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Evaluation of the Determining Factors of the Intention to Use, Satisfaction and Recommendation of Mobile Wallets Adapted to the Utaut2 Model in the Peruvian Context

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Abstract

The massive adoption of mobile wallets in the context of COVID-19 forced retailers to implement it in their businesses. Therefore, it is necessary to assess the determinants of mobile wallet adoption and recommendations among merchants in northern Peru. Objective: To conduct an empirical evaluation to test the research hypotheses gathered during the literature review process. Based on the UTAUT2 model, the partial least-squares technique was used to test the hypotheses. Method: This study relied on a quantitative approach with a nonexperimental design, and a sample of 466 merchants was selected through nonprobabilistic sampling. Results: Eight of the nine hypotheses were confirmed: Perceived utility (β=0.219∗∗∗), attitude (β=0.57∗), perceived risk (β=−0.219∗∗∗), and satisfaction (β=0.515∗∗∗) are the main factors influencing the adoption and recommendations of mobile wallets with standardized beta coefficients of considerable magnitude (β∗∗∗). Conclusion: This study confirms the importance of perceived usefulness, attitude, perceived risk, and satisfaction in driving the adoption and recommendation of mobile wallets among merchants in northern Peru. This information may be useful for merchants wishing to implement mobile wallet services and to increase their customer base. The results of this empirical assessment highlight the need for merchants to focus on improving the perceived usefulness and satisfaction of their mobile wallet services as well as minimizing the perceived risks associated with their use.

Keywords: Mobile wallet, Determinants, Digital transformation, Merchants, UTAUT2

1. Introduction

Since the introduction of such services in India, mobile wallets have become increasingly popular (George & Sunny, 2022). The use of mobile phones for financial transactions has resulted in the development of a variety of mobile payment systems (MPSs), which use the internet to process payments for goods and services (Di Pietro *et al.,* 2015; Kaur *et al.,* 2020). The mobile wallet is a mobile commerce platform that emerged as an innovative contactless payment solution where users can make payments with or without credit cards, send peer-to-peer money, pay bills, and make purchases in online stores directly from the applications offering the service (Kapoor *et al.,* 2022; Mew & Millan, 2021).

The COVID-19 pandemic has further accelerated consumers' favorable intentions toward mobile wallets (Sarmah *et al.,* 2021). It is estimated that in India alone, during the lockdown period, the use of mobile wallets increased by 44% (Undale *et al.,* 2020). Globally, by 2021, there were already more than 3.8 billion people using some form of digital payment service, with this number expected to continue growing in the coming years to reach approximately 5.5 billion by 2027 (Orús, 2023).

Financial technology (Fintech) constitutes an emerging trend that integrates information and communication technologies (ICTs) with existing financial service offerings to create mobile wallet services characterized by innovation, efficiency, ease of use, and security (Shetu *et al.,* 2022; Hassan *et al.,* 2021). The fintech ecosystem in Latin America and the Caribbean (LAC) has evolved and grown over the past three years, where the number of platforms surged at a rate of 112% since the last measurement in 2018 to reach 2482, and investment in fintech platforms significantly increased to reach USD 1600 million in 2021 (Finnovista *et al.,* 2022), demonstrating the potential for sector growth.

Consequently, with the increase in the number of fintech platforms and companies that have launched mobile wallet services through apps and websites in LACs, a population of approximately 630 million people and over 450 million cell phone users, mobile payments have become one of the cornerstones of e-commerce. Furthermore, in 2020, the value of such transactions exceeded 38 billion US dollars in the region, and the value is expected to surpass 100 billion by 2025 (Statista, 2023a). Specifically, these figures of mobile wallet adoption have increased in the context of the COVID-19 pandemic (Mew & Millan, 2021), where consumers and merchants largely adopt digital payments to limit face-to-face transactions, decreasing the likelihood of the virus being able to spread through social contact (Abdullah & Naved Khan, 2021).

