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# MOBILE BANKING AND THE PROPAGATION OF E-COMMERCE IN KENYA THROUGH RELIABLE PAYMENT SOLUTIONS

Denis Kuria

Master Thesis

presented as partial requirement for obtaining the Master's degree in Management Information Systems

**NOVA Information Management School**

**Instituto Superior de Estatística e Gestão de Informação**

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# MOBILE BANKING AND THE PROPAGATION OF E-COMMERCE IN KENYA THROUGH RELIABLE PAYMENT SOLUTIONS

Understanding and Analyzing User Adoption and Trust in Mobile Payment Solutions Within Kenya's SME E-Commerce Sector

by

Denis Kuria

Master Thesis presented as partial requirement for obtaining Master's degree in Information Management with a specialization in Information Systems Management

## Supervised by

Professor Tiago Oliveira, PhD, NOVA Information Management School

April, 2025

# STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism, any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

*Lisbon, April 2025*

*Denis Kuria*

# DEDICATION

I dedicate this thesis to my family, whose encouragement and unwavering support have been my source of strength throughout this journey.

In particular, I would like to express my deepest gratitude to my fiancée, Lilia, whose infinite support, wise advice, and countless sacrifices have been a constant source of inspiration and motivation.

I also extend my heartfelt thanks to my aunt, Stella, and my uncle, Isaac, for their unwavering encouragement, support, and belief in my dreams.

Their love and faith have made this accomplishment possible.

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## ABSTRACT

The research investigates how mobile money services, especially M-Pesa, influence small and medium enterprises' e-commerce development in Kenya. The study validates adoption factors from the UTAUT2 model with emphasis on security mechanisms, convenience of use, and user trust. The study demonstrates how mobile banking brings inclusivity to business operations by helping SMEs solve payment and logistics issues. The research evaluates how USSD solutions work within low-tech networks to offer rural accessibility. Mobile money is essential for SMEs to expand their global markets by offering policy guidelines that benefit a sustainable e-commerce ecosystem. The research examines mobile banking's effects on e-commerce adoption through new evidence after an empirical survey of 315 SME owners, analyzed using PLS-SEM, showing that trust in technology and ease of use significantly influence mobile banking adoption that will help policymakers in emerging markets create effective strategies.



## KEYWORDS

Trust in Technology; SMEs; Mobile Banking M-banking; Digital Financial Solutions; UTAUT2; USSD


## Sustainable Development Goals (SDG):

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# LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **Digital Financial Solutions** | Technology enabled tools and services designed to provide inclusive access to financial systems. |
| **Mobile Banking** | (M-Banking) – The use of mobile devices to access financial services, including funds transfers, payments, and account management. |
| **SMEs** | (Small and Medium Enterprises) – Businesses that maintain revenues, assets, or a number of employees below a certain threshold. In Kenya, SMEs constitute a critical economic sector, often informal and digitally underserved, yet they are pivotal to financial inclusion and e-commerce growth. |
| **USSD** | (Unstructured Supplementary Service Data) **–** A protocol used by GSM cellular telephones to communicate with a service provider's computers. USSD enables mobile banking access without internet connectivity, which is crucial for rural and low bandwidth environments. |
| **UTAUT2.** | (Unified Theory of Acceptance and Use of Technology 2): A theoretical framework developed by Venkatesh et al. (2012) that explains user intentions to adopt technology and subsequent usage behavior by incorporating constructs such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit. |

# 1. INTRODUCTION

Mobile money has introduced transformative changes in Kenya' s financial sector by enabling convenient, efficient, and enhanced financial service operations. The mobile money revolution is most visible among the population segment lacking access to conventional banking outlets. Kenyan mobile payment solutions address financial exclusion by integrating disadvantaged communities into the financial system, allowing millions to access banking services that were previously out of reach. Services such as M- Pesa, Airtel Money, and Orange Money have revolutionized how Kenyans transfer funds, make payments, and manage business finances (Jack & Suri, 2011). These platforms, powered by USSD technology, function even in areas with limited internet access (Mbogo, 2010), thus promoting widespread adoption.

