

Keywords: bus; influencing factors; intention to use buses

Nguyen Hong THAI¹, Thach Minh QUAN^{2*}

FACTORS AFFECTING URBAN PEOPLE'S INTENTION TO USE BUSES IN VIETNAM

Summary. Despite strong development in Vietnam's major cities, buses only contribute to city traffic. Bus services in Vietnamese towns do not yet meet passengers' current needs and are not popular with passengers, especially in terms of time and convenience. This article analyzes the factors affecting urban people's intention to use buses in Vietnam and, on that basis, makes recommendations to the authorities in cities to enhance the attractiveness of bus usage. Twenty-seven factors have been identified as affecting the need to travel by bus. The survey results show that there are still many barriers to attracting passengers using bus services in urban metropolitan areas. Therefore, urban governments in Vietnam need to adjust the current bus route network to suit the needs of the people, especially students, to increase its coverage.

1. INTRODUCTION

In the world, particularly in Vietnam, research on the development of buses in large cities has been carried out for a long time. Most studies have shown that public passenger bus transport is indispensable to modern cities. It plays an important role that cannot be replaced by other forms of public passenger transport.

Despite the strong development in large cities in Vietnam, buses still need to be more effective. In large cities such as Hanoi and Ho Chi Minh City, every year, bus transportation contributes to only about 14% of the city's traffic flow [1]. Frequent bus passengers are mainly students and older people. While the city still has to spend trillions to subsidize bus services every year, urban people do not prefer to use buses. This is because the bus services in Vietnam's urban areas do not yet meet passengers' needs and have not gained favor from passengers, especially regarding time and convenience. The public transport infrastructure for buses does not fully meet passengers' requirements due to lacking land, terminal points, transit points, bus lanes, and, as a result, stops. In many cases, this limits passengers' and buses' accessibility to bus stops reducing the service's operational efficiency and attractiveness.

Moreover, due to urban people's psychological habits and the convenience of using personal vehicles, along with the rapid development of taxis and motorbike taxis, the goal of having buses meet around 16–18% of people's travel needs by 2025 [1] in Hanoi and around 15% of these needs in Ho Chi Minh City [2] is a considerable challenge. By studying the factors affecting the intention of urban people in Hanoi and Ho Chi Minh City to use buses, recommendations can be made to enhance the attractiveness of bus services to meet the needs of socio-economic development in urban areas in Vietnam.

¹ University of Transport and Communications; 03 Cau Giay street, Lang Thuong Ward, Dong Da District, Ha Noi, Vietnam; email: nhthai@utc.edu.vn; orcid.org/0000-0002-3713-2045

² University of Transport and Communications; 03 Cau Giay street, Lang Thuong Ward, Dong Da District, Ha Noi, Vietnam; email: thachquan@utc.edu.vn; orcid.org/0000-0003-1427-4144

* Corresponding author. E-mail: thachquan@utc.edu.vn

2. THEORETICAL BASIS AND RESEARCH MODEL

There have been several studies on the behavioral intentions of individuals. Related theories have been experimentally validated in many parts of the world, such as the theory of planned behavior (TPB) proposed by Ajzen [3] and the theory of reasoned action developed by Fishbein and Co. [4]. These studies help predict and explain individuals' behaviors when performing unusual tasks by using the same research content in the same context. According to the TPB, an individual's behavioral intentions depend on (i) a set of weighted beliefs about a particular behavior (attitude), (ii) the influence of nearby people (subjective), (iii) and the extent to which the individual perceives that they can perform the behavior (perceived behavioral control).

The technology acceptance model (TAM) proposed by Fred David [5] suggests that two beliefs determine an individual's behavioral intentions: perceived usefulness, which is the degree to which an individual believes that a behavior will enhance their performance and perceived ease of use, which is the degree to which an individual believes a behavior can be performed without effort. The model in which combines the TPB and TAM, as proposed by Taylor and Todd [6] and Bhattacharjee [7] (Fig. 1).

According to this model, behavioral intention is influenced by three factors. The first is an individual's attitude towards a behavior (i.e., the degree to which that individual evaluates the behavior as favorable/unfavorable or helpful/unhelpful). Therefore, in this model, the individual's attitude is explained by their perceived usefulness and ease of performing the behavior. The second factor influencing behavioral intention is subjective norms or societal pressures. This factor includes cultural issues and the attitudes of the people involved, especially one's relatives. According to Taylor and Todd [8] and Bhattacharjee [7], the greater one's relatives' expectations, the more attractive a behavior is. The third factor is the individual's ability to maintain control when performing the act. This factor involves the experience or perception of difficulties and obstacles that may occur when acting.

