

Factors Associating Digital Wallet Adoption among Thai Shoppers: An Integration of UTAUT and Perceived Risk Theory

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Abstract

This study examines the factors influencing Thai shoppers' behavioural intention to adopt digital wallet services, drawing on the UTAUT model and perceived risk theory. A quantitative survey method was employed in this study, conducted in Bangkok, Thailand and involved 347 respondents. Structural equation modelling (SEM) was utilized to analyze and test hypotheses. The empirical research revealed that performance expectancy, effort expectancy, and social influence significantly positively impacted Thai shoppers' behavioural intention to use a digital wallet. Additionally, perceived risk significantly negatively impacted Thai shoppers' behavioural intention to use a digital wallet.

Keywords: Digital wallet, Digital payment, SEM, UTAUT model, Perceived risk theory

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Introduction

Currently, the cashless society issue has been widely discussed in the real business world. Most countries are transitioning from a cash to a cashless economy (KPMG, 2020). Cashless societies raise the efficiency and capacity of an economy via cost reductions due to cashless transactions and the increased transparency of the financial service system (Rahman, Ismail, Bahri, and Rahman, 2022). As consumers rapidly accept digitalization and the government drives to transform Thailand into a cashless society, banks are not the only player in mobile payment but also nonbanks who will continue to launch more products and services via online and mobile payment platforms to claim a more extensive customer base through first-mover advantage. Digital payment has been widely adopted by retail customers in Thailand (Chaveesuk, Khalid, and Chaiyasoonthorn, 2021). In addition, the COVID-19 pandemic has prompted the government to implement various defensive measures to control the disease's spread. These measures include widespread lockdowns and the promotion of social distancing, which have rapidly shifted people towards new normal behaviours. One notable impact of these measures is the change in spending habits in terms of the categories and values of products being considered for purchase and the channels through which spending occurs. Many individuals have opted for contactless payment channels to minimise the risk of disease transmission. Statistical data from the Bank of Thailand (2020) regarding the "Volume of Payment Transactions processed through Payment systems and channels" between January 2020 and June 2020 reveals that there has been a significant increase of over 20% in digital payment transactions among Thai people. This surge in spending through digital channels highlights a valuable opportunity that all service providers should consider and capitalize on.

The fast development of Artificial Intelligence (AI) and corresponding emerging digital technologies and devices such as smartphones, robotics, and the Internet of Things (IoT) are fundamentally altering the interplay between customers and service providers. Significantly, the financial service sector has dramatically changed over the past decade by launching new customer technology services such as mobile applications and digital wallets. Recently, Thai commercial banks and non-bank institutes have launched electronic wallets available in online and offline retail stores. For instance, Customers can conveniently make payments through a digital wallet by scanning the store's QR code. Moreover, digital wallets will become a mainstream payment method because the use of digital wallets provides

convenience, fast, and reliable payments (Kaur, Dhir, Bodhi, Singh, and Almotairi, 2020; Namahoot and Jantasri, 2022). Therefore, understanding customers in digital wallet acceptance will enhance financial service providers to gain more an opportunity to be successful and fulfil their customer needs.

On the one hand, consumers' digital acceptance behaviour has been changing over the COVID-19 pandemic. It is the adoption of digital healthcare (Golinelli et al., 2020) and financial technology acceptance (Fu & Mishra, 2022). The previous studies on digital wallets were conducted during the COVID-19 pandemic (Namahoot and Jantasri, 2022; Ponsree, Phongpaew, and Naruetharadhol, 2023; Sharma and Kulshreshtha, 2019; Teo, Law, and Koo, 2020). However, understanding post-pandemic consumer behaviour in digital wallet acceptance will provide valuable customer insights and help fill the knowledge gap regarding the acceptance of digital wallets. This study introduces perceived risk as an essential antecedent in predicting customers' digital wallet adoption. The main goal of the research is to investigate factors influencing Thai shoppers' behavioural intention to use digital wallets.

Theoretical background and hypotheses development

1. Unified theory of acceptance and use of technology

Due to the large number of models dealing with how users come to accept and use technology, researchers have sought a synthesis to unify them into a cohesive framework. In response to this need, Venkatesh et al., (2003) developed a new Unified Theory of Acceptance and Use of Technology (UTAUT) model. The UTAUT combines eight prominent theories and models from IS/IT adoption research, namely Theory of Reasoned Action (TRA) (Fishbein, 1979), Theory of Planned Behavior (TPB) (Ajzen, 1991), TAM (Technology Acceptance Model) (Davis, 1989), motivational model, combined TPB and TAM, diffusion of innovations theory, model of perceived credibility, utilization, and social cognitive theory. The UTAUT incorporates 32 original variables derived from these eight models. These variables are categorized into four exogenous groups: effort expectancy (EE), performance expectancy (PE), social influence (SI), and facilitating conditions (FCs) (Venkatesh et al., 2003).

