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# FACTORS INFLUENCING INDIVIDUAL CONSUMERS' INTENTIONS TO PURCHASE ELECTRIC VEHICLES IN URBAN HANOI

**Summary.** This study aims to identify the factors influencing the intention to purchase electric vehicles for personal use among residents in major urban areas in Vietnam, specifically in Hanoi. This research was conducted using a non-probability sampling method to recruit 360 participants currently residing, studying, or working in the city of Hanoi. Statistical analysis was employed to process the collected data. The results reveal four groups of factors that have an impact on the intention to purchase electric vehicles among urban residents in Hanoi: (1) attitude (economic benefits, environment, safety, convenience, and design), (2) perceived behavioral control, (3) attractiveness of alternative modes of transportation, and (4) subjective norms. Based on the findings, the authors propose several policy implications to promote the development and use of electric vehicles in urban Hanoi. These may include encouraging the use of electric vehicles from economic, environmental, and safety perspectives, creating financial support programs or tax incentives for electric vehicle buyers, and improving public electric charging infrastructure to make electric vehicle usage more convenient.

## 1. INTRODUCTION

According to statistics from the Hanoi Department of Transport, as of November 2022, the capital city of Hanoi has a total of 7,784,657 vehicles (1,056,423 cars, 6,545,317 motorcycles, and 182,917 electric motorcycles). These numbers do not include the approximately 1.2 million vehicles from other provinces and cities that participate in traffic within the capital. These figures indicate a significant increase in the number of vehicles, with Hanoi adding 390,000 vehicles annually, 32,750 vehicles monthly, and 1,100 vehicles daily. This substantial increase in the vehicle population contributes to air pollution in addition to the use of fossil fuels. Many of these vehicles have poor emissions quality, leading to significant air pollution from the growing trend of transportation activities, with personal gasoline-powered vehicles being a substantial source of emissions, including CO and VOC, which significantly impact public health [5].

As society increasingly relies on transportation, reducing vehicle emissions becomes imperative. In the United Kingdom, the government has committed to legally binding targets to reduce greenhouse gas emissions by 80% by 2050 through the Climate Change Act 2008. Technological innovations in the transportation sector, such as the use of alternative fuels for conventional gasoline engines, electric vehicles, and hybrid fuel cell vehicles, are encouraged in various ways to support policy goals of reducing emissions in the transportation sector.

In Vietnam, the recent surge in the use of electric vehicles has attracted the attention of consumers, manufacturers, and policymakers both domestically and internationally. Electric vehicles primarily run on batteries (or fuel cells) and do not use fossil fuels such as gasoline, resulting in fuel savings. They

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do not emit exhaust gases into the environment, helping to reduce air pollution, and they operate quietly, contributing to noise pollution reduction. Therefore, in the future, alongside the global trend of developing and using electric vehicles, electric vehicles will be a useful alternative for individual use in Vietnam, provided they are managed and utilized efficiently.

In Vietnam, there has been no in-depth study on consumer behavior regarding the use of electric vehicles in major urban areas, and data and information on the electric vehicle market and consumers in Hanoi are still very limited. Hence, the present study was conducted to evaluate the factors affecting consumers' purchasing behaviors concerning electric vehicles.

## 2. THEORETICAL BACKGROUND AND RESEARCH MODEL

### 2.1. Theoretical Foundation

#### *2.1.1. Consumer Behavior Model*

Marketers need to thoroughly study customers by asking questions such as what products customers need, where they buy, when they need to buy, why they need to buy, who needs certain products, and finally, how they make the purchase.

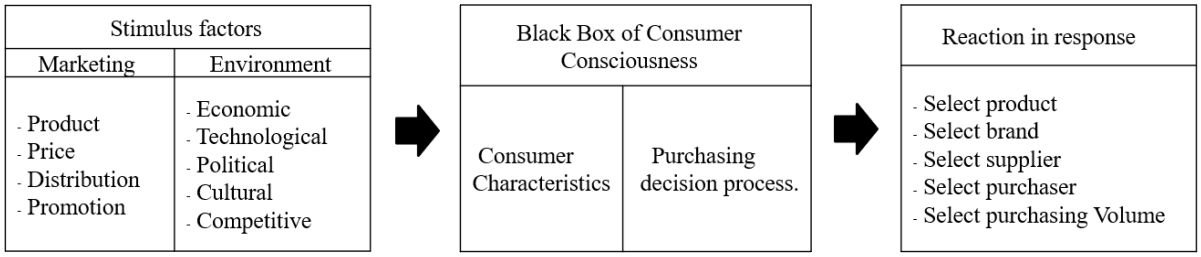


Fig. 1. Consumer Behavior Model

The stimulating factors include two main groups: marketing factors (product, price, distribution, promotion) and environmental factors (economic, technological, political, cultural, competitive), which lead to the "Black Box of Consumer Consciousness - a series of observable and measurable reactions occur. Therefore, it is essential to understand what lies inside the black box of consumer consciousness, and several aspects of this black box need to be examined.

Firstly, how various characteristics (cultural, social, individual, and psychological) influence consumers must be considered. Secondly, whether consumers go through the five stages of the buying process sequentially or if there are changes in the order of these stages needs to be explored.

