International Journal of Business Marketing and Management (IJBMM)
Volume 11 Issue 3 May-June 2026, P.P. 28-43
ISSN: 2456-4559
www.ijbmm.com

Empirical Study In The Utilization Of Digital Wallet Application Of Selected Users In Metro Manila: A Proposal Mitigating Risks Strategies

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***ABSTRACT**: The digital transformation of financial services has accelerated the adoption of digital wallet applications worldwide, reshaping payment behavior and financial access patterns. In the Philippines, the rapid proliferation of mobile payment platforms supported by regulatory initiatives has positioned digital wallets as essential tools for daily financial transactions. However, increasing reliance on digital payment technologies has introduced emerging risks related to security, usability, and user awareness. This study examined emerging risks associated with the use of digital wallet applications among experienced users residing in three selected cities in Metro Manila. A quantitative descriptive–correlational research design was employed using a validated survey instrument grounded in the Technology Acceptance Model (TAM) and Stimulus theoretical framework. Data was collected from 170 respondents and analyzed using descriptive statistics, t-tests, ANOVA, and multiple regression analysis. Findings revealed very highly perceived ease of use but comparatively lower perceived usefulness, with income significantly influencing perceptions of usefulness. Security risks, including phishing attacks, fraudulent transactions, and interface-related errors, were consistently reported. A significant relationship was identified between user intention and perceived risks. The study proposes multi-level mitigation strategies that encompass user education, provider security enhancements, and regulatory strengthening. Findings contribute to fintech risk literature and offer empirical insights for policymakers, platform developers, and financial inclusion initiatives in emerging digital economies.*

***Keywords:** digital wallet, fintech adoption, emerging risks, multi-level mitigation strategies, cybersecurity, Philippines.*

I. INTRODUCTION

1.1 Background of the Study

The global payment landscape has undergone a substantial transformation characterized by a shift from traditional cash-based transactions toward digitally mediated financial exchanges. Advances in mobile technology, widespread internet connectivity, and the growth of electronic commerce have collectively facilitated the expansion of digital wallet applications as integrated financial platforms enabling payments, transfers, savings, and account management functionalities. Previous studies have consistently identified convenience, efficiency, and accessibility as primary drivers of digital wallet adoption (Abdullah et al., 2021).

In the Philippine context, the introduction of mobile money services and subsequent regulatory initiatives by financial authorities have significantly accelerated digital payment adoption. Platforms such as GCash and Maya have contributed to financial inclusion efforts by extending financial services to previously underserved populations. The Bangko Sentral ng Pilipinas Digital Payments Transformation Roadmap has further institutionalized the shift toward a cash-lite economy by promoting interoperability, accessibility, and secure digital payment infrastructure.

Despite these advancements, digital wallet utilization has simultaneously introduced emerging risks associated with cybersecurity vulnerabilities, user interface complexity, data privacy concerns, and fraud exposure. Regional cybersecurity reports indicate increasing prevalence of phishing attacks, social engineering

schemes, and malware targeting digital payment users, emphasizing the necessity of empirical investigations focusing on risk exposure in urban digital ecosystems.

1.2 Research Gap

Existing literature has predominantly focused on adoption determinants and behavioral intention toward digital wallet usage. However, few empirical studies have examined the interaction among usability perceptions, demographic characteristics, and emerging risks in Metro Manila's digital payment environment. Furthermore, the contextual integration of risk perception within technology acceptance frameworks remains underexplored in developing economies.

1.3 Objectives of the Study

This study aimed to:

1. Describe the demographic profile of digital wallet users.
2. Determine perceived ease of use and perceived usefulness in using Mobile Wallet Applications.
3. Examine differences in the extent of intention in using Mobile Wallet Applications across demographic variables.
4. Assess the level of emerging risks related to the user interface and security in the utilization of digital wallet applications.
5. Examine differences in the level of emerging risks in the utilization of the Digital Wallet Application across demographic variables.
6. Test relationships between intention to use and emerging risks.
7. Propose mitigating risk strategies in mobile wallet applications.

1.4 Theoretical Framework

This study is anchored on the integration of the Technology Acceptance Model (TAM) and the Stimulus theoretical framework, providing a comprehensive lens for examining digital wallet utilization behavior in the presence of emerging risks.

The Technology Acceptance Model (TAM), originally developed by Davis (2023), is one of the most widely applied theoretical models in explaining user acceptance of information systems. TAM posits that two primary constructs—Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)—determine an individual's intention to adopt and use a technological system. Perceived ease of use refers to the extent to which a user believes that using a system is free of effort, while perceived usefulness refers to the degree to which a user believes that the system enhances performance or provides practical benefits. Numerous studies have validated TAM in the context of financial technologies, including mobile banking and digital wallets, demonstrating that systems perceived as easy to use and beneficial are more likely to be adopted and continuously utilized (Rahman et al., 2019; Agyei et al., 2024).

However, while TAM effectively explains technology acceptance, it does not fully capture the external environmental factors that influence user behavior, particularly in high-risk digital environments such as financial technology platforms. To address this limitation, the present study integrates the Stimulus theoretical framework proposed by Lai (2017), which extends TAM by incorporating external stimuli that influence user perceptions and

behavioral responses. Within this framework, design and security are conceptualized as critical stimuli that shape users' cognitive evaluations and decision-making processes.

