

# Factors Affecting Electronic Wallet Usage Behaviour in Danang City, Vietnam

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**Abstract:** This study aims to examine factors affecting electronic wallet usage behaviour in Danang City, Vietnam. In addition, the study aims to explore the interrelationships among identified as well as the fit of conceptual model factors of electronic wallet usage behaviour in Danang City, Vietnam. All data were collected online from 311 respondents in Danang City, Vietnam. The data is then analysed using factor analysis and structural equation modelling. The study found that Behavioural Intention (BI) is positively and significantly correlated with Accessibility and Infrastructure (AI), Positive Feeling (PF), Habit (HB), Perceived Trust (PT), and Promotion (PM). However, Social Influence (SI) and Perceived Risk (PR) do not influence the behavioural intention of electronic wallet usage behaviour in Danang City, Vietnam. This study's findings are widely helpful for marketers and managers to plot their promotional and campaigning strategies, emphasising factors that motivate consumers to adopt e-wallet payment. The obtained findings also benefit architects and designers in designing products and services by consolidating lifestyle standards and other requirements of consumers. Policymakers should implement policies and strategies to enforce rules and educate the public to widely adopt cashless payment across various sectors.

**Keywords:** Accessibility and infrastructure, behaviour intention, e-wallet, habit, positive feeling, promotion

## Introduction

Electronic wallets, often known as e-wallets, have become a revolutionary tool in digital banking, providing users with a smooth and safe way to carry out financial transactions. E-wallets allow users to securely store payment details, conduct online transactions, transfer money, and make in-store purchases using their mobile devices. The worldwide shift towards cashless transactions and the growing dependence on digital payment solutions have driven the acceptance of e-wallets, transforming conventional payment methods and improving the overall effectiveness of financial transactions (Khalid et al., 2024).

Da Nang in Vietnam is an exceptional location for studying the elements that affect people's choices in using electronic wallets. It is crucial to comprehend the factors that influence the acceptance and usage of e-wallets by Da Nang City citizens for academic and practical purposes in the financial technology industry. Examining the contextual elements influencing the acceptability and utilization of e-wallets in Da Nang City can provide valuable information for customizing strategies and improving user experiences.

The widespread usage of electronic wallets, often known as e-wallets, has revolutionized the way financial transactions are conducted all over the world, providing consumers with increased convenience and efficiency. The adoption of electronic wallets varies across different regions and demographic groups, indicating that the factors influencing usage behaviour are not yet fully understood. In the context of Danang City, Vietnam, despite rapid urbanization and significant technological advancements, there remains a notable gap in understanding the specific drivers behind the acceptance and use of electronic wallets. It is essential to explore how local socioeconomic conditions, demographic characteristics, and technological readiness shape residents' adoption behaviour. Clarifying these aspects will provide valuable insights into the unique factors influencing electronic wallet usage in Danang City compared to other regions.

E-wallets may provide exceptional convenience in financial transactions, but concerns remain about the risks of a cashless economy, such as privacy breaches and network security issues (Dieu et al., 2023). Additionally, the limited technological skills of users, along with the widespread occurrence of phishing emails and the increase in fraudsters and hackers, provide substantial obstacles to the adoption of e-wallets (Dieu et al., 2023, Dangi & Yacob, 2013). Moreover, Lim et al. (2023) highlighted fraud as a significant obstacle to the widespread acceptance of e-wallet systems, pointing out that unaddressed concerns in this area can hinder customer willingness to keep using e-wallets. Trust difficulties related to e-wallets in comparison to traditional bank cards need to be resolved to encourage wider acceptance (Lim et al., 2023).

In addition, there is a lack of study that thoroughly examines customer views of the potential hazards linked to cashless payment technology in Vietnam (Lim et al., 2023). Hence, this study investigates factors affecting electronic wallet usage behaviour in Danang City, Vietnam. In addition, the study aims to examine the interrelationships among identified as well as the fit of conceptual model factors of electronic wallet usage behaviour in Danang City, Vietnam.

## **Literature Review**

### *Factors Affecting e-Wallet Usage Behaviour*

According to Ramli and Hamzah (2021), numerous researchers have employed various theories to develop their study frameworks related to e-wallets, with the Unified Theory of Acceptance and Use of Technology (UTAUT) being one of the most frequently used in previous studies. Afshan et al. (2018) extended the Technology Acceptance Model (TAM) by introducing the Initial Trust Model (ITM) and a risk dimension, emphasizing the importance of these additional factors in predicting Behavioural Intention (BI) in Internet banking usage in Pakistan. Despite this, there exists a notable research gap regarding the relationship between perceived risk (PR) and BI, as evidenced by conflicting findings in recent studies. Some research, such as that conducted by Abidin et al. (2017), Abrahão et al. (2016), and Giovanis et al. (2019), suggests a significant relationship between PR and BI. Conversely, other studies, including those by Tenk et al. (2020), Sitinjaka and Koesrindartoto (2019), and Widodo et al. (2019), indicate that PR does not exhibit a significant relationship with BI.

Similarly, the relationship between perceived trust and BI presents a contradictory picture in the existing literature. Recent studies by Widodo et al. (2019) and Rantung et al. (2020) highlight a significant association between perceived trust and BI. However, studies by Taufan and Yuwono (2018) and Suebtimrat and Vonguai (2021) contradict these findings, suggesting that perceived trust does not necessarily correlate significantly with BI.

Furthermore, a significant research void exists regarding the quantitative examination of the relationship between PM and BI. Adharsh et al. (2018) conducted qualitative research, revealing that promotions and incentives offered by providers have attracted Indian consumers to choose and use e-wallets.

Given these discrepancies, it is essential to have a thorough grasp of the relationship between PR, perceived trust, and BI when it comes to using e-wallets. This study aims to fill the research vacuum by examining and combining these opposing viewpoints, therefore enhancing our understanding of the elements that affect consumers' behavioural intentions toward e-wallet adoption.

