

Factors Affecting Students' Intention to Use Green Vehicles in Hanoi City: The Role of Regulation from the State's Support Policies

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Abstract

The wave of traffic greening is becoming a new phenomenon, attracting the attention of a large number of the public. Currently, there are many domestic and foreign researchers who have chosen green transportation or green vehicles as research topics, including many research works pointing out factors affecting the intention to use green vehicles. In Vietnam, although there have been research works related to green vehicles, the number of studies is still limited, not meeting the needs of society. This study was conducted within the scope of students in Hanoi city to point out the factors influencing the intention to use green vehicles, thereby evaluating the role of regulation from the State's policies. The results of the study indicate that there are 7 factors that affect students' intention to use green vehicles, including: infrastructure, price, social environment, awareness, attitude, knowledge and personal finance. The research results are used as a basis for proposing a number of solutions to improve students' intention to use green vehicles in Hanoi city.

Keywords: *Green Vehicles, Green Transportation, Policy, State*

1. Introduction

Currently, the trend of greening traffic is becoming a top concern when the living environment shows many signs of destruction and is difficult to recover due to the industrialization and modernization of the economy. Many other countries in the region and around the world, especially Vietnam, are facing challenges related to environmental pollution. The health of the people of the capital is under threat as Hanoi continuously tops the ranking of the most polluted cities in the world with a record high fine dust index. This phenomenon also takes place in many other provinces and cities across the country. The problem of pollution is at a level that is harmful to human health, leading to the emergence of a trend to find and use greener, cleaner and more environmentally friendly energy sources. In which, green vehicles are mentioned as a bookmark, a way to solve many potential problems for environmental pollution. The trend of using electric or green vehicles is being strongly promoted. The widespread participation of electric buses, e-bikes, or public bicycle-sharing stations has had a positive impact on the environment. The convenience and variety of electric vehicles also make people comfortable when choosing the right type of vehicle to participate in traffic. Understanding the importance of the trend of greening traffic to the natural environment and the existence of humanity, researching the factors affecting the intention to use green vehicles is extremely necessary and urgent.

2. Theoretical Basis And Research Model

The study of factors affecting the intention to use sustainable transportation of the Marketing student group [1] pointed out six factors that affect the intention to use sustainable transportation, including: Perception of ease of use, altruistic value, the value of life, the value of ego, and the joy of doing good deeds.

Research on the consumption behavior of electric motorcycles in the green consumption trend of people in Ho Chi Minh City [2] has given factors such as: Pollution reduction effectiveness, perceived quality, level of attention to cost, influence of communication on the system, factors affecting the decision to use electric vehicles of people in Ho Chi Minh City.

The study by Elena Higuera-Castillo et al. [3] has identified factors that influence the decision to use green vehicles when participating in traffic. The study examined the influence of environmental concerns, financial motivations, scope of worries, charging infrastructure, and demographic factors that influence the decision to use green vehicles by surveying 378 students from India and 265 students from Japan.

Research by Kristen Vitolo et al. [4] shows that reducing the price of electric vehicles is one of the important factors for Gen Z high school students to choose electric vehicles as their favorite vehicle.

Jihyeok Jung's research [5] has proposed factors that influence consumers' decisions to use green vehicles in South Korea. The study was conducted through a survey of 1251 people in South Korea. The experimental results of the study show that influencing factors such as awareness of environmental issues, prices and easy conversion of vehicles all have a positive influence on the decision of Korean people to choose electric vehicles instead of traditional gasoline-powered vehicles. From the results of the study, the authors propose a number of measures to encourage consumers to choose green vehicles such as propaganda and proposing supporting policies from the Korean government.

Matjza Knez's research [6] has shown factors that influence decisions to transition from conventional vehicles to lower-emission vehicles such as electric vehicles, also known as green vehicles. The study was conducted through a survey of 700 consumers living in Scotland. Research shows that the decision to use green vehicles is influenced by personal finances, awareness of technology, design of vehicles, and awareness of environmental pollution. In addition, the research work of Trin Thananusak et al. [7] has proven that factors such as personal awareness of environmental pollution, product features, and personal finance have a decisive influence on the transformation and use of green vehicles in the circulation of Thai people.

Thus, it can be seen that researchers have devoted a lot of effort in research and pointed out factors that affect the intention to use green vehicles for people, especially for students and with state regulation. Based on those studies, the author hypothesizes about the factors influencing students' intention to use green vehicles, the regulatory role of state support policies through the following factors:

Q1: Infrastructure has a positive influence on students' intentions to use green vehicles.

H2: Price has the same effect on students' intention to use green vehicles.

Q3: The social environment has a positive influence on students' intention to use green vehicles.

H4: Perception has a positive effect on students' intention to use green vehicles.

