

Multinomial logit regression adoption: Identifying user characteristics of e-wallets in Can Tho City, Vietnam

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ABSTRACT

This research adopted Multinomial Logit Regression to investigate factors that influence users' choice of e-wallets and how these elements affect the probability of current e-wallet usage, suggesting that each service is preferred by different user groups based on demographic and behavioural traits. This paper employed a quantitative approach using a face-to-face survey of 140 respondents using e-wallets in Can Tho City, Vietnam. This study has identified the user characteristics of the top three e-wallet services in Can Tho City, Vietnam, suggesting that each service has unique features that attract different user groups. People with lower incomes, who frequently use e-wallets and engage in smaller transactions, prefer the MoMo e-wallet, which has emerged as the market leader. On the other hand, ZaloPay attracted men with higher incomes, while older individuals with higher spending patterns who used Agribank or MBBank preferred Other e-wallets. E-wallet service providers could identify their target audience through the research findings and then work on developing both existing and new features that align with the needs of those potential users, all aimed at boosting loyalty and expanding user density. However, a more extensive and diverse sample is required to provide a more reliable and comprehensive understanding.

1. Introduction

Technological advancements have had a notable influence on various facets of society, particularly in economics, regarding the formation and evolution of payment instruments. The continued development of technology has made cash transactions less practical in modern times, resulting in an increase in the use of electronic currency. This trend is driven by several disadvantages of cash transactions, including their inefficiency due to the need for buyers to carry cash, the difficulty sellers experience in providing change, and the proliferation of counterfeit bills that are difficult to distinguish from genuine currency (Chen, 2018). As a result, electronic currency has become increasingly popular, as it provides a more efficient and reliable means of conducting transactions.

The advantages associated with online payment transactions have stimulated their adoption by consumers, both within the community and industry. These benefits include the perceived ease of use, speed, and security provided to the broader community (Wasiaturrahma et al., 2019). Furthermore, electronic financial transactions facilitate increased efficiency and have the potential to reduce operational costs related to the production of banknotes and coins. Non-cash payment methods also mitigate the risk of cash being damaged, lost, counterfeited, or

stolen. Additionally, the application of online payments contributes to reducing the amount of cash in circulation, which in turn promotes greater stability in inflation rates. Besides the benefits of cashless payment, various drivers are boosting this trend's popularity. Initially, the growth in popularity of international cards, especially credit cards, reflected their utility in conducting online transactions. Notably, the number of international cards had surpassed 20 million by the end of the second quarter of 2021, representing an increase of 03 million cards from the beginning of the year (Tạp chí Tài Chính Online, 2022). Furthermore, consumers have increasingly embraced contactless and mobile payments, driven by concerns regarding the potential health risks of handling banknotes during the Covid-19 pandemic. Last but not least, public awareness has been raised via cashless day events or international trend integration that stimulated the need for electronic-based transactions in recent years, hence a significant increase in the adoption of e-payment.

E-wallets are one of online payment applications that can be installed on mobile devices running iOS or Android. Vietnam's e-wallet market is characterized by a large number of service providers, launching from traditional banks to fintech firms. In recent years, the market has been dominated by three leading players: Momo, ShopeePay, and ZaloPay, which together account for 90% of the market share, while the remaining 10% is shared by Other e-wallet providers (Decision Labs, 2021).

Pursuant to Decision No. 1813/QĐ-TTg of October 28, 2021, by the Prime Minister, the Can Tho City People's Committee has recently devised a strategic plan spanning 2021 to 2025 (The Prime Minister, 2021), with a primary aim to promote non-cash payment systems in the city. This plan seeks to drive significant shifts away from cash-based transactions among organisations and individuals in Can Tho City. It underscores a firm commitment to harness Fourth Industrial Revolution technologies to enhance security, safety, and confidentiality in non-cash payments. To exemplify this commitment to innovation, Can Tho City has initiated a pilot program, implementing the Market 4.0 model, focusing on non-cash payments at An Thoi market in Binh Thuy district (Bnews, 2022). Importantly, this initiative is just the beginning, as the plan envisions an extensive expansion of non-cash payments in shopping centers and markets, with plans to extend its application to educational and healthcare institutions in the region (Vietnamnet, 2022).

