

Factors affecting consumer behaviour to use e-wallets: An empirical study from Vietnam context

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Abstract:

The purpose of this paper is to investigate the behaviour of using e-wallets (BE) and the factors affecting the use BE belonging to Vietnamese consumers. Research data is collected by sending online questionnaires to consumers who have been using e-wallets in Vietnam - people between the ages of 18 and 50 years old based on the convenient non-probability sampling method. The authors combine both qualitative and quantitative methods in our research to build and develop the research model. To take advantage of the theory of planned behaviour (TPB) and technology acceptance model (TAM), this research uses a combination of TPB and TAM models (C-TAM-TPB) to analyse two factors of the technology adoption model (perceived usefulness - PU and perceived ease of use - PE), the unified theory of acceptance, use of technology factor (social influence - SI), and perceived risk (PR). The research results show that (1) three factors that positively affect e-wallet usage (ranked in descending order) are the PE, SI, and PU and (2) PR does not affect Vietnamese consumer BE. Although the investigation and research on consumer behaviour are quite popular in Vietnam and around the world, the investigation documents the BE and the factors that determine it is still rare in Vietnam. Therefore, this study contributes to investigating and measuring the BE and the factors affecting it in Vietnam. In addition, the combined approach of the C-TAM-TPB model to estimate the influencing factors is a method rarely used in previous studies on consumer behaviour.

Keywords: e-wallets, factors influencing, perceived ease of use, perceived usefulness, perceptions of risks, social influence, Vietnamese consumers.

Classification number: 2.3

1. Introduction

Attached to the development of e-commerce, cashless online payment is becoming a trend all over the world and is being chosen by a large number of Vietnamese to replace traditional forms of payment. In addition

to the convenience, security and speed of cryptocurrencies and technology, the recent outbreak of COVID-19 has spurred the rapid development of online payment methods, including e-wallets (or digital wallets). E-wallets, which are also known as digital wallets or a type of online account, usually add

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up mobile applications or websites. It can be used to make online transactions, replace cash in shopping, pay bills such as electricity or water bills, and transfer money. E-wallets are similar to physical wallets. However, instead of physical money in a wallet, an e-wallet is a collection of money by linking bank accounts and/or linking cards.

By the end of 2019, Vietnam was in the top 15 markets with the highest number of smartphone users globally, 43.7 million people, or equivalent to 44.9% of the total population [1]. The percentage of consumers using mobile payments in Vietnam increased from 37% in 2018 to 61% in 2019, and this is also the highest increase among the six southeast Asian countries [2]. These figures show that Vietnam is a potential market for fast-growing mobile payment applications and for developing e-wallets. Although the Prime Minister has approved “The project to develop non-cash payments for the 2016-2020 period” [3], and e-wallets have been officially licensed by the State Bank of Vietnam since 2014 [4], Vietnam has just over 20 e-wallets that are active in the market such as Momo, Zalopay, Moca, Airpay, etc. Among them, Momo wallet, which is a partner of 12 banks and international card companies, has reached more than 5 million users. The market for the Vietnamese e-wallet has, therefore, great potential with many favourable conditions and the participation of both foreign service providers. The level of competition in the e-wallet market will increase dramatically even though the current volume of transactions via e-wallet in Vietnam is still relatively low.

Up to now in Vietnam, studies on the BE have mostly stopped at the introduction of

e-wallet payments [5], including outlining groups of customers using e-wallets, reasons for customers to use or not to use e-wallets [6], and analysing the impact of trust and individual innovation capacity in information technology on Vietnamese users’ BE [7]. Therefore, it is necessary to have an in-depth and extensive study on the BE and the factors affecting that behaviour to find appropriate solutions to strengthen and expand the e-wallet market in Vietnam, as well as a reference for future e-wallets to become more and more complete.

Therefore, we conduct this study to examine which factors and to what extent these factors influence the customers’ behaviour toward e-wallets in the Vietnamese market. This research will provide useful information about the e-wallet market in Vietnam as well as its driving factors.