The research model of consumer behavior helps managers understand how customers react to the products their businesses offer, including the product's benefits, attractive marketing programs, and channel selection. It ultimately allows them to develop highly effective business and marketing strategies.

#### *2.1.2. Concept of Purchase*

According to [7], the term "behavioral intention" refers to the intention to perform a specific behavior. It is influenced by two factors: attitude, which represents the consumer's attitude towards that behavior, and subjective norms, which are related to the intention of the behavior. "Purchase intention" refers to a consumer's plan that may be executed to buy a product or service. Purchase behavior is often driven by mandatory requirements or needs that arise at a certain point [14]. Another definition [8] states that behavioral intention is influenced by three types of beliefs: behavioral, normative, and control. The author suggests that the stronger the attitude, subjective norm, and perceived control, the stronger the intention to perform the purchase behavior.

In summary, purchase intention is a consumer's pre-determination before deciding to purchase a product or use a service. Transitioning from purchase intention to purchase decision is not straightforward, as numerous impacting factors can influence it.

### *2.1.3. Theory of Planned Behavior (TPB)*

Ajzen (2002) [8] developed the theory of planned behavior (TPB) from the theory of reasoned action by [7]. The TPB posits that behavioral intentions can be predicted with relatively high accuracy from the factors of attitude, subjective norms, and perceived behavioral control [6]. The TPB assumes that an individual's intention, when combined with perceived behavioral control, helps predict behavior more accurately than previous models.

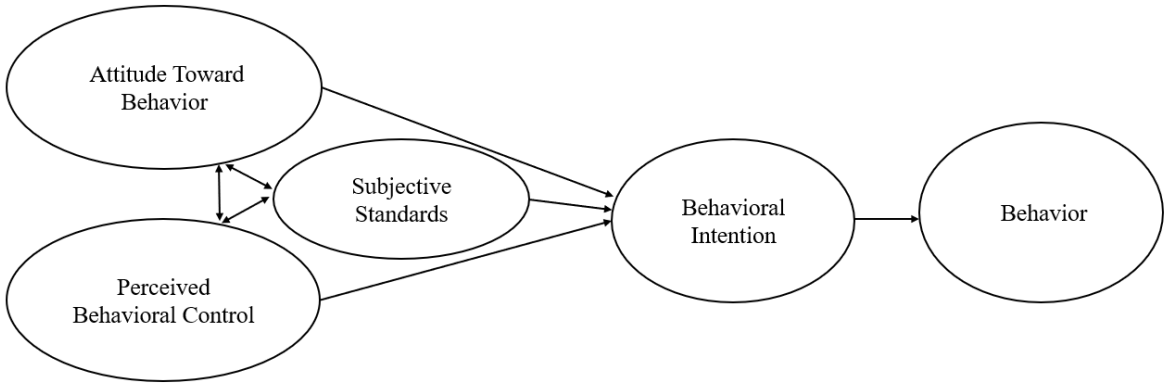


Fig. 2. Theory of Planned Behavior (TPB)

To align the research content with the TPB model, the author's group proposes a research model with five independent variables: perceived usefulness of electric vehicles, attractiveness of conventional vehicles, subjective norms (or social influence), perceived behavioral control, and environmental awareness. The dependent variable in the model is the barrier to the intention of buying an electric vehicle as a means of transportation. These variables are proposed based on previous research and are adjusted to be suitable for the current situation in Vietnam (Fig. 2).

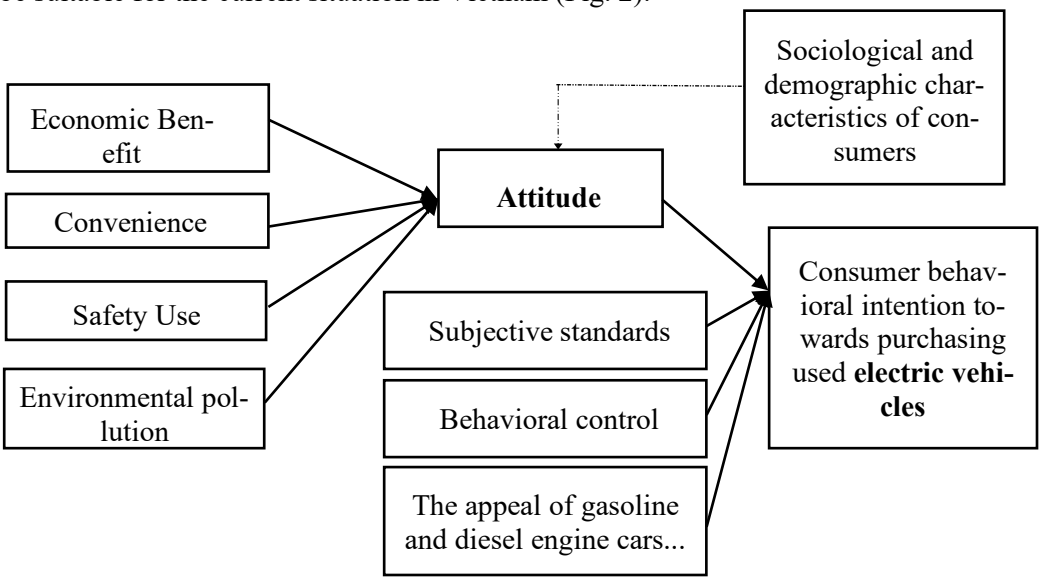


Fig. 3. Model for researching consumer behavior toward electric vehicles

The factors influencing the dependent variable (intention to buy electric vehicles) Y(Sdxđ) are expressed through a linear regression model as follows:

$$Y(Sdxđ) = C1*TĐ1 - C2*TĐ2 + C3*TĐ3 + C4*TĐ4 \quad (1)$$

**With:** *Y(Sdxđ)* : intention to use electric vehicle

*TĐ1, TĐ2, TĐ3, TĐ4,…* : attitude level 1,2,3,4
*C1, C2, C3, C4* : contents level 1,2,3,4

## 3. RESEARCH METHODOLOGY

### 3.1. Qualitative Method (In-Depth Discussions)

Based on the literature, the author's group conducted in-depth discussions to clarify the nature and significance of the research, thereby selecting the theoretical foundation of behavioral intention. They also constructed a research model suitable for the research context in Hanoi's urban areas. With the results obtained from theoretical research and in-depth discussions, the author's group developed a research model and a planned questionnaire to conduct interviews with approximately 30 managers and vehicle owners (both traditional fuel and electric vehicle users) in September 2023 in Hanoi. All interviewees found that the proposed measurement scales in the research model were entirely appropriate for the Vietnamese context. The author's group synthesized four independent variables and one dependent variable into 27 observable variables, as detailed in Table 1.

Table 1

Questionnaire used to conduct interviews with approximately 30 managers and vehicle owners (both traditional fuel and electric vehicle users) in September 2023 in Hanoi

| | Contents | Reference source | Hypothesis |
|---|---|---|---|
| ***1. Attitude towards using electric vehicles cles (TĐ1)*** | | ***Positive impact (+) on intention to buy electric vehi-*** | |
| ***1.1 Economic Benefit*** | | | |
| $LI_1$ | Investing in electric vehicles saves costs | [6, 16, 17, 12] | *Positive impact (+) on intention to buy electric vehicles ($TĐ_{11}$)* |
| $LI_2$ | Using electric vehicles has low operating costs | [6, 17] | |
| $LI_3$ | Fees and procedures for registering electric vehicles are low-cost and straightforward. | Author suggested | |
| ***1.2 Convenience*** | | | |
| $TT_1$ | Use a convenient vehicle for short travel distances within the city | [9] | *Positive impact (+) on intention to buy electric vehicles ($TĐ_{12}$)* |
| $TT_2$ | Flexible when using | [9] | |
| $TT_3$ | Operating benefits | Author suggested | |
| $TT_4$ | When applying IT and developing features during the operation | Author suggested | |
| $TT_5$ | Battery is easy to charge | [11, 12] | |
| $TT_6$ | Battery is easy to replace | [11] | |
| $TT_7$ | Easy for replacing spare parts | [15] | |
| ***1.3 Safety Use*** | | | |
| $AT_1$ | I think using an electric car is safer than a gasoline engine car | Author suggested | *Positive impact (+) on intention to buy electric vehicles ($TĐ_{13}$)* |

| | | | |
|---|---|---|---|
| $AT_2$ | Using an electric vehicle has many support features to help ensure safety when operating | Author suggested | |
| ***1.4 Friendly to environmentally*** | | | |
| MT1 | Using emission-free electric vehicles will help reduce environmental pollution | [6, 17] | *Positive impact (+) on intention to buy electric vehicles ($TĐ_{14}$)* |
| MT2 | Using electric vehicles helps save energy | [11] | |
| MT3 | Using electric vehicles does not make noise | [3] | |
| ***2. Subjective standards*** | | *Positive impact (+) on intention to buy electric vehicles ($TĐ_2$)* | |
| $CC_1$ | My family and friends advising/encouraging me to use an electric vehicle influenced my choice | [7, 6] | *Positive impact (+) on intention to buy electric vehicles ($TĐ_2$)* |
| $CC_2$ | The advertising policies of businesses and sellers influenced my choice | [2] | |
| $CC_3$ | The company's warranty policy and customer service influence my choice | [2, 15] | |
| $CC_4$ | The business's pricing policy and promotional programs affect my choice | [3] | |
| $CC_5$ | Government support and propaganda policies influenced my choice | Author suggested | |
| ***3. Perceived behavioral control*** | | *Positive impact (+) on intention to buy electric vehicles ($TĐ_4$)* | |
| $KS_1$ | For me, using an electric vehicle is easy | [9, 1] | *Positive impact (+) on intention to buy electric vehicles (TĐ4)* |
| $KS_2$ | Using an electric vehicle is entirely my decision | [9, 1] | |
| $KS_3$ | The use of electric vehicles is a modern and civilized social trend | Author suggested | |
| ***4. The appeal of gasoline engine cars*** | | *Negative impact (-) on intention to buy electric vehicles ($TĐ_5$)* | |
| $XM_1$ | I think using motorbikes is faster than electric cars | [3] | *Negative impact (-) on intention to buy electric vehicles (TĐ5)* |
| $XM_2$ | A motorbike has a more robust engine than an electric car | [3] | |
| $XM_3$ | Using gasoline vehicles is more convenient for repair and maintenance support services | Author suggested | |
| $XM_4$ | Using a motorbike to refuel gasoline is more convenient than an electric car | [12] | |
| $XM_5$ | Using a motorbike can travel farther than an electric car | [12] | |
| ***5. Behavioral intentions*** | | | |
| $DĐ_1$ | I will use the electric scooter regularly every day | [11, 1] | Demonstrates intention to purchase used electric vehicles |
| $DĐ_2$ | I will use electric vehicles in the future | [9, 1] | |
| $DĐ_3$ | I would advise friends/family to use electric vehicles | [9, 1] | |