In the Peruvian national context, it is important to note that Yape is part of a B2C (business-to-consumer) fintech owned by the Bank of Credit of Peru. It was launched in the market in 2017, but during the COVID-19 pandemic, it experienced exponential growth in terms of user numbers (Startupeable, 2021), registering more than eight million users (at the end of 2021) and denoting an increase of approximately 2.4 million users compared to the previous year (Statista, 2023c). It is estimated that more than two-thirds of online purchases in Peru were paid with a card (credit or debit). Furthermore, approximately 21.5% of online purchases were settled through wallets or e-Wallets, while bank transfers accounted for less than 4% of e-commerce sales (Statista, 2023b). It is relevant to assess the prevalence of various factors in the adoption and recommendation of mobile wallets by Peruvian merchants in the postpandemic context.

Moreover, various studies confirm that consumers prefer technology that provides fast, secure, convenient, and useful services on a single platform (Singh *et al.,* 2020; Hossain *et al.,* 2019). The primary objective of the present study was to assess the determining factors of the intention to use, satisfaction, and recommend mobile wallets among users engaged in retail and wholesale trade in the Peruvian context using the UTAUT2 model. This study is based on the premise that evaluating the determinants of the intention to use, satisfaction, and recommendation of mobile wallets is of utmost importance due to the growing adoption and relevance of these practices among merchants and consumers in the Peruvian context. These factors can greatly affect a user's decision to use a mobile wallet and whether they are willing to recommend it to others.

2. Literature Review

2.1 Adoption of Mobile or Digital Wallets

Mobile or digital wallets are services in which a mobile device is used to settle payments for goods, services, and bills through wireless communication technologies and other types (Yang *et al.,* 2012). Payments using digital wallets through applications are among the fastest-growing sectors during the COVID-19 pandemic (Shetu *et al.,* 2022). Mobile wallet technologies include direct carrier billing (i.e., buyers make a purchase, and the respective payment amount is deducted directly from the account), quick response (QR), and barcodes (i.e., they act as authentication tools for monetary transactions in applications) (Leong *et al.,* 2020).

In the scientific literature, various studies have examined the factors involved in the adoption of mobile wallet services. Adoption behavior and the intention to use are the constructs most commonly addressed by academics worldwide (Abdullah & Naved Khan, 2021). Variables such as perceived ease of use, usefulness, trust, attitude, perceived risk, and social influence have been explored by various studies linked to the adoption of new technologies (Ramos de Luna *et al.,* 2019; Xu & Du, 2018; Duarte *et al.,* 2018). Belanche *et al.* (2022) employed perceived risk and trust in the TPB model, which has greater predictive ability for the adoption of mobile payments.

2.2 Adapted UTUAT2 Conceptual Model for the Peruvian Context

The Unified Theory of Acceptance and Use of Technology (UTUAT2) is a model with extensive empirical evidence that encompasses various factors involved in the adoption and recommendation of digital wallets, namely, perceived usefulness, perceived ease of use, perceived risk, attitude, intention to use, satisfaction, recommendation of use, and some moderating variables such as innovation, stress from using technology, and social influence (Singh *et al.,* 2020).

Initially, the UTUAT model was suggested; this model includes a series of constructs, such as intention of use, and is based on perceptions reminiscent of the Technology Acceptance Model (TAM) (Slade *et al.,* 2015), such as performance expectancy and effort, to which social influences and facilitating conditions and several moderators were added (Venkatesh *et al.,* 2003). Abrahim Sleiman *et al.* (2023) used this theory to explain the adoption of mobile technologies during the COVID-19 pandemic in China.

