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FACTORS INFLUENCING CONSUMER ATTITUDE AND INTENTIONS TOWARDS USING MOBILE WALLET IN INDIA – AN EMPIRICAL STUDY

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ABSTRACT

This study aims to examine the variables that play a significant role in moulding Indian consumers' attitudes and willingness to adopt mobile wallets. In order to achieve this objective, the researchers put forward an all-encompassing model that builds on the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and other literature on technology usage. An extensive literature review and focus group discussions were conducted to create a preliminary instrument for the study, which was subsequently tested in a nationwide survey consisting of 744 respondents chosen through convenience sampling. The research culminated in a set of significant observations, indicating that factors such as perceived ease of use (PEOU), perceived usefulness (PU), trust, security, facilitating conditions (FC), and lifestyle compatibility have a significant impact on consumers' attitudes and intentions towards mobile wallets. Of the 17 hypotheses initially proposed, 15 were proven to be true, with ease of use emerged as the most significant factor influencing usefulness and trust, while perceived usefulness played an equally critical role imposing a substantial impact on trust, attitude, and intention. The study further emphasized the importance of trust and safety in promoting the adoption of mobile wallets, calling for the creation of a secure infrastructure requiring the involvement of key stakeholders such as financial institutions, mobile wallet providers, government entities, and security experts.

KEYWORDS: TAM, UTAUT, Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Trust, Security, Facilitating Conditions (FC) etc.

INTRODUCTION

1WHAT IS A MOBILE WALLET?

Mobile wallets serve as the digital counterparts to physical wallets, enabling users to make purchases of products and services. Just as one would take out money from a physical wallet to make a payment, a mobile wallet allows users to preload funds from credit cards, debit cards, or internet banking, which can then be used for both online and offline transactions. Mobile wallets facilitate transactions across various channels, including consumer to consumer, consumer to business, consumer to machine, and consumer to online platforms (Shin, 2009).

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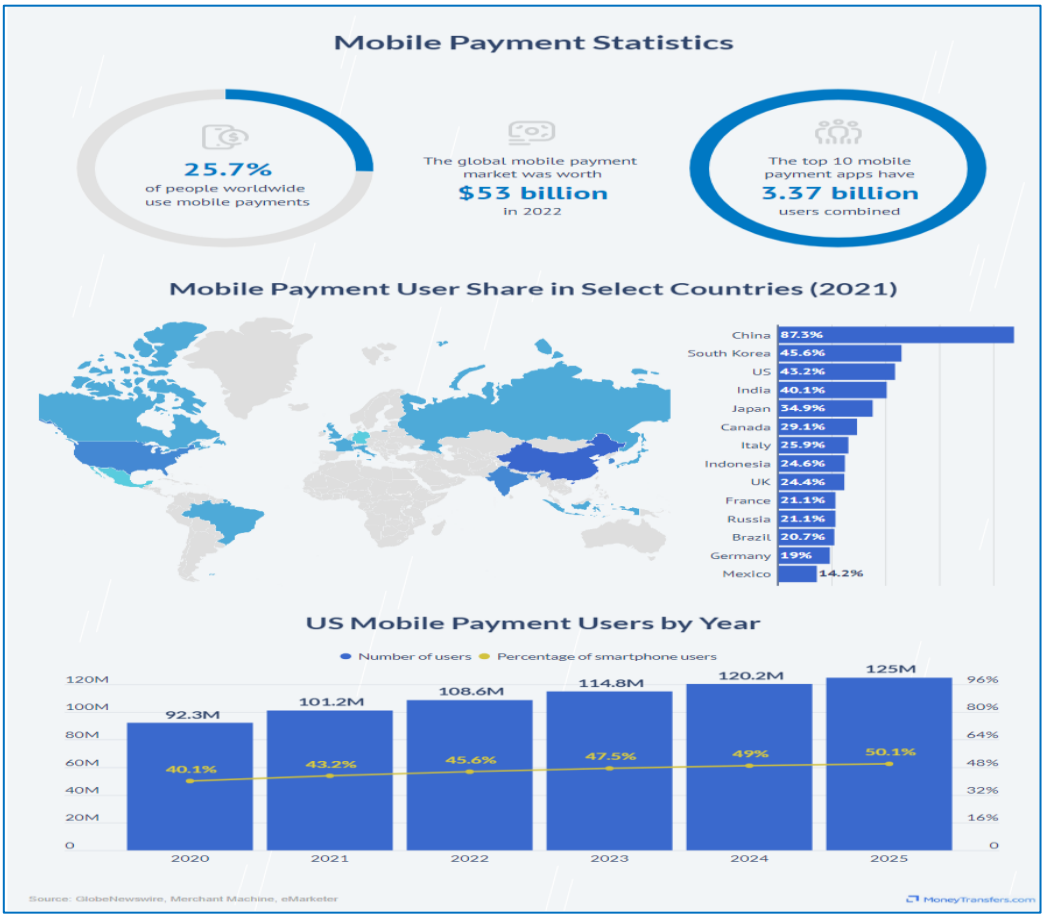
STATE OF MOBILE WALLET IN INDIA