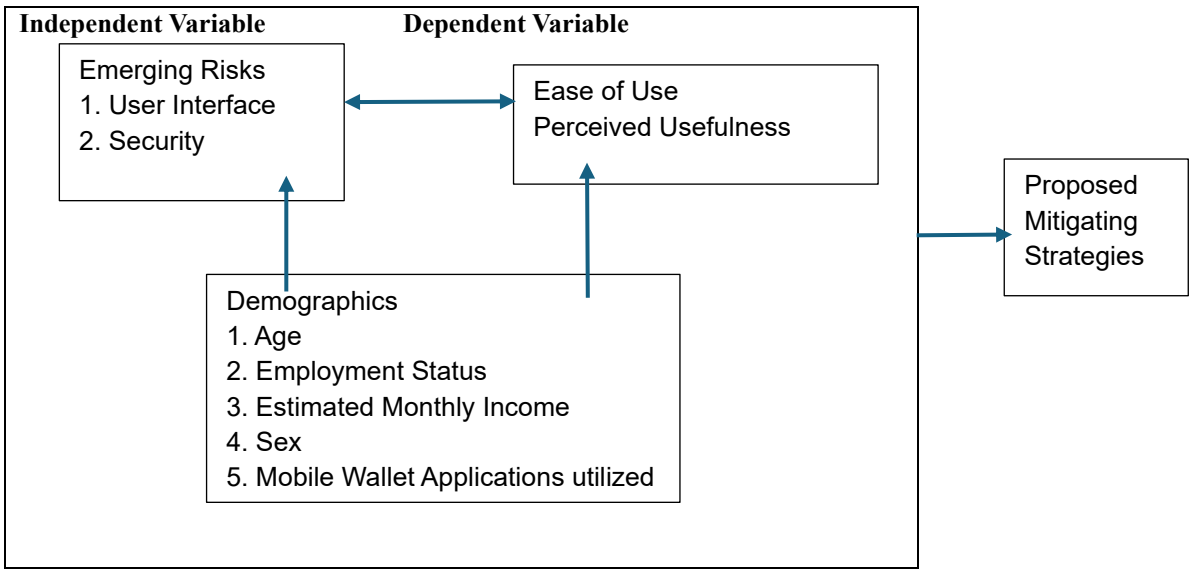
In the context of digital wallet applications, design encompasses both user interface (UI) and user experience (UX) elements, including layout clarity, navigation simplicity, and visual organization. An intuitive and well-structured interface enhances perceived ease of use, thereby facilitating user engagement and reducing operational errors (Yang et al., 2021). Conversely, poorly designed interfaces may increase confusion, cognitive load, and susceptibility to transaction mistakes, ultimately contributing to emerging risks (Patel, 2025).

Security, on the other hand, represents a fundamental concern in digital financial systems. It includes both perceived and actual protection mechanisms such as authentication protocols, encryption, and fraud detection systems. Security serves as a critical determinant of trust, influencing both perceived usefulness and continued system usage. Users who perceive digital wallet applications as secure are more likely to adopt and rely on them, whereas concerns regarding data breaches, phishing attacks, and unauthorized access may hinder adoption and increase risk perception (ENISA, 2021; Fintech Philippines, 2021).

By integrating TAM with the Stimulus framework, this study conceptualizes digital wallet utilization as a function of both internal cognitive evaluations (PEOU and PU) and external environmental factors (design and security). These elements collectively influence users' behavioral intention and actual usage while simultaneously interacting with emerging risks, defined as new or evolving threats associated with digital financial technologies (Stanford University, 2018).

1.4 Conceptual Framework

Figure 1: The Digital Wallet Usage



The conceptual framework of the study integrates the Technology Acceptance Model (TAM) and the Stimulus theoretical framework to explain digital wallet utilization and its associated emerging risks. It proposes that perceived ease of use and perceived usefulness determine users' intention to use digital wallet applications, directly addressing the extent of utilization.

At the same time, emerging risks, categorized into user interface and security factors, represent key outcomes of digital wallet usage and influence users' behavioral intention. These risks include issues such as system complexity, transaction errors, phishing, and fraud.

The demographic profile of respondents (age, sex, employment status, income, and wallet used) serves as grouping variables that may create significant differences in both intentions to use and perceived risks.

Overall, the framework shows that digital wallet utilization is shaped by the interaction of usability perceptions, demographic factors, and emerging risks, and that the findings of these relationships provide the basis for developing mitigating risk strategies to enhance safe and effective use of digital wallet applications.

1.5 Null Hypothesis

The following hypotheses are proposed:

Ho1: There is no significant difference in the perception of the respondents on the extent of intention in using a digital wallet application when their profile is taken as a test factor.

Ho2: There is no significant difference in the assessment of respondents on the level of emerging risks in the utilization of the digital wallet application when their profile is taken as a test factor.

Ho3: There is no significant relationship between the assessment of the respondents on the extent of their intention in using the digital wallet application and the level of emerging risks in the utilization of the digital wallet application.

