National College of Ireland

An Analysis of User-Level Barriers to Mobile Wallet Adoption for Financial Inclusion

MSc Research Project

Master of Science in FinTech

Dominic Adongo

Student ID: 23429038

School of Computing

National College of Ireland

Supervisor: Noel Cosgrave

National College of Ireland

MSc Project Submission Sheet

School of Computing

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An Analysis of User-Level Barriers to Mobile Wallet Adoption for Financial Inclusion

Dominic Adongo

23429038

Abstract

This research project investigates the user-level barriers to mobile wallet adoption and their implications for financial inclusion. It focuses on developed and emerging markets where traditional banking infrastructure is limited. It examines key behavioural, perceptual, and infrastructural challenges that hinder the widespread use of mobile wallets. A quantitative research methodology was used to analyse primary survey data from 70 respondents across 11 countries, including Ireland, the United Kingdom, China, Ghana, India, Nigeria, Colombia, Russia, El Salvador, Mexico, and Zambia. The study combined statistical methods with machine learning techniques to support both analysis and prediction. The findings present an understanding of mobile wallet adoption, highlighting that trust, knowledge, perceived benefits, and user confidence are key drivers. Demographic factors, such as the country of residence, were found to have a moderate influence on adoption. The study's conclusions present practical recommendations that could guide efforts to enhance financial inclusion by addressing barriers to mobile wallet usage.

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1 Introduction

1.1 Background

Mobile wallets are revolutionizing access and how financial services are transacted globally leading to financial inclusion growth. While mobile wallet technology is widespread, adoption or usage varies significantly across different countries and user groups. This disparity stems from user-level barriers like perceptions of trust, ease of use, cost, and security (Chauhan, Kumar and Jaiswal, 2022). In addition, structural constraints like infrastructure gaps, socioeconomic status, and cultural attitudes have heightened the barriers to usage of mobile wallets.

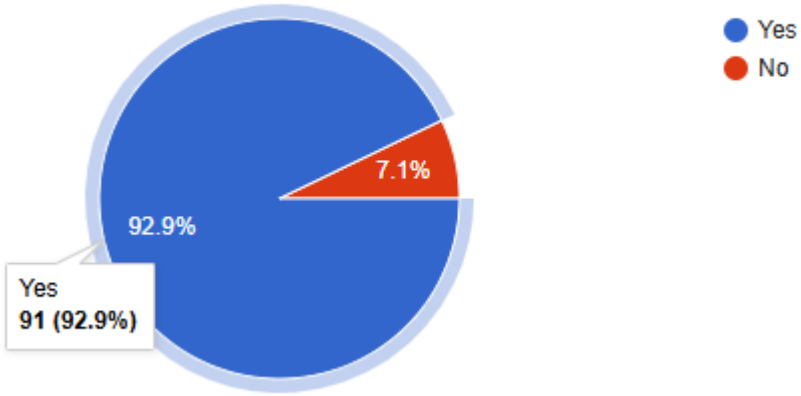

Figure 1: Respondents Mobile Wallet Usage Status

1.2 Motivation

The adoption of mobile wallets at an even and large scale globally is very key to the larger financial inclusion agenda. The use of mobile wallets can be of immense benefit to everyone however, many still do not know how it works or the advantages. On the other hand, providers often find it difficult to move beyond a small group of early adopters and get wider communities on board. Understanding the underlying user level barriers is therefore essential for designing effective interventions that encourage meaningful engagement with digital financial platforms (Barbu *et al.*, 2021).

1.3 Research Question

This research aims to address the below question:

To what extent do user-level barriers to mobile wallets impact on financial inclusion?

1.4 Research Objectives

In addressing question, the research sets out the following objectives:

a. Identify the most prominent user-level barriers preventing mobile wallet adoption.
b. Examine how behavioural constructs (trust, ease of use, benefit perception, security, knowledge) correlate with actual wallet usage.
c. Test whether demographic variables (age, gender, education, income, country) significantly influence adoption and frequency.
d. Determine the extent to which these barriers affect access to financial services.

1.5 Hypotheses

Hypotheses were formulated based on existing theories and prior evidence. They include the following:

a. H1: Individuals who trust mobile wallets are more likely to use them.
b. H2: Ease of use increases the likelihood of mobile wallet adoption.
c. H3: Greater user knowledge about mobile wallets predicts higher adoption.
d. H4: Users with lower income levels face more noticeable barriers to adoption.
e. H5: People who intend to use mobile wallets tend to recommend them to others.

These hypotheses are examined through both user perspectives gathered during the study and statistical models.