In Vietnam, research by Bui (2021) identified the factors influencing the intention to use e-wallets, with a focus on the mediating role of attitudes toward e-wallet usage. To achieve this research objective, Vuong employed the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. Similarly, a study by Nguyen and Vo (2021) examined the factors impacting the intention to use the Momo e-wallet within Can Tho City, utilising Exploratory Factor Analysis (EFA) as their methodology. Both of these studies share a common objective, which is to investigate citizens' intentions to adopt e-wallets based on the Technology Acceptance Model (Bagozzi et al., 1992) and the Unified Theory of Acceptance and Use of Technology, as proposed by Venkatesh et al. (2003) and give relatively little attention to the disparities associated with gender, income, education, etc. However, a crucial question remains unanswered: identifying factors, particularly demographic and behavioural characteristics, that affect the actual usage of e-wallet services. Therefore, it is imperative to conduct research that explores the distinguishing characteristics of e-wallet users in Can Tho who employ various e-wallet providers. This research is essential as it can provide insights into the unique traits of these users, which, in turn, can inform product development and marketing strategies. Furthermore, two significant initiatives are driving the adoption of non-cash payment systems in Can Tho. First, approximately 80% of Can Tho's population aged 15 and above have transaction

accounts or access to online payment methods. Second, efforts are being made to promote online payment methods among residents living and working within Can Tho City (Lao Dong, 2022.)

The primary goal of this research is to identify distinctive characteristics within various user groups aligned with each specific e-wallet service available in Can Tho City. Our focus will primarily encompass three districts: Ninh Kieu, Cai Rang, and Binh Thuy. Subsequently, the findings from this study will inform strategic recommendations aimed at expanding the pool of potential users for these e-wallet services. Even though Vietnam has many e-wallet providers, this study will focus on the top two e-wallets used and categorise other less popular e-wallets as “Other e-wallets.” The subsequent sections of the paper are structured as follows: The second section introduces the empirical model specifications designed for determining the adoption of e-wallets. The following section discusses the data used in the study and explains the variables. Section four presents the results obtained from the multinomial logit models. Finally, the fifth section reports the conclusions drawn from the study.

2. Theoretical basis and econometric model

2.1. Theoretical basis

The Random Utility Model (RUM) offers a valuable theoretical framework for comprehending the choice behaviour of individuals. The RUM explicates the individual’s utility derived from selecting an option from a set of alternatives, which is a function of the probability that the utility associated with a specific option i surpasses that of other options.

One way to express the level of preferences or benefit an individual receives from choosing a particular option j out of a set of alternatives is through the utility function U_{ij} , where i represents the i^{th} individual and j represents the j^{th} alternative.

$$U_{ij} = V_{ij} + \varepsilon_{ij} = \beta_j^t X_i + \varepsilon_{ij} \quad (1)$$

In accordance with the random utility theory, the probability of an individual i selecting alternative j is determined by the utility U_{ij} derived by the individual i from the j^{th} alternative. The utility U_{ij} can be expressed as the sum of two parts: V_{ij} and ε_{ij} , where V_{ij} is the average utility and ε_{ij} is the random part. X_i represents the matrix of characteristics of individual i , and β_j represents the parameter vector for each alternative. Based on this, the probability P_{ij} that an individual i chooses alternative j is determined by the probability that P_{ij} is greater than the utilities U_{ik} of all other alternatives in the individual’s choice, C .

$$P_{ij} = P(U_{ij} \geq U_{ik} \quad \forall k \in C \quad k \neq j) \quad (2)$$

$$P_{ij} = P(V_{ij} + \varepsilon_{ij} \geq V_{ik} + \varepsilon_{ik} \quad \forall k \in C \quad k \neq j) \quad (3)$$

The RUM can be estimated by various econometric methods, including the Multinomial Logit (MNL) regression, a statistical model used in econometrics to examine the relationship between a categorical dependent variable and one or more independent variables.