The global mobile payment market experienced tremendous growth, reaching a value of $53 billion in 2022. A significant portion of the global population, approximately 25.7%, utilizes mobile payments, highlighting its widespread adoption. The top 10 mobile payment apps collectively serve a massive user base of 3.37 billion individuals. QR code payments gained popularity, with 1.5 billion people using them in 2020. In the United States, 43.2% of smartphone owners engage in mobile payments, while 43.9 million Americans rely on Apple Pay. Mobile payments accounted for a substantial 32% of all transactions in the UK in 2021. China emerged as a leader in mobile transactions, with a staggering total of $72.45 trillion in 2022. Ali Pay stands out as the most popular mobile payment provider in China. However, the increasing use of mobile payments also led to a rise in fraudulent activities, with 39% of all fraudulent transactions in the US occurring through mobile payments in 2021.

Figure:1 Mobile Payment Statistics



REVIEW OF LITERATURE

THEORIES ON TECHNOLOGY ACCEPTANCE

The potential of mobile wallets to transform consumer payment methods is uncertain, despite their popularity. In India, where a majority live in rural areas, mobile wallet adoption is minimal due to infrastructure limitations. Most rural residents lack smartphones and internet access, hindering digital transactions. Psychological factors also play a role, as rural India is cash-dependent, with low literacy rates. Security and privacy concerns about storing personal

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data on phones further deter adoption. Mobile wallets offer convenience, but the fear of data breaches, especially in case of a lost or stolen phone, remains a significant obstacle to their widespread use in rural areas.

THE TAM AND UTAUT MODEL

Researchers have enhanced the TAM by including additional variables to increase its explanatory power. For instance, Pikkarainen et al. (2004) introduced factors like perceived usefulness, ease of use, enjoyment, online banking information, security, privacy, and internet connection quality to study online banking acceptance. Teo et al. (2008) extended the TAM framework with subjective norms and facilitating conditions. Geo et al. (2017) combined the TAM with the Theory of Planned Behavior to explore mobile banking adoption in Pakistan.

The adaptability of the TAM is evident in various studies. Shaw (2014) incorporated trust, security, lifestyle compatibility, and facilitating conditions in a study of mobile wallet users in Canada. Muñoz-Leiva et al. (2017) integrated the TAM with the Innovation Diffusion Theory, perceived risk, and trust to explain mobile banking application acceptance. Matemba and Li (2017) used the TAM to predict the acceptance of WeChat wallet's people-to-people (P2P) services in South Africa.

These studies showcase the TAM's versatility in examining diverse aspects of technology acceptance and adoption, making it a valuable tool in the field of technology research. Venkatesh et al. (2003) proposed a model called the unified theory of acceptance and use of technology (UTAUT), which aimed to explain user intentions to use an information system and their subsequent behaviour. The model suggests that four core constructs (performance expectancy, effort expectancy, social influence, and FC) are direct determinants of behavioural intention and ultimately user behaviour. Shin (2009) used the UTAUT model along with constructs of security, trust, social influence, and self-efficacy. UTAUT has been proposed as an extension of TAM, and its validity in explaining technology acceptance has been demonstrated by earlier studies. Martins et al. (2014) developed a conceptual model by combining UTAUT with perceived risk to explain the behavioural intention and usage behaviour of internet banking in Portugal.