### *Behaviour Intention (BI)*

Behavioural intention (BI) plays a crucial role in the adoption and sustained use of e-wallets, as evidenced by various research examining aspects that impact users' intentions. Daragmeh et al. (2021) studied the ongoing desire to use e-wallets during the COVID-19 pandemic, combining the Health Belief Model and Technology Continuous Theory. They emphasized the considerable influence of perceived utility on consumer intentions (Daragmeh et al., 2021). Pertiwi et al. (2020) studied the perceived usage of e-wallets among the Y Generation in Surabaya using the Technology Acceptance Model, highlighting the significance of behavioural attitude in users' decision-making.

Amankwa et al. (2023) investigated how the COVID-19 pandemic affected the intent of formal and informal sector workers in Ghana to use e-wallets. The study concluded that perceived behavioural control was not a significant factor in determining workers' intention, although other variables did impact adoption (Amankwa et al., 2023). In addition, Ariffin et al. (2021) studied customer intent to utilise e-wallet services. They found that perceived value did not enhance the connection between user happiness and e-wallet usage intention.

The study by Hakim et al. (2023) highlighted the crucial role of trust in shaping acceptance attitudes and BI, underscoring the necessity of trust-building techniques to encourage e-wallet adoption. Tian et al. (2023) studied how perceived trust and perceived service quality influence consumers' use of the Alipay e-wallet system, emphasizing the significance of attitude in predicting BI.

Shetu et al. (2022) investigated the sustained use intention of digital wallets, where BI partly mediates perceived usefulness, perceived ease of use, personal innovativeness, and perceived social influence. In addition, Sehat et al. (2023) researched the factors influencing the adoption of e-wallets among UiTM Melaka students and found that BI positively impacts the actual use of e-wallets.

Esawe (2022) conducted a study on mobile e-wallet users to analyse their intents and behaviour. The results showed that the model effectively accounted for a substantial amount of variability in BI and usage (Esawe, 2022). Nugroho et al. (2023) investigated how electronic word-of-mouth (e-WOM) influences consumer satisfaction by considering ease of use, perceived utility, and e-wallet payment. They emphasized the significance of mobile usefulness and simplicity of use in shaping BI (Nugroho et al., 2023).

The literature on the BI for e-wallet usage highlights several aspects that affect behaviour intention, such as perceived usefulness, perceived trust, value, and service quality. Organizations and governments can customize tactics to improve consumer acceptance and encourage the broad usage of e-wallets by comprehending these determinants.

### *Perceived Usefulness (PU)*

Perceived usefulness (PU) is a key concept in understanding user acceptance of technology, as highlighted in numerous research in diverse fields. The TAM and its expansions, including the UTAUT, have emphasized the significance of perceived utility in shaping users' attitudes and intentions toward adopting technology.

According to a study conducted by Martin (2022), PU has a more significant impact on an individual's inclination to employ technology than the Theory of Reasoned Action (TRA). Kim et al. (2008) suggested that PU is a crucial element in the adoption of mobile technology, along with perceived ease of use (PEU). Moreover, Hong et al. (2021) emphasized the influence of perceived utility on technology uptake among preschool instructors amid the COVID-19 pandemic.

In addition, a study conducted by Lee et al. (2017) found that negative affect does not influence PU. Furthermore, Widuri (2022) strengthened the concept of PU using indicators that improve user performance, fulfill needs, and simplify work processes in the digital ZIS acceptance setting. PU was also found to be a key factor influencing the use of a smartphone application for disaster in the study conducted by Wahyudi (2023).

Hence, PU is crucial in influencing users' acceptance and adoption of technology in various fields. It highlights its significance as a fundamental factor in defining user attitudes and intentions toward technology adoption.

***H1: Perceived usefulness (PU) positively influences the behavioural intention (BI) to adopt e-wallet usage in Danang City, Vietnam.***

*Perceived Ease of Use (PEU)*

Perceived ease of use (PEU) is a key term in the field of technology acceptance and user behaviour. The term refers to a person's belief that utilising a specific system will require minimal effort (Mardhiah et al., 2022). This view greatly impacts users' willingness to accept and utilise different technologies. Studies have demonstrated that the perceived simplicity of use positively influences the perceived usefulness (Mardhiah et al., 2022). PEU is linked to users' assessments of ease of use and ease of learning, which are inherent elements of technology use (Sun et al., 2010).

It is essential to grasp the connection between how easily technology is used and how valuable it is perceived to understand how users adopt technology. Research has shown that the PEU of using technology has a favourable impact on its usefulness, resulting in increased user satisfaction (Asmarina et al., 2022). PEU can indirectly affect behavioural intention by enhancing the influence of perceived usefulness on behavioural intention (Widiar et al., 2023). This indirect effect highlights how these two aspects are interrelated and influence consumers' attitudes and intentions toward technology.

***H2: Perceived ease of use (PEU) positively influences the behavioural intention (BI) to adopt e-wallet usage in Danang City, Vietnam.***

*Social Influence (SI)*

Social influence (SI) has been theorized to influence behavioural intention to use technology in the UTAUT model. Venkatesh et al. (2003) defined social influence as the extent to which an individual believes important individuals think a particular technology should be used. Venkatesh further demonstrated that SI is one of the four factors that directly and positively influence customer intentions. SI is a construct similar to the subjective norm in TAM2. Potential influencers for consumers to adopt an e-wallet include family members, friends, colleagues, and neighbours (Peng et al., 2016). Khan et al. (2021) pointed out that individuals tend to be influenced by advice or feedback from people in the early stages of using technology, especially when lacking sufficient experience and belief. Several previous studies have consistently demonstrated that SI has a significant impact on users' BI toward using e-wallet (Bommer, Rana, & Milevo, 2022; Esawe, 2022; Yang, Mamun, Mohiuddin, Nawi, & Zainol, 2021).