There are two endogenous variables: behavioural intention (BI) to use technology and use behaviour. The UTAUT has been applied in many aspects, such as communication, general-purpose, office, and specialized business systems (Williams et al., 2015). Moreover,

the model was widely used in business research by both business and non-business organizations, such as mobile/internet/online banking, digital television, e-health service, e-commerce, and e-government services (Williams et al., 2015).

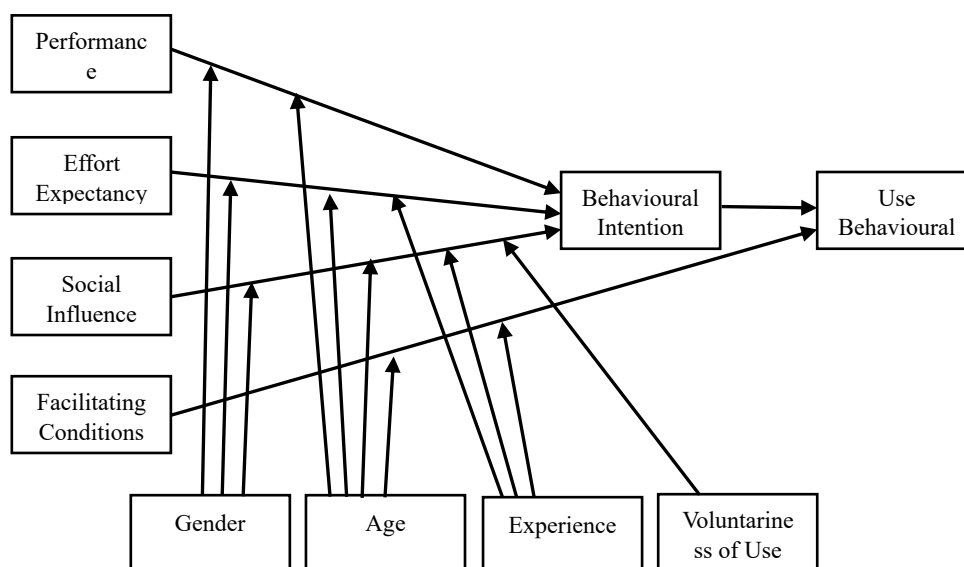


Figure 1 The unified of theory of acceptance and use of technology model (UTAUT)
(Venkatesh et al., 2003)

This study focuses on customers' behavioural intention to use a digital wallet. In addition, the UTAUT suggested three primary constructs: performance expectancy, effort expectancy, and social influence, which directly affect customer behavioural intention (Venkatesh, et al., 2012). Therefore, performance expectancy, effort expectancy, and social influence have been adopted in this research model.

Performance Expectancy (PE) is the degree to which a person believes using technology will benefit their job performance (Venkatesh et al., 2003). A previous study found that performance expectancy is the most influential factor in an individual's behavioural intention to adopt technology (Venkatesh et al., 2003). A recent study investigated Gen Z's intention behaviour of using digital payment, specifically QR code payment, and the result showed that performance expectancy significantly influences Gen Z users (Chaveesuk et al., 2021). In the same vein, the study revealed that performance expectations directly influenced the behavioural intentions of mobile payment users. On the other hand, it did not impact the behavioural intentions of non-users in Taiwan (Lin et al., 2020). The research from

Malaysia shows that performance expectancy has the most significant influence on adopting cashless payments (Rahman, Ismail, and Bahri, 2020). Thus, aligned with prior research in digital payment adoption, it is logical to postulate that Performance expectancy is positively influences with a behavioural intention on digital wallets.

H1: Performance expectancy positively influences behavioural intention on digital wallets.

Effort expectancy (EE) is the ease of technology use (Venkatesh et al., 2003). This factor is associated with perceived ease of use in the technology acceptance model (TAM), which means users' expectation and willingness to adopt new technology or payment method with ease and effortless process (Lin et al., 2020). In the context of digital payment adoption, the previous studies confirmed that perceived ease of use has a direct impact on the behavioural intention to use mobile banking among customers in Vietnam (Le et al., 2020), Thailand (Ponsree et al., 2023), and Malaysia (Wasiul et al., 2020). The study of seniors' intentional online behaviour found that EE positively correlated with internet acceptance among senior customers moderated by education. Especially for higher educated elderly, the expected performance is a good predictor for the intention to use the internet (Niehaves and Plattfaut, 2010). Hence, we propose that effort expectancy positively influences with a behavioural intention on digital wallets.