The research team developed hypotheses related to their research model's independent and dependent variables. The hypotheses are summarized below:

**Hypothesis 1:** Perceived benefits of electric vehicles positively impact the intention to purchase electric cars among urban residents in Hanoi. This means that when urban residents in Hanoi clearly understand the benefits of using electric vehicles, they are more likely to consider purchasing them.

**Hypothesis 2:** The attractiveness of traditional vehicles harms the intention to purchase electric cars among urban residents in Hanoi. This implies that as the attractiveness of conventional vehicles increases, the intention to purchase electric cars decreases.

**Hypothesis 3:** Subjective norms positively impact the intention to purchase electric cars among urban residents in Hanoi. This hypothesis refers to the influence of social factors and personal standards on the intention to purchase electric vehicles.

**Hypothesis 4:** Perceived behavioral control positively impacts the intention to purchase electric cars among urban residents in Hanoi. This relates to the level of consumer confidence in controlling the behavior of purchasing electric vehicles.

Of note, **Hypothesis 2** states that the attractiveness of traditional vehicles has a negative impact, indicating that as the appeal of traditional vehicles increases, the intention to purchase electric cars decreases. The other hypotheses all indicate a positive impact, meaning that when these factors increase, the intention to purchase electric vehicles also increases.

### 3.2. Quantitative Method

After constructing the research model and observation variables, the quantitative research was conducted as follows:

**Step 1 (Pilot survey):** The research team conducted a pilot survey to perform a final check on issues related to questionnaire content, response format, terminology usage, and question sequence in the survey. The sample for this pilot survey consisted of 20 experts, managers, and owners of traditional fuel vehicles in Hanoi, representing diverse backgrounds. After receiving the completed questionnaires, the research team examined the appropriateness of the survey.

**Step 2 (Adjusting the survey questionnaire and conducting the official survey using a random sampling method):** The author's team conducted an official survey of 360 samples in Hanoi's 12 inner districts (including Ba Dinh, Bac Tu Liem, Cau Giay, Dong Da, Hai Ba Trung, Hoan Kiem, Ha Dong, Hoang Mai, Long Bien, Nam Tu Liem, Tay Ho, and Thanh Xuan) from September 15 to 30, 2023. The specific sample structure is as follows:

Table 2

Official Survey Results

| Contents | Đơn vị | Giá trị |
|---|---|---|
| ***Gender*** | % | 100.0 |
| - Male | % | 72.2 |
| - Female | % | 27.8 |
| ***Occupation*** | % | 100.0 |
| - Freelancer | % | 41.7 |
| - Public Servant | % | 34.7 |
| - Student | % | 8.3 |
| - Retired | % | 6.9 |
| - Contracted Employee (company, ...) | % | 8.3 |
| ***Age*** | % | 100.0 |

| | | |
|---|---|---|
| - 16 to 22 | % | 9.7 |
| - 23 to 29 | % | 20.8 |
| - 30 to 39 | % | 18.1 |
| - 40 to 49 | % | 34.7 |
| - > 50 | % | 16.7 |
| ***Purpose of vehicle usage*** | | 100.0 |
| - To company | % | 29.2 |
| - Go to school | % | 34.7 |
| - Working (drivers, shippers, ...) | % | 26.4 |
| - Personal (go shopping, hanging around, ...) | % | 9.7 |
| ***Occupation of the respondents*** | | |
| - < 5 km | % | 30 |
| - 5 to < 10 km | % | 42.5 |
| - 10 to < 15 km | % | 14.5 |
| - 15 to < 20 km | % | 7.8 |
| - > 20 km | % | 5.2 |

The survey sample appears well-suited to capture the perspectives of individuals who currently use electric vehicles and traditional fuel vehicles in urban Hanoi. (Refer to Figs. 4a-4d for graphical representations of the sample structure.)

## 4. ANALYSIS RESULTS

The results of the assessment of factors affecting the intention to buy electric vehicles among urban residents of Hanoi are shown in Table 3.