2.2. Econometric model

The MNL model calculates the likelihood of an individual choosing a specific option from a set of choices based on a set of explanatory factors. It establishes a connection between a dependent variable, denoted as Y , and one or more independent variables referred to as X . Y represents discrete values that signify exclusive and non-overlapping alternatives or categories. In contrast, the independent variables X , which could include factors like cost, time, gender, age, and others, are believed to have an impact on the decision-making process related to selecting a choice

or category. Importantly, the reliability of MNL coefficients in determining statistical significance is affected by the choice of a baseline outcome. When the baseline changes, the coefficients and their associated standard errors are adjusted. Furthermore, the standard errors of MNL coefficients vary based on the chosen baseline because they are influenced by the number of observations within the relevant categories. If a baseline category has a small number of observations, it may lead to higher standard errors for all coefficients. It's important to note, however, that the choice of baseline does not impact the predicted probabilities or their standard errors. The MNL also relies on the principle known as Independence of Irrelevant Alternatives (IIA). This means that the preference for one option over another should not be affected by the presence or absence of other irrelevant choices. This IIA principle ensures that the probability ratio for the initial selection remains constant, regardless of whether other alternatives are introduced.

The MNL has been extensively employed in multiple fields, including marketing research (Agrawal & Schorling, 1996; Van Leeuwen & Rietveld, 2011; Zhu et al., 2022), political science (Liddle & Mujani, 2007; Nownes, 1992; Page & Paulin, 2022), sociology research (Barcus, 2004; Berggren, 2010; Herbaut & Barone, 2021), transportation (Rajanandhini & Elangovan, 2022; Tay et al., 2011; Thrane, 2015) and environmental economics (Diriye et al., 2022; Jin & Shriar, 2013; Murphy et al., 2011), where it is employed to study consumer behaviour, political voting behaviour, labour market outcomes, and other relevant issues. The current study aims to demonstrate the useful application of MNL in investigating e-wallet user behaviour in marketing and application adoption research. The e-wallet individuals select may vary depending on the user's behaviour, demographic, and other socioeconomic characteristics. Under the structure of the MNL model, the probability, P_{ij} , is given by:

$$P_{ij} = \frac{e^{\beta_j^t x_i}}{\sum_{k \in C} e^{\beta_k^t x_i}} \quad \forall j \in C \quad (4)$$

The coefficient β only indicates the direction of the effect, which says nothing about the magnitude of the effect. The Newton method (Greene, 2003) can be utilised to obtain the vector parameter estimates that maximise the log-likelihood function. After obtaining these parameter estimates, the marginal probabilities of choice (marginal effects), which tell when X increases by one unit, then how much P changes, can be calculated as shown below:

$$\frac{\partial P_{iy}}{\partial x_i} = P_{ij} [\beta_j - \sum_{k=1}^J P_{ik} \beta_{k0}] \text{ for } j: 1, 2, \dots, J \quad (5)$$

3. Data and variable explanation

3.1. Data

The study utilised primary data collected from e-wallet users in Can Tho City, including different districts. However, the survey mainly focused on Ninh Kieu, Cai Rang and Binh Thuy district due to its dense population and dynamic employment. Tabachnick and Fidell (1996) suggest a minimum sample size of $n \geq 8m + 50$, where m denotes the number of independent variables in the research model. The current study includes seven independent variables; thus, the minimum required sample size should be at least 106. Eventually, after eliminating non-qualified responses, 140 observations were deemed acceptable and used for analysis.

The present study initially aimed to investigate the prevalence of e-wallet usage in Vietnam, focusing on five popular e-wallets: MoMo, ZaloPay, ShopeePay, ViettelPay, and AirPay (Decision Labs, 2021). Although Can Tho City ranks among the five largest cities in Vietnam, it is considerably smaller in terms of population and economic development compared

to Hanoi and Ho Chi Minh City. To ensure the reliability of the data, we conducted a preliminary assessment. This pre-test aimed to identify the most commonly used e-wallets among the five options available within the specific region of Can Tho City.