2. Literature review

In this study, the authors apply the theory of reasoned action (TRA), which was developed in the social field [8, 9]. The TRA model emphasises the significance of intention in driving customer behaviours. The notion of intention refers to the combination of attitude and subjective norms.

To explain consumer behaviour in information technology, some researchers introduced the TAM, which is based on the logic of TRA [9-11]. However, in this TAM model, they replaced the two factors “attitude” and “subjective norm” with “PU” and “PE”, respectively.

In the line with behaviour theories, the TPB is an improvement of TRA with the introduction of the perceived behavioural control factor to the model [12, 13]. According to TPB,

motivation or intention plays an important role in shaping the consumer's behaviour. Motivation or intention is determined by three basic factors: attitude, subjective norm, and perceived behavioural control. By contrast, TRA and TAM underscore the importance of consumer self-determination in consumption.

S. Taylor, et al. (1995) [14] developed a new model by combining TPB's factors with TAM's factors. This model is known as the decomposed theory of planned behaviour (DTPB). The main components of the model are attitudes, SI, and perceived behavioural control. Of these components, attitude is determined by PU and PE. However, this study still has some limitations such as the survey environment, the causal relationship between the survey questions and answers, the impact of factors outside the model that have not been mentioned, and alternative approaches to research.

V. Venkatesh, et al. (2003) [15] introduced the unified theory of acceptance and use of technology (UTAUT) to explain user intentions in using information systems and usage behaviour. Accordingly, the theory underlines that there are three direct determinants of intended use and behaviour (performance expectancy, effort expectancy, and SI) and one direct determinant of user behaviour (facilitating conditions).

However, there are very few studies on the intention of using an individual customer's e-wallet service - a smart payment method, which is a popular online payment method nowadays. Based on the TAM of F.D. Davis, et al. (1989) [9], several studies in this area were carried out [16-18]. Some authors built

research models based on UTAUT [19-21] or based on the TPB model [22, 23].

For example, T.L.P. Do (2014) [24] outlined the popularity and advantages of non-cash payments at both individual and organizational levels. This research suggests the potential of cashless payment development and the challenges of delivering these services. Finally, the research suggests some solutions to improve the effectiveness of non-cash payment implementation in the future.

The study of H. Amin (2008) [17] expanded the applicability of TAM to mobile phone credit cards. This study showed that the PU, PE, perceived credibility, and the amount of information contained on mobile phone credit cards are important determinants of intention to use a mobile phone credit card, while the level of perceived expressiveness was not the deciding factor. Some researchers rely on TAM to build a new model that comprises different factors like PU, PE, subjective norm, PR, safety/security, attitude, and intent to use [18, 25, 26]. The research results reveal that ease of use and usefulness have a negligible effect on the customer's intention toward mobile wallets. Particularly, PR are positively correlated while safety and confidentiality are negatively associated with the intended use.

Several studies have looked at factors influencing consumer online buying behaviour [27-36]. To predict the intention to use mobile wallets from a mental cost perspective, the empirical study of D. Chatterjee, et al. (2018) [27] indicated the supremacy of the perceived behavioural control constructs over other constructs in predicting the intentions, to use mobile wallets. Junadi, et al. (2015) [28]

extended their unified theory of technology adoption and use UTAUT with security awareness and culture to identify which factors influence Indonesian consumers' intentions to use e-payments. The results demonstrated that not only technology influences consumer behaviour but also culture and perceptions of national security. P. Kaur, et al. (2020) [29] showed that relative advantage, compatibility, complexity, and observability were significantly associated with participants' intentions toward m-wallets. On the contrary, trialability had no relationship with participants' intentions to use and recommend m-wallets to others. C. Kim, et al. (2015) [30] suggested that the personalization, simplicity, and connectivity of m-shopping influences utilitarian value, hedonic value, and shopping value. Meanwhile, L.A. Nelloh, et al. (2019) [31] found that trust is more decisive in the intention to continue to use electronic payments than perception. Based on these research results, studies suggest some recommendations for mobile payment companies to improve their quality, reliability, information management, and the security protection that refers to personalization. For example, B. Shaw, et al. (2019) [32] found that the moderation of smartphone addiction plays a key role in popularizing mobile wallet payments in emerging economies. It also suggests the importance of communicating with the right consumers through the right channels and age groups. J. Sun, et al. (2018) [33] suggest that usefulness, ease of use, subjective standards, in-store compatibility, and experience in the past have a positive relationship with Chinese consumers' intentions to use apparel e-commerce. Other influencing factors are compatibility, relative advantages, and