Table 3

Results of factors affecting the intention to buy electric vehicles among urban residents of Hanoi

| Varieties | Variety name | Number of observations | | Average value | Standard deviation | Minimum value | Maximum value |
|---|---|---|---|---|---|---|---|
| | | Sample | Failure | | | | |
| TĐ1+ | Awareness of the benefits of using electric vehicles positively impacts the intention to buy electric vehicles | | | | | | |
| LI1 | Investing in electric vehicles saves costs | 360 | 0 | 3.91 | 0.712 | 1 | 5 |
| LI2 | Using electric vehicles has low operating costs | 360 | 0 | 3.44 | 0.812 | 1 | 5 |
| LI3 | Costs and procedures for registering electric vehicles are low and simple | 360 | 0 | 4.03 | 0.755 | 1 | 5 |
| TT1 | Use a convenient vehicle for short travel distances within the city | 360 | 0 | 3.61 | 0.505 | 1 | 5 |
| TT2 | Use a mobile and flexible vehicle | 360 | 0 | 3.11 | 0.810 | 1 | 5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TT3 | Use has many convenient utilities when operating | 360 | 0 | 3.35 | 0.700 | 2 | 5 |
| TT4 | Using electric vehicles is convenient when applying IT and developing features during the operation | 360 | 0 | 3.19 | 0.507 | 1 | 5 |
| TT5 | Charging electric vehicles is easy | 360 | 0 | 2.97 | 0.505 | 1 | 5 |
| TT6 | Replacing the battery of electric vehicles is very easy | 360 | 0 | 3.32 | 0.810 | 1 | 5 |
| TT7 | Replacing spare parts for electric vehicles is very simple | 360 | 0 | 2.84 | 0.700 | 1 | 5 |
| AT1 | I think using an electric car is safer than a gasoline engine car | 360 | 0 | 3.57 | 0.510 | 1 | 5 |
| AT2 | Using an electric vehicle has many support features to help ensure safety when operating | 360 | 0 | 3.85 | 0.475 | 1 | 5 |
| MT1 | Using emission-free electric vehicles will help reduce environmental pollution | 360 | 0 | 4.13 | 0.797 | 2 | 5 |
| MT2 | Using electric vehicles helps save energy | 360 | 0 | 4.13 | 0.690 | 1 | 5 |
| MT3 | Using electric vehicles does not make noise | 360 | 0 | 3.10 | 0.720 | 2 | 5 |
| TĐ2- | The attractiveness of vehicles using traditional fuel harms the intention to purchase electric vehicles | | | | | | |
| XM1 | Use motorbikes at higher speeds than electric vehicles | 360 | 0 | 3.28 | 0.720 | 2 | 5 |
| XM2 | Use a motorbike with a stronger engine than an electric vehicle | 360 | 0 | 3.39 | 0.715 | 1 | 5 |
| XM3 | Using gasoline vehicles is more convenient for repair and maintenance support services | 360 | 0 | 3.53 | 0.801 | 1 | 5 |
| XM4 | Using a motorbike to refuel with gasoline is more convenient than an electric vehicle | 360 | 0 | 4.07 | 0.825 | 2 | 5 |
| XM5 | Using a motorbike can travel farther than an electric vehicle | 360 | 0 | 3.88 | 0.425 | 2 | 5 |
| TĐ3+ | Subjective norms have a positive impact on the intention to buy electric vehicles | | | | | | |
| KS1 | For me, using an electric vehicle is easy and convenient | 360 | 0 | 3.35 | 0.840 | 2 | 5 |
| KS2 | Using an electric vehicle is entirely my decision | 360 | 0 | 3.63 | 0.785 | 2 | 5 |
| KS3 | Using electric vehicles is a trend in modern social development | 360 | 0 | 3.68 | 0.710 | 2 | 5 |
| TĐ4+ | Perceived behavioral control positively affects the intention to buy an electric vehicle | | | | | | |
| CC1 | My family and friends advising/encouraging me to use an electric vehicle influenced my choice | 360 | 0 | 3.42 | 0.615 | 2 | 5 |
| CC2 | The advertising policies of businesses and sellers influenced my choice | 360 | 0 | 3.18 | 0.655 | 1 | 5 |
| CC3 | The company's warranty policy and | 360 | 0 | 2.77 | 0.715 | 1 | 5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | customer service affected the choice | | | | | | |
| CC4 | The business's pricing policy and promotional programs affected my choice | 360 | 0 | 3.67 | 0.625 | 2 | 5 |
| CC5 | Government support and propaganda policies influenced my choice | 360 | 0 | 3.47 | 0.705 | 1 | 5 |

The evaluation results indicate that the standard deviations of the surveyed variables are not large, as they are all less than 1. This means that the evaluations of the Hanoi residents are relatively consistent.

The survey results from the Hanoi residents' evaluations of their intentions to purchase electric vehicles include 27 surveyed variables. Seven variables received relatively good ratings (above 4 points). The survey results show that four independent variables influence the intention to purchase and use electric vehicles among Hanoi residents.

**Variable TĐ1+:** The usefulness of using electric vehicles has a positive impact on the intention to purchase electric vehicles.

The related findings are presented in Fig. 4a.