Despite this digital transformation, existing research has not fully explored the drivers and barriers to mobile banking adoption among SMEs in Kenya, particularly regarding trust and actual usage behaviors. Although financial inclusion through mobile money has expanded SMEs' access to digital payment channels (Donovan, 2012), many businesses still struggle with adoption due to concerns about security, technological compatibility, and perceived value (Ouma, Odongo, & Were, 2017). This study seeks to fill that gap by addressing two core research questions: (1) What factors influence the behavioral intention of SMEs to adopt mobile banking services in Kenya? (2) How does trust in technology impact the actual usage behavior of mobile banking among SMEs? Using the UTAUT 2 model as a theoretical foundation, extended with constructs like trust in technology, perceived security, innovativeness, and compatibility, this research aims to understand how mobile banking adoption enables SMEs to overcome infrastructure constraints and participate in the digital economy. These insights are particularly timely for informing policy, fintech design, and inclusive economic development in Kenya' s emerging digital financial landscape (Venkatesh, Thong, & Xu, 2012).

The achievement of this progress depended heavily on new technological innovations through unstructured supplementary service data (USSD). USSD provides effective mobile banking solutions for networks that still provide this service; thus, it remains operational even in areas lacking internet connectivity. This innovation, transforms financial inclusion goals into concrete achievements. Mobile Money has given people without bank accounts the power to find economic freedom, leading to financial growth and better living standards for most of the population. Mobile banking enabling small and medium-sized enterprises (SMEs) to break into e-commerce remains underexplored. SMEs are increasingly turning to digital tools like M-Pesa and USSD platforms to overcome limitations in infrastructure, expand their market reach, and facilitate secure and swift payments across borders (Mbogo, 2010; Donovan, 2012). These digital services are tools for individual financial management and essential platforms for SMEs seeking to access and compete in Kenya's growing digital economy.

The research aims to enhance understanding of mobile money systems that enable SMEs to reach e-business solutions and drive technological adoption for economic operations in underserved zones. The adoption of mobile banking services encounters difficulties because users doubt its security and trustworthy nature and struggle with the digital competence needed to operate it effectively for e-commerce purposes. The research investigates the effects of mobile money services on e-commerce in Kenya through its establishment in underdeveloped markets. Small and medium enterprises can build their consumer base and execute digital payments due to mobile money operations in locations with inadequate infrastructure. The research findings will help government agencies and stakeholders develop financial solutions to meet the needs of different user groups and advance economic growth.

This research investigates how mobile money technologies enable SMEs to engage in e-commerce. Despite mobile banking's accessibility, adoption hurdles persist due to concerns over security, digital literacy, and trust (Ouma et al., 2017). For SMEs in areas with poor infrastructure, mobile banking opens new pathways for reaching customers, accepting payments, and streamlining logistics. This results in broader business participation in digital markets and accelerates economic transformation.

The findings reveal how mobile money platforms support e-commerce integration by reducing transaction costs, improving access to finance, and enhancing operational efficiency. Mobile money adoption thus becomes a vital strategy for SME digital transformation and a blueprint for other emerging markets seeking financial and technological inclusion.

# 2. 2. THEORETICAL BACKGROUND

## 2.1 CONCEPT OF MOBILE BANKING

The concept of mobile banking encompasses a range of services that allow individuals and businesses to perform financial operations using mobile devices. These services can include mobile applications, SMS-based transactions, and unstructured supplementary service data (USSD) platforms. In Kenya, mobile banking has become a cornerstone of financial accessibility, especially for populations historically excluded from formal banking systems (Donovan, 2012; Ouma et al., 2017).

One of the most transformative innovations was M-Pesa, which was launched by Safaricom in 2007. This platform lets users deposit, withdraw, transfer money, pay bills, and access micro-credit facilities through their phones (Jack & Suri, 2011). The simplicity and ubiquity of M-Pesa have contributed significantly to its widespread adoption, including among small and medium enterprises (SMEs). USSD technology plays a critical role by enabling mobile banking in regions with limited internet access, further strengthening the infrastructure for financial inclusion (Mbogo, 2010; Chitungo & Munongo, 2013).

This research builds upon existing literature (Boateng et al., 2011; Abor & Quartey, 2010) to explore how mobile banking, through platforms like M-Pesa, facilitates SME access to digital markets. Unlike conventional banking systems, mobile money solutions offer SMEs affordable, real-time transaction tools that support business scalability and cross-border commerce (Asongu & Nwachukwu, 2017). As such, mobile banking is an innovation in financial technology and a strategic lever for e-commerce participation in underserved regions. Unlike conventional banking systems, mobile money solutions offer SMEs affordable, real-time transaction tools that support business scalability and cross-border commerce. As such, mobile banking is an innovation in financial technology and a strategic lever for e-commerce participation in underserved regions.