1.6 Contribution to Literature

Existing literature has explored mobile wallet adoption from many angles. These include perceived usefulness (Davis, 1989), facilitating conditions (Venkatesh, Thong, and Xu, 2012), and post-adoption satisfaction (Barbu *et al.*, 2021). This study contributes to literature by combining survey techniques with chi-square testing for behavioural-demographic relationships, correlation analysis, regression analysis, text mining from open-ended responses to extract localized insights and Structural Equation Modelling (SEM).

1.7 Structure of the Report

The rest of this report is organised into eight chapters, each building on the last to provide a comprehensive view of the research:

a. Chapter 1 – Introduction: This chapter is the introduction of the research topic, outlining the key questions, objectives, and hypotheses, and explaining the study's overall contribution.
b. Chapter 2 – Related Work: This chapter is a critical review of existing literature on mobile wallets and financial inclusion, highlighting gaps this research aims to address.
c. Chapter 3 – Research Methodology: This chapter describes how the study was designed and carried out, including data collection methods, sampling, and analysis techniques.
d. Chapter 4 – Design Specification: This chapter details the analytical models and statistical tools used to test the research hypotheses and support the findings.
e. Chapter 5 – Implementation: This chapter explains how the research was executed in practice, including the technical environment, tools, and software applied.
f. Chapter 6 – Evaluation: The chapter presents and interprets the key results, discusses statistical outputs, addresses limitations, and links the findings back to the broader research context.

i. Chapter 7 – Conclusion and Future Work: This chapter summarizes the main contributions of the study, reflects on its significance, and offers suggestions for future research.

2 Related Work

This section puts the current research within the existing academic literature by providing a critical review of studies on mobile wallet adoption. This review examines over 53 related research, with 26 cited, to provide a comprehensive and analytical overview of the challenges identified in the literature. A critical assessment of the strengths and limitations of previous research on mobile wallets is vital to identify the major gaps in the current body of knowledge, which provides the basis of this research question.

2.1 Contextual and Structural Factors

The literature points to the role of broader factors in mobile wallet adoption like the technological ecosystem, socio-demographic variables, and the specific characteristics of the market.

2.1.1 The Role of the Ecosystem and Infrastructure

The success of a mobile wallet depends not only on consumers' willingness to adopt it, but also on the presence of a well-developed supporting ecosystem. This includes widespread merchant acceptance, interoperability between different wallet providers and banks, and reliable network infrastructure. A lack of technological skills and awareness were identified as significant inhibitors to mobile wallet adoption in Oman, highlighting the need for user education and support (Sharma *et al.*, 2018). Similarly, research in emerging markets like India and Indonesia has revealed factors such as convenience, alignment with users' lifestyles, and the presence of a supportive ecosystem including merchants and service providers are essential for driving mobile wallet adoption. (Sharma and Kulshreshtha, 2019) (Azizah, Handayani and Azzahro, 2018). Merchants play an important role in mobile wallet adoption. When consumers realize their preferred retailers do not accept a mobile wallet, its perceived usefulness is greatly reduced. A study of the merchant perspective in India found that their willingness to adopt mobile wallet technology was strongly influenced by the perceived value it added to their business and the trust they had in the system. Government and regulatory bodies were also identified as key influencers in the adoption process. (Singh and Sinha, 2020). Lastly, the demonetization policy in India in 2016 acted as a major catalyst for the adoption of digital payment systems by creating a sudden need for cashless transaction methods (Nagdev, Rajesh and Misra, 2021).

2.1.2 Socio-Demographic and Cultural Influences

Socio-demographic factors also have a meaningful impact on mobile wallet adoption. Older adults, particularly those between the ages of 40 and 80, often encounter substantial barriers to adopting mobile wallets. These include security, limited digital literacy, and anxiety around using new technologies (Garibdas *et al.*, 2024). This finding is further supported by research showing that older adults tend to prioritize security and ease of use over the convenience valued by younger

users (Yang, Yang and Chang, 2023). Income and education levels are also frequently cited as significant factors, as they often correlate with access to smartphones and digital literacy (Soodan and Rana, 2020). However, much of the existing research has been conducted within specific geographic contexts, which limits the universal applicability of the findings. For instance, a study on the Mobile Suica system (mobile payment and transit system) in Japan highlighted how the integration of mobile wallets with the country's public transport infrastructure is driving adoption, a factor that may hold less relevance in other markets. This underscores the need to account for cultural and market-specific factors when researching mobile wallet adoption (Amoroso and Magnier-Watanabe, 2012).

2.2 Behavioural Constructs from Technology Adoption Models

The study of mobile wallet adoption is deeply rooted in several foundational theories of technology acceptance and human behaviour.