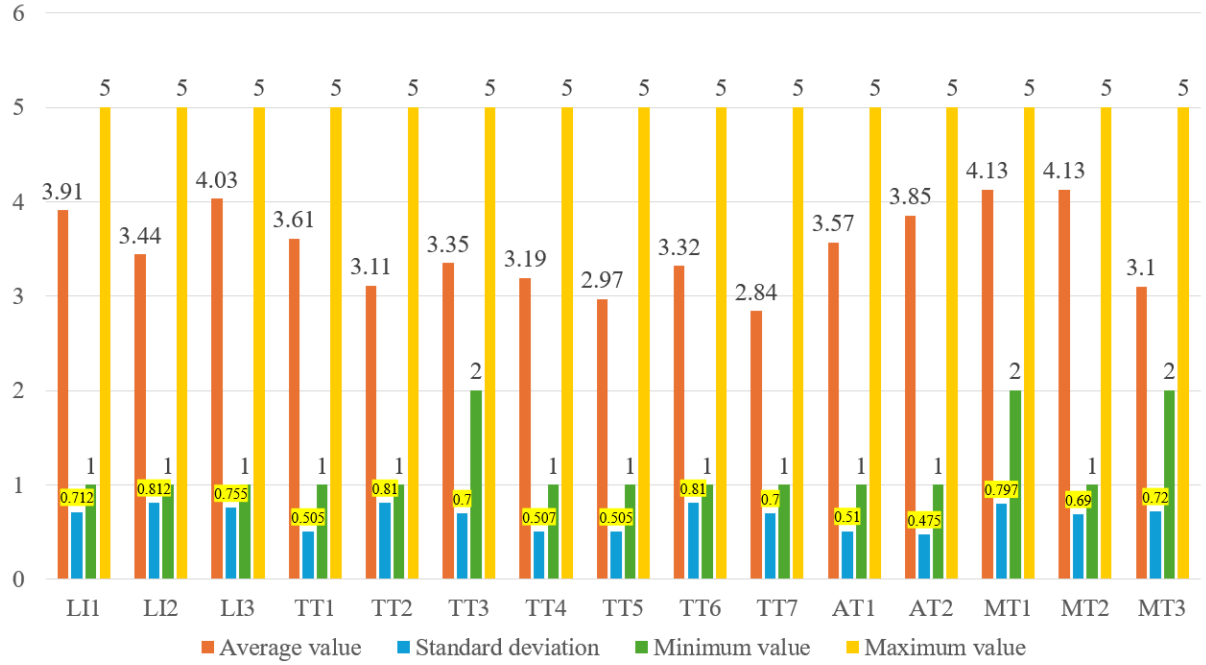


Fig. 4a. Awareness of the benefits of purchasing an electric vehicle

**Variable TĐ$_2$-:** The attractiveness of vehicles using traditional fuel harms the intention to buy electric vehicles. Specifically, these factors harm the levels presented in Fig. 4b.

This factor suggests that the ability of motorcycles to travel longer distances compared to electric cars may reduce the intention to purchase electric vehicles. Buyers may feel that motorcycles are more suitable for long journeys. In summary, these factors adversely affect the intention to purchase electric cars, indicating that aspects such as motorcycles' performance, powerful engines, convenience in repair and maintenance, refueling capability, and long-distance travel ability may make consumers skeptical about switching to electric cars.

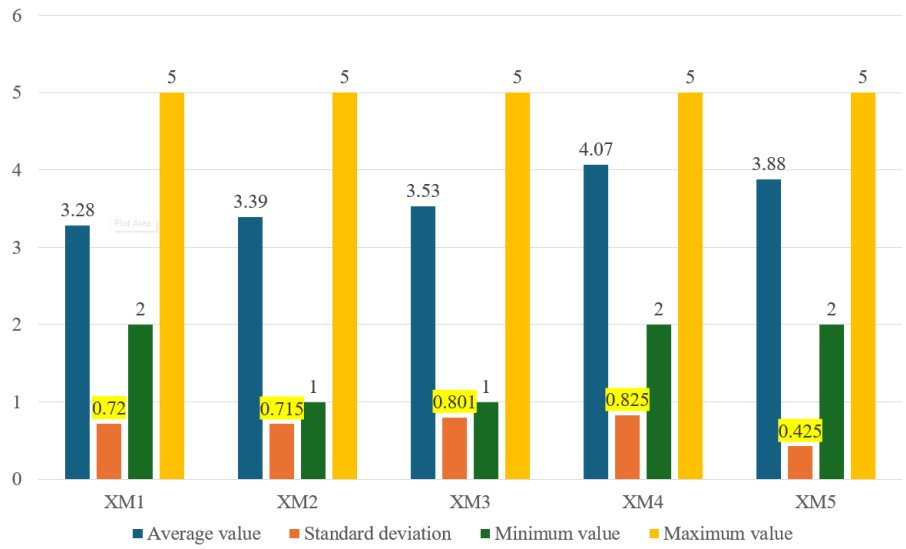


Fig. 4b. The attractiveness of vehicles using traditional fuel harms the intention to purchase electric vehicles

**Variable TĐ3+:** Subjective norms positively impact the intention to purchase electric cars with specific factors and degrees (Fig. 4c).

Based on the results, subjective norms positively influence the intention to purchase electric cars. Using electric cars is seen as aligning with the development trends of modern society. This alignment with societal trends positively influences the intention to purchase electric vehicles, as it may be perceived as a forward-looking and socially responsible choice.