In this initial assessment, we surveyed 33 individuals with diverse backgrounds in terms of age and occupation. They were asked succinctly about their primary e-wallet preference for conducting transactions. Upon analysing the pre-test data, the results unequivocally highlighted MoMo and ZaloPay as the e-wallets most frequently chosen, with an adoption rate of approximately 85% for both. Conversely, the remaining e-wallet options were mentioned by a relatively small proportion of respondents. Consequently, we introduced a new category, "Other e-wallets," to consolidate the proportions associated with these less-frequently selected options, which collectively accounted for less than 15% of the total responses. Ultimately, the dependent variable, the primary e-wallet currently in use, was categorised into three groups, namely MoMo, ZaloPay, and Others, based on the pre-test result.

The dependent variable in this study is the e-wallet predominantly used by the participants; while it is hypothesised that frequency of e-wallet use, expenditure, income, education, age, gender and banking are the key factors affecting the choice of respondents for electronic e-wallets. The survey questionnaire was divided into three sections. The first section sought to examine the behavioural patterns of e-wallet users. The second section aimed to assess the economic indicators of the respondents. Finally, the third section was intended to capture the demographic characteristics of the participants.

3.2. Variable explanation

The dependent variable in the study represents the various e-wallets utilised by the participants. The selection of e-wallets by respondents was classified into three categories: MoMo, ZaloPay, and Other e-wallets. Several international studies, including research conducted in countries like Malaysia (Subramaniam & Kolandaisamy, 2020; Teoh et al., 2020), Thailand (Intarot & Beokhaimook, 2018), Nigeria (Akinbile et al., 2014), and Indonesia (Saputri & Pratama, 2021), have examined the factors influencing the choice of e-wallets, highlighting their appeal to diverse user groups. In the context of Vietnam, this current study aims to assess these factors and draw comparisons between the characteristics of electronic wallet users for both inbound and outbound transactions. Furthermore, this study explores elements that exhibit characteristics specific to the chosen research region.

User behaviour variables:

The frequency of e-wallet use is defined as the total number of times a respondent utilised the e-wallet to make payments within a given month. The research aims to investigate whether the frequency of e-wallet use impacts the preference for an e-wallet service, which can be seen as an indication of the quality and usefulness of the e-wallet.

Expenditure refers to the average monetary value a user spends on a single payment made through an e-wallet, measured in millions of dong per payment. The average amount of money spent on each payment can reflect a user's confidence in the e-wallet they are currently using. A higher value spent on a single payment may indicate that the e-wallet has a good quality of service and high levels of security and safety, which can lead to greater consumer preferences.

Demographic variables:

The utilisation of e-wallets can be attributed to several demographic factors, including age, gender, income, education, and banking. Research conducted in Malaysia demonstrated a

significant correlation between age and the use of e-wallet services (Subaramaniam & Kolandaisamy, 2020; Teoh et al., 2020). In Thailand, both age and gender were found to influence e-wallet preferences among users (Intarot & Beokhaimook, 2018). Moreover, in Nigeria, the characteristics of e-wallet users were determined to be impacted not only by age but also by their level of education (Akinbile et al., 2014). Similarly, in Indonesia, income level was shown to be a statistically significant factor in the selection of e-wallet options (Saputri & Pratama, 2021).

This study investigates the correlation between individuals' primary bank selection and their adoption of e-wallet services. Vietnam boasts a diverse banking landscape, comprising over 30 banks, encompassing both small and large institutions (State Bank of Vietnam, 2022). Given the number of banks, it was not feasible to comprehensively analyse the influence of each on individuals' e-wallet usage choices. Consequently, a pre-test was carried out to request respondents to identify the bank they most frequently utilised relative to any Other banks they may have used. Based on feedback from 33 interviewees, the bank variable was categorized into distinct groups: Vietcombank, Agribank, TPbank, MBbank, and Other banks. The rationale behind examining this variable is that e-wallets can be launched by either a bank or a fintech company. As a result, some e-wallet providers restrict the number of partner banks that can be linked to their services or offer exclusive benefits such as free transactions from multiple banks. This incentive structure holds the potential to impact users' choices of e-wallets.