A prominent framework in this domain is the Technology Acceptance Model (TAM). This model proposes that an individual's intention to adopt new technology is primarily determined by two factors: perceived usefulness and perceived ease of use (Davis, 1989). The expanded Unified Theory of Acceptance and Use of Technology (UTAUT), evolved from TAM, by incorporating constructs such as Perceived Security and Trust (Shin, 2009). This research demonstrated that these factors are significant predictors of mobile wallet adoption, underscoring the critical importance of users' perceptions of safety and reliability beyond just the system's core functionality. Similarly, an investigation on the switching behaviour from physical to digital wallets in Malaysia, confirmed that perceived usefulness and ease of use significantly influence consumers' attitudes towards switching, although this effect is moderated by perceived risk. (Alaeddin *et al.*, 2018). While these models provided a robust foundation, they had some limitations.

A number of studies, notably ones by (Wu, Aw and Wu, 2022) and (Aydin, 2016), have focused on specific demographics, like Generation Z or users in a single country respectively, which may limit the generalizability of their findings. Some research have focused on behavioural intention rather than actual usage, creating a gap between theoretical predictions and real-world behaviour (Slade *et al.*, 2015). A pertinent example is (Shaw, 2014) study involving Canadian students, which revealed that while perceived usefulness emerged as a significant determinant of adoption intention, perceived ease of use did not. This finding suggests a variability in the importance of these factors across diverse user groups and contextual settings. This existing body of literature, despite its contributions, frequently does not fully address the intricate interactions among psychological, social, and technological dimensions, thereby highlighting a critical need for the development of more comprehensive and contextually sensitive theoretical models.

A critical view of understanding mobile wallet adoption is the Diffusion of Innovation (DOI) theory (Miller, 2015). Basically, this theory breaks down how, why, and how fast new ideas and technologies spread through a population. It points out five key attributes of innovation that influence a person's decision to adopt it. These include, relative advantage, compatibility, complexity, trialability and observability. A study in India looked at how people use and recommend mobile wallets, applying that same DOI framework. It found relative advantage,

compatibility, complexity, and observability were all significant predictors of both usage and recommendation intentions (Kaur *et al.*, 2020). This suggests that users are more likely to adopt and promote mobile wallets if they see clear benefits over traditional payment methods, if the technology aligns with their lifestyle, is easy to use, and if they can see others using it successfully. The concept of observability is particularly important as it links directly to social influence for example, seeing friends or peers confidently using a new technology can make it seem normal and reduce perceived risk.

The Theory of Planned Behaviour (TPB) offers another valuable perspective by incorporating broader social and control-related factor (Ajzen, 1991). TPB posits that an individual's behavioural intention is shaped by three fundamental components such as attitude toward the behaviour, subjective norms, and perceived behavioural control. A study effectively used elements of TPB to demonstrate that adoption intentions are significantly influenced by users' attitudes, social norms, and perceived control over using the technology, with demographic factors like age further shaping these effects. (Liébana-Cabanillas, Sánchez-Fernández and Muñoz-Leiva, 2014)

2.3 Post-Adoption Behaviour and Continuance Intention

The Expectation-Confirmation Model (ECM) offers a valuable framework for understanding that a user's intention to continue using a technology is shaped by their overall satisfaction, which is itself influenced by the extent to which their initial expectations are met (Bhattacherjee, 2001)
Research on consumers' resistance to digital innovations showed that both initial trust and post-adoption satisfaction play a vital role in shaping continuance intention. This shift in focus from initial adoption to long-term engagement is of importance to service providers, as retaining existing users is often more cost-effective than acquiring new ones (Talwar *et al.*, 2020). In the post-adoption phase, responsive customer support, service quality, and the continued delivery of value through loyalty programs and promotional offer are factors are important for sustaining user engagement (George and Sunny, 2021).

2.4 Summary and Research Justification

There is a notable gap in research that integrates behavioural, structural, and post-adoption factors into a single, comprehensive framework. This study aims to address these shortcomings by developing and testing a model that integrates technological attributes, user psychology, contextual influences, and post-adoption behaviour.

3 Research Methodology

3.1 Sampling and Participant Selection

The survey was disseminated via digital platforms and social media channels, enabling voluntary participation from a broad user base. The sampling was not segmented, but the design aimed to achieve the highest possible geographic and demographic diversity. A total of 70 valid responses were collected from users across 11 countries namely Ireland, United Kingdom, China, Ghana, India, Nigeria, Colombia, Russia, El Salvador, Mexico and Zambia. Similar sampling techniques have been used in studies exploring mobile wallet adoption in emerging

and developed markets (Amoroso and Magnier-Watanabe, 2012) (Sharma and Kulshreshtha, 2019). While this non-probability sampling method is effective for reaching a diverse audience, it is important to acknowledge its potential for sampling bias. However, the broad geographic diversity across 11 countries helps to mitigate this limitation and enhances the cross-cultural relevance of the findings.

