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Factors Affecting The Decision To Use Apple Pay Wireless E-Wallet

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Abstract:

Purpose: This study investigates the factors influencing the decision to use Apple Pay in Vietnam. It seeks to understand how various perceptions and expectations shape consumer behavior toward adopting wireless payment systems.

Theoretical framework: The research framework is built upon established theories related to technology acceptance and consumer behavior. Key influencing factors examined include Security Perception, Utility Perception, Performance Expectation, Usage Attitude, Ecosystem, and Ease of Use.

Design/methodology/approach: A mixed-methods approach was utilized, combining qualitative and quantitative research methods. A survey was conducted with a sample of 350 consumers in Vietnam. The collected data was analyzed using SmartPLS 3.9 software to ensure the reliability and validity of the measurements.

Findings: The analysis reveals that Security Perception significantly impacts the decision to use Apple Pay. Other factors, such as utility perception, performance expectation, and ease of use, also contribute to adopting this wireless electronic wallet.

Research, Practical & Social Implications: The findings provide valuable insights for stakeholders in the digital payment ecosystem, particularly in enhancing the user experience and addressing security concerns. For practitioners, the study suggests strategies to improve consumer acceptance and usage of Apple Pay. Socially, the research underscores the shift in consumer attitudes toward mobile payment solutions in a technologically advancing environment.

Originality/value: This study adds to the literature on mobile payment systems by focusing on the specific context of Vietnam, where adopting such technologies is on the rise. It provides a nuanced understanding of the factors driving consumer decisions to use wireless payment services, with implications for academic research and practical applications in the digital payments market.

Keywords: Electronic payments, wireless wallet, Apple Pay, usage decision.
JEL Classification: D12, L81, O33, M15, M31

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1. Introduction:

In the technological age's evolution, the digitalization era is expanding, and a rapid payment revolution is occurring. The transaction value in the mobile POS payment market is projected to reach 2.99 billion USD by 2023 (Statista, 2023), and the expected Compound Annual Growth Rate (CAGR 2023–2027) is 14.34, with an anticipated value of 5.11 billion USD by 2027 (Statista, 2023). The estimated number of users is expected to rise to 35.0 million by 2027 (Statista, 2023). The mobile network and internet infrastructure in Vietnam are experiencing remarkable development. With the deployment of 4G networks and the ongoing progress toward 5G, users are provided with fast and stable access, opening up opportunities to use wireless payment applications conveniently. Decision No. 1813/QD-TTg approved the "Development scheme for non-cash payments in Vietnam for 2021-2025" (Minister, 2021). This assumes that the use of electronic wallets is essential in the current Vietnamese market, and it has become a modern trend in Vietnam by combining modern financial technology with online payment across various market segments. The total transaction value of electronic payments in Vietnam is estimated to reach 15 billion USD in 2021, with an expected annual growth rate of 15.7% by 2025 (PWC, 2021). This situation requires e-wallets like Apple to understand the factors that affect Vietnamese consumers. From the above issues, the authors chose the topic: "Factors influencing the decision of consumers in Vietnam to use their Apple Pay wireless e-wallet." This study aims to analyze factors that influence decision-making, and based on those assessments, the team develops a research model based on data analysis. Finally, the study offers scientific governance solutions to attract more and more consumers to use e-wallets and help enterprises and users better understand the interaction between technology and consumers.

2. Literature Review And Hypothesis Development:

Theory of consumer behavior:

Consumer behavior theory (Philip Kotler, 1990) is essential in studying Apple Pay's choices. According to Philip Kotler, consumer behavior is the study of how individuals, groups, and organizations choose, buy, use, and eliminate goods, services, ideas, and experiences to satisfy their needs and desires. This theory can be applied to understand why consumers use or do not use Apple Pay.