HYPOTHESES FORMULATION

PERCEIVED EASE OF USE (PEOU)

Hew et al. (2015) suggested that applications, which are easy to use, would attract consumers to use them and thus would shape their attitudes. The effect of PEOU on attitude has been shown in various studies (Chau and Lai, 2003). Suh and Han (2002) found that PEOU positively and significantly influence attitude toward Internet banking. Deb and David (2014) in their study on Indian mobile banking users found PEOU to influence attitude positively and significantly toward mobile banking. Lin (2011) found that PEOU has a significant effect on attitude and if customers find mobile banking easy to use, they develop a positive attitude toward adopting it. Thus, as PEOU has been as a key determinant in adoption of various information technology platforms, it is safe to argue that the same will hold true in the case of mobile wallets. Thus, the following hypotheses are proposed:

H1a. PEOU positively influences PU associated with mobile wallet.

H1b. PEOU positively affect trust with mobile wallet.

H1c. There is a positive relationship between PEOU and attitude.

PERCEIVED USEFULNESS (PU)

Past studies on technology adoption have consistently shown that PU has a strong influence on attitude and intention to adopt online banking (Chong et al., 2010) and mobile banking (Mohammadi, 2015). Teo et al. (2008) found that PU is an antecedent of attitude and that it has a significant influence on attitude. Deb and David (2014) in the context of mobile banking in India found positive relationship between PU and attitude toward mobile banking. Several studies have demonstrated the direct relationship between PU and attitude (Aboelmaged and Gebba, 2013; Krishanan et al., 2016). When customers perceive clear advantages offered by mobile banking, they are more likely to have a positive attitude and intention toward adopting mobile banking (Lin, 2011). Hence, we propose the following hypotheses:

H2a. PU positively affects trust with mobile wallet.

H2b. PU positively affects Intention toward mobile wallet adoption.

H2c. PU positively affects attitude toward mobile wallet

PERCEIVED SECURITY (PS)

has been found to have a positive impact on behavioral intentions (Flavián and Guinalíu, 2006; Mukherjee and Nath, 2007; Shin, 2009). In the context of online shopping, the positive relationship between security and attitude has been demonstrated by various authors (O'Cass and Fenech, 2003; Vijayasarathy, 2004). Based on these considerations, the following hypotheses are proposed:

H3a. Perceived security has a positive effect on trust toward mobile wallet.

H3b. Perceived security has a positive effect on the intention to use a mobile wallet.

H3c. Perceived security positively influences user attitude toward mobile wallet.

FACILITATING CONDITIONS (FC)

Karjaluoto et al. (2002) found that prior computer experience, prior technology experience, and personal banking experience influence attitude toward online banking. These factors facilitate the adoption of technology. In the context of mobile wallets, facilitating conditions such as the availability and affordability of smartphones and internet connections require knowledge about mobile phones, security, and privacy laws to determine the adoption of mobile wallets.

H4a. FC enhance perceived usefulness (PU) related to mobile wallet.

H4b. FC positively influence attitude toward mobile wallet.

H4c. FC positively influence intention toward mobile wallet.

TRUST

Considering the growing significance of trust in mobile commerce (Misra and Wickamasinghe, 2004; Hong and Cha, 2013; Zhou, 2011; Shaw, 2014), we propose trust as a precursor variable that influences the user's intention to use a mobile wallet. As transactions involve personal, sensitive, and confidential information, trust becomes paramount (Heijden et al., 2003). Moreover, initial trust can help alleviate perceived uncertainty and risk while promoting usage intention (Zhou, 2011). In a study on mobile wallets, Kumar et al. (2018)

found that trust positively affects M-wallet continuance intention. Based on these findings, we propose the following hypotheses:

H5a. Trust has a positive effect on attitude.

