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Factors Influencing Consumers' Electric Vehicle Purchase Intention in Emerging Markets: Evidence from Vietnam

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Abstract: Promoting the adoption of electric vehicles (EVs) in emerging economies plays an important role in decarbonizing the transport sector, but the mechanisms through which policy factors, infrastructure conditions, product attributes, and psychosocial factors shape consumer attitudes and purchase intentions in the early stage of the market are still not fully understood. This study develops an extended model based on the Theory of Planned Behavior (TPB), in which attitude and subjective norm act as mediators linking groups of antecedent variables (policy support and infrastructure, vehicle performance, economic cost and service quality, environmental awareness and personal innovativeness, and social influence) to purchase intention toward EVs, using Vietnam as an illustrative emerging market context. Data were collected through an online survey of 718 Vietnamese consumers and analyzed using structural equation modeling (SEM). The results show that both attitude and subjective norm have positive effects on purchase intention, with attitude being the stronger predictor. Policy support, vehicle performance, environmental awareness, and personal innovativeness strengthen positive attitudes, whereas economic cost and infrastructure constraints weaken attitude; service quality has no significant effect, while social influence reinforces subjective norms. These findings extend TPB to the early-stage EV market in emerging economies and provide policy and managerial implications for designing incentives, infrastructure investment, and more effective marketing strategies to promote sustainable transport.

Keywords: Electric vehicles (EVs); Consumer attitudes; Purchase intentions; Theory of Planned Behavior (TPB); Emerging markets.

1. Introduction

Climate change and air pollution remain serious challenges to sustainable development, driving an urgent global shift toward clean energy solutions. In this context, transport electrification is regarded as a key pathway. The transport sector accounts for a substantial share of energy-related CO_2 emissions, therefore, reducing emissions from the transport system has become a priority of green transition strategies [1]. Based on life-cycle assessments, many studies show that electric vehicles have significantly lower emissions than internal combustion engine vehicles. ICCT indicates that electric vehicles can reduce life-cycle emissions by up to 70-75% in Europe [2], and Zaino et al. argue that these benefits continue to increase as the share of renewable energy in the electricity grid expands [3]. In addition, supported by policy and technological progress, the global electric vehicle market has been growing rapidly: sales in 2024 exceeded 17 million units, accounting for more than 20% of total new car sales [4].

Although this trend is spreading, EV penetration is uneven across country groups. Developed markets such as Norway, Germany, and China have achieved high levels of adoption, while many emerging economies remain at an early stage, even as transport demand and decarbonization pressure continue to rise. In emerging markets, most of the world's population is concentrated and future consumption growth is expected. Identifying the factors that motivate consumers to adopt EVs is particularly urgent. This is needed not only to support decarbonization goals but also to provide a basis for interventions that help accelerate the pace of EV penetration in this group of countries.

To address this important need, this study analyzes the factors influencing purchase intention for EVs in emerging economies. Previous studies have examined the roles of multiple factor groups. These include contextual and structural factors such as social influence, supportive policies, enabling conditions, and the availability of infrastructure [5, 6]. They also include product-related attributes and market conditions such as performance, reliability, ease of use, and efficiency or cost [7, 8]. In addition, they include knowledge and environmental concern [9]. However, evidence from emerging economies still shows substantial differences due to infrastructure conditions, market maturity, and consumers' limited experience with technology. As a result, the relative roles of these factor groups may not be uniform. Moreover, recent studies suggest that consumer behavior in these markets is strongly influenced by contextual and structural factors [10, 11]. Lin et al. point out that in the ASEAN region, social norms, policy, and infrastructure are structural factors that exert a strong and dominant influence on EV adoption behavior [12]. Therefore, studies are needed that take an integrated approach by incorporating these factor groups and testing them jointly in an emerging economy context, in order to clarify the drivers and the mechanism through which purchase intention is formed.

On this basis, this study develops a model that inherits from and extends the Theory of Planned Behavior (TPB) [13], which is a widely influential theoretical framework for predicting behavior related to green technologies [14]. The model emphasizes the mediating roles of attitude and subjective norm in transmitting the effects of antecedent variables on EV purchase intention. These antecedent variables include social influence, policy-related factors including public policy and infrastructure, product-related

factors including performance, service, and economic cost, and consumer cognition including environmental protection awareness and personal innovativeness. This approach aligns with decision-making characteristics in emerging markets, where consumers may rely more on social information and attitudinal evaluations when direct experience with the technology remains limited.

To test the model, the study selects Vietnam as an illustrative research context. Vietnam is a fast-growing emerging economy with concerning levels of air pollution [15] and with strong commitments to energy transition. At the same time, the EV market is still at an early stage but is developing rapidly. Therefore, findings from Vietnam not only have intrinsic value but may also provide reference implications for other emerging markets with similar contexts.

Theoretically, this study contributes by clarifying the mechanism through which antecedent factors indirectly influence EV purchase intention via attitude and subjective norm in emerging economies. Practically, the findings provide important implications for policymaking and market strategy to promote sustainable transport transition and progress toward the net-zero emissions goal. The remainder of the paper is structured as follows. Section 2 presents the theoretical framework and hypotheses. Section 3 covers the research method, questionnaire design and data collection, the measurement model, and hypothesis testing. Section 4 discusses the results and implications. Section 5 outlines limitations and recommendations for future research.