***H3: Social influence (SI) positively influences the behavioural intention (BI) to adopt e-wallet usage in Danang City, Vietnam.***

*Facilitating Condition (FC)*

Facilitating condition (FC) is one of the constructs that influence the BI to use the technology and the subsequent use of technology through direct and indirect means (Venkatesh, Morris et al., 2003). FC reflects consumers' perceptions of the resources and support available to perform the target behaviour. FC has been defined as factors and technical infrastructure that enhance mobile banking, such as training on how to use mobile banking or the capability and resources of a consumer (Chawla & Joshi, 2020). Empirical studies have shown that FC exhibits a strong positive effect on consumers' intention to accept payment system (Hanif, Wang, Mumtaz, Ahmed, & Zaki, 2022; Bommer, Rana, & Milevo, 2022; Gupta & Arora, 2020). One critical note that should be addressed is that FC acts as a mediator between user adoption and BI. Esawe (2022) and Ali et al. (2022) found that FC has an insignificant influence on consumers' BI toward using e-wallets, meanwhile significantly influencing consumers' user behaviour toward e-wallets. This contradiction implies that future research should focus on the impact of FC on BI.

**H4: Facilitating condition (FC) positively influences the behavioural intention to adopt e-wallet usage in Danang City, Vietnam.**

*Hedonic Motivation (HM)*

Venkatesh et al. (2012) developed a new model called UTAUT 2 by adding three new factors: hedonic motivation, habit, and price value, into the existing UTAUT model to predict consumer use of new technology. Venkatesh defined hedonic motivation (HM) as “the extent to which people tend to perform behaviours automatically because of learning.” In other words, it can be defined as pleasure and enjoyment derived from the post-usage behaviour of technology. The pleasure and fun of using mobile payments may affect consumer intention to use it. Previous researchers such as Rosli et al. (2020) and Lin, Lin, and Ding (2020) found that HM has a positive influence on users’ BI towards the use of mobile payment. However, Chresentia and Suharto (2020) found that there is no significant relationship between HM and BI when using e-wallets in e-commerce transactions. Therefore, there is a need to study the impact of HM on BI.

**H5: Hedonic motivation (HM) positively influences the behavioural intention (BI) to adopt e-wallet usage in Danang City, Vietnam.**

*Habit (HB)*

Venkatesh et al. (2003) incorporated three additional factors: hedonic motivation, habit, and price value, resulting in the formulation of UTAUT 2. Habit (HB) refers to the degree to which a person tends to perform a behaviour as a result of learning. According to findings by Macedo (2017), HB has been confirmed as a significant influencer in shaping the usage behaviour of communication and information technology, especially in the case of older adults. Similarly, Megadewandanu, Suyoto, and Pranowo (2016) discovered that HB was the most influential factor significantly affecting individual BI to use a mobile wallet in Indonesia, ranking higher than social influence, effort expectancy, and hedonic motivation. Previous researchers, such as Rosli et al. (2020) and Chresentia and Suharto (2020), have also reported a positive influence of habit on users’ BI towards using mobile payment.

**H6: Habit (HB) positively influences the behavioural intention (BI) to adopt e-wallet usage in Danang City, Vietnam.**

*Perceived Trust (PT)*

Perceived Trust (PT) plays a vital role in the adoption of technology and user behaviour, significantly impacting users' views and intents towards different technologies. Studies have highlighted the significance of trust, perceived usefulness, and perceived simplicity of use in influencing users' adoption of technology (Pipitwanichakarn & Wongtada, 2021). In addition, another research has demonstrated that trust is strongly associated with perceived ease of use, service quality, and price fairness, highlighting its interconnection with other important factors in technology adoption (Martínez-Navalón & Fernández-Fernández, 2023)

**H7: Perceived trust (PT) positively influences the behavioural intention (BI) to adopt e-wallet usage in Danang City, Vietnam.**

*Perceived Risk (PR)*

Perceived risk (PR) plays a vital role in the adoption of technology and user behaviour, shaping users' attitudes and intentions towards different technologies. Studies have found that perceived danger is a significant element that hinders the acceptance of technology (Hu et al., 2019). Scholars have highlighted that PR is strongly linked to a lack of trust and is a key factor that hinders technology adoption (Hu et al., 2019)

A study has investigated the connection between perceived danger and aspects like perceived utility, perceived simplicity of use, and attitude. Research has shown that PR, in combination with these characteristics, affects consumers' adoption behaviour (Namahoot & Rattanawiboonsom, 2022; Rahman & Sloan, 2017). In addition, PR influences the relationships between perceived net equity, perceived amount of uncertainty, and inclinations to adopt technology (Hong & Cho, 2023).

***H8: Perceived risk (PR) negatively influences the behavioural intention (BI) to adopt e-wallet usage in Danang City, Vietnam.***

#### *Promotion (PM)*

Promotional activities substantially impact the adoption of e-wallets, as evidenced by the number of studies. Paat et al. (2022) emphasized the importance of utilising effective promotional techniques to reduce PR to promote e-wallet adoption among enterprises. In addition, Trinh et al. (2022) emphasized the significance of taking promotional efforts into account, along with other considerations, in influencing consumers' choices to use e-wallets. Sulaiman (2023) also highlighted the importance of trust-building promotional initiatives in promoting user confidence and increasing e-wallet usage. In another study, Janteng and Dino (2022) found that PEU and perceived social influence are important factors influencing people's intention to adopt e-wallets in Malaysia. They suggest that promotional tactics focusing on these factors can increase users' willingness to adopt e-wallets (Janteng & Dino, 2022). Rahman et al. (2022) expanded the TAM model to study e-wallet adoption in Malaysia during the COVID-19 pandemic, emphasizing the significance of comprehending how promotional activities can impact e-wallet adoption in crisis scenarios (Rahman et al., 2022).