subjective norms. The research results of [34, 35] showed that information and service quality positively affect initial trust, therefore, there is a positive correlation between endorsement and usefulness. At the same time, their results also show a positive relationship between PU and continued intention to use mobile-based payment methods. In addition, M. Zendehdel, et al. (2015) [36] examined which factors influence potential consumers' online buying attitudes, then found that consumer attitudes towards online purchases influence their purchasing intentions.

A recent study on COVID-19 and e-wallet usage intention found a strong impact of PR, government support, and PU on customers' intention to use e-wallets during the COVID-19 outbreak [37]. The results of the study show that the impact of government support on e-wallet intentions varies from country to country. In addition, PU completely mediates the intention to use a government's e-wallet and partially mediates the effect of PR on the intention to use an e-wallet.

3. Hypothesis, empirical model and research methods

3.1. Research hypotheses and model

In this research, TAM is the main model to explore factors influencing the use of e-wallets. However, TAM does not include social factors. Therefore, we combine two factors of TAM (PU and PE) with one factor of UTAUT (SI) and PR. In essence, the SI and PR belong to perceived behavioural control, which is a factor of TPB.

This combination will probably uncover new problems, not just purely from technology but also from society. This research also removes some intermediate variables, reduces the

indirect relationships between the variables of the reference models, and conducts research on the direct relationship between the independent variables to the dependent variables in the multivariable linear regression model. Finally, the selected factors include PU, PR, SI, and PE (Table 1).

Based on previous studies on the impact of

use [17, 18].

- *H3: There is a negative relationship between PR and BE.*

PR affects attitude towards m-wallet and attitude towards m-wallet affects intention in use [16, 18].

- *H4: There is a positive relationship between SI and BE.*

Table 1. Main models and studies reference.

Research	Model	Perceived behavioural control	Perceived usefulness	Perceived ease of use	Perceptions of risks	Social influence	Attitude	Subjective norm	Intention	Behaviour
	Code	PBC	PU	PE	PR	SI	AT	SN	IN	BE
[8, 9]	TRA					x	x	x	x	x
[9-11]	TAM		x	x			x		x	x
[12, 13]	TPB	x					x	x	x	x
[14]	DTPB	x	x	x		x	x	x		x
[15, 38]	UTAUT					x			x	x

independent variables (PU, PR, PE, and SI) on the dependent variable (BE of consumers in Vietnam), this study suggests the following hypotheses:

- *H1: There is a positive relationship between the PU and BE.*

PU affects attitude towards m-wallet and attitude towards m-wallet affects intention in use [16, 18].

- *H2: There is a positive relationship between the PE and BE.*

PE affects attitude towards m-wallet and attitude towards m-wallet affects intention in

To study the factors affecting the behaviour of Vietnamese consumers to use e-wallets, combined with qualitative research results, the authors built a regression model consisting of one dependent variable (BE) and four independent variables (PU, PR, PE, SI) with the support of SPSS version 20 software. The regression model looks like this:

$$BE = \beta_1 \times PU + \beta_2 \times PE + \beta_3 \times PR + \beta_4 \times SI + \epsilon.$$

in which: BE is the dependent variable that reflects the behaviour of city consumers to use electronic wallets. BE consists of 4 observed variables (codes from BE₁ to BE₄) to measure

the behaviour of the use component:

- BE_1 : I will use e-wallets regularly in the future.
- BE_2 : I will introduce others to use e-wallets.
- BE_3 : I will continue to choose to use existing e-wallets.
- BE_4 : I will sign up for other electronic wallets.