3.1 Survey Instrument

A structured online questionnaire, administered to participants via Google Forms, served as the primary data collection tool. This was developed based on established behavioural constructs and prior validated items from the literature (Shin, 2009).

3.2 Data Preparation and Processing

The raw survey data was first exported from Google Forms and loaded into a *pandas DataFrame* for initial analysis. The initial steps included cleaning and standardizing column names to improve readability and coding efficiency. In the next step, categorical, and ordinal variables were encoded into numerical formats suitable for statistical and machine learning models.

3.3 Statistical Techniques

Chi-square tests of independence were conducted to determine whether these relationships were statistically significant. The Shapiro-Wilk test applied to examine the data revealed it was not normally distributed justifying the use of Spearman rank correlation rather than Pearson correlation technique in subsequent analyses. EFA confirmed the survey items measured the intended constructs. Path analysis with composite scores tested the TAM, UTAUT2, and TPB.

3.4 Predictive Modelling

A logistic regression model was developed to estimate the probability of mobile wallet adoption based on behavioural and demographic variables. Model performance was evaluated using F1 score, and Area Under the ROC Curve (AUC). Additionally, odds ratios and confidence intervals were used to interpret the magnitude and direction of effects. To supplement the logistic model, a LightGBM classifier was implemented because of its ability to handle imbalanced and small-scale datasets efficiently. SEM was conducted using path analysis on composite scores from Likert-scale items, enabling examination of interrelationships among constructs (e.g., Perceived Ease of Use → Perceived Usefulness → Behavioural Intention). Reliability was confirmed through Cronbach's Alpha.

4 Design Specification

The analytical design translated constructs from TAM, UTAUT2, and TPB into measurable survey variables, with *Wallet_Use* (binary: 1 = adopter, 0 = non-adopter) as the dependent variable. Key predictors included trust, knowledge, perceived ease of use, perceived benefits, and income, alongside demographic controls. Likert-scale items were numerically encoded,

and categorical variables were label-encoded for compatibility with statistical and machine learning models. A multi-stage workflow was followed where Chi-Square tests was done to assess associations between demographics and adoption. Next Spearman rank correlations to explore relationships between behavioural constructs. Thirdly, logistic regression to identify significant predictors, supplemented by LightGBM for model comparison and lastly, SEM to validate theoretical frameworks and assess inter-construct relationships.

5 Implementation

5.1 Data Transformation

Categorical and ordinal variables were systematically transformed into numerical formats appropriate for statistical modelling. The binary dependent variable 'Wallet Use' was encoded with responses mapped to 1 for "Yes" and 0 for "No". Other categorical variables including 'Income', 'Gender', and 'Age' were processed using the *LabelEncoder* function from the *scikit-learn* library, which assigned unique integer values to each category level. Likert scale responses, originally captured on a 5-point scale, were mapped to corresponding numerical values ranging from 1 to 5.

5.2 Statistical Analysis Implementation

The statistical analyses were implemented using established Python libraries, with each technique carefully selected for its analytical appropriateness. Chi-Square Tests of Independence: The *chi2_contingency* function was employed and for each variable pair (e.g., 'Income' and 'Wallet Use'), contingency tables were constructed using the *pd.crosstab* function. Spearman Rank Correlation Analysis: Spearman correlation was implemented using the *.corr(method='spearman')* function and applied to the *DataFrame* containing numerically encoded Likert scale variables. Logistic Regression Modelling: The logistic regression and model were fitted using the *sm.Logit()* function with appropriate parameter specifications.

6 Evaluation

The evaluation of the data yielded significant insights into the factors driving mobile wallet adoption. The analysis is presented through the results of the statistical tests and the predictive model.

6.1 Experiment: Chi-Square Analysis of Association

A total of 15 variable pairs were systematically tested using the *chi2_contingency* function. The analysis revealed that while most demographic factors did not demonstrate statistically significant associations with adoption, several key relationships emerged as significant predictors.