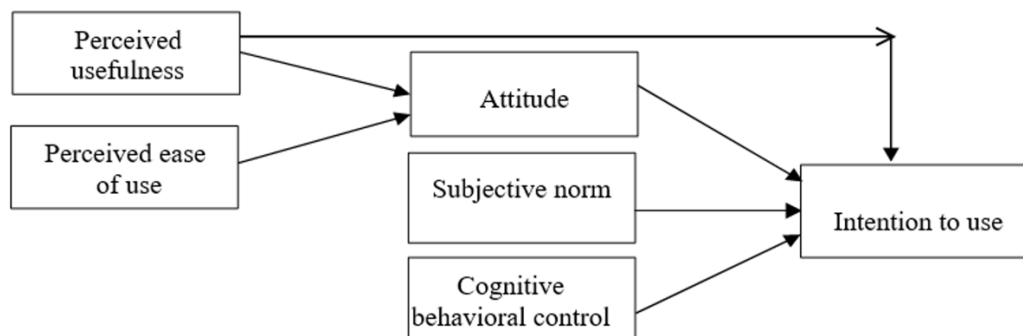


Fig. 1. Model combining the TPB and TAM [4]

In some empirical studies, the "attitude" factor has been omitted because this factor cannot be considered a complete intermediary for assessing the impact of the "perceived usefulness" and "perceived ease of use" factors on the "intent to element behavioral determination," according to Venkatesh [9]. Furthermore, Bagozzi and Warshaw showed that the factors of "perceived usefulness" and "perceived ease of use" directly influence behavioral intention. Many scientists have applied the above theoretical models to experimental research in many countries. For example, [10] conducted research in England, [11] conducted research in Cambodia, and [12] performed a study in Taiwan, in which the "perceived ease of use" factor was renamed by the authors as "perceived ease of participants," according to the research model of factors affecting the use of means of transport introduced by Dang Thi Ngoc Dung [13]. In Hoang Hung and Tran Van Hoa's [4] research "Barriers in intention to using buses as a means of transport to travel by people in Thua Thien Hue province," [14] the authors analyzed, assessed, and measured the impact of barriers affecting people's intention to use buses in Thua Thien Hue province.

For the present research's content to be consistent with the model combining the TPB and TAM, the authors propose a research model with five independent variables—the usefulness of the bus, the attractiveness of private vehicles, subjective norms (or social influences), cognitive behavioral control,

and environmental awareness—and a dependent variable (barriers to the intention to use the bus as a means of transport). The above variables are proposed based on previous studies and are consistent with current practices in Vietnam.

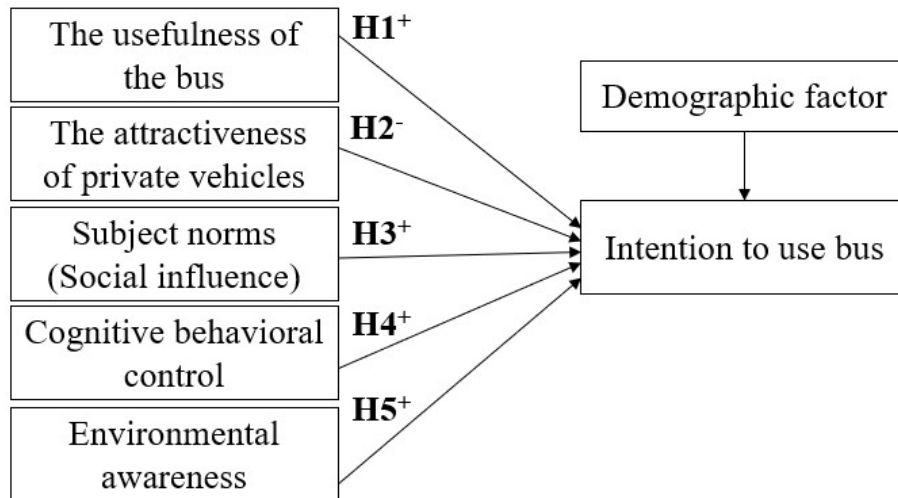


Fig. 2. Research model including factors affecting people's intention to use buses

The factors affecting the dependent variable of “bus usage,” $Y_{(Sdx)}$, are shown through the linear regression model as follows:

$$Y_{(Sdx)} = C_1 * H_1 - C_2 * H_2 + C_3 * H_3 + C_4 * H_4 + C_5 * H_5 \quad (1)$$

3. RESEARCH METHODS

3.1. Qualitative method

In-depth discussions: Based on the collected documents, the authors have carried out many in-depth discussions to clarify the nature and meaning of the research. Thereby selecting the theoretical basis of behavioral intention theory while building a research model suitable for the research context of large cities in Vietnam.

Interview: Based on the results obtained from theoretical research and in-depth discussions, the authors have built a research model and questionnaire for conducting interviews with managers, transportation enterprises, and 20 passengers who used the bus in the survey year (2019) in Hanoi and Ho Chi Minh City. All interviewees believed the scales proposed in the research model were suitable for Vietnam's practical and cultural conditions. Using five independent variables and one dependent variable, the authors derived 27 observed variables, as specified in Table 1.