H5b. Trust has a positive effect on intention.

LIFESTYLE COMPATIBILITY (LC)

Harrison (2015) suggested that LC had the strongest effect on behavioral intention. Muñoz-Leiva et al. (2017) incorporated social image into their external TAM model, highlighting that due to uncertainties associated with innovations, users seek advice from others to gain respect, honor, status, reputation, credibility, social connections, and more. LC is considered critical in the adoption of any new technology as users prefer to associate themselves with like-minded individuals who use similar technology platforms. Based on these insights, we propose the following hypotheses:

H6a. LC positively influences attitude toward mobile wallet.

H6b. LC positively influences intention toward mobile wallet.

ATTITUDE

Based on the Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen (1975), behavioral intention can be explained by the attitude toward behavior, which refers to an individual's positive and negative feelings about engaging in a specific behavior. Similarly, the Technology Acceptance Model (TAM) proposed by Davis (1989) suggests that behavioral intention can be explained by the attitude toward a system. Lin (2011) found a significant and positive relationship between attitude and behavioral intention in the context of mobile banking adoption or continued usage. Deb and David (2014) also empirically established a positive influence of attitude on behavioral intention. Therefore, we propose the following hypothesis:

H7. Attitude has a positive effect on the intention to adopt a mobile wallet.

RESEARCH METHODOLOGY

DATA COLLECTION

Data collection was conducted through both physical and online surveys. A screening question was used to identify respondents who were aware of mobile wallets. Out of a total of 750 respondents, six indicated that they had never heard about mobile wallets and were subsequently excluded from the analysis. The remaining 744 responses were used for further analysis. Convenience and purposive (judgmental) sampling methods were employed to select the participants. Among the 744 responses, 358 were collected through online surveys, while 386 were collected in person.

In this study, the sample size of 744 exceeded the minimum requirement of 60 (Hair et al., 2017). PLS-SEM was chosen over traditional structural equation modeling (SEM) because it does not assume a normal distribution for the data, making it suitable for non-normal data. Additionally, PLS-SEM is commonly used in exploratory research and for predictive purposes in various management domains, including accounting, marketing, and operations management (Lee et al., 2011; Hair et al., 2012; Peng and Lai, 2012). It is particularly effective when dealing with small sample sizes and non-normal data (Reinartz et al., 2009).

SAMPLING PROFILE

Table: 1 Sample Profile

Respondent Profile	Frequency	Percentage
Gender		
- Male	493	66.26%
- Female	251	33.74%
Age Group		
- 18-24 years	658	88.44%
- 25-34 years	86	11.56%
Employment		
- Students	410	55.11%
- Working Professionals	234	31.45%
- Self-employed/Business	68	9.14%
Income		
- < 3 lakhs	330	44.30%
- 3-7 lakhs	130	17.50%
- 7-12 lakhs	119	16.00%
- > 12 lakhs	165	22.20%
Qualification		
- Graduates	409	55.00%
- Postgraduates and above	335	45.00%
Household Size		
- Four persons	326	43.80%
- Three persons	280	37.70%
- Five persons	138	18.50%
Marital Status		
- Single	549	73.80%
- Married	195	26.20%

Table:2 Modes of Payment for Online Purchase

Mode	Frequency (*n*)	Percentage (%)
Internet Banking	366	49.20%
Credit Card	304	40.86%
Debit Card	485	65.19%
Cash on Delivery	481	64.65%
Mobile Wallet	350	47.05%
Note: Percentage exceeds 100 percent due to multiplicity of responses		

ESTIMATION OF MEASUREMENT AND STRUCTURAL MODEL

Table: 3 Types of Internet Connections

Type of Connection	Frequency (*n*)	Percentage (%)
Mobile internet package (prepaid)	379	51
Mobile internet package (prepaid)	286	38.5
Fixed line internet	169	22.7
Note: Percentage exceeds 100 percent due to multiplicity of responses		

Convergent validity was assessed by examining the values of composite reliability (CR) and average variance extracted (AVE). According to Zhang et al. (2014), CR should be at least 0.7 and AVE should be at least 0.5 to demonstrate convergent validity. In this study, both CR and AVE for each construct exceeded these thresholds (Table V).