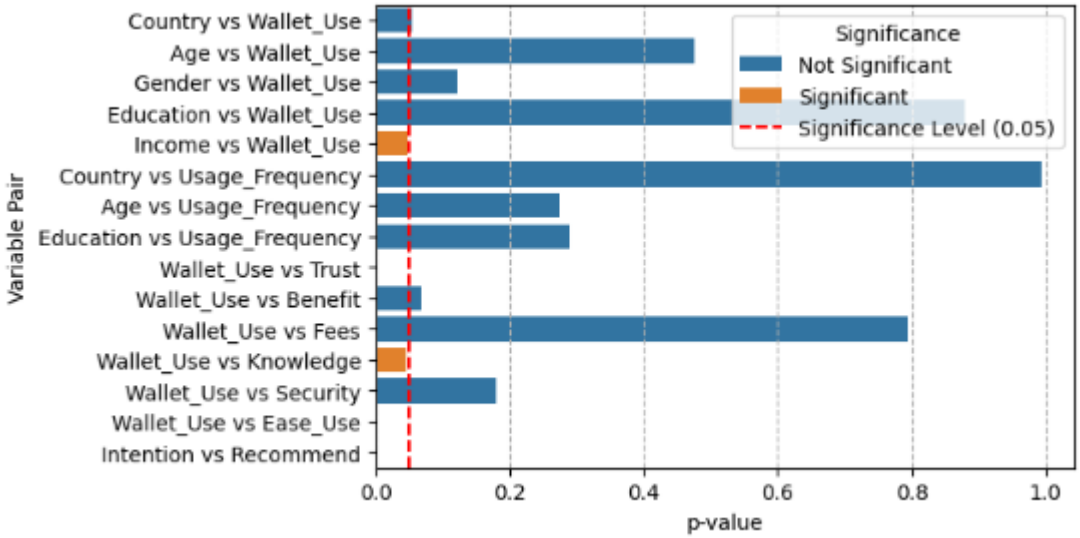

Figure 2: Chi-Square Test

6.1.1 Key Findings

The analysis identified five statistically significant relationships ($p < 0.05$):

1. Economic Barriers: Income level demonstrated a significant association with mobile wallet usage ($\chi^2 = 7.91$, $p = 0.0479$). This relationship suggests that financial constraints may present substantial barriers to mobile wallet uptake.
2. Behavioural Constructs: Three key behavioural factors showed strong associations with wallet usage:
   - Trust exhibited the strongest relationship ($\chi^2 = 19.62$, $p = 0.0006$), showing that confidence in mobile wallet security and reliability is key to adoption decisions
   - Ease of Use showed the highest chi-square value ($\chi^2 = 32.88$, $p < 0.0001$), demonstrating that perceived simplicity and user-friendliness are paramount factors
   - Knowledge displayed a significant association ($\chi^2 = 9.76$, $p = 0.0447$), suggesting that user understanding and technical competence influence adoption patterns
3. Intention-Behaviour Alignment: This yielded the highest chi-square statistic ($\chi^2 = 153.70$, $p < 0.0001$), confirming strong consistency between adoption intentions and advocacy behaviours.

The analysis further identified ten variables demographic that had no significant relationships ($p > 0.05$). It highlighted demographic variables has having no significant associations with mobile wallet adoption:

- Country ($\chi^2 = 18.03$, $p = 0.0545$) - The relationship between a user's country of residence and wallet adoption was marginally non-significant. While not meeting the $p < 0.05$ threshold for statistical significance, this result suggests that geographic and cultural factors may have a subtle influence that a larger sample size could detect more definitively.
- Age ($\chi^2 = 2.50$, $p = 0.4759$) - Age range did not significantly influence adoption patterns
- Gender ($\chi^2 = 2.39$, $p = 0.1224$) - Gender showed no significant relationship with usage

- Education ($\chi^2 = 0.26$, $p = 0.8794$) - Educational attainment was not significantly associated with adoption

These findings suggest that economic capacity and user perceptions are more influential than traditional demographic characteristics in determining mobile wallet adoption. The results underscore the importance of addressing trust concerns, improving user experience design, enhancing financial literacy, and considering economic accessibility in mobile wallet deployment strategies.

6.2 Experiment: Spearman Correlation of Behavioural Constructs

A Spearman correlation matrix was generated to explore the relationships between key behavioural constructs derived from the survey responses. These constructs are trust, perceived benefits, fees, knowledge, and security and were measured using a 5-point Likert scale and numerically encoded for analysis. Due to the non-normal distribution of the data, confirmed via the Shapiro-Wilk test, Spearman's rank correlation was selected as the most appropriate method for assessing monotonic relationships between variables. The heatmap below visualizes these correlations.