Q5: Attitudes have a positive effect on students' intentions to use green vehicles.

Q6: Knowledge has a positive effect on students' use of green vehicles.

Q7: Personal finance has the same effect on the intention to use green vehicles.

3. Research Methodology

3.1. Research model

From previous research hypotheses, the author The research model is proposed as follows:

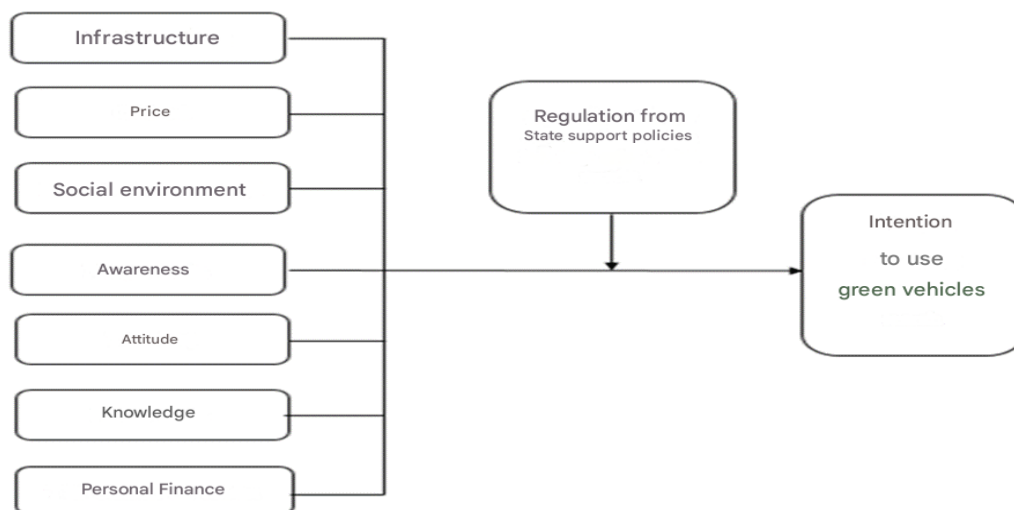


Figure 1. Research model

The research model includes factors that influence the decision to use green vehicles through the State's policy. Specifically, the infrastructure factor (CS) is measured through 4 observed variables, the price factor (GC) is measured through 3 observed variables, the environmental factor (social) is measured through 4 observed variables, the cognitive factor (NT) is measured through 3 observed variables, the attitude factor (TD) is measured through 4 observed variables, the knowledge factor (KT) is measured through 3 observed variables, the financial factor (TC) is measured through 4 observed variables, and the use intention factor (YD) is measured through 3 observed variables.

3.2. Descriptive statistics of research data

The study was conducted based on a research sample of 300 surveys in Hanoi city. An overview of the study sample is shown in Table 1.

Table 1: Information on research data

	Character	Amount	Rate (%)
Schools enrolled	Hanoi University of Industry	110	36,7
	University of Commerce	58	19,3
	National Economics University	71	23,7
	University of Transport	42	14
	Different	19	6,3
Gender	South	131	43,7
	Female	169	56,3
Year Student	Year 1	22	7,3
	Year 2	64	21,3
	Year 3	84	28
	Year 4	130	43,3
Means of use	Walk	24	8
	Bicycle	25	8,3
	Motorcycles	194	64,7
	Automobile	9	3
	Bus	48	16
1-month income management (Phone: VND)	Less than 1,000,000	41	13,7
	1.000.000 - 3.000.000	123	41,0
	3.000.000 - 5.000.000	87	29,0
	Over 5,000,000	49	16,3
Travel expenses for 1 month	Less than 100,000	55	18,3
	100.000 - 500.000	199	66,7

(Phone: VND)	500.000 - 1.000.000	39	12,7
	Over 1,000,000	7	2,3
Sum		300	100%

(Source: Author's compilation)

The study sample is carried out by the author in a convenient way. However, the diversity of research samples was carried out at different universities in Hanoi and still ensured the representativeness of the research sample.

The selected respondents are students in Hanoi's universities. Each university is sent up to 4-5 people. The final result was 362 votes, the number of valid votes was 300 votes.

3.3. Data Processing Methods

In the study, the author mainly uses qualitative and quantitative methods. Qualitative methods are used to develop research hypotheses, research models, and scales in the research model. Quantitative methods are used to: Cronbach's Alpha reliability test evaluates the reliability of the scale and the observed variables in each scale; measure the appropriateness of the data for factor analysis (EFA) to identify factors that represent the observed variables of the scales in the model; analysis of extraction variance to identify factors to be retained and evaluate the explanation of factors; Results of regression correlation analysis to measure the suitability of the research model and to test the research hypotheses that have been developed.