To establish discriminant validity, the square root of the AVE for each construct should be greater than the correlation coefficient with other constructs (Fornell and Larcker, 1981; Liao et al., 2006). The diagonal elements in the correlation matrix (shown in bold) represent the square root of the AVE, while the off-diagonal elements represent the correlation coefficients between the corresponding constructs. Based on the results, discriminant validity was satisfied, as the square root of the AVE for each construct exceeded the correlation coefficient with other constructs (Table V).

Table: 4 Frequency Distribution of Various Mobile Wallet

Mobile wallet services	**Never heard**		**Heard but never used**		**Currently using**		**Stopped using now**	
	Frequency	**%**	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
Paytm	4	0.54%	144	19.35%	543	72.98%	53	7.12 %
Oxigen	123	16.53 %	506	68.01%	75	10.08%	40	5.38 %
MobiKwik	49	6.59%	424	56.99%	188	25.27%	83	11.16 %
PayUMoney	69	9.27%	415	55.78%	190	25.54%	70	9.41 %
Vodafone M-pesa	145	19.49 %	523	70.30%	57	7.66%	19	2.55 %
mRupee	259	34.81 %	444	59.68%	27	3.63%	14	1.88 %
Idea Money	198	26.61 %	504	67.74%	29	3.90%	13	1.75 %
Airtel Money	48	6.45%	540	72.58%	119	15.99%	37	4.97 %
Reliance Jio Wallet	298	40.05 %	413	55.51%	20	2.69%	13	1.75 %
Citrus Pay	191	25.67 %	388	52.15%	119	15.99%	46	6.18 %
Freecharge	43	5.78%	249	33.47%	340	45.70%	112	15.05 %
Momoe	536	72.04 %	183	24.60%	17	2.28%	8	1.08 %
Ruplee wallet	475	63.84 %	236	31.72%	20	2.69%	13	1.75 %
ICICI pockets	259	34.81 %	384	51.61%	80	10.75%	21	2.82 %
SBI Buddy	318	42.74 %	353	47.45%	59	7.93%	14	1.88 %
Chillr	485	65.19 %	221	29.70%	24	3.23%	14	1.88 %
Citi	496	66.67	226	30.38%	15	2.02%	7	0.94

Masterpass		%						%
Lime	511	68.68 %	210	28.23%	15	2.02%	8	1.08 %
HDFC Payzapp	339	45.56 %	335	45.03%	57	7.66%	13	1.75 %
Pingpay	526	70.70 %	199	26.75%	14	1.88%	5	0.67 %

Discriminant validity can be evaluated using multiple criteria. Firstly, it is assessed by comparing the square root of the average variance extracted (AVE) for each construct with the correlation coefficient with other constructs (Fornell and Larcker, 1981; Liao et al., 2006). In the correlation matrix, the diagonal elements represent the square root of the AVE, while the off-diagonal elements represent the correlation coefficients between the corresponding constructs. In this study, both the AVE and composite reliability (CR) values for each construct exceeded 0.7 and 0.5, respectively (Table V).

Another criterion for establishing discriminant validity is cross-loadings, where the indicator loadings on their own construct should be higher than the cross-loadings on any other construct (Chin, 1998). In the present case, this condition is also satisfied, as shown in Table VI.

Additionally, discriminant validity can be verified using the hetero trait-mono trait ratio (HTMT) criterion. This criterion compares the correlation between two constructs (hetero trait) to the correlations within the constructs (mono trait) (Henseler et al., 2015). In this study, the HTMT values between any two reflective constructs were below 0.9, indicating discriminant validity. In summary, the study satisfies the criteria for discriminant validity. The square root of the AVE values exceeded the correlation coefficients with other constructs, indicating adequate discriminant validity. Furthermore, the cross-loadings confirmed the construct's specificity, and the HTMT criterion supported the discriminant validity of the reflective constructs.