Technology Acceptance Model (TAM):

Theories of technology acceptance, such as the TAM (Technology Acceptance Model) (Davis, 1989) or the UTAUT (Unified Theory of Acceptability and Use of Technology) (Venkatesh, 2003), can help analyze the impact of individual and social factors on Apple Pay usage. This includes factors such as convenience, reliability, knowledge of technology, and influence from relatives.

Expectancy Theory:

Theory expectation (Vroom, 1968) helps understand that consumers will choose to use Apple Pay if they expect its use to bring them benefits and value. Benefits can be convenience, security, or other utilities of this application.

Theory of privacy and security:

With the study of using e-wallets, understanding security and privacy theory (Barcena & Wueest, 2015) is critical. Consumers will only use the service if they trust its confidentiality. Information security theories and security models can be applied to research using Apple Pay.

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2.1. Useful awareness

Useful awareness has been defined as the extent to which a person believes that using a particular system will improve his or her performance (Hanudin et al., 2007). Useful awareness directly influences attitudes and is crucial to the intention to accept mobile payments in the digital age (Kazi, 2013). Useful awareness is an element in the TAM model and is extensively studied in the new technology age.

H1: Useful awareness has a positive (+) impact on decision-making

2.2. Security Awareness

Security is considered one of the most essential factors in payment and technology. It determines the success of the bank's mobile payment channel and decides on the user's psychology and decision-making. Some viewpoints say that "using mobile phones in bank payments is reliable" (Karjaluoto et al., 2002). Previous studies have also shown that payment security and confidentiality influence users' attitudes toward online banking (Laforet & Li, 2005). Moreover, this factor is also seen as one of the biggest concerns in the use of electronic payment services, in which users are often concerned about issues of privacy of personal information through the applications and mobile devices used (Laukkanen, 2005), or connectivity risks (Black, 2001). From that, payment security is essential when using electronic payment services.

H2: Security awareness has a positive (+) impact on decision-making

2.3. Performance expectations

Efficient expectation (PE) is characterized by the extent to which the data framework or innovation will give the buyer an advantage in precise operations (Baabdullah, 2019). If the consumer notices that digital payment methods can bring some benefits. For example, performance, efficiency, and speed of service will be more positive when adopting that method (Davis, 1989; Musyaffi & Muna, 2020).

H3: Performance expectations have a positive (+) impact on usage decisions

2.4. Ecosystem

A cloud computing service is included in Apple's latest operating systems. They are bringing utility to the user. Features of iCloud include iTunes storage in iCloud backup. It can provide wireless backup of Apple devices, storage of device settings, application data, and application organization. Additionally, you can synchronize other devices as long as your Apple product runs IOS5, OS X Lion, or higher. It can be synchronized with other devices via iCloud. Previous research has also shown that Apple's ecosystem is becoming increasingly important in modern times, where technology and information systems play an essential role (Frideman et al., 2012).

H4: Ecosystems have a positive (+) impact on usage decisions

2.5. User attitude

The Unified Model of Acceptance and Use of Technology (Unified Theory of Acceptance and Use of Technology - UTAUT) explains a person's attitude toward using an information technology system (Venkatesh, 2003).

Attitude can be defined as “a positive or negative feeling of an individual about carrying out targeted behavior” (Davis, 1989). An attitude toward using a product is a feeling of joy, excitement, satisfaction/dissatisfaction, disappointment, or hatred by an individual for a specific action (Raluca & Ioan, 2010). Attitudes towards products directly influence decisions and decisions made by a person's decision (Mahran & Enaba, 2013).

H5: User attitudes have a positive (+) impact on usage decisions.

2.6. Easy to use

Ease of use, according to the TAM technology model, refers to users who believe that using an information technology system or product will not require much energy and will feel comfortable using the product (Davis, 1989). According to Davis, ease of use is the degree to which a person believes that using a particular system or service will take no effort. Other

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studies have shown that the ease of use of a service affects the intention to accept a product or service (Guriting & Ndubisi, 2006).