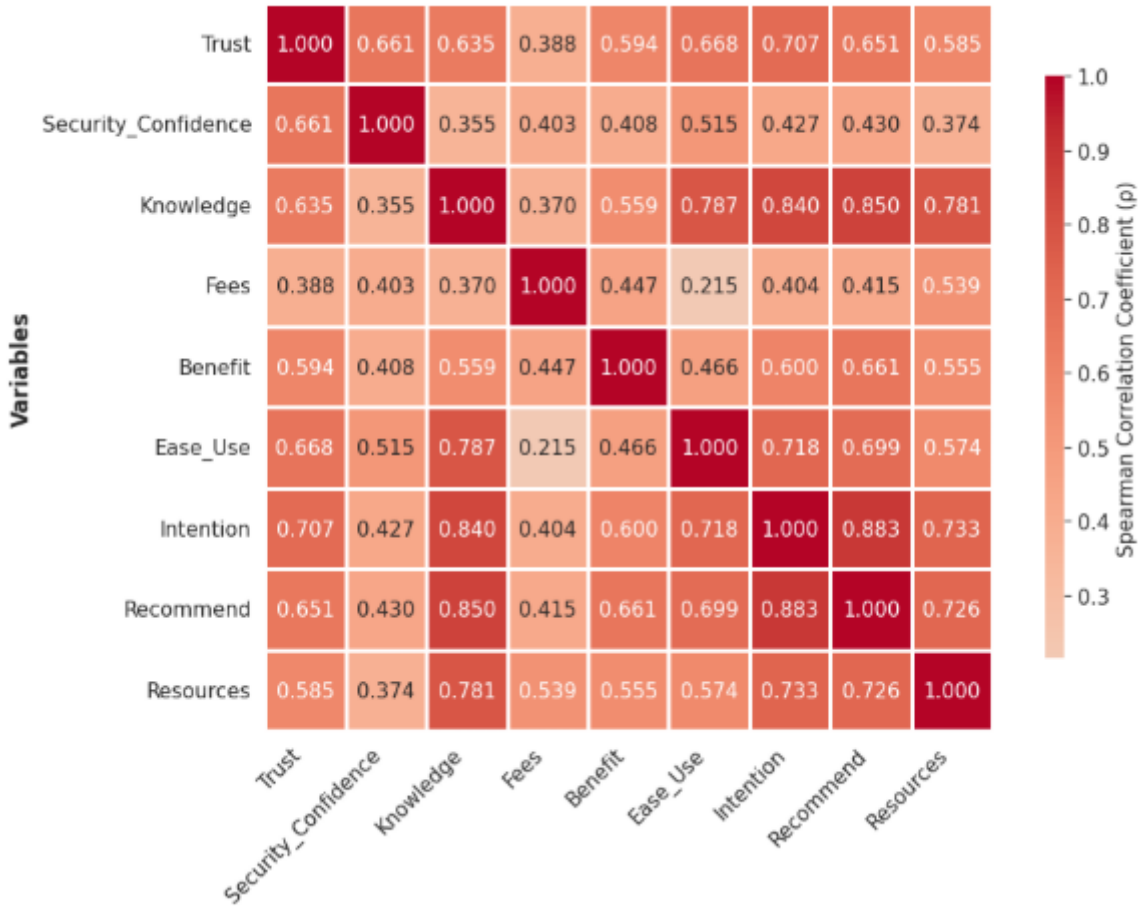

Figure 3: Spearman Correlation Among Behavioural Constructs

6.2.1 Key Findings

There were moderate to strong positive correlations highlighting the interconnectedness of user perceptions in mobile wallet adoption. They were as follows:

- Trust and Security ($\rho = 0.66$): This was the strongest observed relationship and reinforced the argument that a user's willingness to adopt mobile wallets is deeply tied to their perception of security.
- Trust and Knowledge ($\rho = 0.63$): Users who reported higher levels of trust in mobile wallet platforms also tended to rate themselves as more knowledgeable in using technology. This suggests that trust may grow as users feel more competent and capable, indicating a possible feedback loop between learning and confidence.
- Trust and Perceived Benefits ($\rho = 0.59$): Trust also showed a strong positive correlation with perceived utility. This supports TAM's (Technology Acceptance Model) assertion that users are more likely to perceive benefits from systems they trust and reflects how trust acts as a cognitive shortcut that shapes perceptions of value.
- Knowledge and Benefits ($\rho = 0.56$): Users who feel more knowledgeable also tend to perceive higher benefits from mobile wallets. This implies that user education and training could enhance benefit perception, a key lever for improving adoption rates.
- Fees exhibited low to moderate correlations with other constructs (e.g., $\rho = 0.37$ with Knowledge, $\rho = 0.39$ with Trust), suggesting that while pricing sensitivity exists, it is not as tightly coupled with other psychological constructs as trust or knowledge are.

6.2.2 Implications

The correlation structure clearly identifies trust as a central, integrative construct in shaping user attitudes toward mobile wallets. It demonstrates significant associations with security, knowledge, and perceived benefits, suggesting that efforts to improve adoption should prioritize building trust. Strategies to build trust could include:

- Transparent communication around security protocols,
- Educational outreach programs to boost user competence,
- Highlighting practical use cases to reinforce perceived benefits.