- PU is an independent variable reflecting the level of PU of using e-wallets. PU consists of 4 observed variables (codes from PU_1 to PU_4) to measure the PU component:

- PU_1 : Save time when shopping online.
- PU_2 : Can make transactions anytime, anywhere.
- PU_3 : Receive many incentives on prices and transaction fees when making payments or shopping.
- PU_4 : Performing many other functions such as paying for utilities, telephone, etc.

- PE is an independent variable reflecting the perceived level of ease of use of e-wallets. PE consists of 4 observed variables (codes from PE_1 to PE_4) to measure the perception of the ease component:

- PE_1 : Feeling very easy to learn how to use e-wallets.
- PE_2 : Feeling very simple when manipulating e-wallets.
- PE_3 : Usable proficient in e-wallets.
- PE_4 : Clear payment process to help users easily transact.

- PR is an independent variable reflecting the perceived level of risk of using e-wallets. PR consists of 4 observed variables (codes from PR_1 to PR_4) to measure the PR component:

• PR_1 : Using e-wallets can have personal information stolen.

• PR_2 : Using e-wallets can make the mistake of losing money.

• PR_3 : Using e-wallets without a transaction paper can bring risks.

• PR_4 : Using e-wallets will cause system errors and cannot respond promptly to payment transactions.

- SI is an independent variable reflecting the perceived level of SI of using e-wallets. SI consists of 4 observed variables (codes from SI_1 to SI_4) to measure the SI component:

• SI_1 : Using e-wallets is due to the current trend that everyone uses.

• SI_2 : Family and relatives recommend using electronic wallets.

• SI_3 : Friends and colleagues recommend using e-wallets.

• SI_4 : Use e-wallets because of the influence of the media.

- $\beta_1, \beta_2, \beta_3, \beta_4$ are coefficients.

- ε is the error.

The use of the C-TAM-TPB combined model in this study not only helps to identify specific beliefs that may affect the use of information technology but also increases the ability to explain behavioural decisions and modulate behavioural events. By removing some intermediate variables and reducing the indirect relationships between the variables of the reference model, the authors have studied the direct relationship between the independent and dependent variables in the multivariable linear regression model by selecting factors in the C-TAM-TPB scale model and model of P. Luarn, et al. (2005) [38] including PU, PR, SI, and PE (Fig. 1).

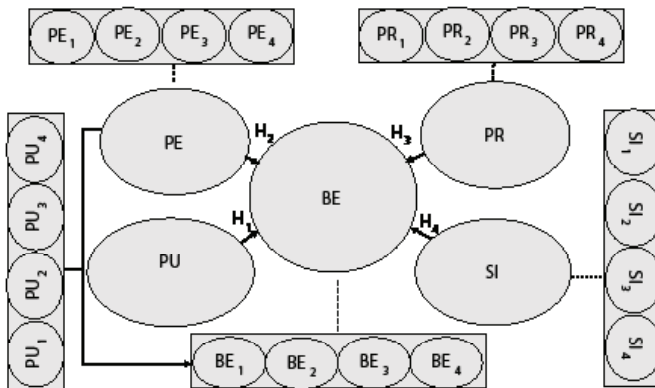


Fig. 1. Overview of the research model.

3.2. Research method

To determine the factors influencing the BE in Vietnam, in this study, we use both qualitative research and quantitative research. At the same time, to ensure the validity and reliability of the data, the research process was conducted according to the following steps (Fig. 2).

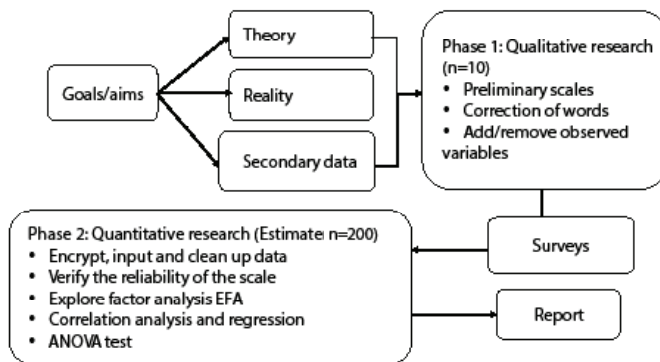


Fig. 2. Research process.