The variables of the research model include ease of use, usefulness, perceived risk, attitude, and social influence, according to the review of the scientific literature and the arguments suggested. Furthermore, they are constructs used in several previous studies (Dwivedi *et al.,* 2017; Singh *et al.,* 2020; Liébana-Cabanillas *et al.,* 2017; Shaw, 2014; Shin, 2007; E. Slade *et al.,* 2016; Thakur & Srivastava, 2014; Y. Yang *et al.,* 2015).
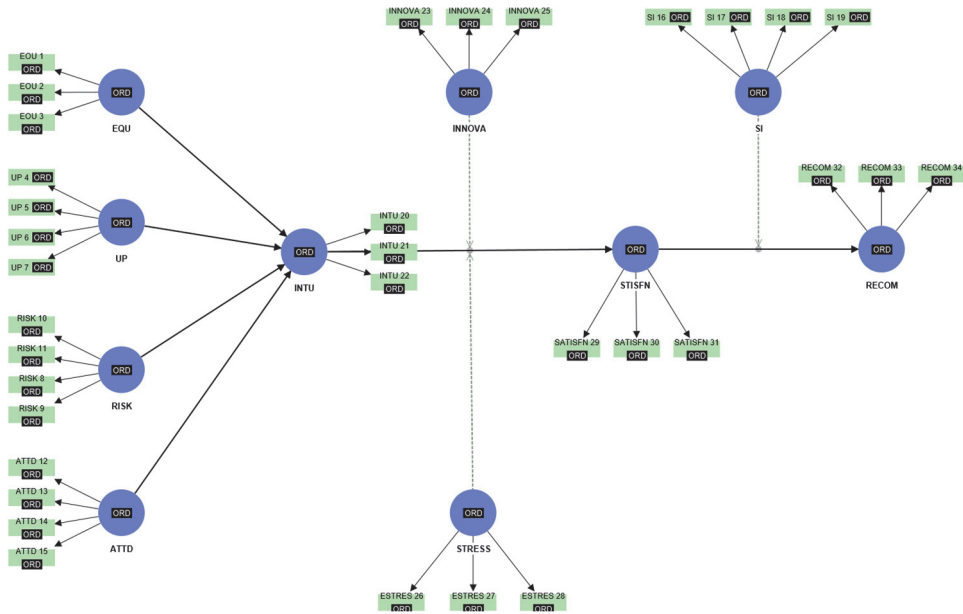
Figure 1. Research Model Adapted from the Original Version of the UTAUT2 Model by Singh *et al.* (2020).

The research hypotheses and conceptualization of the factors determining user intention to use digital wallets in the Peruvian context are as follows: ease of use has been utilized by some technology adoption studies and determined to have a significant influence on user intention (Apanasevic *et al.,* 2016). Oliveira *et al.* (2016) employed ease of use and perceived usefulness to determine their significant influence on user intention to adopt mobile wallets.

In the context of India, various academics have employed constructs such as ease of use, usefulness, user attitude, and social influence, confirming the positive association between these constructs and user intention to use (Madan & Yadav, 2016; Upadhyay & Chattopadhyay, 2015; Abhishek & Hemchand, 2016).

Perceived risk refers to the subjective evaluation that the user makes regarding the possible threats, problems, or challenges associated with the use of the mobile wallet in their financial transactions and activities (Singh *et al.,* 2020). Al-Saedi *et al.* (2020) used factors related to security and perceived risk in the UTAUT model, empirically corroborating that these factors had a significant impact on users' intentions to use mobile payment services.

Attitude refers to the degree to which a person values a particular behavior positively or negatively (Belanche *et al.,* 2022). Previous studies have corroborated the significant relationship between user attitudes and the intention to use a technology (Oliveira *et al.,* 2016). Likewise, the positive relationship between attitude and behavioral intention to adopt mobile payments has been widely demonstrated in various contexts (Upadhyay *et al.,* 2022; Phonthanukitithaworn *et al.,* 2016; Ramos de Luna *et al.,* 2019).

Intention to use is an indicator that indicates the individual's effort to perform a behavior (Mendoza Duran, 2018). Various studies have confirmed direct and indirect connections between perceived satisfaction and user intention (Singh *et al.,* 2020). Similarly, Xu & Du (2018) confirmed that user belief and perception of quality directly influence user perceived satisfaction and intention to continue using a technology.

Consumer perceived satisfaction is positively affected by the benefits and convenience of a

technology. Consequently, greater benefits increase the perceived value of a service and improve user perceived satisfaction (Casidy & Wymer, 2016). Several previous studies have confirmed direct and indirect relationships between perceived satisfaction and intention to use (Liébana-Cabanillas & Alonso-Dos-Santos, 2017; Tajvidi *et al.*, 2021). Xu & Du (2018) demonstrated the indirect influence of user satisfaction on the intention to use a technology.