## 2.2 LITERATURE REVIEW

Previous studies have examined various factors that influence mobile banking adoption, including ease of use, perceived usefulness, and trust. Oliveira et al. (2016) and Baptista & Oliveira (2015) highlighted the importance of user experience, while Chitungo & Munongo (2013) focused on behavioral intentions among rural SMEs.

These findings suggest that perceptions of security, value, and convenience are critical to the adoption of mobile banking. Recent research is also exploring the connection between mobile banking and e-commerce. SMEs are increasingly using mobile money services to enhance their digital capabilities, enter new markets, and engage in cross-border transactions. Sang (2023) emphasized cybersecurity concerns during digital transitions, while Thiongo (2024) identified

structural barriers that Kenyan SMEs face in international e-commerce. SMEs will adopt the platform when they sense strong efforts from the company to maintain platform security and protect client data.

Table 1: Empirical Studies on Mobile Banking and E-Commerce Adoption in SMEs

| Authors | IT Context | Theory | Drivers | Data |
|---|---|---|---|---|
| Oliveira et al. (2016) | Mobile payment adoption and recommendations of mobile payments | UTAUT2 and adoption theories | Trust, perceived risk, PE, FC | Survey of mobile payment users in Europe. |
| Chitungo & Munongo (2013) | Mobile banking adoption in rural Zimbabwe | TAM | Perceived usefulness, ease of use, attitude, behavioral intention | 200 SME respondents in rural Zimbabwe |
| Baptista & Oliveira (2015) | Mobile banking adoption with cultural moderators | UTAUT2 | PE, EE, SI, FC + cultural dimensions | Survey across mobile banking users in Portugal |
| Tam & Oliveira (2016) | Mobile banking and individual performance | DeLone & McLean IS Success Model, TTF | System quality, info quality, service quality, task-tech fit | Survey of mobile banking users in Portugal |
| Sang (2023) | Cybersecurity model for e-commerce SMEs in Kenya | Risk Management Frameworks | Threat identification, risk assessment, vulnerability management | Doctoral research involving Kenyan SMEs |
| Thiongo (2024) | Barriers and enablers to international e-commerce | Market Access & Business Strategy | Regulation, logistics, tech adoption | Case studies of Kenyan SMEs exporting online |
| Wamukekhe (2024) | Financial risk performance of MPESA agents | Financial Risk Assessment Models | Credit risk, liquidity risk, operational risk | Survey and risk audit of rural MPESA agents in Kenya |

| Authors | IT Context | Theory | Drivers | Data |
|---|---|---|---|---|
| Boateng et al. (2011) | E-commerce readiness in Ghanaian SMEs | TOE Framework | Technological capability, organizational support, and environmental readiness | Case study and survey of 60 Ghanaian firms |
| Asongu & Nwachukwu (2017) | Knowledge diffusion via mobile tech in Africa | Knowledge Economy Framework | Mobile phone penetration, financial literacy, inclusive development | 49 African countries (2000–2012 panel data) |
| Abor & Quartey (2010) | SME growth in Ghana and South Africa | Policy and Financial Barriers | Lack of access to finance, tech adoption, infrastructure support | Comparative analysis |
| Alfani & Daulay (2021) | M-banking adoption in SMEs | UTAUT2 | PE, EE, SI, FC, HM, PV, trust, and risk perceptions | 150 SME owner survey in Indonesia |

Table 1 presents empirical studies that have focused on adopting mobile banking and its impact on SMEs' engagement in e-commerce. Several studies explore mobile banking's relationship with cultural, technological, and institutional factors (Baptista & Oliveira, 2015; Oliveira et al., 2016). For example, Tam and Oliveira (2016) analyze how the technology alignment influences performance, while Sang (2023) evaluates cybersecurity readiness in SME digital transitions.

The table further illustrates how theories like UTAUT2, the IS Success Model, and risk assessment frameworks have been employed to examine adoption drivers and contextual barriers. By integrating a wide range of theoretical approaches, this paper contributes to the growing research base exploring mobile banking's role in digital economic participation, particularly among underserved SMEs in Kenya.