First of all, we establish a set of scales to meet the requirements of mathematical statistics in data analysis and processing. These data will be used to evaluate factors affecting the behaviour of the consumers in Vietnam to use e-wallets.

The testing of models and hypotheses is done through quantitative research e.g., interviews with an expected sample size of 200 responses. These interviews are self-

scoring questionnaires. Each answer is rated on a 5-point Likert scale (1=totally disagree, 2=disagree, 3=no idea, 4=agree, 5=totally agree) [39]. The questions in these questionnaires have been developed and tested to suit Vietnamese conditions. To find out if a respondent has ever used or is using an e-wallet in Vietnam, we use filtering, exclusion, and testing questions such as have you ever used an e-wallet? Or can you name any e-wallets that you have used or are using? We chose to exclude those who have not or do not use e-wallets or those who confuse using e-wallets with other payment methods.

The data collected is processed by SPSS. The work done in the formal research includes a preliminary evaluation of the scale, factor analysis of discovery, correlation analysis, regression analysis, and analysis of variance (ANOVA). In the scales of analysis, evaluation, and testing, we continue to type, group, or classify component variables according to their characteristic groups and are appropriately named by exploratory factor analysis (EFA).

The process of researching factors affecting Vietnamese consumer BE is conducted in two phases: phase one is qualitative research and phase two is quantitative research. Before building the official scale, we conducted preliminary research with experts by direct interviews (n=10) to edit words. In phase 1, based on the relevant theories and previous studies reviewed, the team proposed scales for the independent and dependent variables. Next, the sample surveys were sent to 10 experts to discuss ideas and suggestions for the drafted questionnaire. After receiving suggestions from experts, the group synthesized the opinions to adjust the scale and variables in the research model thereby completing the official

questionnaire for the survey to get primary data and conduct quantitative research.

The discussion results are four independent variables and one dependent variable as proposed by the research model, all of which are retained and are deemed necessary and appropriate in the analysis of the factors that influence consumer BE in Vietnam.

The research sample is consumers who have been using e-wallets in Vietnam and aged between 18 and 50 years old. Using the convenient non-probability sampling method based on the approach, and to ensure the required number of samples as well as increase the persuasion of the research results, the authors tried to ensure the required number of samples and increase the persuasion of the research results [40-42]. The authors then decided to submit 200 detailed online questionnaires (Google surveys) to 200 customers using e-wallets in Vietnam. The survey was conducted from December 1, 2019, to March 31, 2020, with 05 questions related to the personal information surveyed (gender, age, occupation, type of wallet used, and frequency of use) and 20 questions related to the behaviour to use the same factors that influence the behaviour to use.

Data collected through the survey was checked and cleaned with unsatisfactory surveys removed. The obtained survey results were 182 responses and, out of 182 responses, only 150 were accepted with 32 disqualified because only one answer was selected for all questions or some were left blank. All collected data was encrypted, input into Excel, then copied to SPSS 20.0 for analysis.

The demographic profile of respondents is presented in Table 2.

The results of the descriptive statistics show

that: (1) The sex ratio difference between men and women is very small and the difference is almost negligible. (2) In terms of age, respondents are mainly in the age group from 18 to 24 with a proportion of more than 53%. (3) regarding the profession, the proportion of pupils and students accounted for the highest rate at 52%; followed by self-employed at 19.3% and civil servants at 17.3%. These are the subjects that regularly have related activities and work and have a need to use e-wallets. (4) Regarding the types of wallets commonly used by people, Momo accounts for the highest proportion with 46%, followed by Moca with 17.3%, and Zalopay with 16%. This data is reasonable because Momo has many standards, familiar features and offers that attract more users. Finally, (5) in terms of frequency of use, using “occasionally” accounts for 36% (largest rate); followed by “1-3 times a week” accounting for 27.3% and “1-3 times a month” 24%, respectively. Vietnam consumers are still not accustomed to using e-wallets and the use of cash is still dominant.

In summary, the sample characteristics show quite good survey results. Respondents focus on answers, provide highly relevant answers, help avoid random errors, and conduct quantitative analysis more efficiently.