2. Theoretical Framework and Hypotheses

The Theory of Planned Behavior (TPB) proposed by Ajzen (1991) extends the Theory of Reasoned Action (TRA) to explain how human behavior is formed [13, 16]. According to TPB, behavioral intention is the direct antecedent of actual behavior, and this intention is determined by three basic psychological components:

Attitude toward the behavior: the degree to which an individual evaluates the behavior as positive or negative.

Subjective norm: the individual's perception of social pressure or others' expectations regarding the behavior.

Perceived behavioral control: the perceived ability and conditions to perform the behavior.

TPB suggests that individuals consider the positive and negative consequences of a behavior and are at the same time influenced by social norms and their perception of control over the environment and context [13]. In the fields of new technology adoption, green consumption, and sustainable transport, TPB has been widely applied and remains an important and reputable theoretical framework [17].

In the EV market of emerging economies, this study follows TPB but focuses only on two components: attitude and subjective norm. EV purchasing in these countries is still at an early stage of development, where beliefs, emotions, and social evaluations are the main driving forces. International studies indicate that, in this stage, attitude and subjective norm are the two factors with the strongest influence on behavioral intention [14].

External factors must first be interpreted by consumers, shaping and changing their attitudes and perceptions of social norms, and only then do they lead to intentions and actual behavior [14, 11, 10]. Following an extended TPB approach, this study integrates several groups of antecedent variables to explain how attitude and subjective norm are formed, instead of modelling direct effects on behavioral intention.

On this basis and to fit the research context, the study proposes a model in which consumers' purchase intention toward EVs is directly predicted by attitude and subjective norm. At the same time, the model includes the following independent variable groups: social influence, policy support, infrastructure, vehicle performance, service quality, economic cost, environmental awareness, and personal innovativeness. These variables are expected to affect purchase intention indirectly by shaping the two mediators, attitude and subjective norm. All relationships in the model are examined through the research hypotheses H1-H6b presented below.

According to TPB, attitude is the individual's positive or negative evaluation of a specific behavior and is a key predictor that directly explains the intention to perform that behavior. In this study, when consumers hold a more favorable and positive attitude toward purchasing and using EVs (for example, believing that EVs bring environmental benefits and represent a modern and technological lifestyle), their purchase intention is expected to be stronger.

The systematic review by Nigam et al. (2024) provides strong support for this relationship [18]. Although their study covers new energy vehicles (NEVs), most of the conclusions are drawn from EV research. They show that attitude is an important psychological factor. Many empirical studies confirm that attitude has a positive and significant effect on EV purchase intention [19, 20]. Therefore, the first hypothesis of this study expects that a more positive attitude will promote consumers' intention to purchase EVs.

H1: Consumers' attitude has a significant positive effect on their intention to purchase EVs.

Subjective norm refers to the social expectations that an individual perceives from important reference groups such as family, friends, or colleagues, which can influence the decision to perform or not perform a specific behavior, together with the willingness to comply with those expectations [13]. In the context of EV adoption, normative influence plays a crucial role because the behavior is socially visible, novel, and associated with uncertainty, which makes consumers more likely to rely on perceived approval or disapproval from others as a form of social validation.

Many empirical studies have confirmed this positive relationship in different contexts, including Norway [21], China [22], and Vietnam [23, 24]. These studies show that perceived social pressure has a significant positive effect on consumers' willingness to accept and intention to purchase EVs. Therefore, the second hypothesis is proposed:

H2: Subjective norm has a significant positive effect on consumers' intention to purchase EVs.

Taylor and Todd (1995) extended TPB by proposing the Decomposed Theory of Planned Behavior (DTPB) [25]. In this model, subjective norm is determined by perceived social influence from important reference groups such as friends, colleagues, superiors, experts, or media channels. These influences shape individuals' perceptions of what others expect them to do, thereby forming the subjective norms that guide behavior.

In emerging markets, where consumer behavior is strongly shaped by collectivist culture and social networks, perceived social pressure is often the central factor in forming subjective norms [10]. This indicates that social factors provide the foundation for subjective norms before they influence purchase intention. Therefore, it can be expected that stronger

social influence will lead individuals to form more positive subjective norms toward EV adoption.

H3: Social influence has a significant positive effect on consumers' subjective norm toward EV adoption.

According to TPB, attitude toward a behavior is formed from beliefs about the outcomes of that behavior and the evaluation of those outcomes as positive or negative [13]. External institutional factors, such as policy support and infrastructure conditions, can directly affect this belief system and thereby influence consumers' attitudes toward purchasing and using EVs.

Policy support plays a guiding role and encourages environmentally friendly consumption. Wang et al. (2020) show that support policies such as subsidies, tax exemptions, and user incentives help create more positive attitudes toward Evs [26]. Similarly, Truong et al. (2024) emphasize that in developing countries, financial policies and macro-level institutional frameworks contribute to changing perceptions and enhancing positive evaluations of Evs [10]. Kumar et al. (2025) also find that financial incentives strengthen consumers' positive beliefs and expectations about EVs in emerging economies [8].

In contrast, inadequate infrastructure has the opposite effect. When consumers perceive that charging stations are limited, poorly located, or that the technical service and maintenance system is underdeveloped, their positive beliefs about the feasibility of owning an EV are weakened, leading to a more negative attitude [10, 8]. Martínez-Gómez and Espinoza (2024) also confirm that a lack of charging stations, limited geographic coverage, and underdeveloped maintenance technology are major barriers that reduce positive attitudes and slow down EV adoption in Latin America [27].

Thus, favorable policy support can strengthen positive attitudes, whereas infrastructure constraints reduce consumers' attitudes toward EVs. The study therefore proposes the following hypotheses:

H4a: Policy support has a positive effect on consumers' attitude toward purchasing EVs.

