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Factors influencing electric motorcycle purchase intention among young consumers in Ho Chi Minh City: The role of policy and barriers

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KEYWORDS

Electric motorcycle, electric vehicle, purchase intention, Theory of Planned Behavior, government policy.

ABSTRACT

As global efforts intensify to achieve Net Zero emissions, this study addresses a critical research gap by examining the factors influencing electric motorcycle purchase intention in Vietnam, a primary example of a motorcycle-dominated emerging economy. Utilizing an extended Theory of Planned Behavior (TPB) framework, the research integrates government policy, technological barriers, cost, and infrastructure through a PLS-SEM analysis of 326 consumers in Ho Chi Minh City. The findings yield two significant, counter-intuitive results that challenge existing paradigms in green technology adoption: First, charging infrastructure is no longer perceived as a barrier, signaling that urban development in Ho Chi Minh City has reached a tipping point of adequacy for potential users. Second, subjective norms - typically a strong driver in collectivist cultures - exert no significant influence on intention, revealing a profound gap between social environmental awareness and individual behavioral compliance. Instead, purchase intention is primarily driven by individual attitude, perceived behavioral control (PBC), and the impact of government policy, while technological anxieties and battery costs remain the dominant deterrents.

1. Introduction

In an era of escalating global air pollution and the depletion of fossil fuels, the transition toward clean, renewable energy sources tends to be viewed as an increasingly urgent priority. While the global shift toward electric vehicles (EVs) is well-documented, the specific application of this technology in motorcycle-dominant regions suggests a unique set of challenges and opportunities. In Vietnam, Ho Chi Minh City (HCMC) faces severe public health threats from over 7.6 million motorcycles, which potentially account for more than 90% of local CO emissions (Ho et al., 2020). Recent data suggests that HCMC remains a leading city for fine dust and air pollution in Vietnam, largely driven by these enormous traffic emissions (IQAir, 2025).

Electric motorcycles (EMs) have emerged as a sustainable solution, potentially reducing CO_2 emissions by up to 90% compared to gasoline-powered alternatives, thereby supporting Vietnam's commitment to achieving Net Zero by 2050 (Thi Le et al., 2025). In a country where motorcycles remain the dominant mode of personal transportation, the development of "electric two-wheelers" tends to have significant economic and environmental implications for green urban development. However, despite the expansion of charging infrastructure and the entry of various domestic and imported brands, the transition to EMs may still be hindered by significant technological, financial, and perceptual barriers.

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Despite the burgeoning literature on electric vehicle adoption, several critical research gaps persist, particularly when transitioning from high-income developed contexts – such as Canada (Wang & Mohamed, 2025), the United States (Pamidimukkala et al., 2023), and Korea (Kim et al., 2018) – to motorcycle - dominant emerging economies like Vietnam.

First, current studies often prioritize individual socio-psychological factors while neglecting the macro-level structural and contextual drivers unique to Lower-Middle Income Countries (LMICs). While charging infrastructure (INF) is universally cited as a primary barrier, existing research lacks a nuanced investigation into whether these perceptions shift in rapidly urbanizing hubs like Ho Chi Minh City, where infrastructure density may have reached a "tipping point" of perceived adequacy. Second, regarding technological barriers (TEK), the literature frequently overlooks specific anxieties – such as battery reliability and safety risks – that are exacerbated by the dense traffic and environmental conditions of Southeast Asian urban centers. Furthermore, while the Vietnamese government has signaled support through directives like Directive 20/CT-TTg (aiming for a gasoline motorcycle ban in specific HCMC rings by 2026), empirical evidence on the effectiveness of these two-wheeled segment policies remains scarce, as most prior research focuses on electric cars. Finally, there is a significant gap in understanding how price-sensitive consumers in LMICs evaluate the trade-offs between initial acquisition costs (COS) and the long-term financial burden of battery replacement.

To address these gaps, this study employs an extended theory of planned behavior (TPB) framework (Ajzen, 1991) to determine the factors influencing EM purchase intentions in HCMC. By integrating context-specific variables such as infrastructure charging (INF), technological barriers (TEK), price and battery cost (COS), and government policy (GOV), this research seeks to provide a more holistic understanding of consumer behavior in an emerging economy. Utilizing Partial Least Squares – Structural Equation Modeling (PLS-SEM), the study aims to supplement TPB theory within the context of LMICs and provide quantitative evidence to help refine state policies and market strategies for sustainable urbanization.

2. Literature review and development of hypotheses

2.1. Theory of planned behavior (TPB)

The theory of planned behavior (TPB), proposed by Ajzen (1991), is one of the most widely used theoretical frameworks for explaining and predicting human behavioral intentions (Ajzen, 1991). TPB suggests that an individual's intention to perform a behavior is the most immediate determinant of that behavior, and this intention is influenced by three key constructs: attitude toward the behavior (ATT), subjective norm (NOR), and perceived behavioral control (PBC). This study will explore how these constructs affect to behavioral purchase intention.

Attitude toward the behavior refers to the degree to which a person has a favorable or unfavorable evaluation of performing the behavior (Ajzen, 1991). In the context of electric motorcycle adoption, this reflects consumers' overall assessment of whether to intend to purchase an electric motorcycle is positive or negative.