In phase 2, after having scale results for the variables in the model from qualitative research, the team designed the questionnaire and coded the observed components of the dependent variable and the independent variables. The reliability of the scale is assessed through Cronbach's alpha coefficients. Using Cronbach's alpha confidence coefficient method before analysing EFA factors eliminates inconsistent variables as these variables can create dummy factors. If Cronbach's alpha coefficient ≥ 0.6 , the scale factor is appropriate.

Table 2. Demographic profile of respondents.

Particulars (characteristics & distribution)		Frequency (people)	Percentage (%)
Gender	Male	63	42.0
	Female	87	58.0
	Total	150	100.0
Age (years)	<18	7	4.7
	18-24	80	53.3
	25-35	43	28.7
	36-50	15	10.0
	>50	5	3.3
	Total	150	100.0
Occupation	Student	78	52.0
	Public servants and officers	26	17.3
	Self-employed	29	19.3
	Worker and free labour	7	4.7
	Other	10	6.7
	Total	150	100.0
Types of electronic wallets used (units)	Moca	26	17.3
	Zalopay	24	16.0
	Momo	69	46.0
	Vnipay	20	13.4
	Other	11	7.3
	Total	150	100.0
Frequency of use (units)	Daily	16	10.7
	1-3 times a week	41	27.3
	1-3 times a month	36	24.0
	Sometimes	54	36.0
	Other	3	2.0
	Total	150	100.0

After removing the unreliable variables through Cronbach's alpha analysis, the EFA was used by the authors to evaluate two important values of the scale, the convergent validity and discriminant validity, and, at the same time set the estimated parameters by each group of variables.

4. Results and discussion

Factor matrix results with the rotated component matrix method show that variable PR_4 , which is "using e-wallets will cause system errors and cannot respond promptly to payment transactions" does not display results (Table 3). Therefore, PR_4 has a load factor of less than 0.5 and will be disqualified.

Table 3. Rotated component matrix^a.

	Component			
	1	2	3	4
PU ₁	.857			
PU ₄	.825			
PU ₂	.802			
PU ₃	.726			
PE ₃		.914		
PE ₂		.892		
PE ₁		.867		
PE ₄		.855		
PR ₁			.925	
PR ₂			.902	
PR ₃			.902	
PR ₄				
SI ₄				.855
SI ₂				.837
SI ₃				.701
SI ₁				.674

Note: ^a: dependent variable; extraction method: principal component analysis; rotation method: varimax with Kaiser normalisation; arotation converged in 5 iterations.

Analysis results showed that most of the observed variables met the criteria of Cronbach's alpha coefficient ≥ 0.6 and total variable correlation ≥ 0.3 . Finally, the study has a total of 20 observed variables before factor analysis was conducted to explore EFA. After testing Cronbach's alpha, the satisfactory variables will continue to be included in the exploratory factor analysis. The research team carried out the observed variables of the scale of factors affecting the behaviour of Vietnamese consumers to use e-wallets through EFA.

The first EFA result showed that four factors were accepted. These four factors explain 72.849% ($>50\%$) of the variability of the data, which proves that EFA analysis is appropriate. Factor loading values of each observed variable were greater than 0.5 indicating a high correlation between the observed variables with the factors. In addition, we can see that the variable PR₄ (using e-wallet will cause system errors and cannot respond promptly to payment transactions) does not represent the data, so we removed this variable. With the second EFA analysis (Table 4), we retained 15 observed variables and the coefficient KMO was 0.793, which is greater than 0.5, so it was suitable for the data. The Chi-squared statistic of Bartlett's test reached 1,411.083 with the significance level of Sig. =0.000, so the observed variables were correlated. Total variance extracted of 76% shows the factors explain more than 76% of the data variation. Therefore, the scales were accepted. The eigenvalue =4,869 and loading factors were all greater than 0.5.

Table 4. The results of eliminating variables through EFA analysis.