In summary, these factors indicate that subjective norms, such as the perceived ease of use, personal control over the decision, and alignment with societal trends, positively impact the intention to purchase electric cars. These factors make electric vehicles more appealing to consumers who value convenience, personal choice, and staying up-to-date with modern trends.

**Variable TD4+:** Perceived behavioral control positively impacts the intention to purchase electric cars with specific factors and degrees (Fig. 4d).

Based on the responses, perceived behavioral control positively influences the intention to purchase electric cars. Below is the description of these factors and their respective degrees of positive impact:

The results related to this factor suggest that government support and promotion policies positively impact the individual's choice. Supportive government policies can incentivize individuals to choose electric cars.

In summary, these factors indicate that perceived behavioral control, including the influence of family and friends, advertising policies, warranty/customer service policies, pricing policies, and government support, positively impact the intention to purchase electric cars. These factors suggest that external factors and policies significantly shape consumers' choices regarding electric cars.

The survey results reveal that variables related to perceiving the benefits of purchasing electric vehicles, subjective norms, and perceived behavioral control positively correlate with the intention to purchase electric cars among urban residents in Hanoi, Vietnam. However, there are also several significant barriers and challenges to the development of the electric vehicle market in urban Vietnam, as indicated below.

Limitations in long-distance travel: A major obstacle is the limited range of electric vehicles. Currently, most electric cars have restricted mileage, and finding charging stations can be challenging, making them less convenient for long journeys.

Charging time and infrastructure: Electric vehicles often require several hours to charge fully, even at fast-charging stations. This extended charging time can inconvenience users and reduce the overall efficiency of electric vehicle usage. Additionally, the availability of high-capacity charging stations is not widespread.

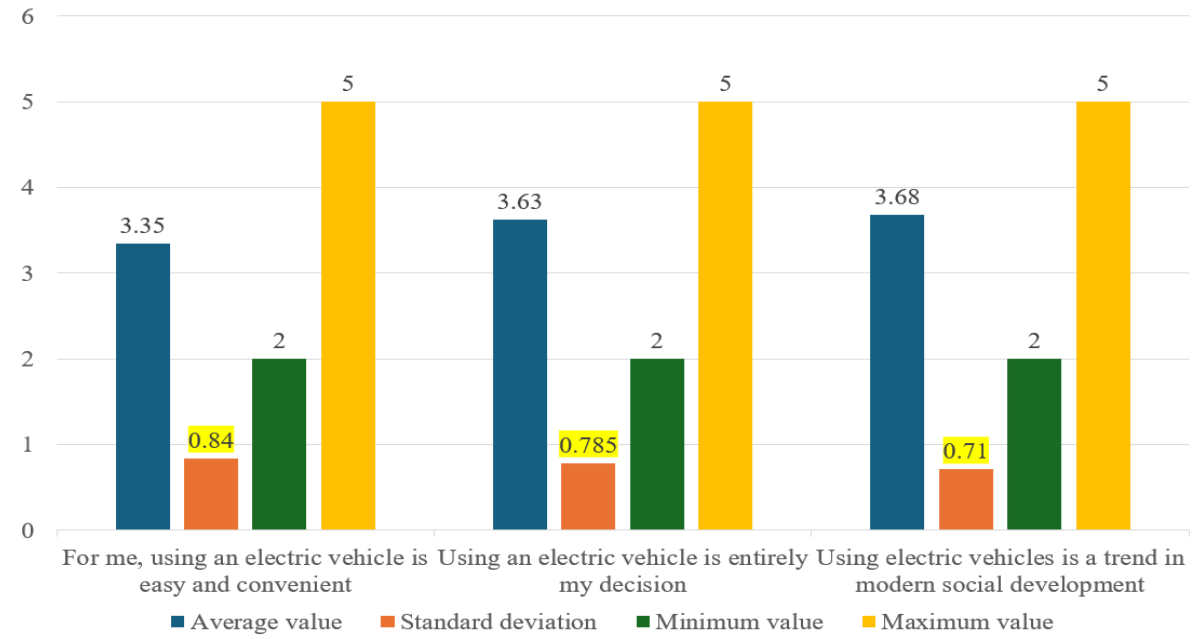


Fig. 4c. Subjective norms have a positive impact on the intention to buy electric vehicles