Subjective norms capture the perceived social pressure to perform or not to perform the behavior (Ajzen, 1991). For instance, individuals may be more likely to intend to purchase electric motorcycles if they believe that people important to them - such as family, friends, or colleagues - support this behavior.

Finally, perceived behavioral control represents an individual's perception of the ease or difficulty of performing the behavior, which is often linked to past experiences or expected obstacles (Ajzen, 1991). In this study's context, factors influence consumers' perceived control over purchasing and using electric motorcycles.

2.2. Government policy

Vietnam has set several key goals and commitments toward 2050, including the pledge to achieve Net Zero emissions. Therefore, policymakers are introducing various policies to enhance public perception of electric motorcycles and to reduce the number of conventional motorcycles, which currently account for a major share of transportation in Vietnam. Government policies encompass regulatory frameworks and strategic initiatives designed to promote electric motorcycle adoption. Government communication campaigns play a vital role in shaping public perception and awareness of electric motorcycles (Champahom et al., 2025).

2.3. Technological barrier

Technological barriers represent challenges regarding vehicle performance and design features, notably encompassing limitations such as restricted driving range and long charging times. These barriers also include consumer anxieties related to the perceived unreliability and immaturity of new components, such as the battery lifespan and potential safety risks like fire or degradation (Pamidimukkala et al., 2023).

2.4. Infrastructure charging

Charging infrastructure comprises fast and slow chargers and is considered an essential supporting facility for electric vehicles. However, the insufficient number of public charging stations and the lack of

private charging options at home or work remain major constraints for electric motorcycle diffusion (Pamidimukkala et al., 2023).

2.5. Price and battery cost

Price and battery cost are perceived financial risks, mainly because new electric motorcycles are relatively expensive due to the lack of economies of scale. Furthermore, the high cost of replacing the battery imposes a heavy financial burden on consumers, which negatively affects the perceived value of electric vehicles (Kim et al., 2018).

2.6. Hypothesis development and theoretical framework

Infrastructure charging (INF) refers to the availability, accessibility, and reliability of charging facilities. In a motorcycle-dominant city like HCMC, the lack of a comprehensive charging network often leads to "range anxiety", where users fear being stranded without power. Prior studies emphasize infrastructure as a critical driver in attitude, subjective norms, and perceived behavioral control (Gupta, 2025). They anticipate that this factor may strongly shape consumer decisions. Hence, this study proposes these following hypotheses:

H1a: Infrastructure charging negatively influences attitude.

H1b: Infrastructure charging negatively influences subjective norms.

H1c: Infrastructure charging negatively influences perceived behavioral control.

Technological barriers (TEK) include concerns about battery safety, durability, performance, and charging technology. In emerging markets like Vietnam, where the electric motorcycle (EM) market is still in its transition phase, these technical concerns function as significant "perceived risks" that shape consumer psychology (Gupta, 2025). Greater technological concerns may lead to less favorable evaluations of adoption, thereby weakening attitude. At the same time, uncertainties related to maintenance, battery performance, and technical reliability can increase the perceived complexity of usage, which in turn reduces perceived behavioral control. In a motorcycle-dominant context, shared skepticism toward new vehicle technologies may also dilute the formation of favorable social expectations, resulting in a weaker influence on subjective norms. So these hypotheses are proposed:

H2a: Technological barriers negatively influence attitude.

H2b: Technological barriers negatively influence subjective norms.

H2c: Technological barriers negatively influence perceived behavioral control.

Cost tends to be the first factor that consumers consider when thinking about purchasing an electric motorcycle, including initial purchase price and long-term battery replacement cost (Gupta, 2025). Studies show cost sensitivity among consumers in LMICs is higher than in developed countries. Higher perceived total cost of ownership can lead to less favorable attitude and lower perceived behavioral control, as consumers may perceive the behavior as financially demanding and difficult to manage. Moreover, widespread cost concerns may also influence subjective norms, since shared economic hesitation within reference groups can weaken the perceived social expectation to adopt electric motorcycles, thereby jointly reducing the intention to purchase. For this reason, this research puts forward these hypotheses:

H3a: Price and battery cost negatively influence attitude.

H3b: Price and battery cost negatively influence subjective norms.

H3c: Price and battery cost negatively influence perceived behavioral control.

TPB positions attitude as one of the primary drivers of behavioral intention (Ajzen, 1991). A favorable evaluation (viewing the purchase as "good" or "satisfying") is the strongest internal motivator for behavioral intention. Extensive research has confirmed the influence of attitude on intention in the adoption of electric vehicles, bicycles, and other green technologies (Gupta, 2025; Wang & Mohamed, 2025). Therefore, the hypothesis is proposed:

H4: Attitude positively influences consumers' intention to purchase electric motorcycles.

TPB suggests that supportive social influence increases intention (Ajzen, 1991). In a collectivist culture like Vietnam, social pressure and the sense of "social responsibility" are expected to drive individual choices toward green products. Previous studies found that subjective norms play an important role in electric vehicle acceptance, especially in collectivist cultures (Gupta, 2025; Sun & Wang, 2020). The present study investigates whether consumers' subjective norms significantly affect their purchase intention for electric motorcycles. This research proposes this hypothesis:

H5: Subjective norms positively influence purchase intention toward electric motorcycles.