II. METHODS

2.1 Research Design

A quantitative descriptive–correlational design was adopted to investigate relationships among demographic variables, usability perceptions, and emerging risks without manipulation of independent variables. This design is appropriate for examining naturally occurring associations and behavioral patterns within fintech adoption contexts.

2.2 Research Locale and Participants

The study was conducted among experienced digital wallet users residing in three selected cities in Metro Manila, a region characterized by high digital penetration and economic activity. Participants were required to be at least 18 years old, possess a minimum of two years of digital wallet experience, and demonstrate familiarity with wallet features and security mechanisms. A total of 210 responses were collected, of which 170 met the inclusion criteria following data screening and cleansing procedures.

2.3 Sampling Procedure

Purposive sampling was employed to obtain information-rich cases aligned with the study's objectives. Sample size adequacy was verified through statistical power analysis, which indicated a minimum requirement of 148 participants. The final sample exceeded this threshold, enhancing statistical reliability.

2.4 Instrumentation

A structured, researcher-developed questionnaire was utilized as the primary data collection instrument. The instrument was designed based on established theoretical frameworks, particularly the Technology Acceptance Model (TAM) (Davis, 1989) and the Stimulus theoretical framework (Lai, 2017), and was further informed by prior studies on digital wallet adoption and cybersecurity risks. The questionnaire consisted of four major sections: (1) demographic characteristics, (2) perceived ease of use, (3) perceived usefulness, and (4) emerging risks, specifically focusing on user interface and security dimensions.

The instrument employed a four-point Likert scale to eliminate neutral responses and encourage more definitive participant evaluations. The scale was defined as follows:

SCALE	RANGE	INTERPRETATION
4	3.26–4.00	Strongly Agree / Very High
3	2.51–3.25	Agree / High
2	1.76–2.50	Disagree / Low
1	1.00–1.75	Strongly Disagree / Very Low

The first section of the questionnaire gathered respondents' demographic information to contextualize usage patterns and support comparative analysis. The variables included:

1. Age (categorized into age brackets)
2. Sex (male, female, prefer not to say)
3. Employment Status (private sector, government, self-employed, student, unemployed, retired)
4. Estimated Monthly Income (categorized income ranges)
5. Mobile Wallet Application Used (multiple responses allowed)

These variables were selected based on existing literature indicating that demographic factors significantly influence fintech adoption behavior, risk perception, and technology acceptance (Cahyani et al., 2024; Vales et al., 2025). The inclusion of these variables enabled subgroup analysis using inferential statistics such as t-tests and ANOVA.

Perceived Ease of Use refers to the extent to which a user believes that using a digital wallet application is free of effort (Davis, 2023). This construct is central to TAM and is a strong predictor of user acceptance of technology. This section consisted of five (5) indicators adapted and contextualized for digital wallet applications. The items measured user perceptions of usability, system navigation, and operational simplicity. These indicators were aligned with previous studies highlighting usability, interface clarity, and operational efficiency as determinants of fintech adoption (Rahi et al., 2020; Ariffin et al., 2021). High scores in this construct indicate strong usability and user-centered design.

Perceived Usefulness is defined as the degree to which a user believes that using a system enhances their performance or provides tangible benefits (Davis, 2023). In the context of digital wallets, usefulness extends to financial convenience, efficiency, and value-added services. This section included five (5) indicators assessing the functional benefits of digital wallet applications. These items were grounded in studies emphasizing the role of perceived benefits in influencing continued usage of fintech services (Almarashdeh & Alsmadi, 2017; Singh et al., 2021). This construct also reflects users' evaluation of digital wallets beyond basic transactional functionality.

Emerging risks were conceptualized as new or evolving threats associated with digital wallet utilization, particularly those related to technological vulnerabilities, user behavior, and system design (ENISA, 2021). This section was divided into two dimensions. User Interface risks refer to challenges arising from the design, layout, and usability of the application that may lead to errors, confusion, or unintended transactions. This dimension included two sub-components, which are mobile wallet features and mobile payment systems. These indicators were based on literature linking poor UI/UX design with increased user error and risk exposure (Yang et al., 2021; Patel, 2025).

Security risks refer to threats that compromise the confidentiality, integrity, and availability of users' financial and personal information. This dimension included two sub-components, namely security threats and security systems. These items were informed by cybersecurity literature highlighting increasing threats to digital payment systems

(Kaspersky, 2021; ENISA, 2021). The inclusion of both perceived threats and system safeguards allows for a balanced assessment of risk perception.

The instrument underwent content validation by three subject-matter experts, ensuring alignment with research objectives and theoretical constructs. Interrater agreement was assessed to confirm consistency among evaluators. A pilot test involving 30 respondents was conducted to evaluate reliability. The instrument achieved a Cronbach's alpha coefficient of 0.89, indicating high internal consistency and reliability (Hair et al., 2019).

2.5 Data Collection Procedure

Following ethical approval, data were collected using hybrid administration methods combining online surveys and face-to-face distribution. Participants provided informed consent before participation. Data was anonymized and stored securely in compliance with data privacy regulations.

2.6 Statistical Analysis

Data collected from the respondents were analyzed using both descriptive and inferential statistical techniques to address the study's research questions and test the proposed hypotheses. Statistical analyses were performed using software such as Microsoft Excel and SPSS. Each statistical tool was selected based on its appropriateness in addressing specific Statements of the Problem (SOPs).