4. Research results

4.1. Descriptive statistics

Table 1

Descriptive Statistics of E-wallet Users Participating in This Study (N = 140)

Variables	Unit	Frequency	Min	Mean	Max
E-wallet	MoMo	70 (50.00%)	-	-	-
	ZaloPay	51 (36.43%)	-	-	-
	Other e-wallets	19 (13.57%)	-	-	-
Frequency	Times/month	-	1	6.136	20
Expenditure	Millions_dong/payment	-	0.03	0.226	1
Income	Millions_dong/month	-	2	8.342	27
Education	Years	-	5	14.779	18
Age	Years	-	18	26.057	44
Gender	Female	82 (58.57%)	-	-	-
	Male	58 (41.43%)	-	-	-
Banking	Vietcombank	46 (32.86%)	-	-	-
	Agribank	28 (20.00%)	-	-	-
	TPbank	15 (10.71%)	-	-	-
	MBbank	14 (10.00%)	-	-	-
	Other banks	37 (26.43%)	-	-	-

Source. Survey results in 2022

This study used a sample of 140 e-wallet users to investigate their behavioural patterns and demographic information. The collected data is presented in Table 1, which shows that Momo was the primary e-wallet used by half of the respondents, while the figure for ZaloPay was reported by approximately 36% of the users, and nearly 14% of those used Other alternatives.

Table 1 illustrates that a significant proportion of e-wallet users had a monthly income of approximately 8.5 million dong. This observation aligns with the average monthly income of urban employees in 2022, which was reported to be around 08 million dong by the General Statistics Office of Vietnam (General Statistics Office, 2022). This information underscores the reliability and representativeness of our findings for the population. Our study adhered to the primary objective of the non-cash payment plan, aiming to ensure that roughly 80% of Can Tho's population aged 15 and above have transaction accounts or access to online payment methods in 2025 (Lao Dong, 2022). Respondents were thoughtfully selected to encompass a diverse range of ages and educational backgrounds to ensure the research sample's representativeness. As a result, the age range of our respondents fell between 18 and 44 years, with an average age of 26 years. Furthermore, the average educational level among respondents was nearly 15 years.

Gender distribution among respondents revealed that 60% were female, while 40% were male. Additionally, our findings indicated that e-wallet users, on average, conducted six transactions per month, with an average expenditure of 226,000 dongs per transaction. In other words, typical e-wallet users allocate approximately 15% of their income, equivalent to 1,300,000 dong, towards online transactions. Regarding the distribution of preferred banks among e-wallet users, Vietcombank emerged as the top choice, selected by nearly one-third of respondents. This notable preference solidifies Vietcombank's position as a leading bank in Vietnam. Meanwhile, Agribank was a less common choice, with only 20% of respondents identifying it as their preferred bank. TPbank and MBbank each garnered a 10% share of respondents' preferences, while 26% opted for Other banks.

4.2. Factors affecting user's e-wallet choice

The findings of the MNL are displayed in Table 2, where Momo was chosen to become the base category because it dominated the population of surveyed e-wallet users. The R^2 pseudo statistic indicates that the model is appropriate for regression analysis, as the independent variables can account for the variation observed in the dependent variable across the three groups. Furthermore, the statistical significance of the model is evident, as it was found to be significant at a level of 0.01%.

As indicated in Table 2, the positive sign and statistical significance of the expenditure variable in both equations suggest that e-wallet users who spent higher amounts per transaction were more likely to select ZaloPay and Other e-wallet options over Momo. This finding suggests that Momo was more suitable for lower-value transactions. Furthermore, the positive and statistically significant magnitude of the income variable in both equations implies that individuals in the higher income bracket were less likely to opt for Momo over ZaloPay or Other alternatives. Therefore, it can be concluded that the choice of Momo among e-wallet users was more influenced by those in the lower-income group.

The results displayed in Table 2 indicate that various variables, including expenditure, income, gender, and the use of Other banks as the primary bank, have a significant impact on users' e-wallet preferences in the first equation. Specifically, those who favoured the Other banking category over Vietcombank demonstrated a preference for Momo over ZaloPay.