H4b: Underdeveloped infrastructure has a negative effect on consumers' attitude toward purchasing EVs.

EV performance is one of the key technical factors that determine consumers' beliefs about the usefulness and reliability of the technology. When consumers perceive that EVs have high performance, such as longer driving range, fast charging, stable operation, and high safety, they tend to evaluate the purchase of an EV as useful and worthwhile [17, 28].

Empirical studies also stress the role of this factor in shaping consumers' perceptions of EVs. Moons and De Pelsmacker (2015) argue that technological advantages and performance are the main sources of favorable attitudes toward environmentally friendly vehicles. Zhao (2023) finds that when users highly rate the performance and reliability of EVs, they express more positive attitudes toward purchasing. In emerging markets, performance and technological stability continue to be seen as key elements that strengthen positive evaluations of EVs [18, 12]. From this, the study proposes:

H5a: Vehicle performance has a positive effect on consumers' attitude toward purchasing EVs.

When approaching a new technology such as EVs, especially in emerging markets, consumers often face uncertainty about service quality. In this study, service quality includes transparent product information, clear promotional offers, and effective after-sales support from firms, and it is also a factor that shapes positive or negative evaluations before purchasing decisions are made. When customers perceive that firms provide reliable information, attractive promotions, and adequate after-sales service, they feel more secure and confident, which in turn leads to a favorable attitude toward purchasing EVs.

Many studies have confirmed the central role of service in shaping evaluations of new energy technologies. Zhao (2023) shows that satisfaction with information, promotions, and technical support from manufacturers has a significant positive effect on purchase attitude [28]. Similarly, Truong et al. (2024) find that Vietnamese consumers often rate EVs unfavorably because of a lack of reliable consulting and after-sales service, indicating the importance of service trust in attitude formation [10]. It is therefore reasonable to expect that when service quality is perceived as high, consumers will develop a more positive attitude toward owning and using EVs.

H5b: Service quality has a positive effect on consumers' attitude toward purchasing EVs.

Besides service quality, perceived economic cost is one of the most salient barriers affecting consumers' attitudes toward EVs. In most markets, high upfront purchase prices, expensive maintenance and battery replacement, together with concerns about depreciation and resale value, make consumers view EVs as a riskier investment than conventional cars. When perceived financial benefits do not match the costs, attitudes toward purchasing EVs tend to decline.

Egbue and Long (2012) show that initial investment and maintenance costs are two major barriers that shape negative attitudes toward Evs [29]. Helveston et al. (2015) also demonstrate that when consumers perceive clear financial benefits (for example, fuel savings or incentive policies), attitudes toward EVs become more positive [30]. More recently, Lin et al. (2025) and Kumar et al. (2025) confirm that cost and affordability remain "core barriers" influencing attitudes in developing economies [12, 8].

Therefore, when consumers perceive a heavier cost burden, they are likely to form less favorable attitudes toward purchasing EVs. The next hypothesis is proposed as follows:

H5c: Economic cost has a negative effect on consumers' attitude toward purchasing EVs.

Consumers' attitudes toward EVs are also strongly shaped by the extent to which they recognize the ecological value of the technology itself, namely that EVs help reduce emissions, save resources, and contribute to sustainable development [18]. When consumers understand and believe in these environmental benefits, they tend to evaluate the purchase of EVs as positive and socially and morally appropriate, which leads to a favorable attitude toward buying and using EVs [31].

In Asian contexts, Wang (2025) and Zheng (2024) measure environmental cognition factors such as environmental responsibility, environmental knowledge, and green beliefs, and show that these factors not only strengthen positive attitudes toward EVs but also increase purchase intention through the mediating role of attitude [32, 33]. These consistent findings suggest that the more clearly consumers perceive environmental issues and the ecological benefits of EVs, the more likely they are to form positive attitudes toward purchasing. Therefore, the following hypothesis is proposed:

H6a: Environmental awareness has a positive effect on

consumers' attitude toward purchasing EVs.

According to Diffusion of Innovations Theory, the level of personal innovativeness reflects the tendency to seek out, experiment with, and adopt new technologies earlier than most other consumers [34]. Individuals with high innovativeness actively search for information, are open to change, and tend to evaluate pioneering products more positively because they can more readily see the benefits and improvements that these technologies may bring to their lives.

In the context of EVs, this characteristic is expressed in the desire to experience new features, follow technological progress, and quickly adapt to green mobility trends. When consumers are more innovative, they are more likely to perceive EVs not only as environmentally friendly vehicles but also as symbols of modernity and technological progress, which leads to more positive attitudes toward purchasing.

Tunçel (2022) supports this "innovativeness → attitude → intention" mechanism in sustainable behavior models, showing that highly innovative individuals hold more favorable evaluations of EVs and that such attitudes play an important role in promoting intention to adopt the product [35]. This suggests that personal innovativeness can be regarded as a foundational factor contributing to positive attitudes toward green technologies such as EVs. Based on this reasoning, the study proposes the following hypothesis:

H6b: Personal innovativeness has a positive effect on consumers' attitude toward purchasing EVs.