Table 1 presents the authors' hypotheses based on five independent variables—the usefulness of the bus, the attractiveness of private vehicles, subjective norms, perceived behavioral control, and environmental awareness—as well as other demographic factors. The research model's dependent variable is barriers to the intention to use the bus as a means of transport. Among the six hypotheses proposed, only the hypothesis about the attractiveness of personal vehicles has a negative effect; the remaining five factors are expected to positively affect the intention to use the bus as a means of transportation.

Table 1

Hypotheses proposed in the research model

H1: The usefulness of the bus positively affects the intention to use the bus		Authors
H11. Using the bus is very convenient H12. Using the bus is very safe H13. Using the bus is very comfortable H14. Using the bus is cost-effective compared to other means of transport H15. Using the bus is independent and timesaving	H₁⁺ Positive effect →	Beirao and Cabral [17], Spear B.D. [18], Yavasvi P. et al. [19]; Domencich T.A et al [20]; Ali Ahmed Mohammedi et al. [21]; Wardman M. [22]; White P. et al. [23]; Dargay J. and Hanly M. [24]; Weinstein A. [25]; Nathanail E. [26]
H16. Using the bus is unaffected by the weather H17. Using the bus ensures mental and physical health H18. Using the bus allows one to take advantage of their commuting time (by resting, entertaining themselves, exchanging information, socializing, thinking, etc.)		Recommendations of the author's team
H2: The attractiveness of individual vehicles harms the intention to use the bus		
H21. Using a private vehicle is more convenient than taking the bus H22. Using a private vehicle cost less than taking the bus H23. Using a private vehicle is more comfortable about time than taking a bus	H₂⁻ Negative effect →	Beirao and Cabral [17]; Chen., C.F. and Chao [27]; W.H. [12]; Hoang Hung and Tran Van Hoa [14].
H24. Using a personal vehicle is a daily commuting habit H25. Using a private vehicle increases one's social position and status H26. Using personal vehicles helps one keep their personal property safe H27. Using a private vehicle helps avoid harassment		Recommendations of the author's team
H3: Subjective norms positively affect the intention to use buses		
H31. Using the bus is civilized and polite H32. Using the bus is very easy and convenient H33. Using the bus is up to the individual's discretion H34. Using the bus is a developing trend in modern society	H₃⁺ Positive effect →	Beirao and Cabral [17], Spear B.D. [18], Yavasvi P. et al. [19]; Domencich T.A et al [20]; Ali Ahmed Mohammedi et al. [21]; Wardman M. [22]; White P. et al. [23]; Dargay J. and Hanly M. [24]; Weinstein A. [25]; Nathanail E. [26]

H4: Perceived behavioral control positively affects the intention to use the bus		
H41. Impact of work on bus use H42. Social influence on bus use H43. Effect of government policies on bus use	H₄⁺ Positive effect →	Chen, C.F. & Chao [27]; W.H. [12]; Hoang Hung and Tran Van Hoa [14].
H5: Environmental awareness has a positive impact on the intention to use the bus		
H51. Using the bus reduces environmental pollution H52. Using the bus reduces traffic congestion H53. Using the bus prevents traffic accidents H54. Using the bus reduces the use of personal vehicles	H₅⁺ Positive effect →	Heath, Y. and Gifford, R. [10]; Hoang Hung and Tran Van Hoa [14].
H55. Using the bus reduces costs for society		Recommendations of the author's team
H6: Demographic factors have a significant effect on the intention to use the bus		
Demographic factors include age, gender, education level, income, and marriage	Make a difference →	Dang Thi Ngoc Dung [13]. Hoang Hung and Tran Van Hoa [14].

3.2. Quantitative methods

After the research model was built and the variables to be observed were determined, quantitative research was carried out through the following steps.

Step 1: Preliminary survey. The authors conducted a sample survey as a final check for problems with question content, answer forms, terminology, and the order of questions in the questionnaire. The surveyed subjects were 20 experts, managers, and passengers who had used buses in Hanoi and Ho Chi Minh City. After receiving all the answer sheets, the authors re-checked the appropriateness of the questionnaire.

Step 2: Adjustment of the survey and development of the official survey. Using the random sampling method, the authors surveyed 300 subjects (150 from Hanoi and 150 from Ho Chi Minh City) from September to November 2019. The subjects were local people who used buses. The survey sample is entirely consistent with the current bus use structure in Hanoi and Ho Chi Minh City. The sample structure is presented in Table 2.

4. ANALYSIS RESULTS AND DISCUSSION

The results obtained from people in Hanoi and Ho Chi Minh City regarding the factors affecting their intention to use buses are shown in Table 3.

The results show that the standard deviation of the survey variables is not significant (all values are less than 1), which means that the respondents' assessments are relatively uniform. In the evaluation of the people of Hanoi and Ho Chi Minh City, the intention to use the bus included 27 variables, seven of which were rated from "pretty good" to "good" (out of a maximum of 4 points). The survey results show that the impacts of seven independent variables on the intention to use buses among urban people in Hanoi and Ho Chi Minh City are as follows.

