = 0.130), underscoring its central role as the key psychological mechanism through which technological perceptions, environmental values, and policy support translate into consumers' intention to adopt E2Ws.

DISCUSSION

Firstly, the results indicate that EC exerts the strongest effect on AT toward E2Ws (β = 0.246). This finding is consistent with prior studies (Jayasingh et al., 2021; Kariathi & Mayasari, 2024; Zhang & Chang, 2023), which emphasize the pivotal role of environmental awareness in shaping consumer AT toward green mobility. Notably, the magnitude of EC in this study exceeds that reported by Jayasingh et al. (2021) (β = 0.203) and Kariathi and Mayasari (2024) (β = 0.183), suggesting that for young consumers in Ho Chi Minh City, E2Ws are perceived not merely as transportation modes but as symbols of a sustainable lifestyle. This finding highlights the growing importance of environmentally responsible consumption among younger generations and reinforces the role of green consumption behavior in supporting SDG 12 (Responsible Consumption and Production). From a theoretical perspective, it extends the TAM by demonstrating that socio-environmental values can outweigh purely economic or functional considerations when evaluating green technologies.

Secondly, SI is found to have a significant positive impact on AT (β = 0.220), reinforcing the conclusions of Kariathi and Mayasari (2024) that social norms play a central role in forming AT toward green mobility. In the context of Ho Chi Minh City, content disseminated by key opinion leaders and influencers promoting sustainable lifestyles appears to foster social consensus and strengthen favorable perceptions of E2Ws. Accordingly, SI not only exerts a direct effect on AT but also amplifies the influence of EC through the diffusion and reinforcement of green consumption norms. This social diffusion mechanism is particularly relevant in dense urban environments, where collective behavioral shifts are essential for advancing SDG 11 (Sustainable Cities and Communities) through the adoption of low-emission transport modes.

Thirdly, GS demonstrates a positive effect on AT (β = 0.186), in line with evidence from China reported by Yang and Wen (2023), where incentives such as tax reductions, battery subsidies, and investments in charging infrastructure facilitate positive consumer perceptions of electric vehicles. This finding is further supported by Maulida and Amalia (2024) and Tuan et al. (2022), who underscore the importance of policy incentives and infrastructure expansion in encouraging electric vehicle adoption. From a sustainable development perspective, this result underscores the role of government intervention in advancing SDG 13 (Climate Action) by creating an enabling policy environment for low-carbon urban mobility transitions. In addition, PEU (β = 0.171) and PU (β = 0.167) also positively influence AT, consistent with prior research (Ariyamongkolcharoen et al., 2024; Maulida & Amalia, 2024). However, their relatively weaker effects compared to EC and SI suggest that young consumers place greater emphasis on environmental and social considerations than on purely

Table 10. Effect size (f^2) results

Construct	AT	EC	GS	PEU	PI	PU	SI	Effect Size Level
AT					0.130			Moderate
EC	0.073							Small
GS	0.053							Small
PEU	0.044							Small
PU	0.035							Small
SI	0.056							Small

functional or economic attributes when forming AT toward E2Ws.

Finally, the SEM results confirm that AT plays a strong mediating role between cognitive factors and PI, supporting prior research that identifies attitude as a key psychological mechanism through which perceptions, social influence, and policy signals shape behavioral intentions (Maulida & Amalia, 2024; Tuan et al., 2022; Zhang & Chang, 2023)). Although the explanatory power for PI is relatively modest ($R^2 = 0.112$), this result is theoretically plausible because the study primarily focuses on attitude formation rather than direct behavioral prediction. Moreover, sustainable transportation research frequently highlights an intention–behavior gap, where favorable attitudes toward green mobility do not necessarily translate into actual adoption (Lin & Shi, 2022; Zheng et al., 2022).

This gap is particularly evident in rapidly urbanizing developing cities, where structural constraints such as income affordability, charging accessibility, and infrastructure reliability may inhibit electric vehicle adoption (Guerrero-Silva et al., 2025; Zhan et al., 2025). Consequently, the findings reflect the complex interaction between psychological determinants and contextual conditions shaping sustainable mobility transitions.

Overall, the findings underscore that promoting E2Ws in developing cities requires an integrated approach that combines environmental awareness, social influence, and consistent government support. By fostering favorable attitudes among young consumers, such strategies can contribute to the transition toward sustainable urban mobility in line with the Sustainable Development Goals (SDGs).