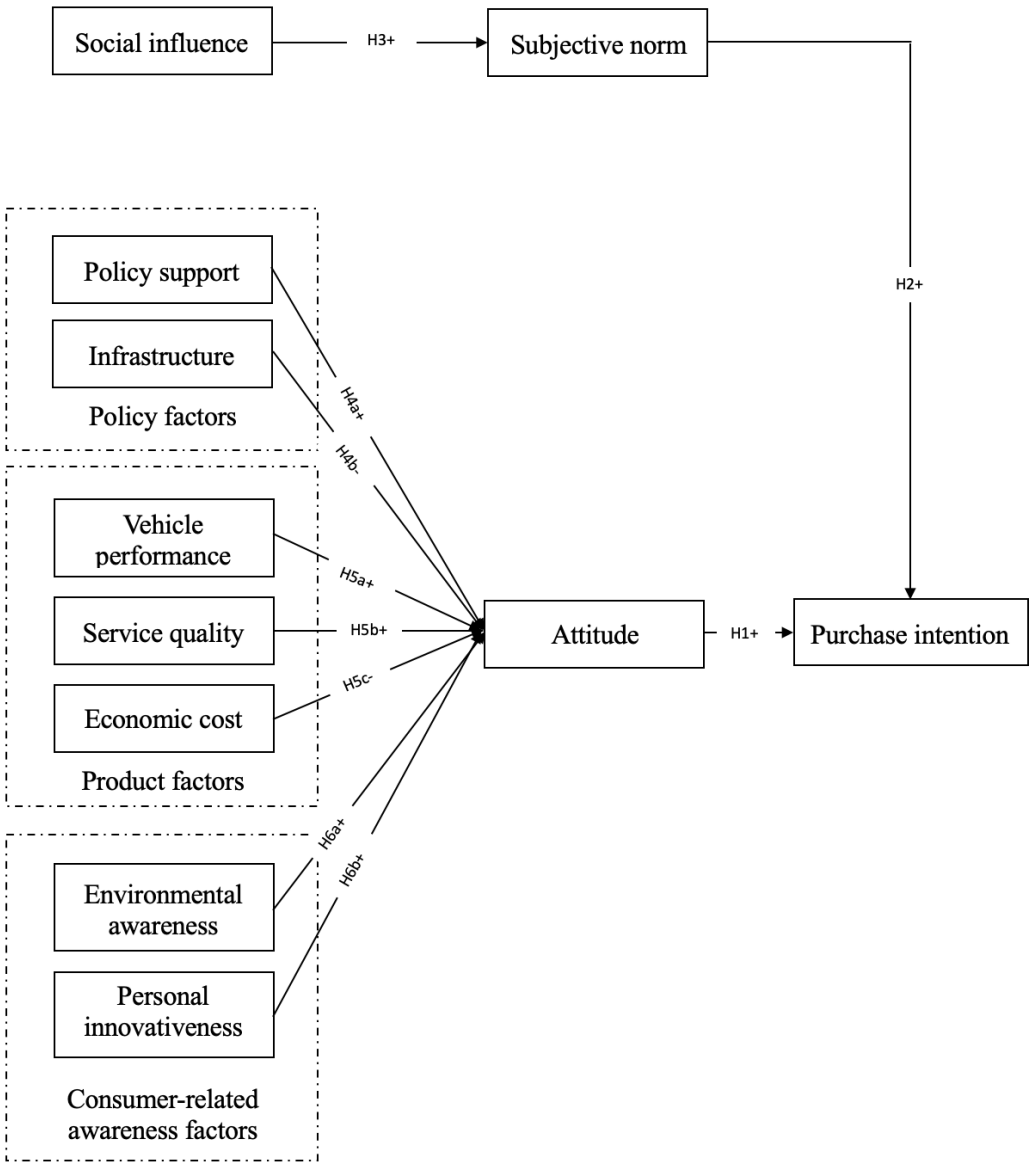


Figure 1. Research model

3. Research methods

3.1. Questionnaire Design and Data Collection

The questionnaire was developed based on measurement scales that had been validated in previous studies on EV adoption behavior and was adapted to fit the research context. Except for demographic variables, all observed variables were measured using a five-point Likert scale (1 = Strongly disagree … 5 = Strongly agree).

Specifically, items measuring vehicle performance, service quality, and economic cost were adapted from Liu et al. (2015), Dong et al. (2020), and Liu (2019) [36-38]. Policy support and infrastructure were measured using scales developed by Xiong and Qin (2018) and Li et al. (2013) [39, 40].

Environmental awareness and personal innovativeness were measured using items adapted from Wang et al. (2024). The social influence scale was adapted from Khazaei (2019) [42]. Finally, attitude toward EVs, subjective norm, and

purchase intention were developed based on EV adoption studies by Huang and Ge (2019) and Moons and De Pelsmacker (2015) [43, 17].

Before the main survey, a pilot test was conducted with a small sample of 78 respondents to examine the clarity of wording, ease of understanding, and reliability of the questions. The Cronbach's alpha analysis showed that some items had low corrected item-total correlations (corrected item-total correlation < 0.30) and would increase the alpha coefficient if deleted. These items were removed from the final questionnaire to improve internal consistency and enhance the reliability of the scales.

After the pilot test, the main survey was carried out from early April 2025. In total, 800 questionnaires were collected through an online survey using the Google Forms platform and targeted Vietnamese individuals. Respondents were reached by sharing the survey link on Facebook and Zalo, by posting in various social media groups with different topics. Among them, 82 invalid responses were excluded, resulting in a valid response rate of 89.8%. The final dataset used for statistical analysis contained 718 valid questionnaires. Detailed demographic characteristics of the respondents are presented in Table 1.