H6: Easy to use have a positive (+) impact on usage decisions

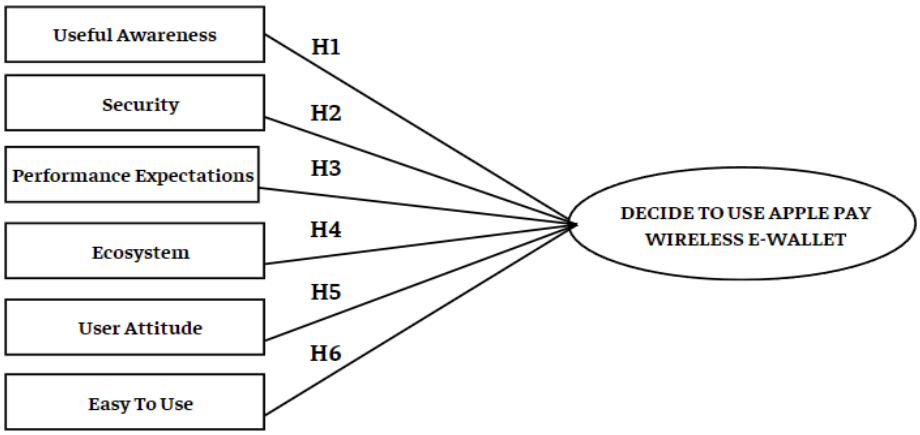

Figure 1. The hypothetical model of the research

3. Research Methods:

The author used a combination of qualitative and quantitative research methods. Research methodology is carried out through meetings and discussions, designing scales, building formal survey questionnaires, and setting up quantitative research questionnaires. Qualitative research methodology: The author collects material from a variety of sources. Quantitative research method: Conduct extensive surveys across a wide range of audiences, collect and statistically assess the opinions of most consumers in Vietnam through a quantitative questionnaire designed with a 5-degree Likert scale to measure the importance of factors drawn from qualitative research. The total number of samples surveyed was 350; after the phase of filtration and cleaning, 303 samples were satisfactory. Finally, the authors use the SmartPLS 3.9 software to analyze data: statistics describing, analyzing, and verifying linear structural models (SEM).

4. Results:

4.1. Descriptive statistics

The team carried out the design of the scale and prepared the official survey questionnaire. Set up a quantitative research questionnaire. Collected results include:

Gender: Out of 303 observations, 140 men accounted for 46.2 percent and 163 women for 53.8 percent. There's no gender difference, and it is relatively uniform. This shows that the Apple Pay electronic wallet is given equal attention, and there is no gender difference in the decision to use the wallet.

Age: The study was conducted in various regions of Vietnam with a sample size 303. Of these, 195 were between the ages of 23 and 35, the highest rate being 64,4 percent. Next is between 36 and 50, with 75 accounting for 24.8 percent. Next is the age group between 18 and 22, who account for 7,5 percent, and the age group 50 and over 3,3 percent. Based on this, the subjects surveyed using the Apple Pay electronic wireless wallet were between 23 and 35 years of age. Through it, you can see that people between the ages of 23 and 35, mostly young people who love technology and features and prefer convenience, are interested in wireless electronic wallets.

Using Apple devices: The group with the highest ratio of Apple devices is 156, with a ratio of 51.5 percent. The unemployed group comprised 90 people, with a ratio of 29.7 percent. The lowest group is the other device group, which is 57 people, with a ratio of 18.8 percent.

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4.2. The measurement model:

The scale's reliability is measured using two indicators: Cronbach's Alpha and Composite Reliability. Cronbach's Alpha CA ≥ 0.7 (DeVellis, 2012); Composite Reliability CR ≥ 0.7 (Bagozzo & Yi, 1988). Based on AVE (Average Variance Extracted), Hock & Ringle (2010) suggest that a measurement scale reaches a convergence value if AVE is ≥ 0.5. According to Table 1, the calculation of the aggregate reliability and mismatch of the component scales show that the concept scales meet the reliability and convergence values requirements.