In TPB, PBC directly increases intention, especially for costly and high-involvement purchases (Ajzen, 1991). When individuals believe they have the resources, knowledge, and ability to deal with EM-related issues, their intention to purchase increases. Given its central role in TPB, this study empirically tests how PBC contributes to forming consumers' purchase intention regarding electric motorcycles. The following hypothesis are proposed:

H6: Perceived behavioral control positively influences consumers' intention to purchase electric motorcycles.

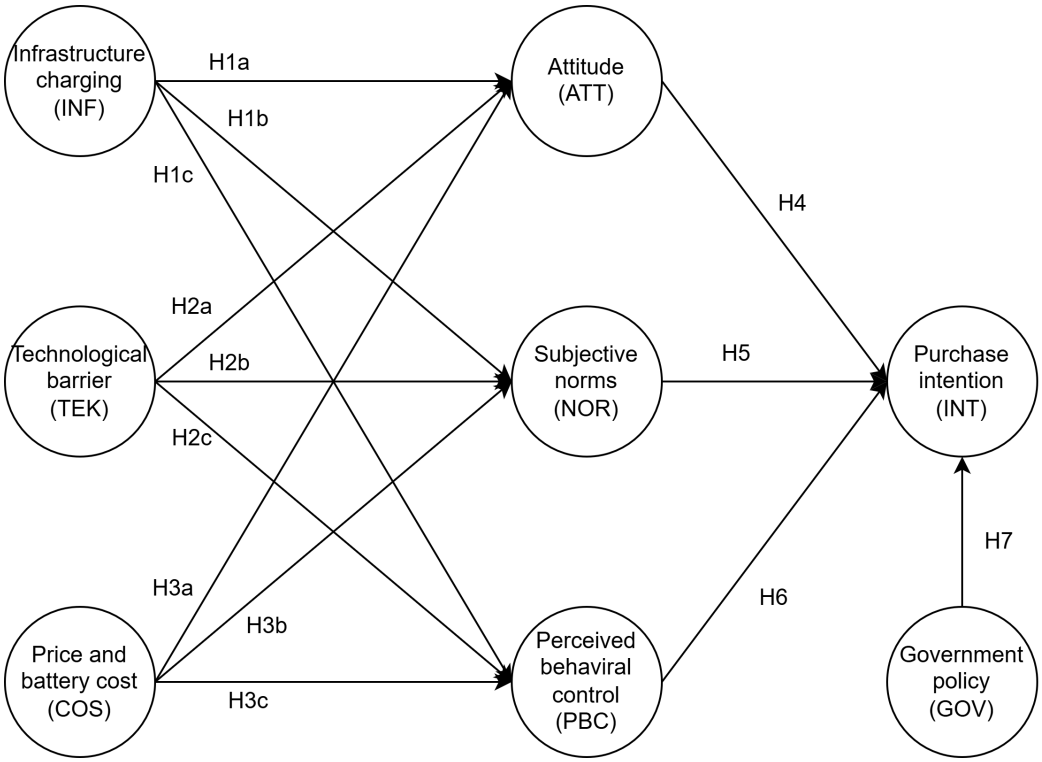

Figure 1. Conceptual framework

Government policies - such as tax reduction, support programs, and regulations limiting gasoline motorcycles - provide institutional credibility and reduce adoption barriers, thereby directly fostering purchase intentions (Champahom et al., 2025; Gupta, 2025; Khoo & Ong, 2015). However, evidence for their effectiveness in Vietnam remains limited. Thus, this study hypothesizes that:

H7: Government policy positively influences intention to purchase electric motorcycles.

3. Methodology

3.1. Questionnaire development

Data were collected through a structured questionnaire administered via both online and face-to-face methods to validate the proposed conceptual model and test the research hypotheses grounded in the theory of planned behavior (TPB) (Ajzen, 1991). The questionnaire consisted of three main sections.

The first section provided respondents with an overview of the research purpose and topic, a statement of confidentiality regarding personal information, and an affirmation of their voluntary participation.

The second section included questions related to participants' demographic characteristics, such as gender, age, occupation, educational level, housing status, types of vehicles currently owned, and place of residence (Ho Chi Minh City or other provinces). Collecting detailed demographic information allows for a comprehensive analysis of sample characteristics and offers potential value for future studies, particularly those employing multi-level analysis.

The final section comprised measurement scales associated with each construct in the structural model. All measurement items were adapted from previously validated scales published in reputable journals and conferences (see Table 1). Items were further modified to reflect the characteristics of consumer behavior toward electric motorcycles in Vietnam, particularly in the context of rapidly evolving government policies and an expanding electric vehicle market.

All constructs in this study were measured using a five-point likert scale ranging from 1 = "Strongly disagree" to 5 = "Strongly agree" (Joshi et al., 2015). The five-point scale was selected for its simplicity, high reliability, suitability for non-normally distributed data, and its common use in socio-economic surveys, where it helps minimize noise and facilitates analysis using PLS-SEM (Joshi et al., 2015).