Table 1. Sample characteristics

Variable		Frequency	Percentage
Age	18-25	77	10.7
	26-35	153	21.3
	36-45	324	45.1
	46-60	144	20.1
	≥ 61	20	2.8
Gender	Male	467	65.0
	Female	251	35.0
Education	Upper secondary school or lower	171	23.8
	Bachelor's degree	367	51.1
	Master's degree or higher	180	25.1
Income	<10	32	4.5
	10-20	223	31.1
	20-30	309	43.0
	≥ 30	154	21.4
Sample Size		718	100

3.2. Measurement Model

The measurement model was used to assess the reliability and validity of the scales before estimating the structural model. The purpose of this step is to evaluate the consistency among the observed variables and the extent to which they represent each latent construct in the research model.

The reliability and validity of the scales were examined using SPSS 26.0 and AMOS 24.0. First, Cronbach's alpha coefficients were used to assess the internal consistency of each construct. All Cronbach's alpha values ranged from 0.775 to 0.901, exceeding the commonly accepted threshold of 0.7, indicating good reliability of the scales (see Table 2).

Next, confirmatory factor analysis (CFA) was conducted in AMOS to test the construct validity of the latent variables. The standardized factor loadings ranged from 0.696 to 0.844, and most of them were greater than 0.7, higher than the minimum recommended level of 0.5 [44], showing that the measurement scales achieved satisfactory construct validity (see Table 2).

Composite Reliability (CR) and Average Variance Extracted (AVE) were then obtained from the AMOS output, based on the standardized factor loadings (λ) and error variances (θ). The formulas for these calculations are provided below for reference [44, 45].

$$CR = \frac{(\sum \lambda)^2}{[(\sum \lambda)^2 + \sum(\theta)]}$$

$$AVE = \frac{(\sum \lambda^2)}{[(\sum \lambda^2) + \sum(\theta)]}$$

The results show that all CR values lie between 0.775 and 0.901, above the threshold of 0.7, and AVE values range from 0.535 to 0.611, all greater than the cut-off value of 0.5, indicating good convergent validity of the scales (see Table 2).

Discriminant validity was assessed by comparing the square root of AVE with the correlations between constructs. In Table 3, the values on the diagonal (in bold) represent the square roots of AVE, while the values below the diagonal indicate the correlation coefficients between latent variables. For each construct, the square root of AVE is greater than its correlations with other constructs, confirming that the scales achieve adequate discriminant validity [45].

Table 2. Analysis results of convergent validity and reliability

Construct and measurement items	Cronbach's α	Loading	CR	AVE
Vehicle performance (CP)				
I believe that the battery of an electric vehicle has a long lifespan.	.901	.793	.901	.603
I believe that the battery charging speed of an electric vehicle is sufficiently fast.		.731		
I believe that the driving range of an electric vehicle is adequate for my daily travel needs.		.748		
I believe that electric vehicles are highly safe, which makes me feel secure when using them.		.766		
I evaluate the driving performance of electric vehicles (power, smoothness) as good.		.797		
I believe that the technologies applied in electric vehicles are reliable and well-developed.		.819		
Service quality (SQ)				
I would consider purchasing if the company provides clear and reliable product information.	.803	.727	.803	.577
I would consider purchasing if the company offers attractive incentives and promotions.		.768		
I would consider purchasing if the company provides high-quality after-sales services, both online and in person.		.783		
Economic cost (EC)				
I think that the current purchase price of electric vehicles is significantly higher than that of conventional vehicles.	.779	.798	.781	.544
I think that the long-term operating costs of an electric vehicle (charging, maintenance) can be very high.		.709		
I think that the depreciation cost (loss of value) of an electric vehicle is higher than that of a conventional vehicle.		.701		
Policy support (PP)				
If the government offered purchase subsidies for electric vehicles, I would consider buying one.	.775	.745	.775	.535
If the government reduced taxes on electric vehicles, I would consider buying one.		.706		
Free parking policies for electric vehicles would increase my likelihood of purchasing one.		.743		
Infrastructure (INF)				
I am concerned that the current number of charging stations is insufficient to meet usage needs.	.810	.785	.810	.587
I am concerned that the locations and distribution of charging stations are not convenient.		.738		
I am concerned that the system of repair and maintenance services for electric vehicles is not yet well developed.		.774		
Environmental awareness (EA)				
I believe that electric vehicles help raise the community's awareness of environmental protection.	.842	.772	.843	.572
I believe that using electric vehicles can reduce the impacts of climate change.		.739		
I believe that electric vehicles help save resources and reduce environmental pollution.		.746		
I believe that electric vehicles reduce carbon emissions and support sustainable development goals.		.769		
Personal innovativeness (INV)				
I tend to want to experience products with innovative and breakthrough features.	.847	.719	.849	.585
I regularly follow information about new technology products.		.747		
I easily adapt to technological changes.		.742		
I believe that technologies related to environmentally friendly vehicles are innovative.		.844		
Social influence (SI)				
Using an electric vehicle would make me be perceived as a progressive person.	.861	.834	.862	.611
I would consult automotive experts before deciding to purchase an electric vehicle.		.750		
I learn about electric vehicles through the experiences of acquaintances who have used them.		.696		
Advertising and media campaigns about electric vehicles make me more inclined to purchase one.		.839		
Subjective norm (SN)				
My family supports my decision to buy an electric vehicle.	.819	.751	.820	.603
If many people around me buy electric vehicles, I would also buy one.		.757		
Most people who are important to me think that I should choose an environmentally friendly vehicle such as an electric vehicle.		.820		
Attitude (ATT)				
I support the government's efforts to promote the development of electric vehicles.	.883	.768	.884	.603
I believe that the performance of electric vehicles can meet my needs.		.764		
I believe that electric vehicles are the future trend of the automobile industry.		.736		
I trust in the quality and reliability of electric vehicles.		.818		
I consider electric vehicles to be a worthwhile technological investment.		.795		
Purchase intention (PI)				
When choosing a vehicle to buy, I will give priority to an electric vehicle.	.859	.769	.859	.604
I am willing to recommend electric vehicles to my friends.		.740		
I actively seek information and want to experience driving an electric vehicle.		.795		
I look forward to the introduction of more new electric vehicle models.		.804		