Additionally, the gender variable positively impacted the first equation, indicating that male users were more inclined to select ZaloPay over Momo compared to female users. In other words, this suggests that men are more likely to choose ZaloPay than female users. However, factors such as the frequency of e-wallet use, age, education, and the use of Agribank, TPbank, and MBbank were statistically insignificant in explaining the differences in user preferences between Momo and ZaloPay.

The analysis of preferences towards Momo and Other e-wallets revealed several statistically significant factors, shedding light on the dynamics influencing users' choices. These factors included expenditure patterns, usage frequency, income levels, age demographics, and the selection of Agribank and MBbank as primary banks. Upon examining the study's findings, older e-wallet users who primarily utilised Agribank and MBbank instead of Vietcombank exhibited a higher inclination towards Other e-wallets than Momo. This suggests that the choice of primary banks plays a role in shaping users' preferences. Additionally, the negative coefficient associated with the frequency variable in the second column provides an interesting insight. It indicates that as the frequency of e-wallet usage within a month increases, users are more likely to favour Momo over Other e-wallets. This finding implies that the frequency of usage positively impacts the preference for Momo, suggesting that users who engaged with e-wallets more frequently tended to show a stronger preference for Momo compared to Other e-wallets.

To summarise, the initial equation evaluated the favour between Momo and ZaloPay, while the second equation investigated the preferences of Momo and Other e-wallets. Compared to Momo, ZaloPay was the preferred choice among male users with higher incomes who conducted larger transactions and used Vietcombank. In contrast, a separate group of users, including those who were older individuals with higher incomes and spent more per transaction but had a lower frequency of e-wallet usage per month and used Agribank and MBbank, preferred Other e-wallets over Momo. Notably, the level of education and the utilisation of TPbank were insignificant in both equations, indicating that these factors do not influence the e-wallet choice. These findings highlight the multi-dimensional nature of users' preferences towards e-wallets, with factors such as age, gender, monthly income, primary bank selection, expenditures, and usage frequency all playing influential roles. By considering these factors, stakeholders in the e-wallet industry can gain valuable insights into consumer behaviour and tailor their offerings accordingly to attract and retain users effectively.

Table 2

Results of Multinomial Logit Regression (N = 140)

Variables	ZaloPay	Others
Expenditure (<i>millions_dong/payment</i>)	4.178*	6.547**
	(2.334)	(3.004)
Frequency (<i>times/month</i>)	-0.0492	-0.558**
	(0.0636)	(0.243)
Income (<i>millions_dong/month</i>)	0.355***	0.263**
	(0.0940)	(0.122)
Education (<i>years</i>)	0.219	0.189
	(0.152)	(0.201)

Variables	ZaloPay	Others
Age (years)	0.0205	0.147*
	(0.064)	(0.0810)
Gender (Male)	0.944*	-0.359
	(0.539)	(0.806)
Agribank	0.635	2.002*
	(0.774)	(1.094)
TPBank	1.152	0.948
	(0.882)	(1.301)
MBBank	-0.221	2.973**
	(1.098)	(1.253)
Other banks	-1.250*	-0.793
	(0.710)	(1.213)
Constant	-7.609**	-9.746**
	(3.166)	(4.619)
Log likelihood	-76.829	
Pseudo R2	0.4431	
Prob > chi2	0.0000	
Standard errors in parentheses		
*** p < 0.01, ** p < 0.05, * p < 0.1		

Source. Survey results in 2022

According to Greene (2003), interpreting coefficients in the MNL model is not a simple task, and as a result, the computation of marginal effects becomes crucial in providing a more comprehensible understanding. In this model, the marginal effect represents the alteration in the probability of the preferred primary outcome of e-wallet users, corresponding to each explanatory variable's change (Goktolga et al., 2005). The outcomes of calculating the marginal effects of the variables are presented in Table 3.