CONCLUSIONS AND IMPLICATIONS

Conclusions

This study investigates the determinants of PI toward E2Ws among young consumers in Ho Chi Minh City by integrating the TAM and TPB. The empirical results indicate that EC, SI, GS, PEU, and PU indirectly influence PI through the mediating role of AT.

Among these factors, environmental concern exerts the strongest effect on attitude ($\beta = 0.246$), followed by SI ($\beta = 0.220$), GS ($\beta = 0.186$), PEU ($\beta = 0.171$), and PU ($\beta = 0.167$). Attitude is found to be the most influential direct determinant of PI toward E2Ws ($\beta = 0.339$), confirming its central mediating role within the proposed research model. All hypothesized relationships (H1–H6) are supported, demonstrating the robustness and explanatory validity of the integrated TAM–TPB framework in the context of an emerging market such as Vietnam.

Based on these findings, the study proposes a set of managerial implications prioritized based on the relative strength of each determinant in shaping young consumers' PI toward E2Ws in Ho Chi Minh City.

Implications for Sustainable Development and Policy

Practical implications

The findings provide several practical implications for firms and practitioners seeking to promote E2Ws among young consumers in emerging urban contexts. First, environmental concern is identified as the most influential determinant of attitude formation. This suggests that firms should position E2Ws not merely as functional transportation alternatives but as environmentally responsible consumption choices. Marketing communications that emphasize emission reduction, energy efficiency, and contributions to environmental sustainability can strengthen favorable attitudes and indirectly enhance purchase intention, particularly among environmentally conscious consumers.

Second, the significant role of social influence highlights the importance of peer effects and social norms in shaping attitudes toward E2Ws. Firms may benefit from community-based marketing strategies, collaborations with opinion leaders, and social endorsement mechanisms that normalize E2W usage as part of a sustainable urban lifestyle. Such approaches can amplify the diffusion of positive attitudes through social networks, especially among younger generations.

Third, the effects of perceived ease of use and perceived usefulness indicate that reducing cognitive and operational barriers remains essential. User-friendly design, clear and accessible product information, and transparent communication of functional and economic benefits, such as lower operating costs and long-term efficiency, can strengthen consumers' value perceptions and foster more favorable attitudes toward electric two-wheelers.

Policy implications for sustainable urban mobility

From a policy perspective, the findings highlight the important role of government support in shaping positive consumer attitudes toward E2Ws. Policy instruments such as purchase subsidies, tax incentives, and investments in charging infrastructure can reduce financial barriers while signaling long-term institutional commitment to low-carbon transport transitions. Such signals are particularly important in developing urban contexts, where infrastructure constraints and market uncertainty may hinder the adoption of emerging mobility technologies.

At the city level, local governments can accelerate E2W adoption by integrating supportive measures into urban mobility policies. Expanding public charging infrastructure, providing dedicated parking spaces for electric vehicles, and integrating E2Ws into low-emission urban zones can improve the practicality of E2W use and reinforce their role in sustainable urban transport systems.

Given that young consumers represent a key segment in the transition toward sustainable mobility, youth-oriented policy initiatives are also essential. Collaboration between municipal authorities and educational institutions may promote environmental awareness programs and sustainable mobility campaigns targeting students and young professionals.

Finally, the promotion of E2Ws should be aligned with broader urban transport planning frameworks, including multimodal transport systems and Sustainable Urban Mobility Plans (SUMPs). Integrating electric two-wheelers with public transport networks can improve urban mobility efficiency and contribute to long-term sustainable transportation development.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study has several limitations. First, the sample is limited to Ho Chi Minh City, which may restrict the generalizability of the findings; future research should extend the survey to other regions using more representative sampling techniques. Second, the use of convenience sampling and online questionnaires may reduce data representativeness. Future studies are therefore encouraged to apply probability-based or mixed-method approaches.

Third, the relatively low explanatory power of purchase intention suggests that additional determinants, such as perceived risk, brand image, and usage experience, should be incorporated. Future research should also examine the relationship between purchase intention and actual adoption behavior.

Finally, policy volatility, regulatory uncertainty, and infrastructure limitations in developing urban contexts such as Ho Chi Minh City may influence consumer confidence and the adoption of electric mobility technologies. In particular, the availability of charging infrastructure and the consistency of governmental support policies can play a critical role in shaping adoption decisions. Future studies should therefore explore the role of policy stability, institutional support, and infrastructure readiness in influencing consumer attitudes and adoption behavior.

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