4. Research Results

4.1. Testing the reliability of the scale

To test the reliability of the scale of variables in the research model, the author used Cronbach's Alpha coefficient and the total variable correlation coefficient. The results of the reliability analysis of the scale showed that the above variables had a Cronbach's Alpha coefficient greater than 0.6, and the total variable correlation coefficient of the scales in the research model was greater than 0.3 (table 2). Therefore, the scales ensure the reliability of conducting EFA analysis.

Table 2: Reliability of the scale

Variable	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Infrastructure (CS): 0.804 Infrastructure		
CS1	0.608	0.764
CS2	0.571	0.779
CS3	0.655	0.738
CS4	0.656	0.737
Price (GC): 0.772		
GC1	0.624	0.676
GC2	0.621	0.676
GC3	0.577	0.727
Social Environment: 0.790		
XH1	0.364	0.859

XH2	0.714	0.680
XH3	0.679	0.697
XH4	0.682	0.696
Perception (NT): 0.841		
NT1	0.723	0.762
NT2	0.710	0.775
NT3	0.684	0.799
Attitude (TD): 0.732		
TD1	0.527	0.670
TD2	0.608	0.622
TD3	0.437	0.720
TD4	0.524	0.672
Knowledge (KT): 0.829		
KT1	0.711	0.740
KT2	0.681	0.773
KT3	0.676	0.778
Personal finance (TC): 0.764		
TC1	0.588	0.695
TC2	0.628	0.672
TC3	0.587	0.696
TC4	0.456	0.763
Intended Use (YD): 0.806		
YD1	0.633	0.756
YD2	0.641	0.746
YD3	0.686	0.701

(Source: Author's survey results)

The KMO coefficient = $1 > 0.742 > 0.5$, indicating that the discovery factor analysis is consistent with the data. The Bartlett test has a sig value of 0.000 which is less than the significance level of 1%, so the observed variables are correlated with the representative factor.

The results of the analysis of the EFA discovery factor extracted 7 factors representing 25 observed variables in the scales at Eigenvalues = $2,287 > 1$. In addition, 7 representative factors explained $87,390 > 50\%$ of the volatility of the 25 observed variables on the scale. These results show that all scales included in the model are satisfactory and used for further tests.

4.2. Analysis of the total variance of extraction

Extraction variance analysis aims to identify factors that need to be retained and to assess the explanation of the factors. Besides, affirming that the model is meaningful. Specifically, it is shown in Table 3 below.

Table 3: Total Extraction Variance

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4,523	18,090	18,090	4,523	18,090	18,090	2,712	10,846	10,846
2	2,817	11,267	29,357	2,817	11,267	29,357	2,550	10,198	21,044
3	2,405	9,621	38,979	2,405	9,621	38,979	2,456	9,824	30,869
4	2,192	8,767	47,745	2,192	8,767	47,745	2,344	9,374	40,243
5	1,764	7,056	54,802	1,764	7,056	54,802	2,312	9,246	49,489
6	1,616	6,464	61,266	1,616	6,464	61,266	2,229	8,915	58,404
7	1,400	5,598	66,864	1,400	5,598	66,864	2,115	8,460	66,864
8	0,927	3,709	70,574						
9	0,778	3,113	73,687						
10	0,709	2,834	76,521						
11	0,621	2,486	79,007						
12	0,597	2,389	81,396						
13	0,521	2,085	83,481						
14	0,498	1,991	85,471						
15	0,463	1,854	87,325						
16	0,436	1,744	89,069						
17	0,409	1,638	90,707						
18	0,390	1,559	92,266						
19	0,365	1,462	93,728						
20	0,321	1,282	95,010						
21	0,294	1,175	96,184						
22	0,281	1,125	97,310						
23	0,258	1,033	98,343						
24	0,223	0,891	99,234						
25	0,192	0,766	100,000						

(Source: Author's survey results)

The above table shows that the total variance of extraction = 66.864% > 50% is satisfactory, from which it can be confirmed that these 7 potential factors explain that 66.864% of the variation of the data. The Eigenvalues of all factors are high (>1), the 7th factor has the lowest Initial Eigenvalues = 1,400>1.