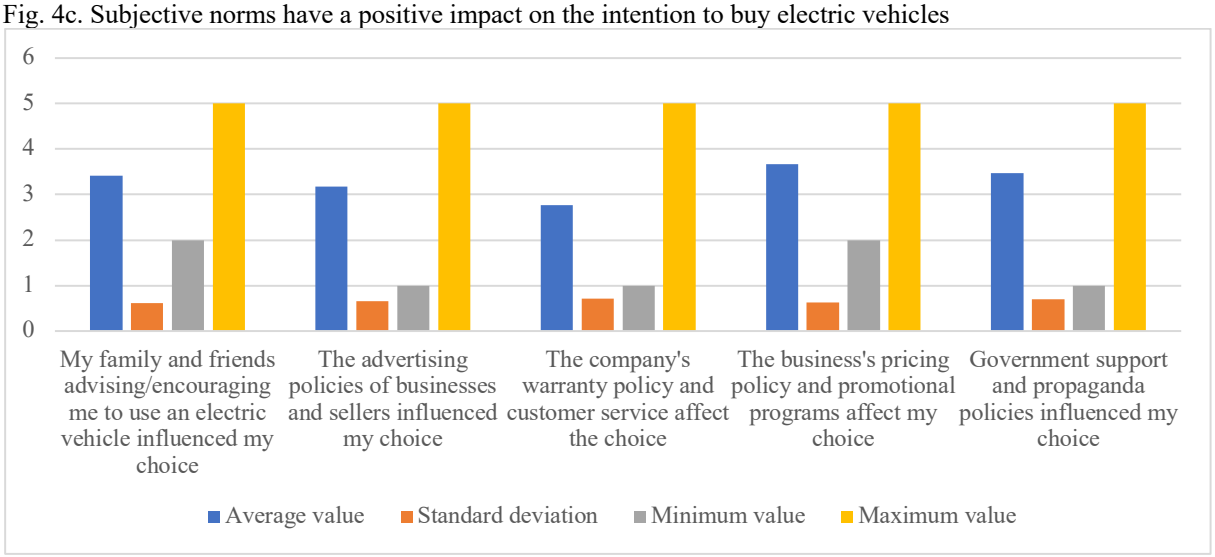


Fig. 4d. Perceived behavioral control has a positive impact on the intention to purchase electric cars, with specific factors and degrees

Battery lifespan: Rapid and frequent charging can significantly reduce the lifespan of electric vehicle batteries, leading to higher maintenance costs in the long run.

Demand for versatile electric vehicles: Vietnamese consumers often expect electric cars to be as versatile as traditional gasoline or diesel-powered vehicles, which are capable of handling various use cases, including city commuting and long-distance travel, without requiring long charging stops.

Public transportation and the future of smart mobility: The development of public transportation options such as metros and electric buses may make urban electric car usage less necessary for some residents. In conclusion, the development of the electric vehicle market in urban Vietnam faces various challenges. To address these issues and promote electric vehicle adoption, efforts should be made to improve electric vehicles' range, optimize charging infrastructure, extend vehicles' battery life, and align electric vehicle offerings with consumers' expectations and needs. Additionally, future advancements in public transportation and smart mobility solutions should be considered part of a comprehensive strategy for sustainable urban transport.

## 5. CONCLUSIONS

### 5.1. Conclusion

In this study, 27 observed variables were grouped into four categories that affect the intention to use electric vehicles among urban residents in Hanoi. The survey results show that the urban residents rated 23 of the 27 observed variables relatively low, with scores ranging from 3.05 to 3.75. Only four of the 27 variables received ratings above 4.00. This indicates that there are still significant barriers to attracting urban residents to purchase electric vehicles.

### 5.2. Recommendations

The following recommendations are suggested to promote the development of electric vehicles in the Vietnamese market overall and in Hanoi in particular. Establish a clear development roadmap: A clear vision and goal-driven roadmap for the development of electric vehicles should be developed. This roadmap should outline the steps and targets for electric vehicle adoption, production, ownership, and usage. Provide financial incentives: Financial incentives should be offered to encourage electric vehicle production, ownership, and usage. These incentives can include tax breaks, subsidies, and other economic benefits for electric vehicle buyers and manufacturers.

Promote charging infrastructure: Policies and initiatives should be implemented to promote the development of charging infrastructure, including fast charging and battery-swapping stations. Ensuring convenient access to charging facilities is essential to alleviate range anxiety. Standardize regulations: Comprehensive standards and regulations related to electric vehicles should be developed, including safety standards, technical specifications, and emissions standards. Standardization will help ensure the quality and safety of electric cars.

Mandate fuel efficiency standards: Mandatory fuel efficiency standards for automobiles and motorcycles should be implemented to encourage the adoption of electric vehicles. These standards should promote the use of electric or green energy sources.

In the short term (2022–2030), attention should be given to boosting the production, assembly, import, and conversion of electric vehicles for road transport and promoting E5 gasoline for road vehicles. Additionally, efforts should be made to develop charging infrastructure to meet the needs of residents and businesses. Encouraging the construction of new and existing bus stops and terminals to meet green criteria is also essential. By 2040, gradual limitations should be imposed on the production, assembly, and import of fossil fuel-powered automobiles, motorcycles, and motorbikes for domestic use, with the eventual aim of ceasing production.

By 2050, 100% of road transport vehicles, including motorcycles, will operate on electricity or green energy sources. All bus stops and terminals should meet green criteria, and all machinery and equipment for loading and unloading should shift from fossil fuels to electricity and green energy sources.

In addition to promoting the development of the electric vehicle market, the government should closely manage the disposal of used batteries to ensure that electric vehicles truly become an environmentally friendly choice. Recovering and recycling used batteries from electric cars can help reduce the burden on landfills and provide a stable supply of critical materials, supporting a sustainable electric vehicle industry. In summary, Vietnam needs clear, comprehensive policies and legal frameworks to develop the electric vehicle sector, which will provide long-term stability for substantial future investments.

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