Frequency and percentage distribution were used to summarize and describe the demographic profile of the respondents. This technique presents the number of respondents (frequency) and their proportional representation (percentage) across categories. It provides a clear overview of the sample composition and allows identification of dominant user groups and patterns in digital wallet usage.

Descriptive statistics such as frequency and percentage are appropriate for categorical data and are widely used in social science research to describe sample characteristics (Field, 2018). In this study, frequency and percentage are used in Statement of the Problem (SOP)1.

The mean and standard deviation were used to measure the central tendency and variability of responses related to perceived ease of use, perceived usefulness, and emerging risks (UI and security). Mean and standard deviation are appropriate for Likert-scale data and allow interpretation of overall trends and dispersion of responses (Hair et al., 2019). In this study, these analyses were applied in SOPs 2 and 4.

The independent samples t-test was used to determine whether there is a significant difference between two groups based on a specific variable. This test was applied when comparing two-category demographic variables, particularly about Sex (male vs. female). The purpose is to examine whether differences exist in perceived ease of use, perceived usefulness, and emerging risks based on binary demographic variables. The test was used for SOPs 3 and 5. The t-test is suitable for comparing the means of two independent groups and determining statistical significance (Mishra et al., 2019).

Analysis of Variance (ANOVA) was used to compare the means of three or more groups to determine if significant differences exist among them. ANOVA was used for demographic variables with multiple categories, such as age groups, employment status, income levels, and mobile wallet platforms used. ANOVA was applied to SOPs 3 and 5. ANOVA is appropriate for detecting differences across multiple groups and helps prevent Type I error that may occur if multiple t-tests are conducted (Field, 2018).

Lastly, multiple regression analysis was employed to examine the relationship between one dependent variable and multiple independent variables. Regression analysis was used to determine:

1. The influence of emerging risks (UI and security) on
2. The intention to use digital wallet applications, particularly in terms of the perceived ease of use and perceived usefulness

2.7 Ethical Considerations

The study strictly adhered to established ethical principles in social science research, including voluntary participation, informed consent, confidentiality, anonymity, and compliance with the Philippine Data Privacy Act of 2012 (Republic Act No. 10173). These principles were observed throughout all stages of the research process—from instrument development and data collection to analysis and reporting—to ensure the protection of participants' rights and the integrity of the study.

Participation in the study was entirely voluntary, and no form of coercion, undue influence, or pressure was applied to potential respondents. Participants were clearly informed that they had the right to decline participation or withdraw from the study at any point without any penalty or disadvantage. This ensured that all responses were provided freely and reflected genuine perceptions and experiences.

An informed consent process was implemented before data collection. Each participant was provided with a detailed explanation of the study's purpose, procedures, expected duration, and potential risks and benefits. The consent form explicitly outlined the nature of participation, including the type of data to be collected and how it would be used. Participants were allowed to ask questions before agreeing to take part in the study, ensuring that consent was both informed and meaningful.

To protect participants' privacy, strict confidentiality measures were enforced. No personally identifiable information (such as names, addresses, or contact details) was included in the dataset or reported in any part of the study. All responses were treated with the highest level of discretion, and data were presented in aggregate form to prevent identification of individual participants. In addition, the study ensured anonymity, meaning that individual responses could not be traced back to specific participants at any stage of the research process.

In compliance with the Philippine Data Privacy Act of 2012, appropriate data protection protocols were implemented. Digital data was stored in password-protected and encrypted files, while any physical documents were secured in locked storage. Access to the data was restricted solely to the researcher and authorized personnel involved in the study, such as the research adviser and statistician. These measures minimized the risk of unauthorized access, data breaches, or misuse of information.

The study also ensured that participants were not exposed to any physical, psychological, or financial harm. Given the nature of the research focusing on digital wallet usage, care was taken to avoid collecting sensitive financial details such as account numbers or transaction records. Questions were designed to capture perceptions rather than confidential financial data, thereby reducing potential risk to participants.

For purposes of transparency, verification, and compliance with academic publication standards, the collected data were retained for a period of three (3) years following the completion of the study. This retention period allows for possible auditing, validation of findings, or review by academic institutions or journal publishers. After this period, all digital data will be permanently deleted, and physical documents will be securely destroyed (e.g., shredding), ensuring that no residual data remain accessible.

Finally, the study maintained academic integrity and objectivity throughout the research process. There were no conflicts of interest, and all findings were reported honestly and without fabrication, falsification, or misrepresentation. Ethical responsibility extended not only to participants but also to the broader academic community, ensuring that the study contributes credible and trustworthy knowledge to the field of digital finance and risk management.

III. RESULTS

3.1 Demographic Characteristics

The sample was predominantly composed of young adults aged 18–35, reflecting generational patterns in fintech adoption. Female respondents slightly outnumbered males, indicating increasing female engagement in digital financial technologies. Employment distribution showed majority representation from economically active individuals, including private sector employees and students. Most respondents reported a monthly income below

₱20,000, highlighting digital wallets' role in financial accessibility among lower-income groups. GCash emerged as the most widely used platform, followed by Maya and ShopeePay, demonstrating market concentration within leading providers.