Table 2

Statistics of the study sample

Sample	Frequency (people)	Ratio (%)
1. Gender		
Male	154	44.3 (%)
Female	146	55.7 (%)
2. Age (years)		
16 to 22	104	34.7 (%)
23 to 29	105	35.0 (%)
30 to 39	44	14.7 (%)
40 and above	47	15.6 (%)
3. Income (million VND)		
Less than 5	133	44.3 (%)
5 to 7	73	24.3 (%)
7 to 10	45	15.0 (%)
10 to 15	18	6.0 (%)
15 to 20	14	5.0 (%)
20 to 30	12	4.0 (%)
30 to 40	5	1.4 (%)

Source: Author's compilation

Table 3

Factors affecting urban people's intention to use buses

Observed variable	Analysis variable name	Number of observations		Average value	Standard deviation	Minimum value	Maximum value
		Sample	Error				
H1⁺	The usefulness of the bus positively affects the intention to use the bus.						
H11	Using the bus is very convenient	300	0	3.05	0.803	1	5
H12	Using the bus is very safe	300	0	3.07	0.812	1	5
H13	Using the bus is very comfortable	300	0	3.05	0.755	1	5
H14	Using the bus is cost-effective compared to other means of transport	300	0	4.20	0.505	1	5
H15	Using the bus is independent and timesaving	300	0	3.15	0.810	1	5
H16	Using the bus is unaffected by the weather	300	0	4.02	0.700	2	5
H17	Using the bus ensures mental and physical health	300	0	3.05	0.507	1	5
H18	Using the bus allows one to take advantage of their	300	0	3.15	0.465	1	5

	commuting time (by resting, entertaining themselves, exchanging information, socializing, thinking, etc.)						
H2⁻	The attractiveness of private vehicles harms the intention to use the bus						
H21	Using a private vehicle is more convenient than taking the bus	300	0	4.25	0.720	2	5
H22	Using a private vehicle cost less than taking the bus	300	0	4.12	0.715	1	5
H23	Using a private vehicle is more comfortable about time than taking a bus	300	0	4.65	0.801	1	5
H24	Using a personal vehicle is a daily commuting habit	300	0	4.55	0.825	2	5
H25	Using a private vehicle increases one's social position and status	300	0	4.15	0.350	2	5
H26	Using personal vehicles helps one keep their personal property safe.	300	0	3.67	0.330	2	5
H27	Using a private vehicle helps avoid harassment	300	0	3.75	0.250	2	5
H3⁺	Subjective norms positively affect the intention to use buses.						
H31	Using the bus is civilized and polite	300	0	3.15	0.840	2	5
H32	Using the bus is very easy and convenient	300	0	3.20	0.785	2	5
H33	Using the bus is up to the individual's discretion	300	0	3.40	0.710	2	5
H34	Using the bus is a developing trend in modern society	300	0	3.50	0.790	2	5
H4⁺	Perceived behavioral control positively affects the intention to use the bus.						
H41	Impact of work on bus use	300	0	3.15	0.615	2	5
H42	Social influence on bus use	300	0	3.10	0.655	1	5

H43	Effect of government policies on bus use	300	0	3.35	0.715	1	5
H5⁺	Environmental awareness has a positive effect on the intention to use the bus.						
H51	Using the bus reduces environmental pollution	300	0	3.65	0.797	1	5
H52	Using the bus reduces traffic congestion	300	0	3.36	0.690	1	5
H53	Using the bus prevents traffic accidents	300	0	3.25	0.720	1	5
H54	Using the bus reduces the use of personal vehicles	300	0	3.14	0.802	1	5
H55	Using the bus reduces costs for society	300	0	3.25	0.750	2	5

Source: The author's processing results

Variable H1+: The usefulness of the bus has a positive impact on the intention to use the bus. Specifically, the following factors have positive effects at the following degrees: **H₁₁** Using the bus is very convenient (3.05); **H₁₂** Using the bus is very safe (3.07); **H₁₃** Bus use is very comfortable (3.05); **H₁₄** Using the bus is cost-effective compared to other means of transport (4.20); **H₁₅** Using the bus is independent and timesaving (3.15); **H₁₆** Using the bus is unaffected by the weather (4.02); **H₁₇** Using the bus ensures mental and physical health (3.05); **H₁₈** Using the bus allows one to take advantage of their commuting time (by resting, entertaining themselves (3.15), Fig. 3a.

H2- Variable H2-: The attractiveness of personal vehicles harms the intention to use the bus. Specifically, the following factors harm the intention at the following degrees: **H₂₃** Using a private vehicle is more comfortable about time than taking a bus (4.65); **H₂₄** Using a personal vehicle is a daily commuting habit (4.55); **H₂₅** Using a private vehicle increases one's social position and status (4.15); **H₂₆** Using personal vehicles helps one keep their personal property safe (3.67); **H₂₇** Using private vehicle helps avoid harassment (3.75) (Fig. 3b).