H2: Effort expectancy positively influences by behavioural intention on digital wallets.

Social influence (SI) is the change in an individual's thoughts, feelings, attitudes, or behaviours resulting from interaction with another individual or a group (Walker, 2007). It means that individual behaviour, such as the adoption of new products, choice of fashion or means of transport, is influenced by others' actions (Pradeliski, 2023). In addition, the viewpoints and expectations of individuals in the user's social circle, including family, friends, and colleagues, significantly influence their intention to adopt a specific technology (Merhi et al., 2021). The existing studies found a significant effect of social influence on digital banking payment behaviour, such as mobile banking in Vietnam (Le et al., 2020) and electronic payment in Indonesia (Rahadi et al., 2021). Research of young Internet users aged 18 to 25 from Vietnam shows social influence significantly predicts behavioural intention to use digital

wallets (Phan et al., 2020). Thus, aligned with prior research, we can claim that social influence is positively influences with the behavioural intention of digital wallets.

H3: Social influence positively influences behavioural intention on digital wallets.

Perceived Risk refers to an individual's subjective assessment or perception of the potential negative consequences or uncertainties associated with a particular action, decision, or situation (Littler and Melanthiou, 2006). In the realm of technology adoption, consumers are inevitably exposed to varying levels of risk. This risk stems from factors that are beyond their control, such as the actions of independent parties like digital wallet providers, hackers, and unfamiliar technologies. As consumers navigate this uncertain environment, they often experience uncertainty regarding their transactions (Kim et al., 2008). In such situations, perceived risk becomes a crucial element in customers' behaviour intention to use technology.

Savas (2017) categorized perceived risk into seven dimensions including; 1. Financial risk can be referred to the possibility of monetary loss linked to a purchase (Laroche et al., 2004); 2. Physical risk is defined as the adoption of the products/services may pose potential harm to users (Jacoby and Kaplan, 1972); 3. Performance risk refers to the potential loss that may occur as a result of product or service failure subsequent to the purchase (Laroche et al., 2004); 4. Social risk involves the possibility of a consumer experiencing a loss in terms of their esteem, respect, or friendship from others (Murray and Schlacter, 1990); 5. Psychological risk entails the feelings of nervousness that arise from post-purchase emotions, including regret, disappointment, worry, and frustration (Dholakia, 2001); 6. Time risk refers to the perception that the adoption and utilization of a product or service will require a significant amount of time to learn and adapt to the service innovation (Stone and Grønhaug, 1993); 7. Privacy risk involves the possibility of losing control over personal information (Featherman and Pavlou, 2003).

According to previous studies indicated that perceived risk has a negative direct effect on a cashless payment system adoption (Hampshire, 2017; Namahoot and Jantasri, 2022; Nuryasman and Warningsih, 2021). In addition, Namahoot and Jantasri (2022) conducted a survey research in Thailand and founded that perceived risk has a negative direct impact on Thai's consumer intention to use cashless payment. Besides, Hampshire (2017) added that customer with a high risk would have negative behavioural intention to use digital payment

systems. However, some previous studies found that customer perceived risk has not a significant effect on intention to use digital payment technology such as customer in Indonesia (Nuryasman and Warningsih, 2021) and Pakistan (Islam et al., 2020). Thus, we propose that perceived risk negatively influences behavioural intention on digital wallets.

H4: Perceived risk negatively influences behavioural intention on digital wallets.