Innovation in the context of adopting new technologies is the degree to which an individual responds to new ideas freely and earlier than others make innovative decisions (Thakur & Srivastava, 2014; Rogers *et al.*, 2008). Innovation in the present study will be used as a moderating variable.

Stress is defined as exposure to stimuli that are considered extremely difficult, intractable, or burdensome, thus exceeding a person's coping capacity (MacLean *et al.*, 2019). In the context of adopting new technologies, stress is the level of discomfort felt by an individual when using digital wallet services (Schaufeli, 2015). Similarly, in the present study, it was used as a moderating variable.

In previous research, social influence has also been included as a third moderator. These combinations are proposed because predicting consumer behavioral intention requires more than a single model, and the integrated framework provides a better understanding of the relationships between the constructs (Singh *et al.*, 2020). Recommending a technology is a behavior following its use that demonstrates a user's willingness and satisfaction with the technology to endorse its use by others (Miltgen *et al.*, 2013). In addition, users generally share their experiences with their friends and family through social media platforms and websites (Oliveira *et al.*, 2016).

Hypothesis 1. Ease of use (EOU) positively and significantly influences intention to use (INTU).

Hypothesis 2. Perceived usefulness (PU) positively and significantly influences intention to use (INTU).

Hypothesis 3. Perceived risk (RISK) negatively influences the intention to use (INTU). **Hypothesis 4.** Attitude (ATTD) positively and significantly influences the intention to use (INTU).

Hypothesis 5. The greater the user's intention to use (INTU) is, the greater the perceived satisfaction (SATISF) with the mobile wallet services.

Hypothesis 6. The greater the user's perceived satisfaction (SATISF) with the mobile wallet is, the greater the user's recommendation (RECOMM) to use the mobile wallet services.

Hypothesis 7. Innovation (INNOV) moderates the relationship between a user's intention (INTU) and perceived satisfaction (SATISF) with the mobile wallet. **Hypothesis 8.** Stress (STRESS) moderates the relationship between a user's intention (INTU) and perceived satisfaction (SATISF) with the mobile wallet.

Hypothesis 9. Social influence (SI) moderates the relationship between a user's perceived satisfaction (SATISF) and recommendation (RECOMM) to use a mobile wallet.

3. Methodology

The study was oriented toward a quantitative, applied approach characterized by well-defined immediate practical purposes and aimed at delivering solutions that impact society (Carrasco, 2019). The study design was nonexperimental and cross-sectional.

In this regard, an empirical study was conducted to test the research hypotheses gathered in the literature review process on the determinants of the adoption, satisfaction, and recommendation of mobile wallets in the Peruvian context.

Participants were selected through nonprobabilistic convenience sampling based on the criterion of ease of access, resulting in a sample of 466 mobile wallet service user merchants from the departments of La Libertad and Lima (Table 1 shows the sociodemographic profile of the participants). The data were collected using a survey technique, and the instrument used was an online questionnaire.

Table 1. Sociodemographic profile of the participants

Total respondents (n=466)		n	%
Gender	Male	217	46.56
	Femele	249	53.42
Age	18-22	118	25.32
	23-25	86	18.45
	26-35	88	18.88
	36-45	76	16.30
	46 and older	98	21.03
Marital Status	Single	288	61.80
	Married	171	36.69
	Widowed	7	1.50
Which mobile device do you use the most?	Smartphone o cell phone	375	80.47
	Tablet	45	9.65
	Laptop or computer	46	9.87
Have you ever used a mobile payment application (virtual wallet) such as Yape, Plin, or Tunki?	Yes	466	100
	No	0	0

Note: Own elaboration

The instrument used in the present study was designed, validated, and applied by Singh *et al.* (2020) among Indian merchants, with the goal of providing significant information about the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT2) before the COVID-19 pandemic.

However, with the onset of the COVID-19 pandemic, the use of mobile wallets among Peruvian clients and merchants grew exponentially; therefore, it was relevant to empirically evaluate such factors among Peruvian merchants. Furthermore, in the literature review, no previous studies have been conducted in the Peruvian context with the purpose of testing research hypotheses related to the UTAUT2 model formulated in other contexts, such as India, North America, or Europe.