***H9: Promotion (PM) positively influences the behavioural intention (BI) to adopt e-wallet usage in Danang City, Vietnam.***

## **Theoretical Framework**

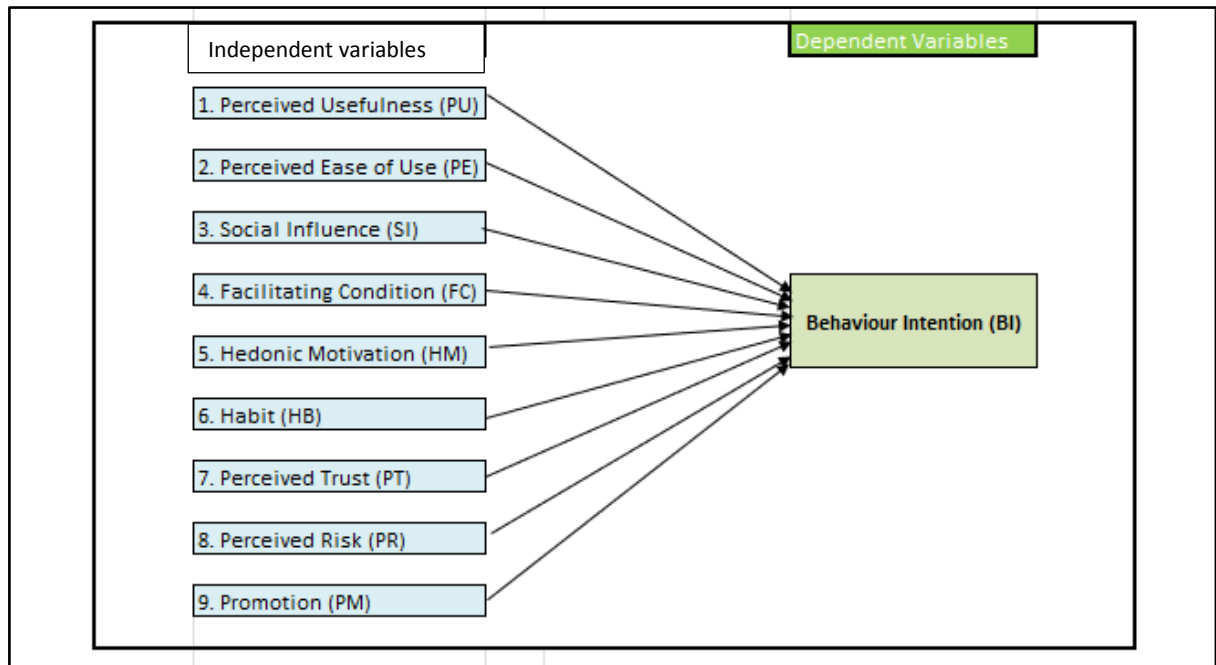
Davis (1989) proposed the TAM model and found that PU and PE are two critical factors influencing user intention to use the technology. The TAM model is widely used in the field of Information Technology (IT) to explain information system usage. Numerous empirical studies have consistently demonstrated that the TAM model consistently explains the variance in usage intention and behaviour. However, the TAM model cannot explain individual behaviour toward technology acceptance, as these studies only explained 40 percent of a system's use.

Therefore, Venkatesh et al. (2003) developed an integrated model, UTAUT, to explain the acceptance of technology. They theorized that performance expectancy, effort expectancy, SI, and FC are the four main factors affecting user acceptance and usage behaviour, Venkatesh et al. (2003).

In 2012, Venkatesh et al. (2012) extended the UTAUT theory by incorporating three new predictor variables: HM, price value, and HB, alongside the existing four of UTAUT, to predict consumer use of new technology. Chiang (2012) compared the variance explained in behaviour intention between the TAM with UTAUT 2 and the TAM model. The results showed that the variance explained in behaviour intention in the UTAUT model increased from 40% to 52% when compared with the TAM model. Furthermore, the extension of UTAUT significantly improved from 56% to 74%. Consequently, many e-wallet studies have adopted the theoretical UTAUT 2 model to explore different factors influencing the intention to use e-wallets. According to Ramli and Hamzah (2021), numerous researchers use several theories to develop their study framework related to e-wallets, and UTAUT is among the most often used by previous studies. In addition to UTAUT, Afshan et al. (2018) extended the TAM theory by incorporating two new variables, namely the Initial Trust Model (ITM) and risk dimension, to predict behavioural intention in Internet banking usage in Pakistan. Afshan found that initial trust, structure assurance, and familiarity with the bank are significant factors affecting users' intention to adopt Internet banking. Privacy and time risks were found to have a negative relationship with users' intention to accept Internet banking. Weng and Run (2013) study the

effects of Malaysian consumers' personal values and sales promotion preferences (PM) on their overall purchase satisfaction (attitude) and behavioural intention (behaviour). The findings revealed that various sales promotion techniques carried out by retailers, manufacturers, and distributors affect the level of purchase satisfaction and BI. Both hedonic and utilitarian sales promotion techniques were used to gain and create market share and competition.

Based on the UTAUT model, the theoretical framework is shown as per Figure 1:



**Fig. 1.** Theoretical Framework

## Methodology

### *Data Collection*

This study utilised data collected by the research team from the University of Danang, focusing on factors affecting electronic wallet (E-wallet) usage behaviour in Danang City. To avoid ambiguity in the questions, the questionnaire began with the study's purpose, a definition of an e-wallet, and the types of e-wallets commonly used in Vietnam. The inclusion of this information helps ensure that respondents understand and answer the questions as intended. The questionnaire consisted of two sections. In the first section, respondents were required to provide their demographic profiles, including gender, age, and the duration of e-wallet usage.

According to Tiwari et al. (2019), there is a significant relationship between independent variables (such as age, gender, annual income, occupation, marital status, and qualification) and dependent variables (the frequency of using digital wallets). This demographic information is crucial for a more in-depth analysis of the relationship between these factors and the variables of interest. The second section of the questionnaire involved respondents rating their level of agreement to 36 items based on a five-point Likert scale, where 1 indicated strongly disagree, and 5 indicated strongly agree. These 36 items belonged to ten constructs based on different models, such as TAM, UTAUT2, and ITM models. All the constructs were adopted from the literature. The details of corresponding items, along with constructs, are shown in Diagram 1, aimed to capture a comprehensive view of the factors influencing electronic wallet usage behaviour.