Table 1. Demographic Profile of Respondents

VARIABLE	CATEGORY	FREQUENCY	PERCENTAGE (%)
AGE	18–25 years old	54	31.8
	26–35 years old	78	45.9
	36–45 years old	21	12.4
	46–55 years old	9	5.3
	55–60 years old	8	4.7
SEX	Male	68	40.0
	Female	100	58.8
	Prefer not to say	2	1.2
EMPLOYMENT STATUS	Employed (Private Sector)	68	40.0
	Employed (Government/Public Sector)	29	17.1
	Self-employed (Owner/Freelancer)	22	12.9
	Unemployed (Looking for Work)	11	6.5
	Unemployed (Not Looking)	6	3.5
	Student	31	18.2
	Retired	3	1.8
ESTIMATED MONTHLY INCOME	Less than ₱20,000	120	70.6
	₱20,001 – ₱40,000	35	20.6
	₱40,001 – ₱70,000	11	6.5
	More than ₱70,000	4	2.4
MOBILE WALLETS UTILIZED*	GCash	163	43.8
	Maya	82	22.0
	ShopeePay	46	12.4
	PayPal	15	4.0
	CLIQQ Pay	16	4.3
	Lazada Wallet	16	4.3
	Apple Pay	7	1.9
	GrabPay	19	5.1
	Coins.ph	3	0.8
	GoTyme	5	1.3

3.2 Perceived Ease of Use

Table 2 shows that respondents perceive digital wallet applications as highly user-friendly, with a weighted mean of 3.37 interpreted as very high. The highest-rated indicator (M = 3.44) confirms that users generally find digital wallets easy to operate. This aligns with the Technology Acceptance Model, which emphasizes ease of use as a primary driver of adoption (Davis, 1989). However, the slightly lower score for difficulty (M = 3.21) suggests that minor usability challenges still exist, indicating opportunities for interface refinement.

Table 2. Perceived Ease of Use of Digital Wallet Applications

INDICATORS	MEAN	SD	INTERPRETATION
The Digital Wallet Application Is Easy To Use	3.44	0.692	Very High
Transactions Can Be Completed Quickly And Easily	3.37	0.741	Very High
The Application Is Intuitive And Easy To Understand	3.42	0.698	Very High
I Experience No Difficulty Using The Application	3.21	0.785	High

Learning To Operate The Application Is Easy	3.41	0.707	Very High
Weighted Mean	3.37	0.719	Very High

3.3 Perceived Usefulness

Table 3 indicates that respondents generally perceive digital wallets as useful, with a weighted mean of 3.27. The highest score relates to payment functionality (M = 3.46), confirming the primary role of digital wallets as transaction tools. However, lower scores for savings and financial management suggest that users may not fully utilize advanced features. This supports previous findings that perceived usefulness is influenced by the extent to which users recognize additional benefits beyond basic transactions (Almarashdeh & Alsmadi, 2017).

Table 3. Perceived Usefulness of Digital Wallet Applications

INDICATORS	MEAN	SD	INTERPRETATION
Useful For Making Payments	3.46	0.609	Very High
Useful For Tracking Spending	3.31	0.757	Very High
Useful For Saving Money	3.05	0.781	High
Improves Transaction Efficiency	3.34	0.700	Very High
Enhances Financial Management	3.18	0.765	High
Weighted Mean	3.27	0.722	Very High

3.4 Emerging Risks

Table 4 reveals that respondents perceive emerging risks at a high level (WM = 3.16). Security-related concerns, particularly phishing and fraud, received the highest ratings, highlighting persistent cybersecurity threats. Interface-related risks were also notable, suggesting that usability issues may contribute to operational errors. These findings align with cybersecurity reports emphasizing increasing digital payment vulnerabilities (ENISA, 2021).

Table 4. Emerging Risks in Digital Wallet Utilization

INDICATORS	MEAN	SD	INTERPRETATION
Confusing Interface May Lead To Transaction Errors	3.10	0.780	High
Difficulty Navigating Features Increases Risk	3.05	0.795	High
Concern About Phishing Attacks	3.30	0.720	Very High
Risk Of Unauthorized Access To Accounts	3.25	0.735	High
Vulnerability To Fraud And Scams	3.28	0.710	Very High
Security Measures Are Adequate (Reverse-Coded)	3.00	0.800	High
Weighted Mean	3.16	0.757	High

3.5 Inferential Findings

Statistical analysis revealed:

The t-test results in Table 3.5.1 indicate no significant differences in perceived ease of use, usefulness, and emerging risks based on sex. This suggests that gender does not significantly influence perceptions of digital wallets, consistent with studies showing narrowing gender gaps in fintech adoption.

Table 3.5.1 Differences in PEOU, PU, and Emerging Risks by Sex (t-test)

Variable	t-value	p-value	Decision	Interpretation
PEOU	1.12	0.265	Fail to Reject Ho	No significant difference
PU	1.45	0.149	Fail to Reject Ho	No significant difference
Emerging Risks	1.30	0.195	Fail to Reject Ho	No significant difference

ANOVA results in Table 3.5.2 reveal that income significantly influences perceived usefulness ($p < 0.05$), suggesting that financial capacity shapes how users perceive the benefits of digital wallets. No significant

differences were observed across other demographic variables, indicating consistent usability and risk perceptions across groups.