The online survey was designed using Microsoft Forms and was structured in two sections. In the first section, questions oriented toward collecting demographic information were considered. The second section considered the items (36 in total) proposed by Singh *et al.* (2020), which were adapted with the support of a professional translator from English to Spanish. Regarding the determinants of mobile wallet use and recommendation included in the instrument, 3 items corresponded to EOU, 4 items to UP, 4 items to RISK, 4 items to ATTD, 4 items to SI, 3 items to INTU, 3 items to INNOVA, 3 items to STRESS, 3 items to SATISFN, and 3 items to RECOMD. The response options were based on a 5-point Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree".

Prior to the application of the data collection instrument, the instrument was evaluated by six experts in writing and about the study, and the results were favorable. Subsequently, the instrument was given to the participants, where the average time of application was 15 minutes.

Data analysis: The analysis and processing of the data were carried out using the statistical software SmartPLS (Ringle *et al.,* 2022), and the partial least squares (PLS) technique was employed to test the research model. Cronbach's alpha coefficient was used to determine the reliability of the measurement instrument; the average variance extracted (AVE) method was also used to determine convergent validity, collinearity, and discriminant validity (Tables 3, 4, and 5).

Ethical Considerations: Participants freely and voluntarily agreed to participate in the study. To verify this, the research team attached the informed consent form at the beginning of the online form, where a mandatory branching question was placed: "Do you voluntarily agree to participate in this research?" with two response options, "I agree" or "I do not agree." If they agreed, the form's questions would automatically open; otherwise, the form would close. The anonymity of the collected information was also preserved.

4. Results

Quality tests of the measurement instrument: To analyze the measurement instrument, an exhaustive investigation of the relationships between a series of elements and their respective standardized external loads was carried out. External loads represent the contributions of each item to an underlying latent construct. Table 2 clearly shows that various items have high and significant external loads on specific structures greater than 0.07, suggesting that these elements are closely linked to these constructs.

Table 2. Standardized internal weights of the collection instruments

Items	External loads (standardized)
ATTD 12 <- ATTD	0.891
ATTD 13 <- ATTD	0.908
ATTD 14 <- ATTD	0.898
ATTD 15 <- ATTD	0.812
EOU 1 <- EQU	0.974
EOU 2 <- EQU	0.972
EOU 3 <- EQU	0.97
ESTRES 26 <- STRESS	0.957
ESTRES 27 <- STRESS	0.97
ESTRES 28 <- STRESS	0.971
INNOVA 23 <- INNOVA	0.903
INNOVA 24 <- INNOVA	0.903
INNOVA 25 <- INNOVA	0.859
INTU 20 <- INTU	0.869
INTU 21 <- INTU	0.876
INTU 22 <- INTU	0.723
RECOM 32 <- RECOM	0.944
RECOM 33 <- RECOM	0.935
RECOM 34 <- RECOM	0.732
RISK 10 <- RISK	0.937
RISK 11 <- RISK	0.884
RISK 8 <- RISK	0.802
RISK 9 <- RISK	0.896
SATISFN 29 <- STISFN	0.975
SATISFN 30 <- STISFN	0.974
SATISFN 31 <- STISFN	0.97
SI 16 <- SI	0.93
SI 17 <- SI	0.646
SI 18 <- SI	0.924
SI 19 <- SI	0.444
UP 4 <- UP	0.861
UP 5 <- UP	0.829
UP 6 <- UP	0.911
UP 7 <- UP	0.923

Table 3 shows that the Cronbach's alpha values for all the constructs are greater than 0.7, suggesting that they have a high level of internal consistency. The composite reliability (CR) is high for all the constructs, indicating consistency and precision in the measurements made, with values ranging between 0.84 and 0.972.

Additionally, the average variance extracted (AVE) values range between 0.583 and 0.947, suggesting that a considerable amount of variance is explained by the constructs in relation to the items. In summary, the results obtained in this study indicate that the components evaluated exhibit solid internal consistency, high reliability, and an adequate ability to assess variability in all items.