A total of 311 respondents, comprising 214 females and 97 males, were included in this scientific research. All respondents are e-wallet users who are using e-wallet to store money and conduct online transactions via computer or smartphone in Danang City at any time. The frequency of using digital wallets is divided into four categories: 47% of respondents participating in this research

have been using e-wallet for less than 6 months, 26% have used e-wallet for at least 6 months but less than 12 months, 16% have used e-wallet for at least 12 months but not more than 24 months, and the last group comprises individual using e-wallet for more than 24 months, accounting for 11% of respondents in this survey. The age group is also divided into four categories: 47% of respondents are under 21 years old, 26% are between 21 and 25 years old, 16% are between 26 and 30 years old, and finally, 11% are over 30 years old.

### *Data Analysis*

During the data cleaning step, relevant factors are meticulously chosen from the questionnaires provided, which are constructed according to the UTAUT paradigm as recommended by previous research. Missing values are handled using imputation methods like mean substitution or regression imputation. Outliers are detected using statistical techniques like z-scores or boxplots and managed by Winsorization or elimination if needed. Normalcy tests are carried out by assessing skewness and kurtosis, and data transformation is applied if the distribution shows considerable deviation from normalcy.

Next, reliability tests are conducted using SPSS IBM 27 software, using Cronbach's alpha to evaluate internal consistency. The standard acceptance threshold for Cronbach's alpha is 0.7 or higher, suggesting satisfactory reliability. Convergent validity is evaluated by analysing factor loadings to confirm that each indicator strongly loads onto its respective latent construct. Discriminant validity is assessed by comparing the square root of the Average Variance Extracted (AVE) for each construct with the correlations between constructs.

After that, factor analysis is conducted according to the theoretical framework of the UTAUT model. Using Principal Component Analysis (PCA) with Varimax rotation, the number of factors to keep is decided based on the Kaiser criterion of keeping factors with eigenvalues above 1 and the Scree plot or parallel analysis. Factor loadings of 0.4 are deemed significant, suggesting robust connections between variables and factors.

The next step would involve using AMOS 29 Software to determine the model fit. The SEM framework is constructed using variables determined through factor analysis. Latent variables are defined along with the observable indicators. The theoretical connections between hidden variables are integrated into the model, creating the structural routes. SEM model parameters are estimated. Estimates are calculated for factor loadings, regression coefficients, and error variances, while modification indices are utilised to pinpoint places in the model that could be enhanced.

Sensitivity analyses are performed to assess the stability of the results under different conditions. It requires reanalysing the data and re-establishing the relationships between variables to meet the criteria of absolute, incremental, and parsimonious fit in each model. Last but not least, the results from the SEM study are finally examined and interpreted. The data's patterns, trends, and linkages are analysed in connection to the research objectives and hypotheses. The discussion focuses on the significance of the findings for theory, practice, and future research in the field of e-wallet adoption.

## **Findings and Discussion**

### *Exploratory Factor Analysis (EFA)*

Factor analysis is a technique that is used to reduce a large number of variables into a smaller number of factors. We analyse the EFA for a total of nine independent variables using the PCA and Varimax rotation. As indicated by the significant level of Bartlett's test being below 0.05 and the KMO value of 0.91, which indicates adequate sampling. The total variance obtained for eigenvalues greater than one was 69.34%, meaning that 69.34% of the variance in the data could be explained. Finally, seven components were identified from a total of nine independent variables. The loading of all factors is found to be more than 0.50. Accessibility and infrastructure (AI) are the new factors that comprise the PEU and FC constructs. Additionally, the HM and PU constructs were integrated to generate new factors called Positive Feelings (PF) toward e-wallets.

Table 1 indicates that the instrument's overall reliability is acceptable, with every factor falling within an acceptable range of above 0.70 based on Cronbach's alpha value. This suggests that the instrument consistently measures the constructs it intends to assess with sufficient internal consistency.

**Table 1.** Reliability Test

<b>Construct</b>	<b>Reliability Test</b>	<b>Item</b>
Accessibility & Infrastructure (AI)	0.880	7
Positive Feeling (PF)	0.879	7
Promotion (PM)	0.841	3
Perceived Trust (PT)	0.895	4
Habit (HB)	0.854	4
Social Influence (SI)	0.734	4
Perceived Risk (PR)	0.892	3
Behavioural Intention (BI)	0.882	4
<b>Overall</b>	<b>0.932</b>	<b>36</b>

**Table 2.** Exploratory Factor Analysis Outcome

	<b>Accessibility &amp; Infrastructure (AI)</b>	<b>Positive Feeling (PF)</b>	<b>Promotion (PM)</b>	<b>Perceived Trust (PT)</b>	<b>Habit (HB)</b>	<b>Perceived Risk (PR)</b>	<b>Social Influence (SI)</b>
<i>IPE1</i>	<b>0.683</b>	0.339			0.241		0.193
<i>IPE2</i>	<b>0.756</b>	0.251		0.131	0.211	-0.182	
<i>IPE3</i>	<b>0.57</b>	0.386	0.11	0.17	0.101		0.107
<i>IPE4</i>	<b>0.7</b>	0.299		0.142	0.297		
<i>IFC1</i>	<b>0.574</b>		0.417	0.157	-0.167		0.318
<i>IFC2</i>	<b>0.688</b>	0.104	0.245	0.224		-0.198	0.128
<i>IFC3</i>	<b>0.602</b>	0.165	0.453	0.169			0.217
<i>2PU1</i>	0.307	<b>0.686</b>	0.228				0.164
<i>2PU2</i>	0.265	<b>0.782</b>	0.181	0.109			
<i>2PU3</i>	0.128	<b>0.834</b>	0.111	0.132		-0.104	
<i>2PU4</i>	0.248	<b>0.496</b>	0.112	0.137	0.147	-0.115	0.38
<i>2HM1</i>	0.316	<b>0.371</b>	0.316	0.28	0.292		0.308
<i>2HM2</i>	0.379	<b>0.495</b>	0.104	0.297	0.289		0.185
<i>2HM3</i>	0.365	<b>0.388</b>	0.185	0.282	0.39		0.266
<i>3PM1</i>	0.133	0.237	<b>0.774</b>	0.11	0.13		
<i>3PM2</i>		0.138	<b>0.788</b>	0.149	0.164		
<i>3PM3</i>	0.237	0.125	<b>0.774</b>	0.222	0.137		
<i>5PT1</i>	0.147	0.219	0.4	<b>0.603</b>		-0.129	0.206
<i>5PT2</i>	0.284	0.141	0.231	<b>0.739</b>	0.163	-0.187	0.153
<i>5PT3</i>	0.246		0.163	<b>0.79</b>	0.163	-0.24	
<i>5PT4</i>	0.158	0.182	0.119	<b>0.795</b>	0.148	-0.237	0.198
<i>4HB1</i>	0.309	0.164	0.266		<b>0.643</b>	-0.161	0.203
<i>4HB2</i>	0.128		0.14		<b>0.869</b>		