4.3. Results of marginal effects

Table 3

Results of Marginal Effects (N = 140)

Variables	MoMo	ZaloPay	Others
Expenditure (millions_dong/payment)	-0.537**	0.269	0.269*
	(0.252)	(0.232)	(0.151)
Frequency (times/month)	0.018**	0.02	-0.037**
	(0.008)	(0.013)	(0.016)

Variables	MoMo	ZaloPay	Others
Income (<i>millions_dong/month</i>)	-0.039***	0.037***	0.002
	(0.009)	(0.009)	(0.006)
Education (<i>years</i>)	-0.024	0.021	0.003
	(0.016)	(0.018)	(0.012)
Age (<i>years</i>)	-0.005	-0.004	0.01**
	(0.007)	(0.007)	(0.005)
Gender (<i>Male</i>)	-0.082	0.149**	-0.067
	(0.06)	(0.066)	(0.045)
Agribank	-0.112	-0.007	0.119*
	(0.092)	(0.104)	(0.072)
TPBank	-0.147	0.143	0.004
	(0.115)	(0.121)	(0.062)
MBBank	-0.088	-0.195	0.283***
	(0.11)	(0.121)	(0.1)
Other banks	0.138*	-0.14	0.003
	(0.08)	(0.087)	(0.059)
Standard errors in parentheses			
*** p < 0.01, ** p < 0.05, * p < 0.1			

Source. Survey results in 2022

Regarding the variables associated with e-wallet behaviour, the marginal effect of the expenditure variable was statistically significant in Momo and Other e-wallet usage. The marginal coefficient of expenditure in the first column displays a value of -0.537, indicating that a decrease in payment amount increased the likelihood of selecting Momo by 53.7%. This implies that e-wallet users were inclined to choose Momo as their primary preference in e-wallet use if they tended to have lower-value transactions. In contrast, selecting Other e-wallets indicated a positive marginal parameter, meaning that higher-value transactions increased the preference for selecting the Other e-wallets. Specifically, a one million increase in expenditure raised the probability of choosing Other e-wallets by 26.9%.

Furthermore, the frequency of payments per month was also statistically significant in both the Momo and the Others alternatives, with marginal coefficients of 0.018 and -0.037, respectively. The latter suggests that higher transaction rates per month decreased the probability of selecting Other e-wallets by 3.7%, whereas the likelihood of selecting Momo increased by 1.8%. Therefore, e-wallet users who regularly conducted transactions were more likely to prefer Momo, while those who limited their e-wallet usage would be inclined to select Other alternatives. These findings emphasise that e-wallet users who engaged in regular transactional activities were more inclined to prefer Momo as their e-wallet of choice. On the other hand, users who limited their usage of e-wallets demonstrated a greater propensity for selecting Other e-wallets.

Regarding socioeconomic and demographic variables, the marginal effect of the income variable reveals that low-income individuals were more likely to select Momo. In contrast, high-income individuals tended to prefer ZaloPay as their primary preference in e-wallet usage. The findings of this study indicate that a decrease in the user's monthly income by one million increased the probability of selecting Momo as the primary preference in e-wallet use by 3.9%. Conversely, the probability of selecting ZaloPay decreased by 3.7%.

As demonstrated in Table 3, it is apparent that the marginal effects of age and gender were only statistically significant in the use of Other e-wallets and ZaloPay, respectively. The marginal coefficient of age indicates that older respondents were more inclined to use the Other e-wallets as their primary preference in e-wallet usage. Specifically, the probability of choosing Other e-wallets increased by 1% for every one-year rise in the respondent's age. Regarding the gender variable, the marginal effect is 0.149, suggesting that the probability of using ZaloPay as the primary preference in e-wallet usage increased by 14.9% among male users. This finding suggests that male users were more likely to prefer ZaloPay over females.

Finally, the banking variable was observed to have a statistically significant impact on the choice between Momo and Others. Specifically, using Agribank or MBbank as the primary account, relative to Vietcombank, climbed the probability of selecting Other e-wallets by 11.9% and 28.3%, respectively. Conversely, the probability of selecting Momo increased by 13.8% when respondents used Other banks in the bank category.