Table 3. Analysis results of discriminant validity

	Mean	S.D.	CP	SQ	EC	PP	INF	EA	INV	SI	SN	ATT	PI
CP	3.381	1.092	0.776										
SQ	3.507	1.116	0.014	0.760									
EC	3.241	1.140	-0.008	-0.001	0.737								
PP	3.468	1.012	-0.031	-0.080	0.001	0.731							
INF	3.340	1.129	0.020	0.010	0.093	0.002	0.766						
EA	3.252	1.028	0.035	0.017	0.004	0.014	0.004	0.757					
INV	3.630	.980	0.002	-0.005	0.006	0.044	-0.009	0.047	0.765				
SI	3.254	1.070	0.020	0.002	0.046	-0.073	0.020	0.018	-0.037	0.782			
SN	3.645	.937	-0.011	0.051	0.058	0.028	0.095	0.020	0.040	0.206	0.776		
ATT	3.615	.946	0.440	0.017	-0.463	0.229	-0.435	0.266	0.314	-0.042	-0.006	0.777	
PI	3.654	.858	0.229	0.079	-0.164	0.147	-0.228	0.135	0.138	0.003	0.259	0.559	0.777

3.3. Hypothesis Testing

Before testing the hypotheses, the overall fit of the structural model was assessed using AMOS 24.0. The results show that all fit indices meet the acceptable thresholds: χ^2 = 879.346, df = 781 (χ^2/df = 1.126), GFI = 0.946, CFI = 0.993, TLI = 0.992, RMSEA = 0.013, and PCLOSE = 1.000. These values indicate that the model has a very good fit to the data.

The regression analysis in the SEM model shows that the model explains 4.2% of the variance in Subjective norm, 76.6% of the variance in Attitude, and 36.8% of the variance in Purchase intention. This implies that policy, product, and consumer-related awareness factors play a very important role in shaping attitudes toward EVs, while social influence accounts for a smaller share in explaining consumers' subjective norms.

The results of hypothesis testing are presented in Table 4. In this table, the β coefficients represent the standardized regression weights, whereas the C.R. and P values reflect the statistical significance of each relationship in the model.

The results indicate that Vehicle performance (CP), Policy support (PP), Environmental awareness (EA), and Personal innovativeness (INV) all have positive and significant effects on Attitude toward EVs (β = 0.442, 0.232, 0.236, and 0.287; $p < 0.001$), thereby supporting hypotheses H5a, H4a, H6a, and H6b. In contrast, Economic cost (EC) and Infrastructure (INF) have significant negative effects on Attitude (β = −0.418 and −0.405; $p < 0.001$), confirming H5c and H4b in the expected negative direction. The effect of Service quality (SQ) is not statistically significant (β = 0.036; p = 0.227), so hypothesis H5b is not supported.

In addition, Social influence (SI) has a positive effect on Subjective norm (SN) (β = 0.204; $p < 0.001$), supporting hypothesis H3. Both Attitude (ATT) and Subjective norm (SN) have positive and significant effects on Purchase intention (PI) (β = 0.548 and 0.265; $p < 0.001$), confirming hypotheses H1 and H2. In summary, most of the hypotheses in the model are supported, except for H5b regarding the effect of Service quality on consumers' attitudes.

Table 4. Hypothesis testing results

	Path	Standardized estimate (β)	C.R.	P	Results
H1	ATT → PI	.548	12.707	***	Supported
H2	SN → PI	.265	6.685	***	Supported
H3	SI → SN	.204	4.627	***	Supported
H4a	PP → ATT	.232	7.153	***	Supported
H4b	INF → ATT	-.405	-11.696	***	Supported
H5a	CP → ATT	.442	13.253	***	Supported
H5b	SQ → ATT	.036	1.209	.227	Not Supported
H5c	EC → ATT	-.418	-11.752	***	Supported
H6a	EA → ATT	.236	7.678	***	Supported
H6b	INV → ATT	.287	9.034	***	Supported

4. Discussion and Implications

4.1. Discussion

The structural model results show that the proposed theoretical framework explains the purchase intention of potential EV consumers reasonably well. The two mediating variables, attitude and subjective norm, both have significant positive effects on purchase intention, with attitude being the stronger predictor. At the same time, policy factors, product factors, and consumer-related awareness factors are confirmed as important antecedents that shape attitude. Overall, these findings are consistent with the central view of behavioral models derived from TRA/TPB [13, 16].

The positive relationship between attitude and purchase intention indicates that when consumers evaluate owning and using an EV as a reasonable, beneficial, and worthwhile choice, the probability of forming a purchase intention increases clearly. This result is in line with most previous studies [20, 46, 47]. Although subjective norm has a weaker effect than attitude, it still suggests that expectations perceived from friends, colleagues, and media channels play a supporting role in strengthening purchase intention. This is consistent with Simsekoglu and Nayum (2019) [21] and Asadi et al. (2021) [19], who argue that subjective norm is particularly important because environmentally related decisions are social in nature and influenced by community pressure and expectations.