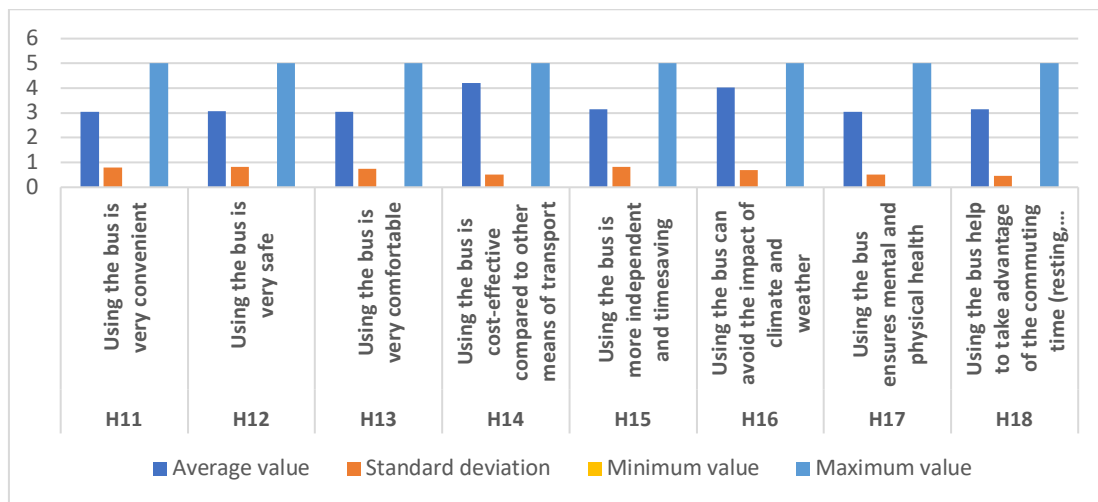


Fig. 3a. The usefulness of the bus positively affects the intention to use the bus

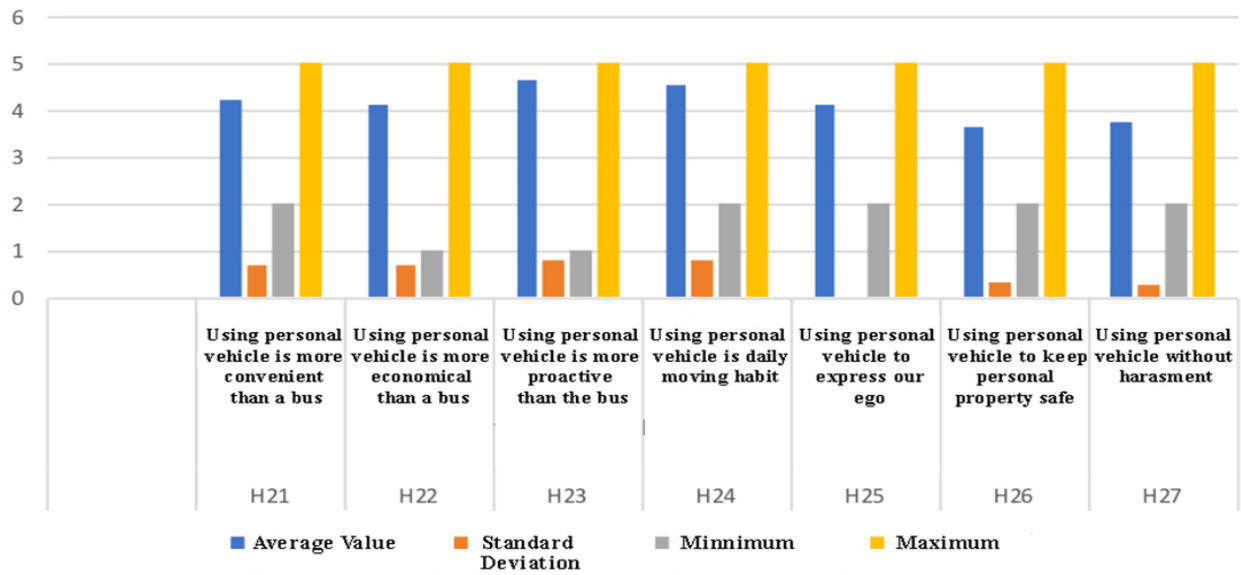


Fig. 3b. The attractiveness of personal vehicles negatively affects the intention to use buses

Variable H3+: Subjective norms positively affect the intention to use the buses. Specifically, the following factors have positive effects at the following degrees: **H₃₁** Using the bus is civilized and polite (3.15); **H₃₂** Using the bus is easy and convenient (3.20); **H₃₃** Using the bus is up to the individual’s discretion (3.40); **H₃₄** Using the bus is a developing trend in modern society (3.50) (Fig. 3c).

Variable H4+: Perceived behavioral control positively affects the intention to use the bus. Specifically, the following factors have positive impacts at the following degrees: **H₄₁** Impact of work on bus use (3.15); **H₄₂** Social influence on bus use (3.10); **H₄₃** Effect of government policies on bus use (3.35).