Research framework

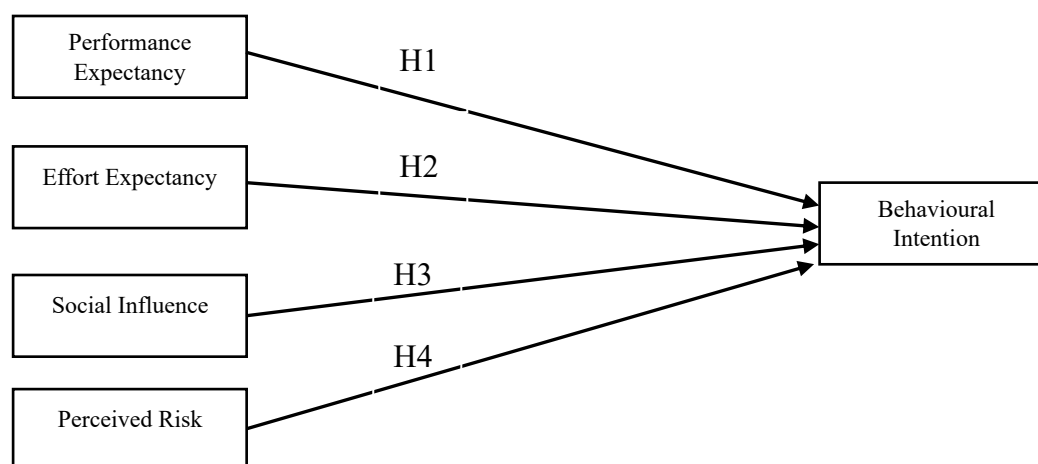


Figure 2 Conceptual framework

Methodology

A quantitative survey method was employed in this research study. A convenience sampling method was used. The data collection process was conducted in Bangkok. For research fieldwork, we used a pencil-and-paper survey to collect data from Thai customers who used digital wallets and/or online payments to purchase products and services. Since this study adopted confirmatory factor analysis to test measurement reliability and validity and the structural equation model to test the conceptual model, the appropriate number of sample sizes should preferably be above 200 (Bagozzi and Yi, 2012). Moreover, Yuan and Hayashi (2010) suggested that the sample size of SEM is between 300 to 400. Thus, the 347 samples in this study are within the sample size recommended by the literature. We offered a Thai northern-style keyring to the participants.

Descriptive statistics were used to describe general information of the sample using frequency and percentage. The total number of respondents was 347 (15% non-response

rate) comprised of 220 female (63.4%) and 127 male (36.6%). Age ranging from 36 – 40 years old (25.07%) was the majority age group, with a bachelor's degree (46.40%), Single (67.7%). Most participants are employed (74.64%). The average monthly income below 15,000 Baht (19.88%)

Questionnaire was used as a research instrument, which was pretested with 20 respondents to ensure clarity and validity. The main questions consisted of the items to measure five constructs shown in the conceptual model. To measure perceived expectancy, we adopted the perceived expectancy scale from Venkatesh et al. (2003), the effort expectancy scale was adopted from Venkatesh et al. (2012), the social influence scale was adopted from Kijsanayotin et al., (2009), perceived risk scale was adopted from Savas (2017), and behavioural intention scale was adopted from Venkatesh et al. (2012). A Likert scale was used in which 1 = “Strongly disagree” and 7 = “Strongly agree” for all questions.

The model was tested using structural equations modelling (SEM), a statistical method measuring complex theoretical relationships between latent and manifest variables (Fornell and Larcker, 1981). SEM is composed of two primary phases. In the first phase, confirmatory Factor analysis (CFA) tests whether the individual rating scales used in the survey are latent variables and whether the data reliability and validity conditions are met. The second phase involves a multilevel regression to determine the validity of relationships between measured latent variables (Zhang et al., 2016). This method's main advantage is the possibility of testing the relationships between exogenous and endogenous variables. Exogenous variables influence the other tested concepts without being influenced on their own. Endogenous variables can be affected by exogenous ideas and other endogenous variables in the system (Nitzl, 2016). In this paper, the SEM analysis is performed with AMOS 21 software.

Common method bias exists when a measurement technique introduces systematic variance into a measure. A careful questionnaire design was implemented to reduce Common method bias before data collection. A single-factor post hoc test for common methods variance also suggested no "same-source" factor in the data (Podsakoff et al., 2003). Thus, Common method bias was not deemed as a threat.

Results

Measurement model assessment. CFA results (Table 1) showed that the model fits the data relatively well: $\chi^2/df = 2.696$, $p < 0.001$, comparative fit index (CFI) = .958, Tucker

Lewis index (TLI) = 0.947, incremental fit index (IFI) = .958, goodness-of-fit index (GFI) = 0.906, adjusted goodness-of-fit index (AGFI) = 0.869, root mean square error of approximation (RMSEA) = 0.070, PCLOSE < .000, and standardized root mean square residual (SRMR) = 0.057. The CFI, TLI, and IFI indicated that the model was parsimonious, because each measure exceeds the recommended threshold of 0.9. Items yield estimates of more than 0.5 and are statistically significant ($p < .001$), indicating they share high variance within the same construct.