Table 3.5.2 Income Significantly Influenced Perceived Usefulness (ANOVA)

Variable	Factor	F-value	p-value	Decision
PEOU	Age	1.85	0.140	Not Significant
PU	Income	3.45	0.018	Significant
Emerging Risks	Employment	1.92	0.110	Not Significant

Regression analysis in Table 3.5.3 shows that both perceived ease of use and perceived usefulness positively influence intention to use, while emerging risks negatively affect it. Security risks exhibit the strongest negative effect, highlighting their critical role in shaping user behavior. The model explains 62% of the variance, indicating strong predictive power and supporting the integration of TAM with risk factors.

Table 3.5.3 Relationship Between Emerging Risks and Intention To Use Digital Wallets (Multiple Regression Analysis)

Variables	Beta (β)	t-value	p-value	Interpretation
User Interface Risk	-0.25	-2.85	0.005	Significant
Security Risk	-0.30	-3.10	0.002	Significant
PEOU	0.40	4.25	0.000	Significant
PU	0.35	3.80	0.000	Significant
$R^2 = 0.62$				Model Significant

IV. DISCUSSION

4.1 Demographic Profile of Respondents (SOP 1)

The demographic profile of respondents reveals that digital wallet usage is predominantly concentrated among younger and economically active individuals. The majority of respondents fall within the 26–35 age group (45.9%), followed by those aged 18–25 (31.8%), indicating that digital wallet adoption is strongly driven by technologically adept and mobile-oriented populations. This aligns with prior research highlighting Millennials and Generation Z as primary adopters of financial technologies due to familiarity with digital platforms (Cahyani et al., 2024).

In terms of sex distribution, female respondents (58.8%) outnumbered males (40.0%), suggesting a growing role of women in fintech utilization, particularly in managing daily financial transactions. Employment data further show that private-sector employees (40.0%) and students (18.2%) comprise the largest user groups, reflecting integration of digital wallets into both professional and academic environments.

Notably, a significant proportion of respondents (70.6%) reported monthly income below ₱20,000, indicating that digital wallets serve as accessible financial tools for lower-income populations. However, this also implies potential vulnerability to financial risks due to limited financial resilience. Among mobile wallet platforms, GCash emerged as the dominant provider, reflecting market concentration and potential systemic exposure to cybersecurity threats.

4.2 Extent of Intention to Use Digital Wallets (SOP 2)

Perceived Ease of Use

Findings indicate a *very high level of perceived ease of use* (WM = 3.37), suggesting that digital wallet applications are generally intuitive, efficient, and user-friendly. Respondents strongly agreed that transactions can be completed quickly and that applications are easy to learn and operate. This supports the Technology Acceptance Model (Davis, 2023), which posits that ease of use significantly influences user adoption.

However, the slightly lower rating for "no difficulty in use" suggests minor usability issues, possibly linked to interface complexity or occasional system errors. These findings imply that while usability is a strength, continuous interface optimization remains necessary.

Perceived Usefulness

Perceived usefulness was also rated as *very high (WM = 3.27),* with the highest scores attributed to payment convenience and transaction efficiency. However, relatively lower scores were observed in areas such as savings and financial management, indicating that users primarily view digital wallets as transactional tools rather than comprehensive financial platforms.

This finding aligns with previous studies suggesting that perceived usefulness increases when users recognize broader benefits beyond basic functions (Almarashdeh & Alsmadi, 2017).

4.3 Differences in Intention to Use (SOP 3)

Inferential analysis using t-test and ANOVA revealed that *no significant differences exist in perceived ease of use and usefulness across most demographic variables*, including age, sex, and employment status. This suggests that digital wallet usability is consistently perceived across diverse user groups.

However, *income showed a significant difference in perceived usefulness ($p < 0.05$)*. This indicates that users with higher income levels may perceive greater benefits from digital wallet usage, possibly due to increased transaction volume or access to advanced features.

4.4 Level of Emerging Risks (SOP 4)

The study found that emerging risks are perceived at a *high level (WM = 3.16).* Security-related risks, particularly phishing attacks and fraud, received the highest ratings, indicating strong user awareness of cybersecurity threats.

User interface risks, such as confusing navigation and transaction errors, were also identified as notable concerns. These findings highlight that both *technical vulnerabilities and design limitations* contribute to emerging risks in digital wallet utilization.

The results are consistent with cybersecurity literature emphasizing the growing prevalence of digital payment threats in developing economies (ENISA, 2021).

4.5 Differences in Emerging Risks (SOP 5)

Analysis of variance revealed *no significant differences in perceived emerging risks across demographic groups*, indicating that risk awareness is relatively uniform among users. This suggests that cybersecurity threats are widely experienced or recognized regardless of age, income, or employment status.