Table 3. Construct validity and reliability reports

Construct	α	CR	AVE
ATTD	0.9	0.906	0.771
EQU	0.971	0.971	0.945
INNOVA	0.87	0.919	0.79
INTU	0.767	0.759	0.682
RECOM	0.841	0.855	0.767
RISK	0.903	0.929	0.776
SI	0.727	0.84	0.583
STISFN	0.972	0.972	0.947
STRESS	0.964	0.964	0.933
UP	0.904	0.904	0.777

Note: α= Cronbach's alpha; CR= Composite reliability; AVE= Average variance extracted

On the other hand, the VIFs from the collinearity test of the constructs fall between 1.136 and 5.029, indicating that all the items corresponding to their respective constructs do not show collinearity issues.

Table 4. Collinearity Report

Construct	Collinearity
	VIF
ATTD -> INTU	2.165
EQU -> INTU	4.04
INNOVA -> STISFN	3.489
INTU -> STISFN	1.848
RISK -> INTU	2.243
SI -> RECOM	2.557
STISFN -> RECOM	2.423
STRESS -> STISFN	2.994
UP -> INTU	5.029
INNOVA x INTU -> STISFN	2.062
SI x STISFN -> RECOM	1.136
STRESS x INTU -> STISFN	2.228

5. Discriminant Validity

The correlation between the constructs and the square roots of the AVEs is presented in Table 5, which allows us to verify the discriminant validity of the latent variables. According to Fornell *et al.* (1982), the diagonal elements of a matrix should have higher values than their off-diagonal rows and columns. This study demonstrated that the square of the AVE roots for each construct was greater than the correlation coefficient between the other variables.

Table 5. Discriminant validity report

	ATTD	EQU	INNOVA	INTU	RECOM	RISK	SI	STISFN	STRESS	UP
ATTD	**0.878**									
EQU	0.684	**0.972**								
INNOVA	0.579	0.727	**0.889**							
INTU	0.77	0.655	0.515	**0.826**						
RECOM	0.762	0.751	0.69	0.715	**0.876**					
RISK	0.523	0.692	0.769	0.398	0.596	**0.881**				

	ATTD	EQU	INNOVA	INTU	RECOM	RISK	SI	STISFN	STRESS	UP
SI	0.737	0.753	0.821	0.646	0.767	0.713	**0.764**			
STISFN	0.657	0.804	0.712	0.653	0.801	0.607	0.766	**0.973**		
STRESS	0.208	0.364	0.685	0.07	0.342	0.581	0.518	0.336	**0.966**	
UP	0.722	0.857	0.729	0.666	0.774	0.734	0.771	0.768	0.368	**0.882**

6. Testing of Research Hypotheses

In the context of this research, a series of hypotheses were evaluated through path analysis. The primary objective is to examine the relationships between various latent variables to understand their interactions and possible influence on the adoption and recommendation of mobile wallets by Peruvian merchants. Table 6 presents the results obtained in this study, structured in terms of parameter estimates, standard errors, t values, and p values, as well as the standardized path coefficients representing the relationships between the variables. Eight of the nine proposed hypotheses were confirmed. Path coefficients for the eight tested hypotheses ranged from -0.219 to 0.515, and the p values for each of the hypotheses were statistically significant. The path for the moderation hypothesis where INNOVA x INTU→ SATISF was not statistically significant (path coefficient = 0.005, z value = 0.113); consequently, H7 was rejected.

Table 6. Research Hypothesis Testing

Construct	Path	2.50%	97.50%	(STDEV)	(|O/STDEV|)	p-value	Decision
EOU→INTU	0.23*	0.103	0.357	0.065	9.839	0.000***	Accepted
UP→INTU	0.219***	0.076	0.366	0.073	3.535	0.003**	Accepted
RISK→INTU	-0.219***	-0.312	-0.122	0.048	7.623	0.000***	Accepted
ATTD→INTU	0.57*	0.454	0.685	0.058	6.838	0.000***	Accepted
INTU→STISFN	0.314***	0.217	0.396	0.046	4.553	0.000***	Accepted
STISFN→RECOM	0.515***	0.416	0.614	0.051	5.831	0.000***	Accepted
INNOVA x INTU→ STISFN	0.005	-0.078	0.104	0.046	10.134	0.910	Refused
STRESS x INTU→ STISFN	-0.14*	-0.251	-0.05	0.051	0.633	0.006**	Accepted
SI x STISFN→ RECOM	-0.216***	-0.276	-0.155	0.031	2.998	0.000***	Accepted