The reliability and validity of the resulting model were determined after performance of CFA (Table 1). Reliability was measured using Cronbach α , where the resulting value should be higher than 0.7 for each construct (Cronbach, 1951). Convergent validity was measured using Cronbach Alpha (α) and Average Variance Explained (AVE) provided that the conditions $\alpha > 0.7$, $\alpha > AVE$ and $AVE > 0.5$ are met (Hair, Anderson, Babin, and Black, 2010). Composite reliability above 0.7 (Bagozzi and Yi, 2012; Hair et al., 2010).

Table 1 CFA: measurement model results

Items	Loading
Performance expectancy ($\alpha = 0.885$; CR = 0.887; AVE = 0.723)	
1. I find digital wallet useful in my daily life	.856
2. Using digital wallet helps me to accomplish purchasing process more quickly	.866
3. Using digital wallet increases my productivity	.828
Effort expectancy ($\alpha = 0.758$; CR = 0.882; AVE = 0.621)	
1. Learning how to use digital wallet is easy for me	.752
2. My interaction with digital wallet is clear and understandable	.757
3. I find digital wallet easy to use	.862
Social influence ($\alpha = 0.865$; CR = 0.865; AVE = 0.681)	
1. People who are important to me think that I should use digital wallet	.838
2. People who influence my behaviour think that I should use digital wallet	.817
3. People whose opinions that I value prefer that I use digital wallet	.822
Perceived risks ($\alpha = 0.930$; CR = 0.929; AVE = 0.724)	
1. On the whole, considering all sorts of factors combined, signing up for this service is risky.	.786
2. Using this service exposes me to an overall risk.	.796
3. This service is dangerous to use.	.826

Table 1 CFA: measurement model results (Continued)

Items	Loading
4. Using this service causes me to be concerned with experiencing some kind of loss.	.932
5. All things considered, I think I would be making a mistake by using this service.	.903
Behavioural intention ($\alpha = 0.900$; CR = 0.903; AVE = 0.758)	
1. I intend to use technology service in the future	.891
2. I will always try to use technology service in my daily life	.932
3. I plan to use technology service frequently	.781
Chi-square	293.83
df	109
CFI	.958
GFI	.906
AGFI	.869
RMSEA	.070

Notes: α = Cronbach's alpha; CR = composite (construct) reliability; AVE = average variance extracted. Loadings are standardized; all t-values are significant ($p < .001$).

Structural model and hypotheses testing. The path analysis unveiled factors associated with behavioural intention to use digital wallets by Thai shoppers (Table 2). The most crucial factor influencing behavioural intention to use digital wallets is performance expectancy ($\beta = 0.280$, $p < 0.05$), followed by social influence ($\beta = 0.235$, $p < 0.05$) and effort expectancy ($\beta = 0.153$, $p < 0.00$), respectively. Furthermore, the perceived risks significantly negatively impact behavioural intention to use a digital wallet ($\beta = -0.114$, $p < 0.00$).

Table 2 Structural and path analysis results

Hypotheses	Path relationships	Standardized coefficient (β)	T value	p	Results
H1	PE $\rightarrow$ BI	.280	1.944	.050*	Supported
H2	EE $\rightarrow$ BI	.153	1.665	.000**	Supported
H3	SI $\rightarrow$ BI	.235	1.974	.048*	Supported
H4	PR $\rightarrow$ BI	-.114	3.562	.000**	Supported

Discussion

The research study examines the factors associated with consumers' intention to use digital wallets. The sample consists of 347 shoppers in Thailand. The questionnaire is used as a tool to collect data. Most of our samples are female, aged 36 – 40 years old, single, with an average monthly income below 15,000 Baht and graduated with a bachelor's degree. Most participants are employees.

The research finding aligns with the UTAUT model and confirms that performance expectancy, social influence, and effort expectancy positively influence consumers' intention to use digital wallets. In contrast, perceived risk negatively influences consumers' intention to use digital wallets. In addition, performance expectancy is the most potent predictor of consumers' intention to use digital wallets, which implies that the features and the functions of the digital wallet platform are the most concerning issue for the customer. This is consistent with the finding of (Hoque and Sorwar, 2017) indicated that performance expectancy is the strongest determinant of the elderly's technology adoption in Bangladesh. Besides, the results showed that social influence is the second most crucial factor associated with consumers' intention to use digital wallets. This means the viewpoints and expectations of people surrounding the users, such as family, close-knit friends, and colleagues, lead the users to adopt the technology. These results are similar to Merhi et al. (2021) study found that individuals in the user's social circle, including family, friends, and colleagues, significantly influence their intention to adopt a specific technology.