4HB3		0.129		0.196	<b>0.816</b>	-0.13	0.137
4HB4	0.276		0.354	0.164	<b>0.602</b>	-0.201	0.15
7PR1				-0.219		<b>0.852</b>	
7PR2				-0.132	-0.112	<b>0.89</b>	
7PR3		-0.105		-0.116	-0.156	<b>0.861</b>	
6SI1	0.194	0.106	0.231		0.145		<b>0.718</b>
6SI2				0.172	0.113		<b>0.825</b>
6SI3	0.125	0.143		0.275	0.15		<b>0.631</b>
1SI4	0.446		0.282	0.28	0.139		<b>0.421</b>

*The coefficients meet the condition.*

Cronbach's Alpha	0.88	0.879	0.841	0.895	0.854	0.892	0.734
Eigenvalue	4.364	3.33	3.142	3.063	3.045	2.667	2.578
Cumulative %	69.34%						
KMO	0.91						
Bartlett's Test	0.000						

### Measurement Model

In this study, the measurement model or construct's validity, reliability, and unidimensionality are assessed using a confirmatory factor analysis (CFA). Prior to testing structural models, the measurement model's validity and reliability are assessed using SPSS AMOS version 29.

Standard model fit categories to assess a model's fitness include absolute model fit, incremental fit, and parsimonious fit. Absolute model fit indices evaluate how well the hypothesized model fits the observed data without comparing it to alternative models or null models. Examples of absolute fit indices include RMSEA (Root Mean Square Error of Approximation) and Goodness-of-Fit Index (GFI). Incremental fit indices compare the fit of the hypothesized model to that of a baseline model. Examples include the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Non-Normed Fit Index (NNFI). Parsimonious fit indices take into account the complexity of the model, penalizing for model complexity. Examples include the Normed Chi-Square (CMIN/DF).

The fitness of the model needs to be investigated before further analysis. The recommended values for RMSEA and CMIN/DF are lower than 0.08 and 5.00, respectively, indicating a good fit for absolute and parsimonious fit. In comparison, higher values of CFI, TLI, and NFI indicate a good fit for incremental fit models, with a standard threshold set at 0.90 or higher for each of these indices. If the model does not meet the fit index, the factor loadings and modification indices (MI) are examined to improve model fit.

According to Table 3, only the SI and BI models meet all recommended values for the models' fit indices. The PR and SI may be considered fit as they meet the GFI, CFI, and NFI indices, even though the CMIN/DF is null due to having only three items within a construct.

However, the initial CFA models for AI, PF, and HB were found to be unfit as they did not meet all criteria of the model fit category, as shown in Table 4.2.1. For example, the RMSEA and CMIN/DF are higher than 0.08, and the values of GFI, CFI, TLI, and NFI are lower than 0.90. Even though the PT model met at least one of the fit indices for two different criteria of the model (incremental fit and parsimonious fit), with GFI, CFI, TLI, and NFI greater than 0.90, the value of CMIN/DF departs significantly from the recommended value of 5.00. Therefore, we need to improve these four measurement models by examining their item factor loadings or modification indices (MI). An item with a lower factor loading should be deleted from the construct. If the MI is more than 15, it indicates a redundant item. In such cases, we need to decide whether to delete one of the items with

the lowest factor loading or correlate the pair of redundant items as free parameter estimates to solve the redundant item and improve the model fit.

We removed the 1FC1 and 1FC3 items from the AI model because their factor loadings were lower than 0.60. Additionally, items 2PU1, 2PU3, and 2PU4 had lower factor loadings, so we deleted them and correlated errors 7 and 11 in an attempt to increase the fitness of the PF model. Thirdly, we connected errors 13 and 16 for the habit model to increase the model's fitness. Finally, we connected errors 28 and 30 to improve the fitness of the PT model.

The measurement model for these four constructs has been improved and meets all recommended values for the three-model fit category after the modifications. For example, the GFI, CFI, TLI, and NFI for all models are greater than 0.90. Additionally, for the CMIN/DF, all models have values lower than 5.00, except for the SI and PR models, as the construct only has three items and a slightly higher value of 5.352 for the PT model.

After the measurement models are fitted, we must assess the convergent and discriminant validity of each measurement model. The AVE is an indicator used to determine convergent validity. As a rule of thumb, an AVE of at least 0.50 is highly recommended for adequate convergence. However, if the AVE is less than 0.5 but the composite reliability (CR) is higher than 0.6, the convergent validity of the construct is still considered adequate (Fornell & Larcker, 1981). Table 4.2.3 indicates that all constructs have appropriate convergent validity, with an AVE larger than 0.50 and a CR higher than AVE.

Discriminant validity refers to the extent to which factors are distinct and uncorrelated. When there are no redundant elements in the measurement model, discriminant validity is achieved. The rule is that the square root of AVE must be greater than the correlation between the respective constructs. Each measurement model should have a stronger relationship with its factor than with any other factor. In Table 6, the diagonal values (in bold) represent the square root of AVE, while the other values represent the correlation between the respective constructs. Discriminant validity for all constructs is achieved when the diagonal value is higher than the values in its row and column. As indicated in Table 4.2.4, discriminant validity is achieved for all constructs.