	First rotated component matrix	2nd rotated component matrix
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.779	0.793
Bartlett's Test of Sphericity	0.000	0.000

As recognised by the model, four factors affect the behaviour of consumers to use e-wallets in Vietnam. According to the results of the factor analysis of the dependent variable (in Table 4),

we have KMO coefficient=0.779, Bartlett's test has a significance level of Sig.=0.000<0.05, a variance extracted of 76%, and all variables have factor load coefficients greater than 0.5. Thus, the factor BE included 4 observed variables, which were BE₁, BE₂, BE₃, and BE₄.

After the factor analysis phase of EFA, the factors were included in the model test. Factor value is the average of observed components belonging to that factor. Pearson correlation analysis is used to consider the suitability of components in the regression model. The results of regression analysis will be used to test hypotheses H1 to H4. If the correlation coefficients are statistically significant (Sig.<0.05), the analysis shows that the PR factor is correlated with the dependent variable (-0.44 fails), so the PR factor can be eliminated

(Table 5). Despite this, the team still used the PR to run the test regression again.

The regression analysis results (Table 6) shows that both PU, PE and SI are accepted and have a positive relationship with the BE due to the coefficient Sig.<0.05. PR has an inverse linear relationship with the coefficient Sig.>0.05. Therefore, the authors can conclude that three independent variables, PU, PE, and SI, are significant in the model and positively impact the dependent variable because the regression coefficients are all positive. The variable PR is eliminated. The very small VIF magnification factor (VIF<2) shows that these independent variables do not have a close relationship, so no multicollinearity phenomenon occurs. Therefore, the relationship between the independent variables does not affect the interpretation results of the model.

Table 5. Correlations.

		BE	PU	PE	SI	PR
BE	Pearson correlation	1	.392**	.526**	.275**	-.044
	Sig. (2-tailed)		.000	.000	.001	.590
	N	150	150	150	150	150
PU	Pearson correlation	.392**	1	.487**	.270**	-.090
	Sig. (2-tailed)	.000		.000	.001	.274
	N	150	150	150	150	150
PE	Pearson correlation	.526**	.487**	1	.108	.065
	Sig. (2-tailed)	.000	.000		.187	.432
	N	150	150	150	150	150
SI	Pearson correlation	.275**	.270**	.108	1	-.045
	Sig. (2-tailed)	.001	.001	.187		.589
	N	150	150	150	150	150
PR	Pearson correlation	-.044	-.090	.065	-.045	1
	Sig. (2-tailed)	.590	.274	.432	.589	
	N	150	150	150	150	150

** : correlation is significant at the 0.01 level (2-tailed).

Table 6. Coefficients^a.

Model	Unstandardised coefficients		Standardised coefficients	t	Sig.	Collinearity statistics	
	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>			<i>Tolerance</i>	<i>VIF</i>
(Constant)	1.683	.356		4.721	.000		
1 PU	.104	.073	.115	1.425	.036	.703	1.423
PE	.362	.062	.453	5.809	.000	.751	1.332
SI	.155	.057	.193	2.747	.007	.926	1.080
PR	-.033	.042	-.055	-.800	.425	.976	1.024

^a: dependent variable.

The adjusted coefficient of R^2 is 0.320, which shows that the independent variables explain 32% of the change in the dependent. Durbin-Watson achieved 1.850 (between 1 and 3) and accepted the hypothesis of no correlation in the model. To verify the suitability of the linear regression model, we consider the F value from the ANOVA analysis table. This test shows the linear relationship between the dependent variable and the independent variable. ANOVA analysis shows that the regression model has F-test=77.796; Sig.<0.05, which shows that the model is suitable for the dataset and can be extended to the whole population. Thus, the linear regression model satisfies the conditions. The regression equation is as follows:

$$BE = 0.115 * PU + 0.453 * PE + 0.193 * SI$$

The study results show there are three drivers of customers' intentions to use e-wallets in Vietnam. Their influence levels are arranged in descending order: PE ($\beta=0.453$), SI ($\beta=0.193$), and PU ($\beta=0.115$). This result is also completely consistent with the expert opinions of those that participated in the focus group discussions during the preliminary research phase.