The initial questionnaire was reviewed by a panel of five experts specializing in quantitative research in the fields of economics and marketing in Vietnam. The revised version was then pilot-tested with 15 consumers in Ho Chi Minh City (10 university students and 5 office workers) to assess clarity, preliminary reliability, and completion time prior to the official data collection phase.

Table 1. Measurement scales

Latent construct	Item	Variables
Infrastructure charging (INF) (Pamidimukkala et al., 2023)	INF1	Insufficient public charging stations for electric motorcycles.
	INF2	Having charging problems in the absence of a garage/private space.
	INF3	Insufficient maintenance and repair services for e-motorcycles
	INF4	Low reliability of the charging power grid for e-motorcycles
Technological barrier (TEK) (Pamidimukkala et al., 2023)	TEK1	Limited driving range (on a single charge)
	TEK2	Long charging times
	TEK3	Limited battery life
	TEK4	Poor safety
	TEK5	Doubts about the reliability of e-motorcycles
	TEK6	Limited choices of e-motorcycle models
Price and battery cost (COS) (Kim et al., 2018)	COS1	E-motorcycles are expensive to purchase
	COS2	E-motorcycles have high costs to replace a battery
	COS3	High costs (purchase and battery) reduce the attractiveness of e-motorcycles compared to conventional vehicles
Government policy (GOV) (Champahom et al., 2025)	GOV1	Government policies promoting e-motorcycles have a positive impact on my view
	GOV2	I believe government policies supporting e-motorcycles are crucial factors in their adoption
	GOV3	Adjusting to government regulations inspires me to consider e-motorcycles
Attitude (ATT) (Vafaei-Zadeh et al., 2022)	ATT1	In general, I think buying an electric motorcycle is very good
	ATT2	In general, I think buying an electric motorcycle is very wise
	ATT3	In general, I think buying an electric motorcycle is very satisfying
Subjective norms (NOR) (Wang & Mohamed, 2025)	NOR1	I think I have a sense of social responsibility
	NOR2	I think owning an e-motorcycle contributes significantly to environmental protection
	NOR3	People close to me think it is important to consider the environment when purchasing a motorcycle
Perceived behavioral control (PBC) (Wang & Mohamed, 2025)	PBC1	I am confident that I can adapt to the technology of e-motorcycles (e.g., battery durability, safety)
	PBC2	I think it is very easy for me to save money by owning an e-motorcycle
	PBC3	I have the resources, knowledge, and ability to deal with the issues of owning e-motorcycles
	PBC4	Purchasing an e-motorcycle and charging it is entirely within my control
Purchase intention (INT) (Semeijn et al., 2019)	INT1	When I need to buy a new motorcycle, I am willing to buy an electric motorcycle
	INT2	When I need to buy a new motorcycle, I am planning to buy an electric motorcycle
	INT3	When I need to buy a new motorcycle, I am going to buy an electric motorcycle

3.2. Data collection

Following the inverse square root method proposed by (Kock & Hadaya, 2018), the minimum sample size was determined based on the smallest path coefficient considered theoretically meaningful. The minimum sample size is given by the following equations:

$$n_{min} = \left(\frac{z}{|p_{min}|} \right)^2$$

The minimum expected path coefficient was set at a small but practically meaningful level, reflecting effect sizes commonly observed in TPB-based studies on pro-environmental and electric vehicle adoption behaviors. This assumption allows the detection of theoretically relevant relationships while avoiding overly conservative sample size requirements. The significance level of 5% and a p-min of 0.15 were chosen; the suggested minimum sample size was 275.

This study aims to investigate the perceptions and purchase intentions of individuals who have never owned an electric motorcycle. These individuals may or may not possess knowledge about electric motorcycles. Consequently, the research team employed a convenience sampling method to collect data. This method has been demonstrated to be particularly effective when surveying a large population (Song et al., 2012). The survey was conducted in Ho Chi Minh City from September 15, 2025, to November 25, 2025. This city is the most economically developed in the country. Ho Chi Minh City covers an area of 2.095 km² and has a population of approximately 8.9 million people (Vietnam Ministry,

2024). Furthermore, the infrastructure in Ho Chi Minh City is highly developed. The city has a greater density of charging stations compared to other cities nationwide. The electric motorcycle market in Ho Chi Minh City is also more vibrant, featuring numerous international brands such as Yadea, SYM, and Yamaha. Domestic manufacturers like Vinfast and DatBike are also present. This has led to an increase in repair and maintenance facilities in the city.

The research team opted to utilize both online and offline approaches for the survey. The online survey was conducted through Google forms. The research team also visited public areas, such as shopping malls, to engage survey participants by printing forms and requesting them to complete the surveys.

The research team collected 389 survey forms from both online and offline sources. They excluded forms from people who did not live in Ho Chi Minh City, those who had used electric vehicles before, and those with incomplete or unusual data. After removing invalid forms, 326 valid responses remained for data modeling.

4. Data analysis and results

4.1. Demographic characteristics

There are 326 sample demographics presented in Table 2. In this sample, females outnumber males, but the difference is not significant.