For policy-related factors, government support policies have a significantly positive impact on attitude. When consumers feel that incentives on taxes and fees, financial support, or priority in registration and road use for EVs are clear and stable, they tend to view the switch to EVs more positively. This is similar to the finding of Wang et al. (2025) [48], who conclude that support policies, especially subsidies, tax reductions, and investment in user infrastructure, do not necessarily change purchase behavior directly, but strongly shape consumers' attitudes and increase the economic attractiveness of EVs by making them cheaper and easier to access. In contrast, incomplete infrastructure has a clearly negative effect on attitude. Those who worry about the density of charging stations, convenient locations, charging time, or the reliability of the system find it difficult to form a positive attitude, even when they are aware of existing incentives. This shows that in the early stage of the market, infrastructure barriers can overshadow many other benefits of EVs. Concerns about driving range and inadequate charging infrastructure make consumers hesitant and discourage EV adoption [49, 50].

From the perspective of product attributes, the results show that vehicle performance has a significant positive effect on attitude. Consumers who believe that EVs meet their requirements for driving performance, battery life, technological reliability, and safety are more likely to evaluate this choice favorably. This is consistent with the review by Nigam et al. (2024), which points out that functional attributes of vehicles, especially performance, acceleration, reliability, and driving range, are important factors that shape attitude and thereby increase the tendency to adopt Evs [18]. In contrast, economic cost has a strong negative effect on attitude. When the initial cost of purchasing and owning an EV is perceived as high relative to purchasing power or compared with conventional cars, attitudes toward EVs become less favorable [51]. Similarly, Krause et al. (2013) note that consumers' misconceptions about fuel and operating costs negatively affect their preferences and evaluations of Evs [52]. This is consistent with evidence from many emerging markets, where budget constraints and limited access to finance are prominent economic barriers to adopting green technologies [12].

A notable result is that service quality (including clear product information and advice, after-sales support, and promotional activities) does not have a significant effect on attitude. A reasonable interpretation is that at the current stage, most survey respondents have not yet had direct experience with EV-related services, so it is difficult for them to form a clear evaluation of this aspect. At the same time, when the number of users is still limited, tangible attributes such as performance, cost, and usage infrastructure may dominate and shape attitude more strongly than service-related factors.

In terms of consumer perception, both environmental awareness and personal innovativeness have positive effects on attitude. For environmental awareness, the findings show that people who understand more clearly the consequences of air pollution, greenhouse gas emissions, and the role of transport in emissions tend to form more positive attitudes toward EVs, viewing them as a choice consistent with environmental protection goals. This repeats the conclusion of Wang et al. (2021) that environmental concern significantly affects attitude and purchase intention [20]. Another study that considers EVs as a green consumer product also shows that pro-environmental identity and values are important drivers of favorable evaluations of EVs, thereby increasing the tendency to accept this technology [53]. At the same time, individuals who are willing to try new technologies, interested in new experiences, and less risk-averse are also more likely to form positive evaluations of EVs. This suggests that combining messages that emphasize the environmental contribution of EVs with messages that highlight their modern and pioneering technological features may be an effective way to strengthen favorable attitudes. These findings contradict those of Tu and Yang (2019), who, in a study of the Chinese EV market, did not find a significant effect of personal innovativeness on attitude [54].

Finally, the relationship between social influence and subjective norm is also clarified in the model. When consumers are frequently exposed to information from the media, experts, or policy campaigns, they tend to perceive more clearly that important reference groups support and expect them to consider EVs [54]. Previous studies have also emphasized the role of peer opinions and mass media) in EV purchase decisions [55, 17].

Overall, the results show that EV purchase intention in an emerging market is formed on the basis of a combination of benefit-cost evaluations, infrastructure conditions, environmental awareness, personal innovativeness, and signals from the policy and social environment. Attitude serves as an important convergence point of these factors, while subjective norm and barriers related to infrastructure and cost adjust the level of consumers' willingness to switch. These characteristics need to be taken into account when comparing with more developed markets, where infrastructure is more complete and EVs are already widespread, in order to explain differences in the mechanisms that shape EV purchase intention across different stages of market development.

4.2. Theoretical Implications

From a theoretical perspective, based on empirical evidence collected in Vietnam, an emerging market that remains highly dependent on conventional motor vehicles, this study proposes an extended TPB approach by simultaneously integrating groups of antecedent variables, including policy support, product attributes, individual perceptions, and social influence, into the mechanism that shapes attitude and subjective norm. This approach not only provides a better explanation of how EV purchase intention is formed, but also suggests that applications of TPB need to be adjusted to the specific characteristics of emerging markets, where consumer behavior is shaped at the same time by economic conditions, policy frameworks, and social norms. The study also responds to calls to extend the model with psychological mediating mechanisms and to strengthen empirical evidence in emerging economies [18].

First, the study reinforces the view that attitude is the central component in models of green consumer behavior. Within the extended TPB framework, attitude does not only reflect positive or negative evaluations of EVs, but also serves as the convergence point of beliefs about effectiveness, utility, policy support, and personal values and orientations. This implies that, instead of focusing only directly on intention, theoretical models of green technology adoption should consider the mediating role of attitude as a bridge through which groups of beliefs are synthesized and transformed into behavioral tendencies.