## 3. PROPOSED RESEARCH MODEL

The Unified Theory of Acceptance and Use of Technology (UTAUT2) is a widely used theoretical model among all these explanations. Mobile banking innovation requires both ease of use and accessibility; therefore, this model demonstrates the factors for and against innovation (Alfani & Daulay, 2021). The models provide essential knowledge to understand how mobile money services enter Kenyan social lives and enable e-commerce activities.

UTAUT2 was developed as a unified model based on combining two previous models: the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB). The research established an advanced and well-integrated theoretical model for understanding technology acceptance, which includes studying mobile payments through M-Pesa in Kenya. UTAUT model experienced growth by developing into UTAUT2 with additional features that enhance understanding of consumer technology acceptance regarding mobile banking.

Figure 1 shows Putranto's (2020) Unified Theory of Acceptance and Use of Technology (UTAUT2) introduces four constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. In UTAUT2, performance expectancy is closely related to perceived usefulness and refers to beliefs about the utility of a specific technology in achieving certain goals (Baptista & Oliveira, 2015). These include faster transactions, better control over finances, and more security, especially in the case of mobile banking.

Based on perceived ease of use, effort expectancy reflects how easily users perceive the technology. This construct is especially pertinent to m-commerce, where aesthetics and simplicity are key to customer acquisition and subscription (Thiongo, 2024). Social influence, another factor of the UTAUT model, focuses on the perception of the pressure from family, friends, organizations, or other groups to adopt the technology in question (Xue et al., 2024). This is evident in Kenya, where M-Pesa has become popular, so users are convinced to join this platform because most of their friends are already engaged in it. This social aspect contributes to the adoption cycle to ensure mobile banking becomes the norm rather than the exception (Thiongo, 2024).

The fourth UTAUT2 construct facilitates conditions related to the physical, organizational, and technical context levels that support technology usage. The availability of M-Pesa agents, Safaricom telecommunication networks, and government policies facilitates mobile banking in Kenya. Such conditions enable the users to have easy access to the technology without significant challenges in terms of logistics or finances, thus increasing the trend towards adoption.

UTAUT2 is an effective theory that explains why mobile banking items are widespread in Kenya. The perceived usefulness is apparent when one considers the factors of security, convenience, and cost regarding financial transactions (Onsongo, 2019). People appreciate the platform's utility regardless of the purpose – paying for utilities, sending money to

relatives or friends, or receiving money for goods and services (Wamukekhe, 2024). This utility is especially felt when conventional banking services are underdeveloped or unavailable and mobile cash becomes the only financial service available to the population and enterprises. The perceived ease of use is another critical factor that has enabled mobile money to gain popularity.

This is made possible through the USSD technology, which helps everybody with essential mobile phone access to financial services, irrespective of the internet (Wamukekhe, 2024). This makes it possible not only to confine the platform to tech-savvy or an urban audience but also to a rural and low-income population. The simplified USSD codes used for operations and navigation of the menus have ensured that every person in Kenya can easily use mobile money services regardless of age, gender, or geographical location (Onsongo, 2019). This invariably brings the influence of other people into the equation, as individuals are also likely to be influenced to adopt a particular technology.

Drawing from the UTAUT2 model and extending it with constructs relevant to mobile financial technology in developing markets, this study proposes a conceptual model (Figure 2) that maps the antecedents influencing behavioral intention and use behavior. The following hypotheses explain the relationships.

### 2.2.1 CONSTRUCTS RELATIONSHIPS

**H1.** Facilitating Conditions → Behavioral Intention Access to infrastructure, including smartphones, internet connectivity, and financial literacy resources, significantly impacts SMEs' willingness to adopt mobile banking (Owusu Kwateng et al., 2019). If SMEs perceive the necessary tools are present, they are more likely to form positive intentions toward usage.

**H2.** Facilitating Conditions → Use Behavior This hypothesis links resource availability with actual use. Empirical findings support that facilitating conditions inform intention and directly enhance the likelihood of system use, especially in resource-constrained environments (Putranto, 2020).

**H3.** Performance Expectancy → Behavioral Intention SMEs are more inclined to adopt m-banking when they perceive it will enhance productivity, reduce transaction time, and improve customer convenience (Oliveira et al., 2016).

**H4.** Effort Expectancy → Behavioral Intention Ease of use remains critical. SMEs, especially those with limited tech exposure, prioritize intuitive solutions that require minimal learning effort (Cheng et al., 2006).