Table: 5 Convergent and discriminant validity

Constructs	**Cronbach's α**	**Composite reliability**	**Average variance extracted (AVE)**	**ATT**	**FC**	**INT**	**LC**	**PEOU**	**PU**	**SEC**	**TR**
ATT	0.928	0.942	0.773	*0.878*	-	-	-	-	-	-	-
FC	0.755	0.842	0.577	0.530	*0.761*	-	-	-	-	-	-
INT	0.881	0.915	0.735	0.771	0.536	*0.858*	-	-	-	-	-
LC	0.879	0.909	0.674	0.728	0.588	0.737	*0.819*	-	-	-	-
PEOU	0.842	0.885	0.613	0.581	0.477	0.532	0.547	*0.780*	-	-	-
PU	0.906	0.924	0.677	0.688	0.409	0.640	0.630	0.657	*0.819*	-	-
SEC	0.858	0.895	0.638	0.671	0.420	0.621	0.588	0.502	0.596	0.797	-
TR	0.891	0.913	0.644	0.654	0.446	0.644	0.613	0.507	0.534	0.778	0.

											8 0 4

Note: Diagonal values are squared roots of AVE; off-diagonal values are the estimates of the inter-correlation between the latent constructs

Table:6 Measurement Model Cross Loadings

Constructs	ATT	FC	INT	LC	PEOU	PU	SEC	TR
ATT1	0.875	-	-	-	-	-	-	-
ATT2	0.89	-	-	-	-	-	-	-
ATT3	0.905	-	-	-	-	-	-	-
ATT4	0.868	-	-	-	-	-	-	-
ATT5	0.866	-	-	-	-	-	-	-
FC1	-	0.755	-	-	-	-	-	-
FC2	-	0.806	-	-	-	-	-	-
FC4	-	0.804	-	-	-	-	-	-
FC5	-	0.666	-	-	-	-	-	-
INT1	-	0.464	0.869	-	-	-	-	-
INT2	-	-	0.805	-	-	-	-	-
INT3	-	-	0.891	-	-	-	-	-
INT4	-	-	0.867	-	-	-	-	-
LC1	-	-	-	0.854	-	-	-	-
LC2	-	-	-	0.893	-	-	-	-
LC3	-	-	-	0.867	-	-	-	-
LC4	-	-	-	0.755	-	-	-	-
LC5	-	-	-	0.708	-	-	-	-
PEOU2	-	-	-	-	0.658	-	-	-
PEOU3	-	-	-	-	0.741	-	-	-
PEOU4	-	-	-	-	0.836	-	-	-
PEOU5	-	-	-	-	0.816	-	-	-
PEOU6	-	-	-	-	0.853	-	-	-
PU1	-	-	-	-	-	0.813	-	-
PU2	-	-	-	-	-	0.793	-	-
PU3	-	-	-	-	-	0.854	-	-
PU5	-	-	-	-	-	0.845	-	-
PU6	-	-	-	-	-	0.793	-	-
PU7	-	-	-	-	-	0.823	-	-
S1	-	-	-	-	-	-	0.765	-
S3	-	-	-	-	-	-	0.846	-
S4	-	-	-	-	-	-	0.713	-
S5	-	-	-	-	-	-	0.876	-
S6	-	-	-	-	-	-	0.791	-
T1	-	-	-	-	-	-	-	0.805
T2	-	-	-	-	-	-	-	0.799
T3	-	-	-	-	-	-	-	0.842
T4	-	-	-	-	-	-	-	0.848
T5	-	-	-	-	-	-	-	0.741

T6	-	-	-	-	-	-	-	0.76

Next, the structural model was estimated by applying the bootstrapping technique (Vinzi et al., 2010) that is a resampling technique that draws many subsamples, say 5,000 from the original data. This resulted in estimating the path coefficients and their two-tailed significance.