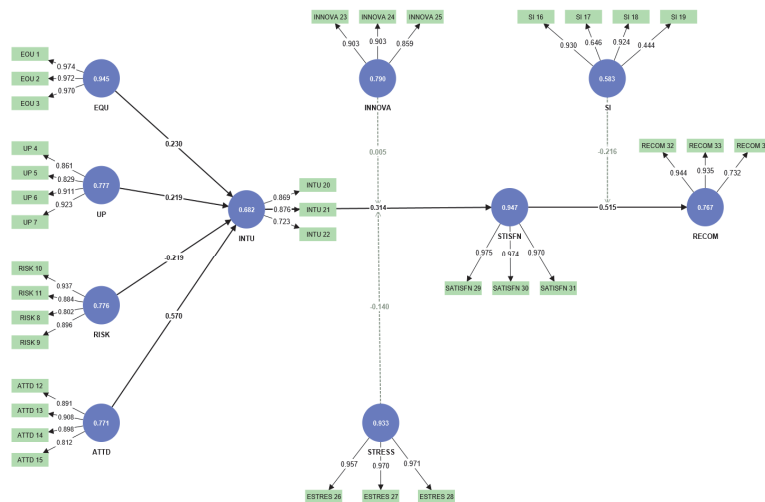Note. Path = coefficient path; ***p < 0,001; **p <0,01; *p <0,05

Figure 2. Resolved Research Model

7.   Proportion of Variability in Constructs

Table 7 displays the R-squared values indicating that EOU, UP, RISK, and ATTD explained 64.8% of the variance in INTU. On the other hand, INTU explains 73.7% of the variance in STISFN. STISFN explained 63.8% of the variance in RECOM.

Table 7. R-squared values

Construct	R^2	%
INTU	0.648	64.8
RECOM	0.737	73.7
STISFN	0.638	63.8

8.   Discussion

The intention to use electronic wallets focuses on facilitating and expediting payment processes, both online and at physical points of sale, and promoting financial inclusion. The study confirmed that EOU has a positive and significant influence on users' INTU when using mobile wallets (β=0.23*), similar to the findings of Lopez & Palomino (2021), who demonstrated a significant influence between ease of use and perceived usefulness (β =.24). Apanasevic *et al.* (2016) and Oliveira *et al.* (2016) also demonstrated the influence of EOU on INTU.

Additionally, mobile wallets offer a series of advantages to both users and merchants, including practicality, accessibility, lack of physical contact, convenience, and usefulness. The study also revealed the significant influence of PU on INTU, which corresponds with the findings of Madan & Yadav (2016) and Upadhyay & Chattopadhyay (2015). Moreover, it was demonstrated that RISK negatively influences INTU when mobile wallets are used, which corresponds with the findings of Al-Saedi *et al.* (2020), who included determinant factors such as security and perceived risk in the UTAUT model, corroborating their significant impact on users' INTU when using mobile payment services.

Furthermore, the attitude toward the intention to use electronic wallets is generally positive and driven by convenience, speed, and security. The results of this research indicate that ATTD positively and significantly influences INTU when individuals use mobile wallets; within the same context, Belanche *et al.* (2022) emphasize that attitude is the degree to which a person values a behavior positively or negatively. Previous studies have also shown a significant influence between ATTD and INTU (Upadhyay *et al.,* 2022; Ramos de Luna *et al.,* 2019; Phonthanukitithaworn *et al.,* 2016).

The intention to achieve perceived satisfaction with electronic wallet services is based on a combination of factors, including ease of use, security, transaction efficiency, and customer service quality. These factors may vary depending on the specific context and type of electronic wallet used (Mendoza Duran, 2018).