**H5**. Social Influence → Behavioral Intention Peer recommendations motivate adoption, particularly from successful business owners or networks. In Kenyan contexts, word-of-mouth

from other entrepreneurs can be more persuasive than institutional campaigns (Mbogo, 2010).

**H6.** Hedonic Motivation → Behavioral Intention While hedonic factors like convenience or novelty may play a role in consumer adoption, their role in SME adoption is marginal. However, features like real-time transaction alerts offer satisfaction that supports adoption (Alfani & Daulay, 2021).

**H7.** Price Value → Behavioral IntentionPrice sensitivity is relevant. SMEs seek affordability, but value-for-money (efficiency, reliability, support) is the more dominant factor in influencing intention (Baptista & Oliveira, 2015).

**H8**. Innovativeness → Behavioral Intention Tech-forward SME owners are more willing to experiment with new tools like mobile banking. This innovativeness aligns with early adopter characteristics found in many successful digital transitions (Baudier et al., 2020).

**H9.** Compatibility → Behavioral Intention When m-banking tools align with existing SME processes (e.g., sales logging, payment tracking), adoption increases. High compatibility reduces resistance and boosts operational fit (Venkatesh et al., 2012).
**H10**. Perceived Technology Security → Behavioral Intention Perceptions of data protection and transaction safety critically influence SME decision-making. Without confidence in security, intention remains low despite other benefits (McKnight et al., 2002).

**H11.** Trust in Technology → Behavioral Intention Trust emerges as a core determinant. As shown in prior studies, trust evolves from successful interactions and significantly predicts willingness to engage with mobile platforms (Marikyan & Papagiannidis, 2023).

**H12.** Trust in Technology → Use Behavior Even without strong initial intentions, SMEs that trust mobile banking systems are likelier to engage with them. This direct link suggests trust overcomes hesitation (Tam & Oliveira, 2016).

**H13.** Behavioral Intention → Use Behavior A well-supported path in technology acceptance models: intention is the strongest predictor of actual usage. This is confirmed in both consumer and SME contexts (Venkatesh et al., 2003).

**H14**. Intention to Recommend → Behavioral Intention The decision to recommend a platform often reinforces the individual's intention to use it. SMEs that advocate for a platform are typically convinced of its value, reinforcing their own usage decisions (Oliveira et al., 2016).

**H15**. Habit → Behavioral Intention reflects the extent to which SMEs have become accustomed to using mobile banking systems as part of their routine business processes. In contexts where digital tools are frequently utilized for transactions, habits can develop that strongly reinforce behavioral intention (Limayem et al., 2007). For SMEs that have already integrated mobile banking into their workflows, continued usage is often driven less by

conscious evaluation and more by automaticity and familiarity, making habit a powerful predictor of intention.

Each path offers a critical view of the complex dynamics shaping mobile banking adoption among SMEs in Kenya. The framework serves as both a theoretical guide and a practical map for financial institutions aiming to scale inclusive fintech solutions.

Since the mobile money solution is already entrenched in Kenyan society, people will venture into using it due to the societal pressure, culture, and innovation from their peer groups. For instance, most commercial and personal transactions require using M-Pesa as the most convenient payment mode for selling products or services (Wamukekhe, 2024). These social interactions facilitate a positive feedback loop, where adoption causes more significant app usage, which drives more adoption. Enabling factors, such as the physical infrastructure and widespread availability, make it possible for users to easily incorporate mobile money into their day-to-day lives (Onsongo, 2019). The availability of agents minimizes the difficulties that clients may experience by constantly allowing for deposits and withdrawals of cash through agents, even in the most obscure and remote areas.