**Table 3.** Measurement Model Fit Indices Before Modification

Name of Criteria	Name of Index	(AI)	(PF)	(HB)	(PT)	(PM)	(PR)	(SI)	(BI)
Absolute Model Fit	RMSEA	0.194	0.229	0.357	0.220	0.636	0.723	0.077	-
	GFI	0.845	0.782	0.878	0.954	1.000	1.000	0.991	0.997
Incremental Fit	CFI	0.849	0.800	0.872	0.962	1.000	1.000	0.985	1.000
	TLI	0.773	0.700	0.617	0.962	NULL	NULL	0.956	1.003
	NFI	0.838	0.791	0.870	0.960	1.000	1.000	0.978	0.998
Parsimonious Fit	CMIN/DF	11.998	16.258	38.088	15.082	NULL	NULL	2.727	0.729
<b>Model Fit</b>		<b>Not meet</b>				<b>Meet</b>			

**Table 4.** Measurement Model Fit Indices After Modification

Name of Criteria	Name of Index	(AI)	(PF)	(HB)	(PT)
Absolute Model Fit	RMSEA	0.067	0.101	0.0270	0.122
	GFI	0.984	0.993	0.9980	0.91
	CFI	0.990	0.995	1.0000	0.994
	TLI	0.980	0.969	1.0000	0.965
Incremental Fit	NFI	0.983	0.993	0.9980	0.993
Parsimonious Fit	CMIN/DF	2.319	3.944	1.2040	5.352
<b>Model Fit</b>		<b>Meet</b>			

**Table 5.** Convergent Validity and Composite Reliability (CR) for Each Construct

Construct	Convergent Validity	Composite Reliability	Discriminate validity
AI	0.569	0.901	0.755
PF	0.631	0.889	0.794
HB	0.589	0.882	0.768
PM	0.637	0.859	0.798
PR	0.737	0.875	0.858
BI	0.656	0.893	0.810
PT	0.710	0.900	0.843
SI	0.408	0.838	0.639

**Table 6.** Discriminate Validity between the Construct

	AI	PF	HB	PM	PR	BI	PT	SI
AI	<b>0.755</b>							
PF	0.749	<b>0.794</b>						
HB	0.488	0.55	<b>0.768</b>					
PM	0.481	0.58	0.392	<b>0.798</b>				
PR	-0.316	-0.219	-0.305	-0.1	<b>0.858</b>			
BI	0.171	0.178	0.153	0.181	0.049	<b>0.810</b>		
PT	0.566	0.596	0.461	0.54	-0.434	0.399	<b>0.843</b>	
SI	0.585	0.661	0.498	0.471	-0.174	-0.043	0.59	<b>0.639</b>

### Structural Model

All measurement models were combined into one measurement model to see whether they are all valid and reliable. The fitness indices assessment for the structural model is shown in Table 7. For example, an RMSEA is 0.069, lower than 0.08, and a CMIN/DF is 2.382, lower than 5.00, indicating a good absolute and parsimonious fit. In addition to the fitness indices mentioned in Table 7, the structural model also exhibits a Comparative Fit Index (CFI) higher than 0.902, indicating a well-fitting model. This comprehensive assessment suggests that the structural model accurately represents the relationships among the variables under study. As a result, it can serve as a reliable tool for testing hypotheses and gaining insights into the underlying mechanisms discussed earlier. A well-fitting structural model enhances the credibility of the study's findings and provides a solid foundation for future research and practical applications in the field.

**Table 7.** The Fitness Indices Assessment for the Structural Model

Name of Criteria	Name of Index	Result	Remark
<b>Absolute Model Fit</b>	RMSEA	0.069	Meet
	GFI	0.823	Not Meet
<b>Incremental Fit</b>	CFI	0.902	Meet
	TLI	0.887	Not Meet
	NFI	0.844	Not Meet
<b>Parsimonious Fit</b>	MIN/DF	2.382	Meet