To sum up, the findings of this study indicate that Momo users exhibited four significant characteristics, including a lower income level, a preference for smaller payment amounts, frequent usage of e-wallets, and use of Other banks. On the other hand, ZaloPay was primarily preferred by men with high incomes. Meanwhile, older people tended to pay higher value individual transactions but used e-wallets less frequently, and those who used Agribank and MBBank as their primary accounts tended to prioritise Other e-wallets as their primary preference in e-wallet use.

5. Conclusions

This research employed MNL as a methodological approach to investigate the factors affecting the preference of e-wallet users in Can Tho City, Vietnam. The results of this research align with previous studies that have investigated the impact of variables such as age (Subaramaniam & Kolandaisamy, 2020; Teoh et al., 2020), gender (Intarot & Beokhaimook, 2018) and income (Saputri & Pratama, 2021) on e-wallet preferences. However, unlike the findings by Akinbile et al. (2014), educational level was not found to have a significant effect on e-wallet preferences in Can Tho City, Vietnam. Additionally, this study examined the impact of payment amount, monthly frequency of e-wallet use, and the primary bank account used on e-wallet preferences. The results show that these variables are statistically significant in determining e-wallet choices. Based on the research findings, the MoMo e-wallet has held a significant position in the market, representing approximately 50% of the overall distribution. This particular e-wallet has gained immense popularity and trust among users. Significantly, this study has identified the user characteristics of the top three e-wallet services in Can Tho City, Vietnam, suggesting that each service has unique features that can attract different user groups.

The first group who preferred using Momo highlights four distinct traits that have been identified as statistically significant. The first characteristic observed among MoMo users was their relatively lower income compared to ZaloPay and Other e-wallet users. This suggests that individuals with limited financial resources were more inclined to opt for MoMo as their

preferred e-wallet service. Additionally, these users tended to engage in transactions involving smaller amounts of money, indicating a preference for micro or low-value transactions facilitated by MoMo. Furthermore, the study reveals that MoMo users exhibited a frequent and consistent pattern of e-wallet usage. This finding suggests that they relied heavily on the convenience and accessibility provided by MoMo for their daily financial transactions. Moreover, these users showed a marked preference for Others in the bank category over Vietcombank. In terms of the second e-wallet user group, the research highlights a distinct preference among men with higher incomes for the ZaloPay e-wallet. This finding implies that individuals with greater financial resources tended to gravitate towards a different e-wallet service, possibly due to the varying features, benefits, or branding associated with ZaloPay. Meanwhile, the last group who exhibited a preference for Other e-wallets identified the following demographic characteristics. Older individuals, who generally spent more on each purchase, demonstrated a lower frequency of e-wallet usage. Instead, they relied on Agribank or MBBank while considering Other e-wallets as their primary preference.

About academics, most prior research has primarily focused on examining individuals' intentions to embrace e-wallets, giving relatively little attention to the disparities associated with gender, income, education, and the behavioural facets of e-wallet usage. Nevertheless, this study has made a noteworthy contribution by providing empirical evidence that underscores the inclination of distinct user groups towards particular e-wallet services, influenced by their demographic and behavioural characteristics. Moreover, the outcomes of this research can add to the existing literature on Multinomial Logit Regression studies and provide more information about factors affecting e-wallet choices in Can Tho, Vietnam. Knowledge of user characteristics is essential, particularly for the industry, since this research can aid product development and marketing strategies. Regarding practices, these findings offer valuable insights for e-wallet service providers in comprehending user characteristics. Fintech companies can enhance their strategies by prioritising user-centric approaches and aligning their services with consumer characteristics to bolster usage rates. Furthermore, these results furnish crucial information for third-party entities, banks, and other stakeholders in electronic payments, enabling them to develop integrated functions and enhance user convenience.

While the research topic has successfully met its designated research objectives, limitations stemming from time and budget constraints necessitated using a simple random sampling method and a relatively modest sample size. Consequently, the research findings may not possess a high degree of representativeness. A broader and more diverse sample encompassing various geographical areas holds the potential to offer a more comprehensive understanding within the regional context.

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