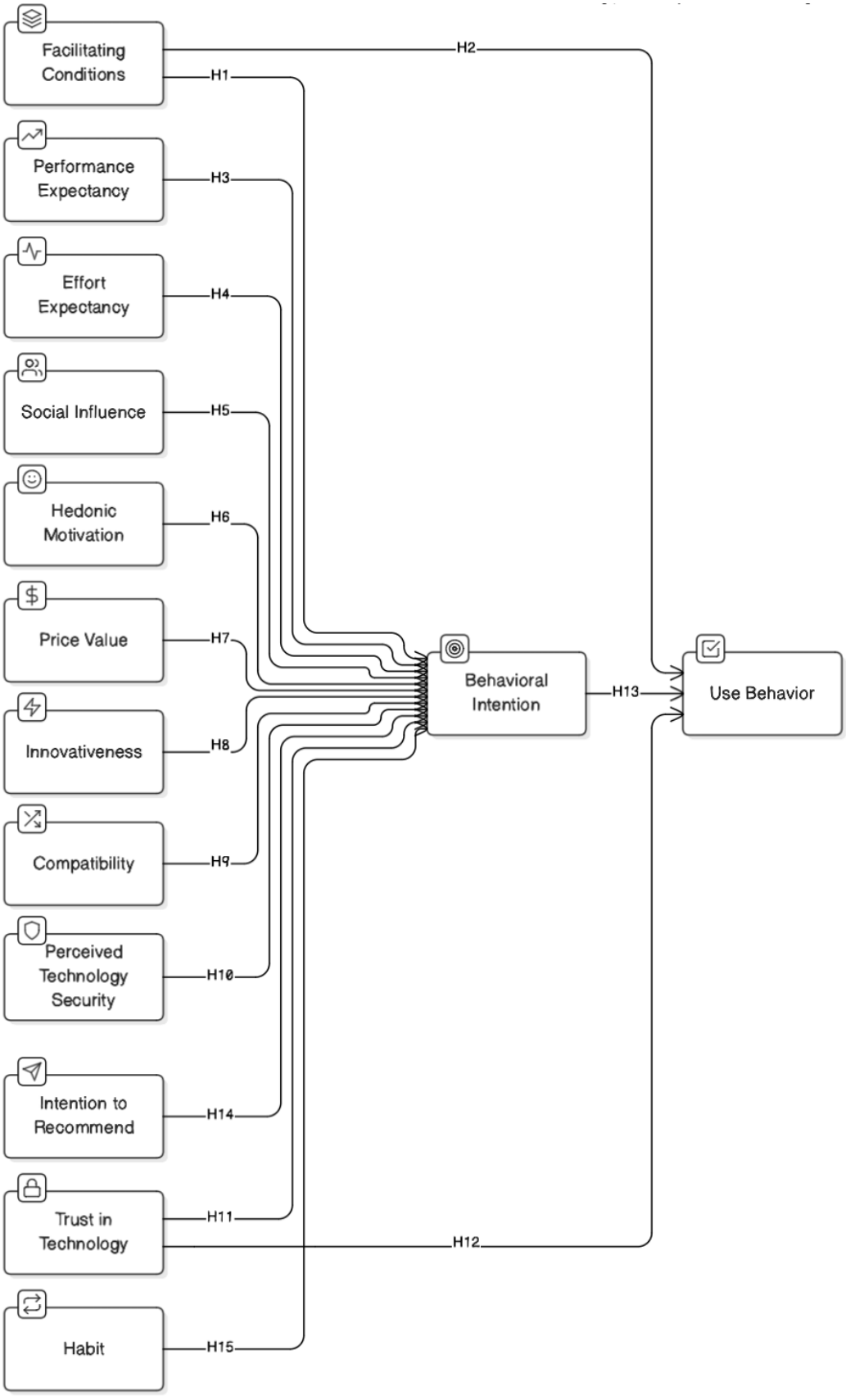
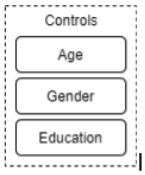



Figure 1: Proposed UTAUT2 Model Framework.




**Note:** an extended unified theory of acceptance and use of technology (UTAUT2).

Using this theoretical model, this study aims to shed light on how the USSD mobile money technology boosts the growth of e-commerce in Kenya. Thus, the perceived usefulness and perceived ease of use of mobile money are essential while facilitating e-commerce practices among SMEs (Thiongo, 2024). The emergence of safe payment systems helps to make transactions on the Internet, increasing the number of clients and saturation of the market. Word of mouth is also a factor that influences the SME adoption of e-commerce as more and more companies realize the benefits of digital commerce and pull-through (Thiongo, 2024). Another level of enablers includes partnerships with logistics providers and digital platforms to enhance SME readiness for mobile money integration.

# 4. METHODOLOGY

## 4.1 MEASUREMENT

A structured online questionnaire was developed to gather the data needed to evaluate the UTAUT2-based adoption model. All constructs in the survey were adapted from previously validated literature and measured using a 7-point Likert scale ranging from "1 – Strongly Disagree" to "7 – Strongly Agree." The only exception was the use of behavior construct, which employed a frequency scale ranging from "1 – Never" to "7 – Every time I need it." To ensure clarity and cultural relevance, key Swahili terms were incorporated into appropriate questions. A back-translation process was implemented to maintain linguistic consistency between the English and Swahili versions.