Table 1. Measurement model verification

Scales	Observed Variables	Outer loading	CA	CR	AVE
Security awareness (S)	The information is encrypted and not shared with the seller?	0.851	0.877	0.916	0.731
	Security features are right on devices like Face ID and Touch ID; can you only make payments on your device?	0.878			
	Apple Pay generates a unique code for each transaction, helping to reduce the risk of your card information being leaked.	0.854			
	Do you trust that Apple Pay protects your personal information and accounts from online threats?	0.835			
Useful awareness (U)	Is the payment system convenient to use on any Apple device?	0.793	0.845	0.887	0.615
	Does the Apple Pay payment system help you use it in any situation (even without the Internet)?	0.878			
	Transact through the app quickly without going to the bank or wasting time looking for cash or card transactions.	0.828			
	Are your transactions more convenient when you use an Apple Pay wallet?	0.768			
	Is the Apple Pay e-wallet useful in your daily life?	0.629			
Performance expectations (PE)	Is Apple Pay's level of security for your payment information the same as expected?	0.725	0.716	0.821	0.534
	Is Apple Pay flexible enough to meet your payment needs anytime and anywhere?	0.694			
	When there is a technical problem using Apple Pay, will they solve it quickly and effectively?	0.710			
	Can Apple Pay help you manage your finances better?	0.790			
User attitude (UA)	Do you appreciate the ease of use and service benefits that Apple Pay brings?	0.808	0.860	0.900	0.643
	Are you willing to use Apple Pay for shopping and payments rather than using other payment methods?	0.857			
	Do you find it easy to perform operations on your Apple Pay wallet?	0.768			
	Is the Apple Pay wallet interface straightforward to understand?	0.830			

	Does transacting on Apple Pay e-wallet help you save time and effort?	0.740			
Ecosystem (E)	Is integrating Apple Pay on Apple devices convenient and practical for everyday life?	0.819	0.740	0.827	0.547
	Have you felt more comfortable not having to carry a physical credit card and being able to pay with Apple Pay from your phone or watch?	0.728			
	Does using Apple Pay through Apple devices help optimize your payment experience?	0.790			
	Does the Apple ecosystem make it easier for you to track your finances and payment transactions?	0.603			
Easy To Use (ETU)	Does Apple Pay e-wallet have a friendly user interface and simple operation?	0.718	0.860	0.900	0.643
	Save maximum time when paying and confirming transactions using Touch ID or Face ID.	0.853			
	Apple Pay optimizes touchless payments when transacting and shopping	0.833			
	Do you feel easy managing your transactions and finances with Apple Pay?	0.838			
	Is Apple Pay easier to use and more convenient than other payment methods (wallets, credit cards)?	0.758			
Decision To Use (DTU)	Did you decide to use Apple Pay to make payments instead of using a credit card or cash in a physical store?	0.815	0.811	0.863	0.515
	Did you decide to use Apple Pay based on the security features (Touch ID or Face ID that Apple provides)?	0.741			
	Do you plan to use Apple Pay e-wallet in the future?	0.755			
	Do you plan to use Apple Pay e-wallet regularly?	0.643			
	Have you experienced problems or obstacles using Apple Pay, and has this influenced your decision?	0.714			
	Would your decision to use Apple Pay change in the future based on new factors or changes in the Apple ecosystem?	0.618			

Source: processed data using SmartPLS 3.9

For the Heterotrait-Monotrait (HTMT) index, Clark & Watson (1995) and Kline (2015) suggest that the HTMT value ≤ 0.85 guarantees the differentiation between the hidden variables in the model. Moreover, the factor has no differential value if the HTMT is more significant than 0.85.