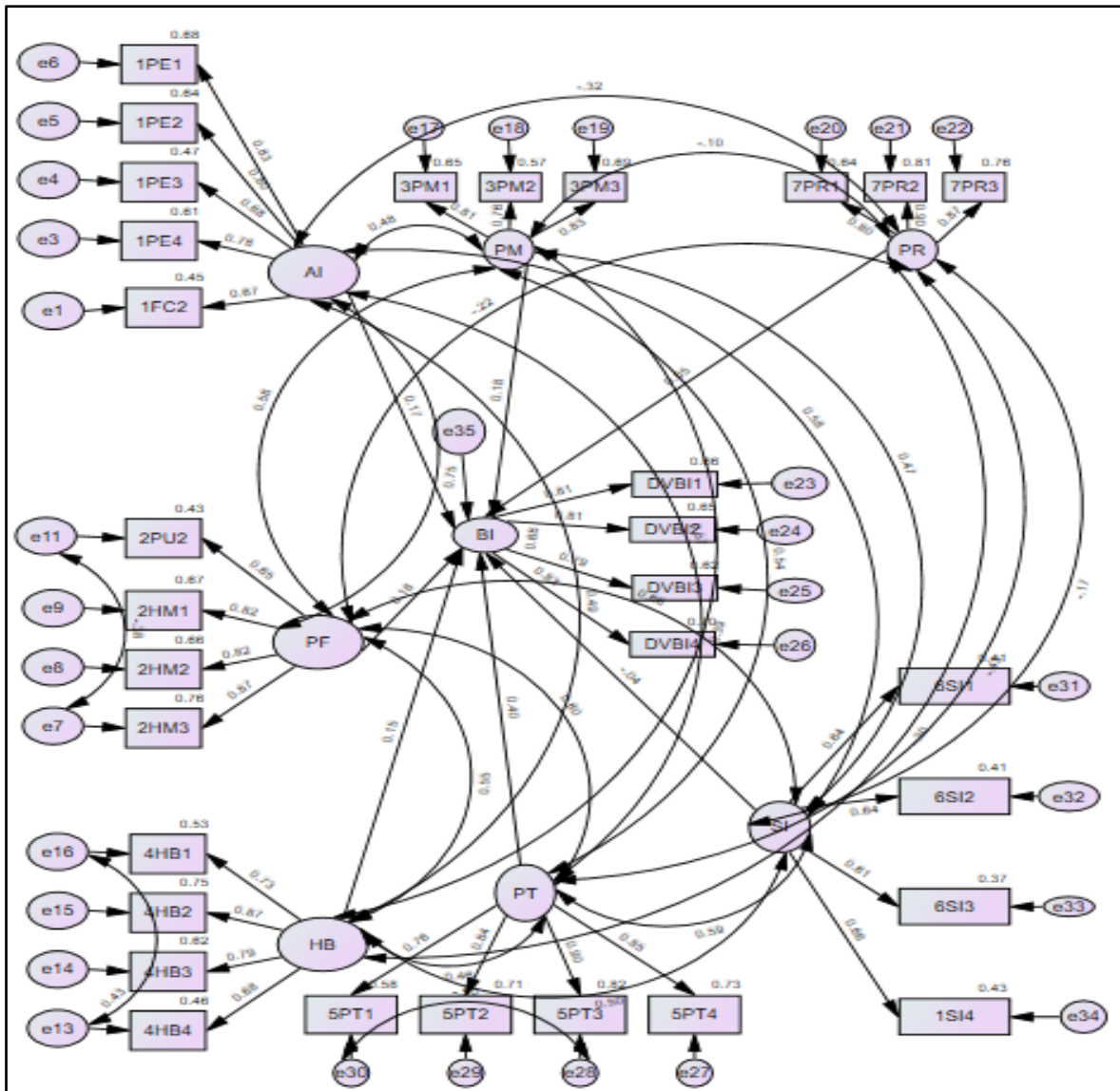


Fig.2 The Structural Modelling

*Hypothesis Testing*

The coefficient of determination ( for behavioural intention is 0.684, as shown in Figure 1. The data indicates that approximately 68.4% of the variance in behavioural intention is explained by the factors included in the structural model. This strong variance explanation highlights how well the model explains the factors influencing behavioural intention. Furthermore, the lack of multicollinearity problems is indicated by the correlation between the constructs, which is less than 0.85, as shown in Table 4.2.4. This is important because it makes sure that the predictor variables in the model do not have a strong correlation with one another, which could lead to inconsistencies in the estimation of how each predictor variable affects behavioural intention.

Table 8 shows that BI is positively and significantly correlated with AI, PF, HB, PT, and PM. These findings suggest that as the accessibility and infrastructure provided by the e-wallet provider improve, along with a positive feeling toward using the e-wallet, the formation of a habit in using the e-wallet, higher confidence in the e-wallet platform, and increased promotional activities, the likelihood of using an e-wallet also increases. However, it is noteworthy that BI's use of an e-wallet is not influenced by social influence. These findings are consistent with the results of two previous studies conducted by Gupta and Arora (2020) and Shin and Lee (2021), which found that SI is not associated with the adoption of mobile wallets. Additionally, the PR not being associated with the

adoption of digital wallets in Indonesia, as indicated by Widodo et al. (2019), is also consistent with the results of this study.

**Table 8.** Hypothesis Testing Result

No	Hypothesis Test	Estimate	P	Remark
H1	BI <--- AI	0.141	0.028	<b>Supported</b>
H2	BI <--- PF	0.187	0.046	<b>Supported</b>
H3	BI <--- HB	0.122	0.01	<b>Supported</b>
H4	BI <--- PT	0.297	***	<b>Supported</b>
H5	BI <--- SI	-0.045	0.588	Not Supported
H6	BI <--- PR	0.03	0.354	Not Supported
H7	BI <--- PM	0.165	0.004	<b>Supported</b>

## Conclusion

This study aims to examine factors affecting electronic wallet usage behaviour in Danang City, Vietnam. In addition, the study seeks to investigate the interrelationships among identified as well as the fit of conceptual model factors of electronic wallet usage behaviour in Danang City, Vietnam. The study employed a comprehensive methodology involving EFA and CFA. EFA helped identify key factors influencing e-wallet usage behaviour, while CFA validated and refined the measurement models. Subsequently, a structural model was constructed to examine the relationships among variables and test hypotheses regarding e-wallet adoption determinants.

Firstly, we identified seven key factors affecting e-wallet usage BI using factor analysis. From nine factors that have been set through the theoretical framework, the factors have been reduced to seven factors, namely AI, PF, PM, PT, HB, SI, and PR. After that, SEM is employed to identify the interrelationship and fitness of the model. Based on the structural equation modelling result, we found that BI is positively and significantly correlated with AI, PF, HB, PT, and PM. These findings suggest that as the accessibility and infrastructure provided by the e-wallet provider improve, along with a positive feeling toward using the e-wallet, the formation of a habit in using the e-wallet, higher confidence in the e-wallet platform, and increased promotional activities, the likelihood of using an e-wallet also increases. However, it is noteworthy that behavioural intention to use an e-wallet is not influenced by social influence. The structural model demonstrated strong explanatory power, with approximately 68.4% of the variance in behavioural intention explained by the identified factors.

In summary, our study provides valuable insights into the drivers of e-wallet adoption in Danang City, highlighting the importance of accessibility, positive user experience, and trust in shaping user behaviour. These findings can inform targeted strategies to promote e-wallet adoption and enhance the digital payment ecosystem in Vietnam and beyond. However, this study is not without its limitations. The research is confined to Danang City, which may limit the generalizability of the findings to other regions. Additionally, the study primarily relies on self-reported data, which may introduce response bias. Future research could expand the geographical scope and employ longitudinal data to capture evolving user behaviour over time. Moreover, exploring additional factors like regulatory impact and technological literacy could further enhance the understanding of e-wallet adoption dynamics.

## Co-Author Contribution

The authors confirmed that there is no conflict of interest in this article. Alnadzry, Soo Peng, and Hafiza carried out the fieldwork and prepared the literature review. Zahayu and Masnita wrote the research methodology and did the statistical analysis and interpretation of the results. All authors reviewed the results and approved the final version of the manuscript.

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