## 4.2 DATA COLLECTION

The final survey was disseminated through popular digital channels, including WhatsApp and Telegram, targeting business-oriented communities and SME forums in Kenya. Data collection took place from March 10 to March 19, 2025. A total of 350 responses were received, of which 315 valid and complete responses were retained for final analysis after cleaning and screening for missing values.

The respondents were primarily SME owners or managers with active experience using mobile banking platforms such as M-Pesa for business transactions. Convenience sampling was employed, providing rapid access to relevant participants while optimizing time and cost.

The analysis focused on key constructs: performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), price value (PV), behavioral intention (BI), and trust, with adoption as the final dependent variable demographic characteristics such as gender, age, income, educational level, and business size were collected to authenticate the data and provide a comprehensive understanding of the respondents. Additionally, participants were asked to share their mobile banking experiences to assess their familiarity and usage patterns.

## 4.3 SAMPLE CHARACTERISTICS

The Table presents the demographic breakdown of the 315 valid respondents. The gender distribution is relatively balanced, with a slight female majority (51.1%). Most respondents have at least a high school diploma and 45.2% have completed a bachelor's degree. Regarding income, the majority (56.1%) reported earning between KES 50,000 and 100,000 per month.

Table 2: Sample Characteristics table

| Characteristic | Category | N | % |
|---|---|---|---|
| Gender | Female | 159 | 51.1% |
| | Male | 152 | 48.9% |
| Education | Below high school | 4 | 1.3% |
| | High school | 130 | 41.7% |
| | Bachelor's degree | 141 | 45.2% |
| | Master's degree | 17 | 5.4% |
| | Doctorate | 4 | 1.3% |
| | Other | 16 | 5.1% |
| Income (KES) | Less than 50,000 | 29 | 9.3% |
| | 50,000 – 100,000 | 175 | 56.1% |
| | 100,000 – 200,000 | 83 | 26.6% |
| | Above 300,000 | 25 | 8.0% |

# 5. DATA ANALYSIS AND RESULTS

The partial least squares structural equation modeling (PLS-SEM) method was applied to the research model for data analysis. This technique is known for being variance-based and for its exploratory and predictive capabilities (Hair, Hult, Ringle, & Sarstedt, 2014; Ringle, Sarstedt, & Straub, 2012). SmartPLS 4 (Ringle, Wende, & Becker, 2015) was the software used to evaluate both the measurement and structural models.

## 5.1 MEASUREMENT MODELS

The first part consists of a measurement model that analyzes the measurement properties of the observed variables. The quality of this measurement model is assessed based on reliability, convergent validity, and discriminant validity, which indicates whether the questions are consistent and dependable. The reliability of the observed variables is determined by their factor loadings in relation to a respective endogenous construct and composite reliability. An observed variable is deemed reliable if its factor loading exceeds .70 and the overall composite reliability of the endogenous construct is above .7 (Hair et al., 2022). However, items scoring below .7 should not be discarded if the overall average variance extracted (AVE) of the construct is greater than .5. The items with a factor loading below .4 should be removed (Henseler et al., 2009). Convergent validity is established based on the endogenous constructs' average variance extracted (AVE). An AVE value greater than .5 indicates acceptable convergent validity (Hair et al., 2022).

Table 3: Convergent validity and reliability

| Constructs | Items | Loading | CR | AVE | t-value |
|---|---|---|---|---|---|
| Facilitating conditions | FC1 | 0.809 | 0.801 | 0.574 | 29.350*** |
| | FC2 | 0.764 | | | 11.850*** |
| | FC3 | 0.695 | | | 15.136*** |
| Performance expectancy | PE1 | 0.872 | 0.765 | 0.526 | 21.394*** |
| | PE2 | 0.6 | | | 6.913*** |
| | PE3 | 0.677 | | | 9.465*** |
| Effort expectancy | EE1 | 0.765 | 0.777 | 0.537 | 18.726*** |
| | EE2 | 0.706 | | | 15.021*** |