The results in Table 2 indicate that the values of the HTMT index are all less than 0.85. Therefore, the structures in the model achieve discriminant validity

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Table 2. Correlation matrix between Heterotrait – Monotrait (HTMT) conceptual structures

	S	U	E	PE	UA	ETU	DTU
S							
U	0.073						
E	0.101	0.105					
PE	0.071	0.076	0.152				
UA	0.059	0.530	0.266	0.087			
ETU	0.176	0.125	0.179	0.109	0.159		
DTU	0.550	0.333	0.246	0.277	0.384	0.549	

Source: Data processing results using SmartPLS 3.9

According to Fornell & Larcker (1981), "discriminant validity is ensured when the square root of AVE for each latent variable is higher than all the correlations between latent variables."
The results, as shown in Table 6, present the first number in each column as the square root of the AVE values (0.855, 0.784, 0.74, 0.731, 0.801, 0.802, 0.718), all of which are higher than the numbers below representing the correlations between latent variables.

Table 3. Correlation matrix between conceptual structures according to the Fornell-Larcker standard

	S	U	E	PE	UA	ETU	DTU
S	0.855						
U	-0.030	0.784					
E	0.05	0.043	0.740				
PE	0.044	0.016	0.067	0.731			
UA	-0.036	0.448	0.228	-0.002	0.801		
ETU	0.158	0.101	0.141	0.037	0.140	0.802	
DTU	0.470	0.302	0.218	0.219	0.336	0.472	0.718

Source: Data processing results using SmartPLS 3.9

4.3. The Structural model:

The research team utilizes VIF, R Square, and f square indices along with the path coefficients to evaluate the structural model.

The estimation of path coefficients is based on the regression of each dependent variable on the predictor variables (Hair et al., 2014). If multicollinearity issues occur among independent variables, it may lead to the non-assurance of path coefficients. The VIF results also indicate that the correlation of predictor variables does not violate the multicollinearity assumption because all coefficients fall within an acceptable range, specifically VIF = 1.286 – 2.672 < 5. Therefore, the model does not violate this phenomenon.

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Table 4. VIF coefficient

	VIF		VIF		VIF
DTU1	1.895	ETU2	2.486	S5	1.863
DTU2	1.549	ETU3	2.346	U1	1.681
DTU3	1.698	ETU4	2.234	U2	2.672
DTU4	1.503	ETU5	1.660	U3	2.058
DTU5	1.514	PE2	1.286	U4	1.710
DTU6	1.480	PE3	1.347	U5	1.467
E1	1.669	PE4	1.455	UA1	2.038
E2	1.463	PE5	1.327	UA2	2.431
E3	1.421	S1	2.418	UA3	1.710
E4	1.523	S2	2.633	UA4	2.184
ETU1	1.759	S3	2.248	UA5	1.698

Source: Processing results using SmartPLS 3.9

The R^2 value 0.25 represents a weak endogenous structure if 0.5 is relative and 0.75 is high (Hair et al., 2014). According to the analysis results, the value of the adjusted R^2 of the Usage Decision model is 0.537. Through an analysis of the impact of factors influencing consumer decisions to use Apple Pay wireless electronic wallets in Vietnam. This explains 53.7% of the variation of the dependent variable and the remaining 46.3% unexplained due to other factors not included in the model.

Table 5. R Square and R Square Adjusted

	R Square	**R Square Adjusted**
DTU	0.537	0.528

Source: Processing results using SmartPLS 3.9

Table 6. f Square

	DTU	**E**	**ETU**	**PE**	**S**	**U**	**UA**
DTU							
E	0.014						
ETU	0.236						
PE	0.070						
S	0.363						
U	0.058						
UA	0.067						

Source: Processing results using SmartPLS 3.9

According to Cohen (1988), the index table f Square assesses the importance of independent variables. The value of f^2 ranges from 0.014 to 0.363, which explains the impact relationship in the variables from small to large. Since the data analyzed in the PLS is assumed to be non-standardly distributed, the importance of factors such as path coefficients cannot be tested using trials to test the significance of parameters in regression analysis. Instead, PLS relies on non-parametric bootstrap analysis to assess the importance of coefficients (Hair et al., 2014). The values are calculated using bootstrapping to examine whether path coefficients significantly deviate from zero. In this study, the non-parametric bootstrap technique was tested on 303 observations with 5000 iterations to meet the requirements for testing the linear structural model.