Second, modelling the effect of social influence through

subjective norm clarifies the role of social norms in a cultural context that values collectivism, a dimension that has often been simplified in many previous behavioral models [24, 47, 37]. Rather than assuming that social influence affects intention directly, subjective norm should be viewed as an intermediate layer that reflects the process through which expectations and evaluations from reference groups are internalized into individual decisions.

Third, the study contributes to clarifying how consumers evaluate product attributes in the early stage of the EV market. Attributes related to essential use value, such as driving performance, play a more prominent role than supporting values, such as pre-sales and after-sales service, in shaping attitude. Therefore, in theoretical terms, models that explain attitudes toward new technologies should distinguish between core utilitarian value and additional benefits, instead of treating them as a single homogeneous group.

Fourth, the study highlights the role of practical barriers such as economic cost and the state of charging infrastructure as a separate group of beliefs that are directly linked to how consumers form attitudes toward EVs. These barriers reflect the constraints that consumers anticipate during use [56], and can weaken positive evaluations even when environmental and technological benefits are clearly recognized. This suggests that, especially in emerging markets, constraint-related beliefs can be modelled as a group of factors that influence attitude, in addition to being interpreted only as perceived behavioral control as in traditional models.

Finally, considering environmental awareness and personal innovativeness together as antecedents of attitude shows that positive attitudes toward EVs are shaped both by pro-environmental value orientations and by the willingness to experience new technologies. This suggests that, in studies of EV consumer behavior, variables that reflect environmental concern and Personal Innovativeness can be examined in combination, rather than only as separate factors. From a modelling perspective, this approach adds an explanatory possibility in which Personal Innovativeness is not only used as a moderating variable or a direct antecedent of intention [41], but also as an antecedent of positive attitudes toward green technologies before leading to usage intention. This observation is consistent with the argument of Diffusion of Innovation on the role of individuals with a tendency toward innovation in the early stages of technology diffusion [57].

4.3. Policy Implications

The present study offers several practical implications, suggesting directions for intervention for both government and businesses to promote the transition toward sustainable transport in emerging markets.

From a policy perspective, the level of concrete support from the government plays an important role in fostering positive attitudes toward EVs, especially in the early stage of market development [3]. Direct incentives such as purchase subsidies, reductions or exemptions of certain taxes and fees, and priority in registration or road access for EVs, if maintained consistently over a sufficiently long period, can help consumers feel more confident when deciding to switch to EVs. At the same time, it is necessary to step up investment in and upgrading of charging infrastructure, including expanding the network of charging stations in residential areas, commercial zones, and along major transport corridors nationwide, as well as providing transparent information on the location and operating status of charging stations, in order to reduce perceived barriers regarding the feasibility of using EVs. The relationship between subjective norm, personal innovativeness, and intention to use also suggests that policies can target early adopters through dedicated priority mechanisms, such as higher subsidies in the initial stage or preferential charging and parking fees for this group [58].

From the business side, an important implication is the need to position EVs based on their core use value. Consumers in Vietnam, representing emerging markets with limited income levels and infrastructure, tend to focus strongly on practical attributes such as driving performance, durability, safety, and operating costs. Therefore, marketing activities should concentrate on demonstrating these values by publishing standard data on driving range and battery life and communicating clearly about maintenance costs and life-cycle ownership costs. In addition, providing more opportunities for consumers to test drive EVs is important, as test drives have a positive effect on consumer perceptions [59]. Engaging highly innovative customers through product experience programs, early-user communities, or new technology launch events is also a useful way to create positive reference sources in the market.

Finally, communication about environmental benefits should be based on concrete information and figures, such as the reduction in emissions compared with conventional vehicles, the share of renewable energy in the power mix, and battery life and recyclability, in order to strengthen beliefs and reduce consumer skepticism. Although service quality has not yet shown a prominent role in shaping attitudes, preparing service networks and appropriate warranty policies for EVs at an early stage remains important for maintaining positive attitudes and customer trust as the market moves into a broader development phase. These implications are directly relevant to Vietnam and at the same time provide useful reference points for other emerging EV markets with similar development conditions.

5. Limitations and Recommendations for Future Research

Like other empirical studies, this research has several limitations that need to be acknowledged. First, although Vietnam is selected as a representative case of emerging economies, the findings cannot be fully generalized to all developing countries because of differences in policy institutions, infrastructure development, and socio-cultural characteristics. Future studies could extend the comparison to a wider range of emerging economies to verify the consistency of the relationships between antecedent factors (social influence, perceptions, product attributes, and policy support) and attitude, subjective norm, and purchase intention.

Second, the data were collected through an online survey, so sample bias may arise due to an uneven geographical distribution of respondents. Subsequent research should apply more diverse sampling strategies or combine online and face-to-face surveys in order to enhance representativeness. In addition, another limitation is that the present study does not compare the effects across different demographic groups such as gender, education, and income, which are important determinants [60]. Future research could examine these aspects.

Third, the current research model focuses mainly on two factors, attitude and subjective norm, in order to help address the lack of in-depth studies on mediating variables in

emerging markets. However, extending the model by adding other mediating or moderating variables such as consumer innovativeness [35] or perceived barriers [61] is necessary to capture more fully the behavioral mechanisms of EV consumers in these markets.

Finally, although this study concentrates on behavioral intention, actual purchase behavior may be influenced by constraints such as financial capacity, charging infrastructure conditions, and policy stability. Therefore, future research could focus more directly on actual consumer behavior rather than only intention, or conduct additional studies to clarify the gap between intention and action in EV adoption.

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