The sample is dominated by young adults aged 18-34, accounting for 95.4% of the total observations. Regarding vehicle ownership, conventional motorcycles remain the most prevalent mode of transportation among respondents.

4.2. Measurement model evaluation

The evaluation of the measurement model was conducted by assessing four primary criteria: indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. These assessments ensure that the latent constructs are measured accurately and reliably before testing the structural relationships.

Table 2. Demographic characteristics of participants

Item		Frequency	Percentage
Gender	Male	137	42.02
	Female	189	57.98
Age	18 - 24	243	74.54
	25 - 34	68	20.86
	35 - 44	10	3.07
	45 - 54	5	1.53
	>= 55	0	0
Employment	Student	169	51.84
	Office worker	134	41.10
	Manual worker	1	0.31
	Self-employed	15	4.60
	Homemaker/Retired	1	0.31
	Others	6	1.84
Education	High school	7	2.15
	Undergrad	204	62.58
	Bachelor's	90	27.61
	Postgraduate	25	7.67
Household characteristics	Private house	84	25.77
	Apartment (with parking)	120	36.81
	Apartment (no parking)	2	0.61
	Rented room	120	36.81
Personal (or Household) vehicle ownership	Gas motorcycle	308	94.48
	E-motorcycle	6	1.84
	Gasoline car	26	7.98
	Electric car	2	0.61
	No personal vehicle	15	4.60

4.2.1. Indicator Reliability and Refinement

Initially, the outer loadings of all items were examined against the recommended threshold of 0.708 (Hair et al., 2021). During this process, two indicators - TEK6 (Limited choices of e-motorcycle models) and COS1 (E-motorcycles are expensive to purchase) - exhibited loadings below the required threshold and were subsequently removed. Following their removal, the model retained 27 indicators, all of which demonstrated improved and satisfactory loading values, confirming strong indicator reliability.

4.2.2. Internal Consistency Reliability

To evaluate the internal consistency of the constructs, this study utilized three metrics: Cronbach's Alpha, rho_A, and Composite Reliability (CR). As shown in Table 3, all Cronbach's Alpha values ranged from 0.753 to 0.944, comfortably exceeding the standard benchmark of 0.70. Similarly, both rho_A and CR values for all eight latent constructs were well above the 0.708 threshold. These results collectively indicate that the scales used in this research possess high internal consistency and stability.

4.2.3. Convergent Validity

Convergent validity was assessed using the average variance extracted (AVE). According to the results in Table 3, all constructs achieved AVE values exceeding 0.50, ranging from 0.665 for perceived behavioral control to 0.899 for purchase intention. This signifies that each latent construct explains more than half of the variance of its respective indicators, confirming satisfactory convergent validity.

4.2.4. Discriminant Validity

Finally, discriminant validity was evaluated using the Heterotrait-Monotrait (HTMT) ratio. As presented

Table 3. The evaluation of the measurement model

Latent constructs	Item	Loadings	Cronbach's Alpha	rho_A	CR	AVE
Attitude (ATT)	ATT1	0.932	0.931	0.932	0.956	0.878
	ATT2	0.945				
	ATT3	0.934				
Price and Battery Cost (COS)	COS2	0.924	0.836	0.837	0.924	0.859
	COS3	0.930				
Government policy (GOV)	GOV1	0.806	0.753	0.760	0.858	0.668
	GOV2	0.806				
	GOV3	0.840				
Infrastructure charging (INF)	INF1	0.848	0.877	0.879	0.916	0.731
	INF2	0.871				
	INF3	0.861				
	INF4	0.838				
Purchase intention (INT)	INT1	0.939	0.944	0.944	0.964	0.899
	INT2	0.965				
	INT3	0.940				
Subjective norms (NOR)	NOR1	0.838	0.854	0.857	0.888	0.775
	NOR2	0.895				
	NOR3	0.907				
Perceived behavioral control (PBC)	PBC1	0.739	0.831	0.838	0.912	0.665
	PBC2	0.831				
	PBC3	0.842				
	PBC4	0.845				
Technological barrier (TEK)	TEK1	0.910	0.937	0.942	0.952	0.799
	TEK2	0.875				
	TEK3	0.898				
	TEK4	0.899				
	TEK5	0.886				

in Table 4, all HTMT values remained significantly below the conservative threshold of 0.85 (Hair et al., 2021). The highest recorded value was 0.827 (between attitude and purchase intention), which still indicates that each construct is empirically distinct from the others in the model.

In summary, the measurement model demonstrates strong reliability and validity across all established criteria, providing a robust foundation for the structural model analysis.

Table 4. Heterotrait-Monotrait ratio results

	ATT	COS	GOV	INF	INT	PBC	NOR	TEK
ATT								
COS	0.582							
GOV	0.621	0.266						
INF	0.302	0.422	0.158					
INT	0.827	0.593	0.584	0.271				
PBC	0.801	0.587	0.554	0.276	0.767			
NOR	0.816	0.496	0.473	0.286	0.678	0.763		
TEK	0.657	0.706	0.372	0.467	0.706	0.608	0.497	

4.3. Structural model results

To further ensure the absence of multicollinearity, VIF values were inspected and found to be below 5 (Hair et al., 2021), confirming that no problematic collinearity exists among the latent variables.