Variable H5+: Environmental awareness has a positive impact on the intention to use the bus. Specifically, the following factors have positive effects at the following degrees: **H₅₁** Using the bus reduces environmental pollution (3.65); **H₅₂** Using the bus reduces traffic congestion (3.36); **H₅₃** Using the bus prevents traffic accidents (3.25); **H₅₄** Using the bus reduces the use of personal vehicles (3.14); **H₅₅** Using the bus reduces costs for society (3.25) (Fig. 3d).

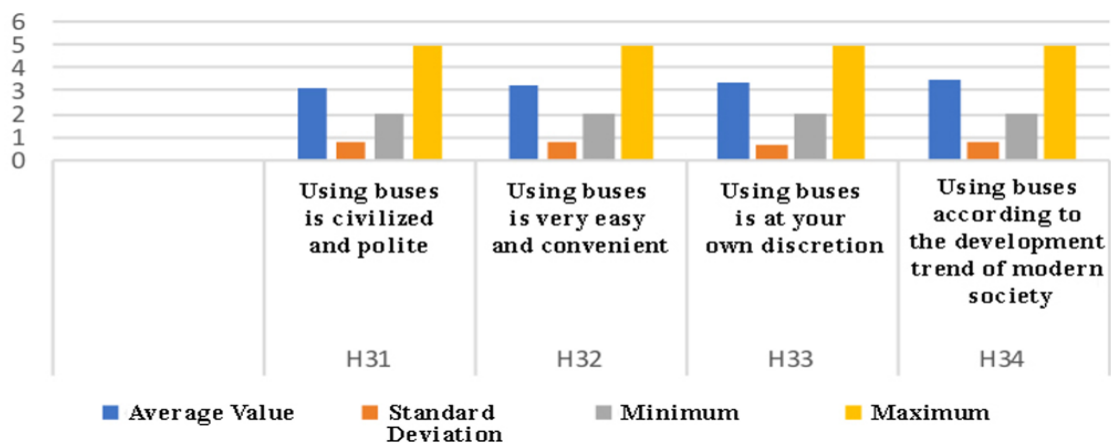


Fig. 3c. Subjective norms positively affect the intention to use buses

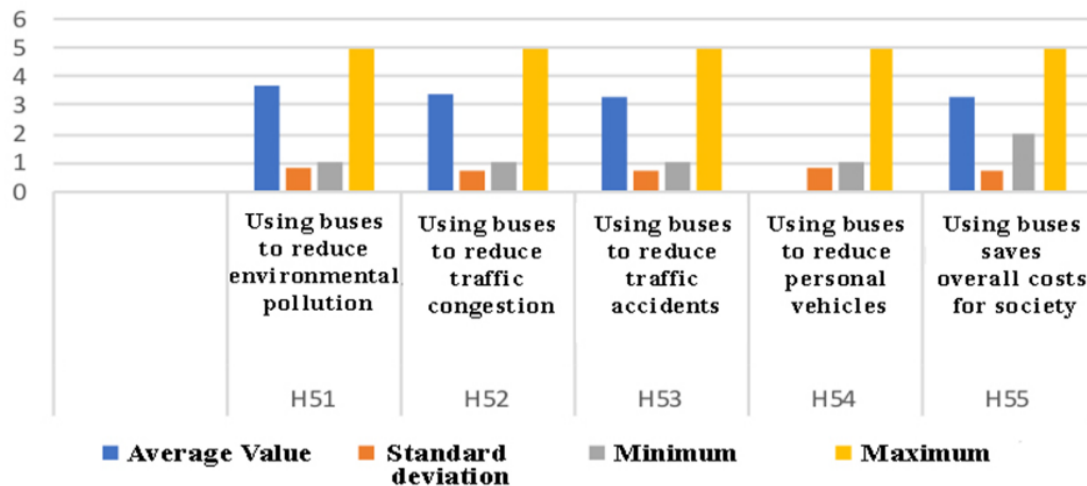


Fig. 3d. Environmental awareness has a positive effect on the intention to use buses

The results of the survey (Table 3) show that using a personal vehicle is more convenient than taking the bus (4.50), using a private vehicle costs less than using buses (4.12), using a private vehicle is more comfortable about time than buses (4.15), using a personal vehicle is a daily commuting habit (4.55), using the bus is cost-effective compared to other means of transport (4.20), using buses is unaffected by the weather (4.02), and using private vehicles increases one's social position and status (4.15). These variables are highly appreciated because people in Hanoi and Ho Chi Minh City often use personal vehicles as their primary mode of transportation. On the other hand, Hanoi and Ho Chi Minh City have high population densities, and congestion occurs often. Moreover, the bus network could be more convenient, and the time cost of using public transportation is relatively high. Therefore, the use of personal vehicles is inevitable. These matters represent considerable barriers to bus use in Hanoi and Ho Chi Minh City.