4.3. Regression Correlation Analysis

Correlation coefficient analysis was conducted for 7 independent variables and 1 dependent variable with a Pearson correlation coefficient and a 2-sided test with a significance level of 0.05. To examine the correlation between variables in the model and to detect multi-community phenomena during regression analysis. First of all, the study conducts a test of the suitability of the model through a correlation matrix between independent variables and dependent variables. Based on the correlation coefficient, we have a regression model shown in Table 4 as follows:

Table 4: Correlation between variables

		YD	CS	TD	NT	XH	TC	GC	KT
YD	Pearson Correlation	1	0,234 [*] *	0,358 **	0,232 [*] *	0,430 **	0,388 [*] *	0,381 **	0,392 **
	Sig. (2-tailed)		0,000	0,000	0,000	0,000	0,000	0,000	0,000
	N	300	300	300	300	300	300	300	300
CS	Pearson Correlation	0,234 **	1	-,005	0,090	0,134 *	-,007	0,027	0,081
	Sig. (2-tailed)	0,000		0,938	0,118	0,020	0,911	0,645	0,161
	N	300	300	300	300	300	300	300	300
TD	Pearson Correlation	0,358 **	-,005	1	0,138 [*]	0,163 **	0,346 [*] *	0,151 **	0,330 **
	Sig. (2-tailed)	0,000	0,938		0,016	0,005	0,000	0,009	0,000
	N	300	300	300	300	300	300	300	300
NT	Pearson Correlation	0,232 **	0,090	0,138 *	1	0,076	-,019	0,016	0,146 *
	Sig. (2-tailed)	0,000	0,118	,016		0,191	0,738	0,782	0,012
	N	300	300	300	300	300	300	300	300
XH	Pearson Correlation	0,430 **	0,134 [*]	0,163 **	0,076	1	0,261 [*] *	0,054	0,175 **
	Sig. (2-tailed)	0,000	0,020	0,005	0,191		0,000	0,351	0,002
	N	300	300	300	300	300	300	300	300
TC	Pearson Correlation	0,388 **	-,007	0,346 **	-,019	0,261 **	1	0,251 **	,274 ^{**}
	Sig. (2-tailed)	0,000	0,911	0,000	0,738	0,000		0,000	0,000
	N	300	300	300	300	300	300	300	300
GC	Pearson Correlation	0,381 **	0,027	0,151 **	0,016	,054	0,251 [*] *	1	0,204 **
	Sig. (2-tailed)	0,000	0,645	0,009	0,782	0,351	0,000		0,000
	N	300	300	300	300	300	300	300	300
KT	Pearson Correlation	0,392 **	0,081	0,330 **	0,146 [*]	0,175 **	0,274 [*] *	0,204 **	1
	Sig. (2-tailed)	0,000	0,161	0,000	0,012	0,002	0,000	0,000	
	N	300	300	300	300	300	300	300	300
**. Correlation is significant at the 0.01 level (2-tailed).									
*. Correlation is significant at the 0.05 level (2-tailed).									

(Source: Author's survey results)

From the table above, it can be seen that the Sig. values of the factors CS, TD, NT, XH, TC, GC, KT are all less than 0.05, proving that these factors are all linearly correlated with the YD variable (consciousness of using green means). On the basis of analyzing the linear correlation between variables, we

construct multivariate regression to determine the extent of the explanation of the independent variables on the dependent variable (R squared) and R2 (R Square) shown in Table 5 below:

Table 5: Correlation between variables

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0,689a	0,474	0,462	0,55145	2,131

(Source: Author's survey results)

From the table above, the corrected R2 value = 0.462. This result shows that the independent variables in the model explain 46.2% of the variation of the dependent variable, the remaining 53.8% of the variation of the dependent variable is explained by non-model variables and random errors. The Durbin–Watson value = 2,131, which is greater than 1 and less than 3 does not occur multi-linear between variables. That shows that all research factors have a positive impact on students' intention to use green vehicles in Hanoi.

5. Conclusion And Implications

Research on factors influencing the intention to use green vehicles of students in Hanoi have clearly indicated the role and Mechanism of impact of factors affecting the intention to use green vehicles of students to help managers have specific grounds for making The policy is suitable for all users of green vehicles, especially students. The theoretical and practical contribution of the study has filled theoretical gaps in the relationship between factors that influence the intention to use green vehicles of students in universities in Hanoi. In addition, the results of empirical research show a clear and complete awareness of the role and usefulness of the behavior of using personal vehicles of students in particular and the whole society in general. The study conducted to build a relationship between factors affecting the intention to use green vehicles of students to clearly indicate the direct impact of the State's policies on the community and the university on students in order to further raise the awareness of using green vehicles of all people in society, including students in Hanoi. The results of the study show the role of the State in increasing investment in public transport infrastructure such as bus networks, bicycle paths, and safe stops/parking spots. At the same time, it is necessary to pay more attention to the university's leaders in building and developing infrastructure, synchronizing facilities, and creating a separate space for students to use green vehicles. However, in addition to the achieved results, the study also has certain limitations such as the number of survey samples is still small, only concentrated in Hanoi city. Therefore, future studies should be carried out at scale universities across the country to give experimental results with higher accuracy. However, the findings have contributed significantly to the opening of a new strategy that will help leaders be less expensive and more efficient in synchronizing infrastructure across the country.

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