4.3.1. Direct effect

In this study, the analysis uses bias-corrected and accelerated bootstrapping confidence intervals with 326 cases and 10 000 samples, test two-tailed at the significance level of 5% to estimate the significance of path coefficients (β) that measured both direct and indirect path relationships (β) among the proposed variables.

The path coefficients value and p-value of proposed hypothesis shows in Table 5.

Intention to buy not influenced by subjective norms NOR ($\beta_{NOR \rightarrow INT} = 0.025$, $p > 0.05$), but intention is positively affected by attitude ATT ($\beta_{ATT \rightarrow INT} = 0.532$, $p < 0.05$), followed by perceived behavioral control PBC ($\beta_{PBC \rightarrow INT} = 0.247$, $p < 0.05$), and government policy GOV ($\beta_{GOV \rightarrow INT} = 0.099$, $p < 0.05$).

Infrastructure charging does not impact any latent constructs, p-value > 0.05 with specific value is 0.798, 0.377, 0.680 on ATT, NOR, PBC respectively.

Technological barriers is found to have negative impact on attitude ATT($\beta_{TEK \rightarrow ATT} = -0.492$, $p < 0.05$), subjective norms NOR($\beta_{TEK \rightarrow NOR} = -0.295$, $p < 0.05$), and perceived behavioral control PBC($\beta_{TEK \rightarrow PBC} = -0.395$, $p < 0.05$).

Similarly to TEK, price and battery cost negatively affect attitude, subjective norms, and perceived behavioral control, with the magnitude of the effect increasing for ATT ($\beta_{COS \rightarrow ATT} = -0.211$, $p < 0.05$), NOR(βCOS →NOR = -0.217, $p < 0.05$), PBC($\beta_{COS \rightarrow PBC} = -0.252$, $p < 0.05$).

To assess the substantive impact of the exogenous constructs, the effect size (f^2) was examined following the thresholds suggested by (Hair et al., 2021). Following to (Cohen, 1988), effect size values of 0.02, 0.15, 0.35 refer to small, medium, and large effects, respectively. As shown in Table 5, the effects of ATT on INT ($f^2 = 0.272$) and TEK on ATT ($f^2 = 0.232$) are solidly medium, approaching large thresholds. The effect of GOV on INT is small ($f^2 = 0.020$), indicating a limited but non-negligible contribution to the

Table 5. Hypothesis testing and effect size estimation

	Relationship	p-value	Path coefficient	Supported?	VIF	f2
H1a	INF -> ATT	0.798	0.011	No	1.244	0.000
H1b	INF -> NOR	0.377	-0.045	No	1.244	0.002
H1c	INF -> PBC	0.680	0.021	No	1.244	0.001
H2a	TEK -> ATT	0.000	-0.492	Yes	1.772	0.232
H2b	TEK -> NOR	0.000	-0.295	Yes	1.772	0.064
H2c	TEK -> PBC	0.000	-0.395	Yes	1.772	0.132
H3a	COS -> ATT	0.001	-0.211	Yes	1.673	0.045
H3b	COS -> NOR	0.001	-0.217	Yes	1.673	0.037
H3c	COS -> PBC	0.000	-0.252	Yes	1.673	0.057
H4	ATT -> INT	0.000	0.532	Yes	2.938	0.272
H5	NOR -> INT	0.689	0.025	No	2.302	0.001
H6	PBC -> INT	0.000	0.247	Yes	2.171	0.079
H7	GOV -> INT	0.010	0.099	Yes	1.401	0.020

Table 6. Specific indirect effects

	Path coefficient	p-values	Supported?
COS -> ATT -> INT	-0.112	0.001	Yes
INF -> ATT -> INT	0.006	0.793	No
TEK -> ATT -> INT	-0.262	0.000	Yes
COS -> PBC -> INT	-0.062	0.001	Yes
INF -> PBC -> INT	0.005	0.689	No
TEK -> PBC -> INT	-0.097	0.000	Yes
COS -> NOR -> INT	-0.005	0.700	No
INF -> NOR -> INT	-0.001	0.799	No
TEK -> NOR -> INT	-0.007	0.703	No

Table 7. Total indirect effects

	Path coefficient	p-values	Supported?
COS -> INT	-0.1799	0.0001	Yes
INF -> INT	0.0101	0.7515	No
TEK -> INT	-0.3668	0.0000	Yes

explained variance. Conversely, INF, NOR have effect size smaller than 0.02 with p-value > 0.05, suggesting no substantive effect on their respective endogenous variables. The remaining constructs demonstrate small effect sizes, providing modest contributions to the model's predictive power.

4.3.2. Specific indirect effect and total indirect effect

The relationship of each latent construct explores the mediating role. The model has three mediators including attitude, subjective norms, perceived behavioral control.

A bootstrapping test is used and results shown in Table 6 and Table 7.

Attitude functions as a mediating variable in the specific indirect effects from COS to INT and from TEK to INT. However, attitude does not mediate the specific indirect effect from INF to INT. A similar pattern is observed for PBC, which also serves as a mediator in some indirect paths but not in the indirect relationship from INF to INT.