The heatmap also reveals that Knowledge plays a dual role: both as a predictor of benefit perception and as a correlate of trust. This underscores the importance of digital literacy as a pillar of financial inclusion strategies.

Lastly, the moderate correlation between Fees and other variables suggests that while affordability is a barrier, it may operate more independently from perceptions like trust and knowledge. This finding aligns with the logistic regression model results, where Income was a statistically significant predictor of adoption, further emphasizing that economic factors may act outside of or alongside psychological barriers.

6.3 Experiment 3: Logistic Regression for Predicting Adoption

To identify which user-level perceptions most influence mobile wallet adoption, a logistic regression model was built using Trust, Knowledge, Ease of Use, and Income as independent variables. These were selected based on theoretical alignment with UTAUT2, TAM, and TPB

frameworks, and derived from numerically encoded Likert-scale responses. The binary dependent variable, 'Wallet Use', was coded as 1 for adopters and 0 for non-adopters.

Variable	Coefficient	Std. Err.	p-value	Odds Ratio
const	-1.1557	0.44	0.009	0.315
Trust	0.634	0.359	0.078	1.885
Knowledge	0.5579	0.538	0.3	1.747
Ease Use	-0.1064	0.911	0.907	0.899
Income	1.0949	0.097	< 0.001	2.989

Table 1: Logistic Regression Results

6.3.1 Key Findings

- Income emerged as the most statistically significant predictor ($p < 0.001$). The odds ratio of approximately 2.99 suggests that each increase in income category nearly triple the odds of adopting a mobile wallet. This confirms H4 from the research hypotheses: *"Users with lower income levels face more noticeable barriers to adoption."*
- Trust shows a positive and moderately significant association ($p = 0.078$). Although slightly above the 0.05 significance threshold, the direction and magnitude of the effect (odds ratio ≈ 1.89) reinforce its importance as a near-critical factor in user decision-making. This aligns with previous findings in both the correlation matrix and existing literature (e.g., Shin, 2009; Shaw, 2014).
- Knowledge and Ease of Use did not achieve statistical significance in the model ($p > 0.05$). This is likely due to multicollinearity, where their predictive influence was absorbed by other correlated variables. For instance, the Spearman correlation analysis revealed a strong positive relationship between Trust and Knowledge ($\rho = 0.63$). Similarly, the Chi-Square test showed a highly significant association between wallet usage and Ease of Use ($\chi^2 = 32.88$, $p < 0.0001$). This suggests that while 'Knowledge' and 'Ease of Use' are critical, their effects in this model are being expressed through the 'Trust' and 'Income' variables, which remain the most direct predictors.

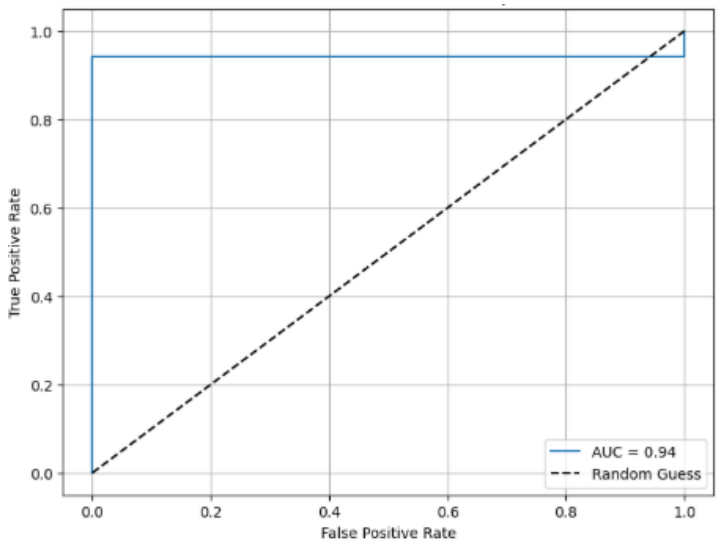

Figure 4: ROC Curve for Mobile Wallet Adoption Model

The model achieved an AUC of 0.94, indicating excellent discriminative capability. It correctly distinguishes between adopters and non-adopters 94% of the time a substantial result for a relatively small and imbalanced dataset. .