In this regard, the study results demonstrated the influence of INTU and STISFN on users when employing mobile wallets. These results correspond with Xu & Du (2018), who confirmed the influence of user belief, quality perception, and intent to use mobile wallets on perceived satisfaction. Moreover, the study determined that STISFNs positively and significantly influence users' intention to use RECOMs for mobile wallets, which corresponds with the results of Singh *et al.* (2020), who corroborated the same hypothesis in the context of India.

As has been shown in other contexts, INNOVA does not have a moderating effect on the influence of INTU or STISFN. These results correspond with those of Singh *et al.* (2020) and Rogers *et al.* (2008).

The study also demonstrated that stress (STRESS) moderates the relationship between user intention (INTU) and perceived satisfaction (STISFN) with the mobile wallet. In this respect,

Permatasari *et al.* (2022) showed that stress has a negative and significant effect on perceived usefulness among Indonesian merchants.

Finally, the study demonstrated that social influence (SI) moderates the relationship between user perceived satisfaction (STISFN) and recommendation (RECOM) to use a mobile wallet, which partially corresponds with the results of Tusyanah *et al.* (2021), who demonstrated that social influence has a negative effect on behavioral intentions through experience.

Digital wallets offer a series of benefits in terms of convenience, accessibility, security, and financial organization. However, they also present certain challenges and risks, such as technological dependence, security risk, lack of widespread acceptance, and technical issues. It is important to consider these pros and cons when contemplating the use of a digital wallet, carefully assessing individual needs and trust in the platform's security before adopting it as the main payment method. However, there are still knowledge gaps regarding this topic, among which security is the main modality, identity theft, where scammers can gain access to digital wallet accounts and empty them of funds. This can occur through credential harvesting and stuffing, where scammers

9. Conclusions

This study demonstrated the validity and reliability of a measurement instrument designed to assess the factors influencing the adoption of mobile wallets by Peruvian merchants. The results indicate that the measured constructs possess strong internal consistency, high reliability, and an adequate capacity to explain the observed variability in participants' responses. The detailed analysis of external loadings and psychometric properties, such as Cronbach's alpha, composite reliability, and average variance extracted, suggest that the instrument is statistically robust.

The tests for collinearity confirmed that the constructs were distinct and uniquely contributed to the model, while discriminant validity ensured that each construct measured different phenomena. Hypothesis testing through path analysis revealed the acceptance of most of the proposed hypotheses, with the exception of moderating hypothesis H7.

The resolved research model demonstrated a significant proportion of the explained variability in the intentions and behaviors related to mobile wallets. These findings contribute to the understanding of the adoption of financial technologies and can guide developers and merchants in the effective implementation of these digital tools.

In conclusion, the developed instrument is a reliable means to measure the attitudes and behaviors of Peruvian merchants toward mobile wallets, providing valuable insights for improving adoption and user satisfaction. This study also highlights areas for future research, particularly with respect to security, interoperability, and user understanding in the context of digital wallets.

In this study, predominant factors influencing the adoption of mobile wallets were identified, such as ease of use (EOU), perceived usefulness (UP), associated risks (RISK), and attitude (ATTD) toward technology. These elements are crucial because they significantly shape the intention to use (INTU) and, consequently, user satisfaction (STISFN), which in turn enhances the recommendation to use (RECOM). Notably, attitude and perceived ease stand out as the most decisive factors, highlighting the importance of an intuitive interface and confidence in security for technological adoption.

This study is not without limitations. The sample focused exclusively on Peruvian merchants, which could limit the generalization of the results to other cultural or economic contexts. Moreover, the measurement of complex constructs such as innovation did not have a significant moderating effect, suggesting that additional factors could be at play.

For future research, it is recommended that the sample be expanded to include various geographical and cultural contexts to improve the generalizability of the results. It would also be relevant to explore the impact of emerging trends in mobile payment technology and how security perceptions can be improved and communicated to users. Furthermore, interoperability between different platforms and user understanding emerge as critical areas for subsequent studies, which

could provide a deeper understanding of the adoption of digital wallets on a global scale.

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