The results indicate that subjective norms do not serve as a mediator in any of the three specific indirect relationships from COS, TEK, and INF to INT, as the indirect effects via subjective norms were found to be statistically insignificant.

The total indirect effect of a mediation relationship is calculated as the sum of all its specific indirect effects (Hair et al., 2021). The aggregated indirect effects from COS to INT and from TEK to INT both exhibit p-values < 0.05, indicating the presence of significant indirect relationships from COS -> INT and TEK -> INT. However, the total indirect effect from INF to INT shows a p-value > 0.05; therefore, no significant indirect relationship exists between INF and INT.

4.3.3. Explanatory power

The study used measure to evaluate the structural model's explanatory power is the coefficient of determination (R2) value (Hair et al., 2021), the R2 value ranging from 0 to 1 reflects the percentage of each dependent variable's variance that is explained by its antecedents in the model. Table 8 shows that INT explained 64% (adjusted) of the variance. Meanwhile, the remaining dependent variables (also mediating variables) reached explanatory levels of 40.5%, 32.7%, and 22.8%, respectively, ATT, PBC, and NOR.

Table 8. Explanatory power

	R Square	R Square Adjusted
ATT	0.411	0.405
INT	0.645	0.640
PBC	0.333	0.327
NOR	0.235	0.228

5. Discussion & Conclusion

5.1. Comparison with previous studies

This study reveals a complex landscape of EM adoption in Ho Chi Minh City (HCMC). A pivotal finding is that subjective norms do not significantly influence purchase intention. This result stands in stark contrast to established literature, such as (Sun &

Wang, 2020) and (Gupta, 2025), who found that social pressure is a primary driver in collectivist cultures. This suggests that young Vietnamese consumers may be exhibiting greater individualistic decision-making or that environmental social pressure has not yet reached a threshold for behavioral compliance.

Furthermore, the non-significance of infrastructure charging as a barrier to attitude, perceived behavioral control, or intention challenges the findings of (Gupta, 2025; Pamidimukkala et al., 2023), who identified infrastructure as a critical constraint. This discrepancy likely stems from the high urban development and charging station density specific to HCMC compared to the broader contexts studied previously. Conversely, the significant negative impact of technological barriers and price/battery costs on attitude and perceived behavioral control aligns with (Gupta, 2025), confirming that technical anxieties and long-term maintenance costs remain universal deterrents.

Regarding financial and technical deterrents, the significant negative impact of price/battery costs (COS) and technological barriers (TEK) aligns with (Gupta, 2025), confirming that anxieties and costs remain universal hurdles. However, this study provides deeper nuances through the refinement of the measurement model: the exclusion of TEK6, which reflected concerns about limited EM models, suggests that the Vietnamese EM market has expanded enough that model variety is no longer a salient technological issue. The indicator COS1 was excluded, given the increasing availability of electric motorcycles across multiple price segments, including affordable options, respondents – particularly younger consumers – may no longer perceive the upfront price as a major financial barrier compared to conventional motorcycles.

5.2. Theoretical implications

Theoretically, this research extends the theory of planned behavior (TPB) by integrating macro-level structural factors – including government policy, infrastructure, and technological barriers – within a Low- and Middle-Income Country (LMIC) context.

First, the study identifies a "contextual maturity" effect regarding urban infrastructure. The results demonstrate that in a highly developed urban