4.6 Relationship Between Intention and Emerging Risks (SOP 6)

Multiple regression analysis demonstrated a *significant relationship between intention to use and emerging risks.* Specifically:

1. *Perceived ease of use ($\beta = 0.40, p < 0.001$)* positively influences intention
2. *Perceived usefulness ($\beta = 0.35, p < 0.001$)* positively influences intention
3. *Security risks ($\beta = -0.30, p < 0.01$)* negatively influence intention
4. *User interface risks ($\beta = -0.25, p < 0.01$)* negatively influence intention

The model explains *62% of the variance ($R^2 = 0.62$),* indicating strong explanatory power. These findings suggest that while usability encourages adoption, *risk perception acts as a significant barrier*, supporting the need to integrate risk factors into TAM frameworks.

4.7 Proposed Mitigating Risk Strategies (SOP 7)

Based on the findings, the following strategies are proposed:

1. User-Level Strategies

   a. Enhance digital financial literacy

   b. Promote awareness of phishing and fraud

   c. Encourage use of authentication features

2. Provider-Level Strategies

   a. Improve UI/UX design for clarity and error reduction

   b. Strengthen multi-factor authentication and encryption

   c. Provide real-time fraud alerts

3. Policy-Level Strategies

   a. Strengthen regulatory frameworks

   b. Enforce cybersecurity standards

   c. Promote nationwide digital literacy programs

V. CONCLUSIONS

The findings of this study underscore that *digital wallet adoption is strongly driven by usability advantages*, particularly in terms of perceived ease of use and operational efficiency. Respondents consistently reported that digital wallet applications are intuitive, convenient, and easy to learn, which significantly enhances their willingness to adopt and continuously use these platforms. This supports the fundamental premise of the Technology Acceptance Model (TAM), which identifies ease of use as a critical determinant of technology acceptance (Davis, 2023). In the context of Metro Manila, where mobile technology is deeply embedded in daily life, usability becomes a decisive factor that lowers barriers to entry and accelerates digital financial inclusion.

However, while usability promotes adoption, the study reveals that *perceived usefulness varies across socioeconomic groups,* particularly in relation to income levels. Users from higher-income groups tend to perceive greater value in digital wallet applications, likely due to their ability to maximize features such as bill payments, online shopping, and financial management tools. In contrast, lower-income users, although highly engaged, may primarily use digital wallets for basic transactions such as remittances and mobile load purchases. This disparity suggests that perceived usefulness is not uniform but is shaped by users' financial capacity, transaction needs, and level of financial literacy. Consequently, digital wallet providers must tailor their services to ensure that value is accessible and meaningful across diverse socioeconomic segments.

Despite the widespread adoption of digital wallets, the study highlights that *emerging security threats remain significant barriers to trust*. Respondents expressed strong concerns regarding phishing attacks, fraudulent transactions, and unauthorized access, indicating that security risks are highly salient in users' minds. These

concerns reflect the evolving threat landscape in digital finance, where increased connectivity and convenience are accompanied by heightened exposure to cyber risks. Trust, therefore, emerges as a critical factor that can either sustain or hinder continued usage. Even when users recognize the benefits of digital wallets, persistent security concerns may reduce confidence and limit full adoption, emphasizing the need for robust cybersecurity measures and user education.

The study further confirms that while *the Technology Acceptance Model (TAM) remains applicable*, it requires *contextual enhancement through the integration of risk-related factors*. Traditional TAM focuses primarily on positive determinants of adoption—perceived ease of use and perceived usefulness—but does not explicitly account for the negative influence of perceived risks. The findings demonstrate that emerging risks significantly affect user behavior, suggesting that a more comprehensive model is needed to capture both enabling and inhibiting factors. By incorporating elements such as security risks and interface-related vulnerabilities, the study contributes to extending TAM into a more context-sensitive framework that better reflects real-world fintech environments.

Finally, the results emphasize that *multi-stakeholder mitigation strategies are required* to address the complex challenges associated with digital wallet utilization. Effective risk mitigation cannot rely solely on users or providers; instead, it necessitates a coordinated approach involving multiple actors. At the user level, there is a need to enhance digital financial literacy and cybersecurity awareness to empower individuals to protect themselves against threats. At the provider level, continuous improvements in system design, security infrastructure, and fraud detection mechanisms are essential to ensure safe and reliable services. At the policy level, regulatory bodies must strengthen oversight, enforce data protection standards, and promote inclusive digital finance initiatives. Together, these efforts can create a more secure and resilient digital payment ecosystem.

All in all, the study highlights the dual nature of digital wallet adoption—driven by convenience and usability yet constrained by emerging risks. Addressing this balance requires not only technological innovation but also strategic collaboration among stakeholders to ensure that digital financial systems remain both accessible and secure.

VI. IMPLICATIONS

The findings of this study offer significant implications across theoretical, practical, and policy dimensions, contributing to a deeper understanding of digital wallet adoption and risk management in emerging digital economies.

From a *theoretical perspective*, the study supports and extends the *Technology Acceptance Model (TAM)* by incorporating *perceived risk constructs* into its framework. While TAM traditionally emphasizes perceived ease of use and perceived usefulness as primary drivers of technology adoption (Davis, 1989), the results demonstrate that these factors alone are insufficient to fully explain user behavior in fintech environments. The presence of emerging risks, particularly those related to security threats and interface vulnerabilities, introduces a critical layer of complexity that influences user intention. By integrating risk as a moderating or inhibiting factor, the study contributes to the evolution of TAM into a more comprehensive and context-sensitive model. This theoretical enhancement is particularly relevant in digital finance, where trust, security, and risk perception are inseparable from usability considerations. Consequently, the study provides a valuable foundation for future research aiming to develop hybrid models that better capture the realities of technology adoption in high-risk digital ecosystems.