The remaining 20 out of 27 variables were rated from "average" to "quite good" (i.e., from 3 to 4 points) by people in Hanoi and Ho Chi Minh City. These are enormous barriers affecting people's intention to use the bus, as expressed through the following variables: using the bus is very convenient (3.05), using the bus is very safe (3.07), using the bus is very comfortable (3.05), using the bus is more independent and timesaving (3.15), using the bus is civilized and polite (3.15), and using the bus is very easy and convenient (3.20). Cause Health and Co. [15], Nguyen and Co. [16] find that:

- Currently, the city's public transport infrastructure network has many limitations, such as not meeting development needs, not keeping up with the rapid increase in private vehicles, ineffective current traffic demand management solutions, and a lack of an efficient and integrated public transport system. The previous investment followed a temporary infrastructure solution and a lack of centralized and critical investment.
- According to survey data, up to 74.3% of bus users are students, small traders, and employees working on the route that the bus passes through who think that using the bus is quite suitable. However, the variables of "social influence on bus usage" (3.10) and "the influence of government policies on bus usage" (3.35) have not been highly appreciated because societal influences, as well as government policies on the bus sector, have not yet been effective. The purpose of the bus subsidy is to reduce the density of personal vehicles, traffic congestion, traffic accidents, environmental pollution, etc. However, people's habits are difficult to change because they think using a private vehicle is very convenient and allows flexibility, which is a considerable obstacle.
- In addition, the analysis shows significant differences in people's perceptions and assessments concerning the variables "using the bus is cost-effective compared to other means of transport" (4.20) and "using a private vehicle cost less than taking the bus" (4.25). Thus, it can be understood that if expenses other than bus fares are eliminated, using buses is more economical than using other modes of transportation. However, besides bus fares, there are additional costs such as private vehicle

parking; walking; and waiting for the bus, motorbike taxi, etc. Thus, the bus cannot compete with personal vehicles.

5. CONCLUSIONS

According to the analysis, evaluation, and results on barriers to the intention of people in Hanoi and Ho Chi Minh City to use buses, 27 factors belonging to five groups have been identified as affecting the need to travel by bus. The survey results show that 20 out of the 27 observed variables are not highly appreciated by the respondents (scores ranged from 3.05–3.75), and only seven out of 27 observed variables received scores of > 4.00. These outcomes mean there are still many barriers to attracting passengers to use bus services in urban areas.

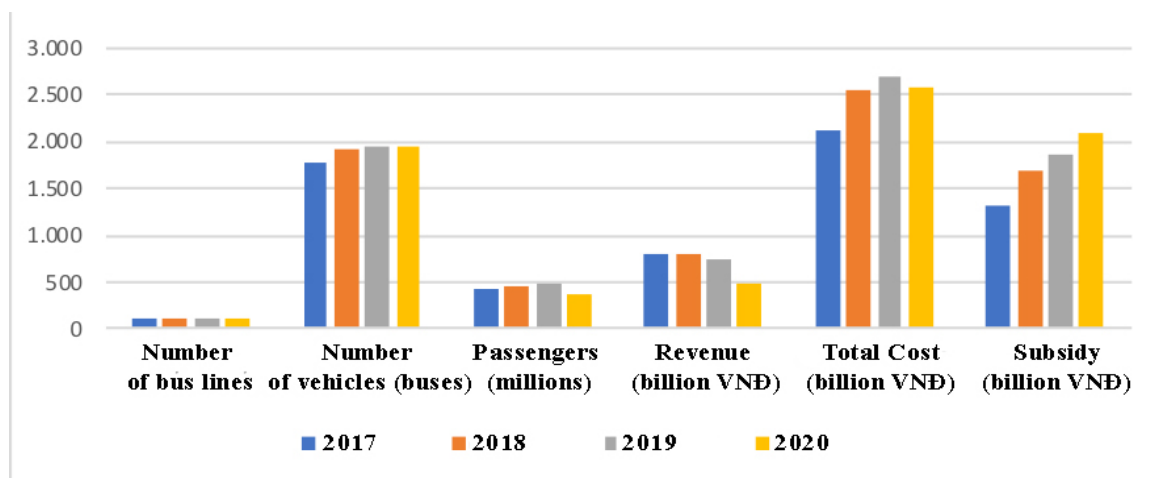


Fig. 4. Result of Public Transportation in Hanoi from 2017 to 2020. Source: Hanoi Department of Transport from 2015–2020

Therefore, urban governments in Vietnam need to adjust the current bus route network to suit the needs of the people, especially students, to increase the coverage of the bus route network. Doing so will increase the accessibility of traffic users to bus services and help them save time when traveling by bus.

At the same time, it is necessary to find ways to limit personal vehicle use, such as introducing legislation to control motorcycle emissions, encouraging public transport usage, and limiting the number of personal vehicles entering the city during rush hour, for example, by charging fees for entering the city. However, these are complex and sensitive issues that could affect most people's lives, so it is necessary to accurately assess the social impacts of these policies to ensure appropriate measures are taken.