6.3.2 Robustness Checks and Comparisons

Additional models including Regularized Logistic Regression, Random Forest, and LightGBM were implemented to compare predictive robustness:

Model	Precision (Class 0)	Recall (Class 0)	F1 Score (Class 0)	Accuracy
Logistic Regression	0	0	0	0.94
Balanced Random Forest	0.14	1	0.25	0.67
XGBoost	0.06	1	0.11	0.06
LightGBM	**0.25**	**1**	**0.4**	**0.83**

Table 2: Model Comparison

LightGBM delivered the best trade-off retaining accuracy, boosting recall on minority class, and maintaining interpretability through feature importance plots. The logistic regression model reveals that income is the most decisive predictor of mobile wallet adoption, reinforcing the economic nature of digital exclusion. Trust also stands out as a near-significant enabler, acting as a perceptual gateway to adoption. The model's high AUC underscore its practical value in identifying at risk segments.

6.4 Experiment: Structural Equation Modelling of Adoption Theories

A SEM analysis was performed to test the validity of the TAM, UTAUT2, and TPB theoretical frameworks using the collected survey data. They showed the following results:

Construct	Cronbach's Alpha
Perceived Ease of Use (PEOU)	0.957
Behavioural Intention (BI)	0.948
Facilitating Conditions (FC)	0.89
Perceived Usefulness (PU)	0.798
Trust (TRUST)	0.785
Social Influence (SI)	0.701

Table 3: Cronbach's Alpha Test

These high alpha values confirm that the survey items used to measure each construct were reliable and consistently captured the intended underlying concepts.

6.5 Discussion

The evaluation reveals a clear hierarchy of barriers to mobile wallet adoption. The findings from all four experiments draw the conclusion that economic and perceptual factors are far more influential than demographic characteristics like age, gender, or country of residence
The chi-square tests established a foundational link between income and adoption, which was then confirmed by the logistic regression model, where income emerged as the most significant predictor. This underscores that financial inclusion via mobile wallets is not just a matter of technological access but also of economic capacity. This finding strongly corroborates the work of (Soodan and Rana, 2020), who also identified income and education levels as significant factors related to digital literacy and access to smartphones. The correlation analysis highlighted the centrality of trust. While it was only marginally significant in the final regression model, its strong correlation with security, benefits, and knowledge suggests that it acts as a foundational belief system. Users who trust the technology are predisposed to see its benefits and feel more confident in their ability to use it. This aligns perfectly with the conclusions of both (Shaw, 2014) and (Shin, 2009), who previously identified trust as a critical mediator in mobile technology adoption. A key finding is the high predictive power of the logistic regression model (AUC = 0.94). This indicates that a few key variables primarily income and user perceptions can very accurately predict adoption. This has strong implications for players in the Finance sector, suggesting that targeted interventions focusing on building trust and demonstrating value, particularly to lower-income groups, could be highly effective.

The primary limitation of this study is the relatively small sample size of 70 respondents (n=70), which may limit the generalizability of the findings and could be the reason why some variables like trust did not reach full statistical significance in the regression model. However, the consistency of the findings across different analytical methods and the high performance of the predictive model lends considerable weight to the conclusions drawn.

7 Conclusion and Future Work

This research set out to analyse the user-level barriers to mobile wallet adoption and their impact on financial inclusion. The study successfully identified and quantified the most significant barriers, confirming that perceptions of Trust, Knowledge, Ease of Use, and a user's Income level are critical determinants of adoption. The key finding is that while demographic factors like age, gender, and country of residence showed no significant impact, behavioural and economic barriers are paramount. The logistic regression model demonstrated that these factors, particularly income, can predict a user's decision to adopt a mobile wallet with a high degree of accuracy (AUC = 0.94).

The implications of this research academics are it reinforces the importance of integrating economic variables into traditional technology acceptance models like TAM and UTAUT. For players in the financial space, the findings provide a clear roadmap to advance financial inclusion, enhance user trust, simplify user experience, and address the economic hurdles faced by potential users. Strategies could include transparent security policies, partnerships with trusted local institutions, and designing tiered services that are affordable for lower-income segments.

The primary limitation of this research is its sample size, which, while diverse, is not large enough to make definitive global generalizations. The cross-sectional nature of the data also provides a snapshot in time, rather than a view of adoption trends as they evolve.
Meaningful future work should build upon these findings. A longitudinal study tracking a larger cohort of users over two to three years would provide invaluable insights. Such a study could track changes in perceived trust, digital literacy, transaction frequency, and the types of financial services accessed to understand the journey from non-adoption to habitual use. Furthermore, a comparative cross-cultural study with larger samples could explore the nuanced impact of cultural and regulatory environments. For example, a direct comparison between a market with high mobile money penetration like Ghana and a market with a different digital payment ecosystem like Mexico (both included in this study's sample could yield valuable, context-specific strategies and extend the work of researchers like (Amoroso and Magnier-Watanabe, 2012). This would provide a more granular understanding, enabling the development of highly contextualized and effective strategies for global financial inclusion.

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