From a *practical standpoint*, the study highlights the urgent need for *feature enhancement, user education, and interface optimization* among digital wallet providers. Although users generally perceive digital wallets as easy to use, the persistence of interface-related challenges indicates that continuous improvement in user experience design is necessary. Simplifying navigation, reducing cognitive load, and minimizing transaction errors can significantly enhance user confidence and reduce operational risks. In addition, the findings emphasize the importance of strengthening security features, such as multi-factor authentication, real-time fraud detection,

and secure encryption protocols, to address growing cybersecurity concerns. Equally important is the role of *user education*, as many risks stem from behavioral vulnerabilities such as a lack of awareness of phishing schemes or unsafe digital practices. Providers must therefore invest in educational campaigns, in-app guidance, and user support systems to empower consumers to use digital wallets safely and effectively. These practical measures not only improve user satisfaction but also enhance trust and long-term adoption.

From a *policy perspective*, the study reinforces the importance of *regulatory oversight and digital literacy initiatives* in sustaining a secure and inclusive digital payment ecosystem. As digital wallets become integral to financial transactions, regulatory bodies such as central banks and data privacy authorities must ensure that robust standards are in place to protect users from fraud, data breaches, and system vulnerabilities. This includes enforcing compliance with cybersecurity protocols, strengthening consumer protection policies, and monitoring fintech providers to ensure accountability. Furthermore, the findings highlight the critical role of *digital and financial literacy programs* in reducing user vulnerability to emerging risks. Governments and institutions must prioritize nationwide initiatives that educate citizens on safe digital practices, risk awareness, and responsible financial behavior. Such efforts are particularly important in developing economies like the Philippines, where rapid digital adoption may outpace users' ability to manage associated risks.

The study underscores that effective digital wallet adoption is not solely a technological issue but a multidimensional challenge requiring theoretical refinement, practical innovation, and strong policy support. By addressing usability, risk, and governance simultaneously, stakeholders can foster a more secure, inclusive, and sustainable digital financial environment.

VII. RECOMMENDATIONS

In light of the findings of this study, several strategic recommendations are proposed to enhance the safe, effective, and sustainable utilization of digital wallet applications. These recommendations address critical areas of concern, including security, functionality, user awareness, and regulatory coordination.

First, there is a pressing need to *strengthen platform security architectures*. As the study revealed that security risks, particularly phishing attacks, fraud, and unauthorized access, remain significant concerns among users, digital wallet providers must invest in advanced cybersecurity measures. This includes implementing multi-layered security systems such as multi-factor authentication (MFA), biometric verification, end-to-end encryption, and real-time fraud detection mechanisms. In addition, continuous system monitoring and regular security audits should be conducted to identify vulnerabilities and mitigate potential threats proactively. Strengthening security architectures not only protects users' financial and personal data but also builds trust, which is essential for sustaining long-term adoption.

Second, digital wallet providers should *enhance financial management features* to increase perceived usefulness across diverse user groups. While users primarily utilize digital wallets for basic transactions, the study indicates that more advanced features, such as budgeting tools, expense tracking, savings options, and financial planning support, are underutilized or insufficiently developed. By integrating user-friendly financial management functionalities, providers can transform digital wallets from simple payment tools into comprehensive financial platforms. This enhancement is particularly important for promoting financial inclusion, as it enables users, especially those from lower-income groups, to better manage their finances and make informed financial decisions.

Third, there is a critical need to *expand cybersecurity awareness programs* targeted at digital wallet users. The findings suggest that many risks are not solely technological but are also rooted in user behavior, such as susceptibility to phishing scams and unsafe online practices. Therefore, both service providers and government institutions should collaborate to develop and implement educational initiatives that promote safe digital practices. These programs may include in-app alerts, tutorials, public awareness campaigns, and partnerships with educational institutions to integrate digital financial literacy into curricula. By empowering users with knowledge

and skills, these initiatives can significantly reduce vulnerability to cyber threats and enhance overall user confidence.

Finally, the study recommends efforts to *promote interoperability and regulatory harmonization* within the digital payment ecosystem. As multiple digital wallet platforms operate simultaneously, ensuring seamless interaction among systems is crucial for improving user experience and expanding accessibility. Interoperability allows users to transfer funds across different platforms efficiently, reducing fragmentation in the digital financial landscape. At the same time, regulatory harmonization is necessary to ensure consistent standards for security, data privacy, and consumer protection across all providers. Regulatory bodies should work collaboratively with fintech companies to establish unified guidelines and compliance frameworks that support innovation while safeguarding user interests.

In conclusion, these recommendations highlight the need for a *multi-dimensional approach* involving technological enhancement, user empowerment, and institutional collaboration. By strengthening security systems, expanding functionality, improving user awareness, and aligning regulatory efforts, stakeholders can create a more resilient and inclusive digital wallet ecosystem capable of addressing emerging risks while maximizing the benefits of digital financial innovation.

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