Similarly, the existing studies found a significant effect of social influence on digital banking payment behaviour, such as mobile banking in Vietnam (Le et al., 2020) and electronic payment in Indonesia (Rahadi et al., 2021). Subsequently, effort expectancy positively affects consumers' intention to use digital wallets. This is consistent with the previous study found that perceived ease of use has a direct impact on the behavioural intention to use mobile banking among customers in Vietnam (Le et al., 2020), Thailand (Ponsree et al., 2023), and Malaysia (Wasiul et al., 2020). It means the users are interested and have adopted digital wallets due to their easy-to-use interface.

On the other hand, the results show that perceived risk negatively impacts consumers' intention to use digital wallets. This means that users will adopt digital wallets when they perceive less risk. Similarly, the previous study found that customers who perceive

risk at a high level would have a negative intention to use electronic payment systems (Hampshire, 2017) as well as Namahoot and Jantasri (2022) found that perceived risk has a negative direct effect on a cashless payment system adoption.

Contribution of the study

Theoretical contributions. This research study offers valuable insights into the adoption of digital wallets among Thai shoppers, contributing to the current theoretical understanding in this field. The study incorporates the concept of perceived risk and utilizes three key constructs, namely performance expectancy, effort expectancy, and social influence, derived from the UTAUT model. The study's empirical findings shed light on the relative importance of these factors in influencing consumers' intention to use digital wallets. Among the factors examined, performance expectancy emerges as the most influential factor, indicating that Thai shoppers are primarily motivated to adopt digital wallets based on their expectations of the benefits and advantages associated with their use. This could include convenience, efficiency, and enhanced shopping experiences. Besides, social influence also significantly impacts consumers' intention to use digital wallets. This suggests that the opinions and recommendations of influential individuals, such as peers, celebrities, or experts, can sway Thai shoppers' decision-making process and increase their propensity to adopt digital wallets. Furthermore, the study reveals that effort expectancy, which refers to the perceived ease of use and user-friendliness of digital wallets, is another critical factor influencing consumers' intention to adopt them. This implies that the more effortless and intuitive the digital wallet interface and functionality are perceived, the more likely Thai shoppers will embrace this payment method.

In contrast, perceived risk negatively influences Thai consumers' intention to use digital wallets. This finding highlights the significance of addressing and mitigating customers' concerns regarding potential risks associated with digital wallet usage. These risks could include security vulnerabilities, data breaches, or fraudulent activities. Implementing robust security measures and effectively communicating them to consumers is crucial to alleviate their fears and building trust in digital wallet services. This research contributes to a comprehensive understanding of the factors influencing digital wallet adoption among Thai shoppers, including the role of perceived risk, performance expectancy, effort expectancy, and social influence. Considering these factors, this study's knowledge contributions can shed

light on Thai customers' behavioural intention to use digital wallets in the post-pandemic era.

Managerial implications. The research results benefit both marketers and digital wallet developers. The feature and interface of digital wallets should be designed to facilitate and increase customer convenience in the payment process. For instance, the quality of digital wallets is easy to log in and pay for goods and services. Moreover, the platform must fit with customers' existing devices, such as iOS and Android.

Moreover, the research findings suggest that social influence plays a significant role in shaping the intention of individuals to use digital wallets. In the context of digital wallet adoption, influencers and opinion leaders can leverage their credibility, expertise, and persuasive abilities to motivate and convince shoppers to embrace digital wallet services. By associating their personal experiences and endorsements with digital wallets, these influential individuals can create a positive perception and increase the likelihood of adoption among potential users. The communication strategy employed in marketing efforts should highlight digital wallets' convenience and safety aspects. This approach aims to alleviate customers' concerns and reduce their perceived risks associated with digital wallet usage. Emphasizing the ease of transactions, seamless payment processes, and robust security measures can help instil confidence in shoppers and mitigate any apprehensions they may have. By addressing and alleviating these perceived risks, companies can encourage greater adoption of digital wallets and enhance customer trust and satisfaction.

Limitation and future research

Although this study enriches the understanding of customers' digital wallet adoption, it still has limitations. First, this study is a quantitative research study. Future research should consider employing qualitative methods or a mixed-method approach to understand customers' adoption of digital wallets better. Second, the data were collected through a cross-sectional survey. In future research, longitudinal data collection should be applied to extract insights from customers over time, capturing their perspectives from time A to time B.

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