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Table 7. Structure Model Bootstrapping Results Table

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
E -> DTU	0.083	0.089	0.040	2.100	0.036
ETU -> DTU	0.341	0.338	0.039	8.829	0.000
PE -> DTU	0.180	0.184	0.037	4.806	0.000
S -> DTU	0.417	0.417	0.036	11.650	0.000
U -> DTU	0.184	0.186	0.044	4.202	0.000
UA -> DTU	0.203	0.206	0.047	4.334	0.000

Source: Data processing results using Smart PLS 3.9

Compare the impact levels of the variables in decreasing order as follows: We see that the Security Awareness variable has the most substantial impact on Usage Decision (β = 0.417), followed by the easy-of-use variable that has an impact on usage decision (β= 0.341); the User attitude variable which affects usage decisions (β = 0.203); the Useful awareness, which has a positive impact on use decision (β = 0.184); and the Performance Expectations variable (β = 0.180); Ecosystem variables (β = 0.083).

Thus, linear structural analysis and verification results show that all assumptions from H1, H2, H3, H4, H5, H6 are accepted. It means that security awareness, useful awareness, performance expectations, user attitudes, ecosystems, and ease of use directly influence usage decisions.

5. Conclusions And Management Implications:

The research team has obtained results that can meet the primary objective set by the group, which is to study the factors influencing the decision to use Apple Pay wireless electronic wallets. Seven factors have been identified. Using the SEM model testing method, the research team has determined the influence levels of the factors that the team gave and ranked them in descending order of influence as follows: Security awareness (β = 0.417), Ease of use (β = 0.341), User attitude (β = 0.203), Useful awareness (β = 0.184), Performance expectations (β = 0.180), Ecosystem (β = 0.083).

The consumer's decision to use is a crucial factor in the success of a business. The research results help Apple and e-wallet providers understand more about customers, their expectations and opinions, and their attitudes to their decision-making regarding using e-wallets.

So, Apple needs to implement measures to enhance security: Continuous Security Upgrades: Ensure that the security system of Apple Pay is consistently upgraded to address new challenges and security threats. Collaborate closely with cybersecurity experts and information security management organizations. Regular security checks are performed to make sure the system is free of vulnerabilities. They are ensuring confidentiality and security policy. Support, providing clear information on security measures for users, accompanied by instructions and supporting documentation so they can implement basic safety measures, such as two-factor authentication and tracking transaction history.

In addition, Apple needs measures to enhance its brand and provide a smooth, easy-to-use user experience. Updates and integrates new features. Providing support and proactive information on new features can help alleviate concerns and build confidence—emphasis on Apple Pay compatibility. Ensure and upgrade stable, fast, and secure operations.

Academically, the research has contributed to introducing a scale of decision-making for using an Apple Pay wallet in the context of research in Vietnam.

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Due to time constraints, the research is done only by collecting data with convenient sampling methods, and the number of surveys is small. Next, research should use probability sampling to increase the representation of the study and the number of surveys. At the same time, the authors' experience could be higher; it is limited and has a shortcoming in the research. Further research in the future should extend to other factors that influence the decision to use a wireless e-wallet when engaged in e-wallet payments.

Authors Declaration:

Conflicts of Interest: None

-We Hereby Confirm That All The Figures and Tables In The Manuscript Are Mine and Ours. Besides, The Figures and Images, which are Not Mine, Have Been Permitted Republication and Attached to The Manuscript.

- Ethical Clearance: The Research Was Approved by The Local Ethical Committee in The University.

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