5. Conclusions and policy implications

This paper examines the behaviour of Vietnamese consumers using e-wallets and measures the factors affecting the usage behaviour. Our argument is based on previous studies of the effect of independent variables on the dependent variable, and we suggest that there is a positive relationship between PU, PE, and SI on consumer BE in Vietnam, as well as a negative relationship between PR and attitude towards e-wallets. Using the C-TAM-TPB model, we tested this idea by conducting a study on the direct relationship between the independent variables and the dependent variables in a multiple linear regression model. Research results have proved part of our argument to be correct. We found that ease of use has a strong impact on Vietnamese consumer e-wallet usage behaviour. When the PE variable increases by 1 standard deviation, the user BE increases by 0.453 standard deviations. Similarly, when the SI and PU variables increase by 1 standard deviation, the BE variable increases by 0.193 and 0.115 standard deviations, respectively. The research results also show that risk perception does not

affect the BE for Vietnamese consumers. This is explained by the fact that e-wallets have just entered Vietnam and the e-wallet market is not fully developed. Additionally, the risks are also rare, so Vietnamese consumers are not aware of this problem.

This article contributes to the growing literature regarding the use of non-cash payment means including e-wallets. We provide detailed pieces of evidence on the factors affecting the behaviour of Vietnamese consumers to explain the trend of using e-wallets in terms of ease of use, social impact, usefulness, as well as potential risks when using e-wallets.

Regarding the sampling method in this study, while interviewing by the online survey is a convenient sampling method, the reliability may not be the best.

To encourage Vietnamese consumers to increase non-cash payments - including the use of e-wallets - we propose the following key implications:

The first is to increase the expected ease of use. According to the analysis results, PE is the factor that has the strongest impact on using e-wallets. Therefore, to increase the PE of the e-wallets, suppliers should improve technology and processes, increase the amount of readily available buyer information on electronic orders/invoices, shorten the time it takes to use the e-wallet, and increase the comfort and ease of transactions using e-wallets. Besides, specific instructions for customers before and during the payment transactions by e-wallets should be given.

The second is to promote SI - one of the factors most strongly influencing the behaviour of individual customers in Vietnam to use

e-wallets. Therefore, to promote this feature, service providers should take advantage of the pervasiveness of the media, television, social networks, and online forums to introduce and promote transmission and dissemination of electronic wallet products. Taking advantage of the influence of famous people and reputable people to promote the e-wallets product is another idea.

The third is to increase usefulness. Usefulness is the third strongest factor that influences the behaviour of individual customers in Vietnam to use e-wallets. Therefore, suppliers need to focus on solutions to increase the expected usefulness by users for their e-wallet products. Specifically, to upgrade the efficiency and convenience of customers using e-wallets, suppliers need to learn and catch up with the ever-expanding demands of e-payment by customers and integrate various payment facilities in many fields such as payment for travel reservations, etc., or even international money transfer for services purchased abroad. To help customers save time and money, suppliers should integrate with e-wallets to automatically search and propose to customers the most preferential price for the service that the customer needs.

The fourth is to upgrade e-wallets to become more and more trusted by customers. Suppliers need to pay attention to building a reasonable price policy to attract customers and improve the competitiveness of e-wallets compared to other electronic payment methods such as internet banking, mobile banking, ATM cards, credit cards, debit cards, etc. Service providers also need to develop and maintain low-cost policy incentives for customers, especially during new stages of development. In addition, suppliers need to actively link and cooperate with goods/service providers to offer

promotions and discount policies for customers when paying with e-wallets. Pay attention to demographic information depending on the goals, business strategies, target customers, and the influence of factors like age, gender, education experience, and income to build for themselves the right policies to help businesses thrive and achieve set goals and strategies.

In the future, we hope that this study will be expanded to not only investigate and measure the factors affecting the behaviour of Vietnamese consumers but also to consumers in other countries in Asia and other parts of the world associated with different cultures, lifestyles, incomes, personalities, trends, development levels, etc. We hope that this study will provide a deeper understanding of the trends and factors that affect the behaviour of consumers using e-wallets around the world so that the recommendations are more specific and useful.

CRedit author statement

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COMPETING INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this article.

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