References

1. Shirley, T. & Peter, T. *Assessing IT Usage: The Role of prior experience*. 1995. Vol. 19(4). P. 561-570. Available at: <https://www.jstor.org/stable/249633>.
2. *Plan for development of Ho Chi Minh public transportation system to 2025*. (2015.08.16). Ho Chi Minh Department of Transportation.
3. Ajzen, I. The theory of planned behavior. *Organizational behavior and Human decision process*. 1991. Vol. 50(2). P. 179-221.

4. Hoang, H. & Tran, H.V. Barriers to the intention to use buses as a means of transport of people in Thua Thien Hue province. *Science Journal of Hue University: Economics and Development*. 2017. Vol. 126. P. 101-114.
5. Dinh, T.T. *Research on solutions to improve the quality of public passenger transport services by bus of Hanoi Transport Corporation*. Master thesis in economics. 2013.
6. Nguyen, M. *Improving the operational efficiency of the public passenger transport system in urban areas*. PhD thesis in economics. University of Transport. Hanoi. 2014.
7. Bhattacharjee, A. Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*. 2001. Vol. 25(3). P. 351-370.
8. Fishbein, M. & Ajzen, I. *Attitude, intention, and behavior: An introduction to theory and research*. MA: Addison-Wesley. 1975.
9. Venkatesh, V. Determinants of perceived ease of use: integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*. 2000. Vol. 11. No. 4. P. 342-365.
10. Long, B. & Choocharukul, K. & Nakatsuji, T. Psychological factors influencing behavioral intention of using future sky train: a preliminary result in Phnom Penh. *3rd Atrans Symposium*. 2010. Bangkok, Thailand: Asian Transportation Research Society. P. 123-129.
11. Chen, C. & Chao, W. Habitual or reasoned? Using the theory of planned behavior, technology acceptance model, and habit to examine switching intentions toward public transit. *Transportation Research Part F: Traffic Psychology and Behaviour*. 2011. Vol. 14(2). P. 128-137.
12. Davis, F. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*. 1989. Vol. 13(2). P. 319-340.
13. Dzung, D. Factors affecting intention to use the Metro subway system in Ho Chi Minh City. *Master thesis in Economics*. Ho Chi Minh University of Economics. 2012.
14. Chuttur, M. Overview of the technology acceptance model: origins, developments, and future directions. *Sprouts: Working Papers on Information Systems*. 2009. Vol. 9(37).
15. Heath, Y. & Gifford, R. Extending the theory of planned behavior: predicting the use of public transportation. *Journal of Applied Social Psychology*. 2002. Vol. 32(10). P. 2154-2189.
16. Nguyen, D. Research and evaluation of the public bus transport system in urban areas in Vietnam. *PhD thesis in economics*. University of Transport. 2011.
17. Beirão, G. & Sarsfield Cabral, J.A. Understanding attitudes towards public transport and private car: A qualitative study. *Transport Policy*. 2007. Vol. 14(6). P. 478-489.
18. Spear, B.D. Generalized attribute variable for models of mode choice behavior. *Transportation Research Record*. 1976. Vol. 592. P. 6-11.
19. Babu, P.R. & Krishna, K.V. & Shirisha, W. & Yasasvi, P.N. Heuristic search strategy for service restoration using DFS and BFS techniques. In: *India International Conference on Power Electronics 2010 (IICPE2010)*. New Delhi, India: IEEE. 2011. P. 1-8.
20. Domencich, T.A. & Kraft, G. *Free transit*. D.C. Heath, Lexington, Mass. 1970. Available at: <https://trid.trb.org/view/1210951>.
21. Mohammed, A. & Shakir, A. Factors that affect transport mode preference for graduate students in the national university of malaysia by logit method. *Journal of Engineering Science and Technology*. 2013. Vol. 1(8). P. 352-363.
22. Wardman, M. Public transport values of time. *Transport Policy*. 2004. Vol. 11(4). P. 363-377.
23. Paulley, N. & Balcombe, R. & Mackett, R. & Titheridge, H. & Preston, J. & Wardman, M. & et al. The demand for public transport: The effects of fares, quality of service, income and car ownership. *Transport Policy*. 2006. Vol. 13(4). P. 295-306.
24. Dargay, J.M. & Hanly, M. The demand for local bus services in England. *Journal of Transport Economics and Policy (JTEP)*. 2002. Vol. 36(1). P. 73-91.
25. Weinstein, A. Customer satisfaction among transit riders: how customers rank the relative importance of various service attributes. *Transportation Research Record*. 2000. Vol. 1735(1). P. 123-132.

26. Nathanail, E. Measuring the quality of service for passengers on the hellenic railways. *Transportation Research Part A: Policy and Practice*. 2008. Vol. 42(1). P. 48-66.
27. Chen, C.F. & Chao, W.H. Habitual or reasoned? Using the theory of planned behavior, technology acceptance model, and habit to examine switching intentions toward public transit. *Transportation Research Part F: Traffic Psychology and Behaviour*. 2011. Vol. 14(2). P. 128-137.

Received 09.09.2021; accepted in revised form 26.02.2023