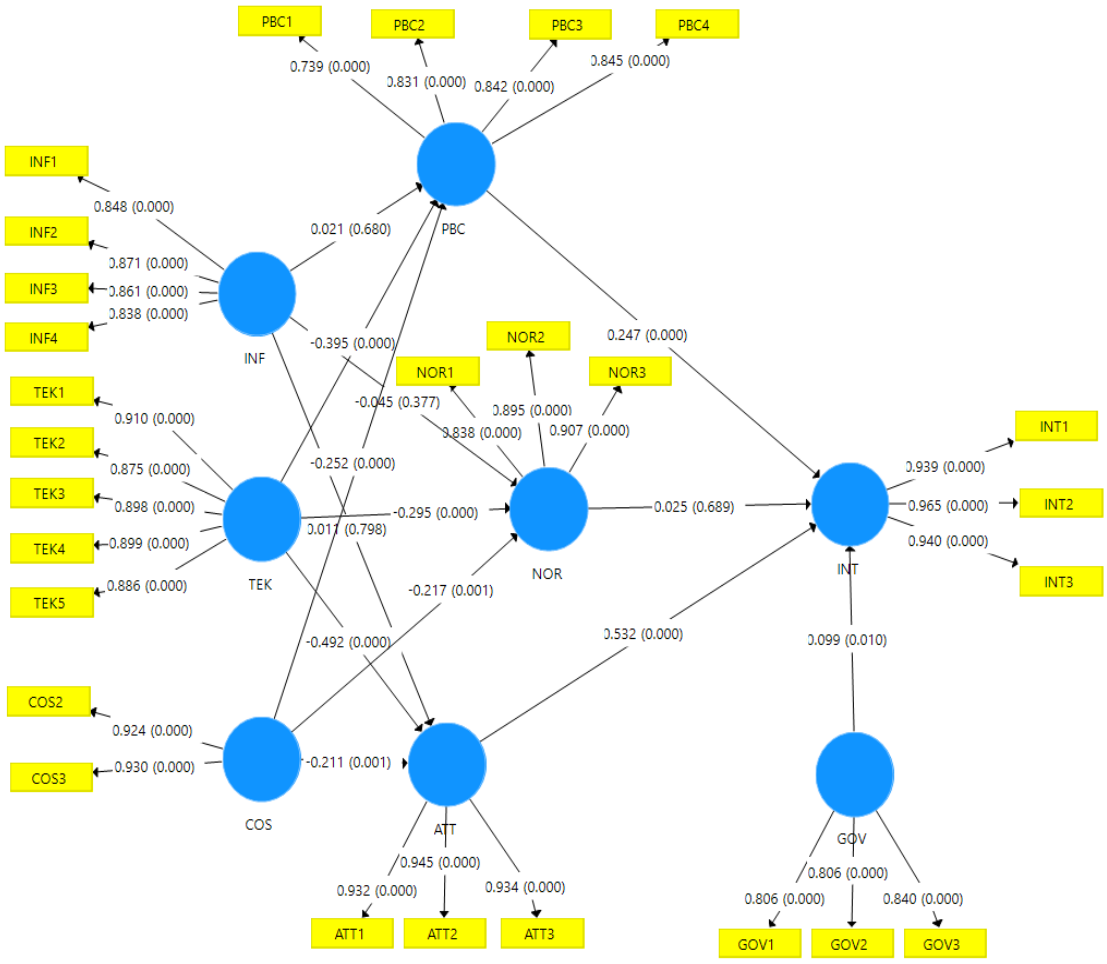

Figure 2. Final structural model

environment like Ho Chi Minh City, structural barriers such as charging infrastructure can become statistically non-significant once they reach a perceived level of adequacy. This suggests that for potential adopters in such contexts, physical access to charging is no longer the primary bottleneck for forming an intention.

Second, the study offers a critical contribution to the understanding of the "Social-individual gap" in sustainable technology adoption. While TPB typically positions subjective norms as a strong driver in collectivist societies, this study found they had no significant influence on purchase intention. This reveals a profound gap between social environmental awareness and individual behavioral compliance; consumers may acknowledge social responsibility, yet this pressure fails to serve as a sufficient motivational trigger.

Instead, the findings reinforce that attitude and perceived behavioral control remain the dominant psychological pillars. However, the study also highlights that this individual intention is still heavily moderated by the negative impacts of technological barriers and price/battery costs (COS), which serve to erode the positive evaluations and control perceptions that lead to a final purchase decision.

5.3. Managerial implications

For EV manufacturers and policymakers, these results suggest a strategic pivot. Since HCMC consumers perceive infrastructure as adequate, firms should shift resources from "availability marketing" to addressing performance doubts and battery replacement concerns (COS). To enhance attitude, which was the strongest predictor of intention ($\beta = 0.532$), marketing should emphasize the wisdom and satisfaction of the purchase rather than just environmental social responsibility. Additionally, since government policy has a positive influence, manufacturers should align their promotional campaigns with state-led "Net Zero" initiatives to leverage institutional credibility.

5.4. Conclusion, limitations and future work

As Vietnam intensifies efforts to meet Net Zero commitments by 2050, the transition to sustainable transport in motorcycle-dominated cities like HCMC is critical. This study validated an extended TPB model, finding that attitude and perceived behavioral control are the primary psychological drivers of EM purchase intention.

Crucially, the research identifies that infrastructure is no longer a primary deterrent for the surveyed demographic in HCMC. However, significant technological and cost barriers continue to erode consumer attitudes and perceived control. The lack of subjective norms on intention highlights a shift in how young consumers process environmental expectations.

Limitations and future work: Despite its contributions, this study has several limitations that offer fertile ground for future academic inquiry. First, the sample is heavily concentrated on young consumers, which may not fully capture the financial constraints or practical requirements of older, head-of-household demographics. Second, the geographic focus is restricted to Ho Chi Minh City, a metropolitan hub where infrastructure density has reached a "tipping point" of perceived adequacy. Consequently, the finding that infrastructure is no longer a barrier may not be generalizable to rural or less-developed regions where charging networks remain sparse. Finally, while the study utilizes an extended TPB framework to measure purchase intention, it does not account for the "intention-behavior gap" - the discrepancy between what consumers plan to do and their actual market choices. Future research should adopt longitudinal designs to track the transition from intention to actual ownership, providing a more robust validation of the proposed model. Comparative studies between urban and provincial contexts are also essential to determine the exact threshold at which infrastructure ceases to be a primary deterrent. Furthermore, given the unexpected non-significance of social influence in this study, future work should employ qualitative methods, such as in-depth interviews or focus groups, to investigate the "Social-Individual Gap" and understand the shifting role of collectivist values among Southeast Asian young consumers. Finally, integrating additional variables like environmental concern or perceived value could further enhance the model's explanatory power.

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