EVALUATION OF THE STRUCTURAL MODEL

The path coefficients and their significance are presented in Table VII. It is seen that out of the 17 hypotheses proposed, 15 are supported. Two of the hypotheses, namely, PEOU impacts attitude (H1c) and security influences intention (H3b) have a desired positive impact but are insignificant. It is seen that PEOU has a positive and significant impact on PU and trust thereby supporting H1a and H1b. PU is found to have a significant and positive impact on trust, intention and attitude thereby supporting H2a–H2c. The construct security

Table:7 Summary of Structure Model Results

Hypotheses	**Relationship**	**Original sample (O)**	**Sample mean (M)**	**SD**	***t*-statistics (O/SD)**	***p*-values**	**Supported/ rejected**
H1a	PEOU → PU	0.601	0.604	0.032	18.781	0.000	Supported
H1b	PEOU → TR	0.111	0.113	0.036	3.083	0.001	Supported
H1c	PEOU → ATT	0.043	0.047	0.038	1.132	0.118	Rejected
H2a	PU → TR	0.086	0.09	0.04	2.150	0.013	Supported
H2b	PU → INT	0.104	0.107	0.037	2.811	0.002	Supported
H2c	PU → ATT	0.26	0.264	0.042	6.190	0.000	Supported
H3a	SEC → TR	0.673	0.676	0.03	22.433	0.000	Supported
H3b	SEC → INT	0.027	0.03	0.041	0.659	0.245	Rejected
H3c	SEC → ATT	0.204	0.206	0.035	5.829	0.000	Supported
H4a	FC → PU	0.12	0.123	0.039	3.077	0.001	Supported
H4b	FC → ATT	0.095	0.098	0.031	3.065	0.001	Supported
H4c	FC → INT	0.072	0.077	0.037	1.946	0.021	Supported
H5a	TR → ATT	0.107	0.11	0.043	2.488	0.005	Supported
H5b	TR → INT	0.13	0.134	0.046	2.826	0.002	Supported
H6a	LC → ATT	0.295	0.297	0.042	7.024	0.000	Supported
H6b	LC → INT	0.263	0.265	0.048	5.479	0.000	Supported
H7	ATT → INT	0.363	0.364	0.048	7.563	0.000	Supported

The results indicate that PU has a positive and significant impact on trust and attitude, providing support for H3a and H3c. Furthermore, the construct FC is found to have a significant and positive impact on PU, attitude, and intention, thus supporting H4a, H4b, and H4c. The construct trust demonstrates a positive and significant influence on both attitude and intention, supporting H5a and H5b. Additionally, the construct LC directly affects attitude and intention, providing support for H6a and H6b. Lastly, the hypothesis H7, which suggests that attitude positively and significantly influences intention, is also supported.

SUMMARY OF FINDINGS AND MANAGERIAL IMPLICATIONS

The study analyzed 17 proposed hypotheses related to the factors influencing mobile wallet adoption. Of these, 15 were supported, though two did not reach statistical significance. It was found that Perceived Ease of Use (PEOU) had a significant direct impact on Perceived Usefulness (PU) and trust. However, its impact on attitude was positive but not statistically significant. These findings align with prior research highlighting the relationship between PEOU and PU and the positive impact of PEOU on trust.

Perceived Usefulness (PU) was found to significantly influence trust, attitude, and intention regarding mobile wallet adoption. PU emerged as the main predictor of attitude and intention, aligning with previous studies.

The study also established significant relationships between Security (SEC) and trust, as well as SEC and attitude, but not SEC and intention. This underscores the importance of security in building trust and shaping user attitudes, in line with prior research.

Facilitating Conditions (FC) significantly influenced PU, attitude, and intention in the context of mobile wallet adoption, indicating the importance of an enabling environment in driving adoption.

Trust was identified as a crucial factor influencing user attitude and intention to adopt mobile wallets, consistent with prior research in the context of mobile wallets and other technologies.

Lifestyle Compatibility (LC) was shown to be vital in shaping user attitude and intention toward mobile wallet adoption. A higher level of LC aligns user values, experiences, personality, and preferences with the technology, leading to a positive attitude and intention.

These findings offer insights into the factors that influence mobile wallet adoption and suggest that mobile wallet service providers should focus on improving perceived ease of use, perceived usefulness, security, facilitating conditions, trust, and lifestyle compatibility to enhance user attitudes and intentions toward adoption.

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