| Constructs | Items | Loading | CR | AVE | t-value |
|---|---|---|---|---|---|
| | EE3 | 0.725 | | | 15.045*** |
| Social influence | SI1 | 0.719 | 0.749 | 0.503 | 11.209*** |
| | SI2 | 0.593 | | | 5.043*** |
| | SI3 | 0.8 | | | 16.302*** |
| Hedonic motivation | HM1 | 0.744 | 0.752 | 0.503 | 15.469*** |
| | HM2 | 0.683 | | | 12.058*** |
| | HM3 | 0.701 | | | 12.207*** |
| Price value | PV1 | 0.829 | 0.756 | 0.514 | 17.674*** |
| | PV2 | 0.555 | | | 4.904*** |
| | PV3 | 0.74 | | | 11.835*** |
| Innovativeness | I1 | 0.664 | 0.781 | 0.544 | 6.992*** |
| | I2 | 0.811 | | | 14.630*** |
| | I3 | 0.731 | | | 12.205*** |
| Compatibility | C1 | 0.747 | 0.79 | 0.557 | 18.367*** |
| | C2 | 0.736 | | | 15.735*** |
| | C3 | 0.755 | | | 21.375*** |
| Perceived technology security | PTS1 | 0.714 | 0.778 | 0.539 | 13.478*** |
| | PTS2 | 0.711 | | | 10.667*** |
| | PTS3 | 0.776 | | | 20.164*** |
| Intention to recommend | IR1 | 0.813 | 0.82 | 0.694 | 25.876*** |
| | IR2 | 0.853 | | | 38.010*** |
| Trust in technology | TT1 | 0.813 | 0.793 | 0.562 | 21.175*** |
| | TT2 | 0.734 | | | 15.843*** |

| Constructs | Items | Loading | CR | AVE | t-value |
|---|---|---|---|---|---|
| | TT3 | 0.698 | | | 12.900*** |
| Habit | HR1 | 0.797 | 0.808 | 0.584 | 23.436*** |
| | HR2 | 0.729 | | | 15.879*** |
| | HR3 | 0.774 | | | 20.990*** |
| Behavioral intention to use | BI1 | 0.74 | 0.771 | 0.529 | 22.283*** |
| | BI2 | 0.724 | | | 20.451*** |
| | BI3 | 0.718 | | | 18.674*** |
| Use behavior | U1 | 0.769 | 0.757 | 0.51 | 21.516*** |
| | U2 | 0.667 | | | 14.812*** |
| | U3 | 0.702 | | | 16.828*** |

The results provided in Table 4 indicate that all observed items exhibited strong reliability in measuring their respective endogenous constructs. The composite reliability scores for all constructs exceeded the threshold of 0.70, signifying high internal consistency and reliability. In addition, Average Variance Extracted (AVE) values for each construct were above 0.50, which confirms the model's convergent validity.

The second criterion for evaluating the quality of the measurement model is discriminant validity. This was assessed using the Fornell-Larcker criterion, which requires that the square root of the AVE for each construct must be greater than its correlations with other constructs in the model (Fornell & Larcker, 1981). As shown in Table 3, this condition was satisfied for all constructs in the model. For example, constructs such as Performance Expectancy (√AVE = 0.766), Trust in Technology (√AVE = 0.775), and Use Behavior (√AVE = 0.727) had square root values greater than their correlations with other constructs, demonstrating strong discriminant validity.

Therefore, based on the measurement model results — including internal consistency, convergent validity, and discriminant validity — the model satisfies all recommended quality checks, and the researcher can proceed to test the structural model.

Table 4: Fornell-Larcker criterion.

| | BI | C | EE | FC | HR | HM | I | IR | PTS | PE | PV | SI | TT | UB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BI** | 0.727 | | | | | | | | | | | | | |
| **C** | 0.498 | 0.746 | | | | | | | | | | | | |
| **EE** | 0.472 | 0.517 | 0.733 | | | | | | | | | | | |
| **FC** | 0.448 | 0.475 | 0.551 | 0.758 | | | | | | | | | | |
| **HR** | 0.463 | 0.598 | 0.491 | 0.485 | 0.764 | | | | | | | | | |
| **HM** | 0.417 | 0.544 | 0.512 | 0.582 | 0.453 | 0.71 | | | | | | | | |
| **I** | 0.347 | 0.39 | 0.242 | 0.298 | 0.39 | 0.345 | 0.738 | | | | | | | |
| **IR** | 0.568 | 0.378 | 0.31 | 0.369 | 0.361 | 0.357 | 0.35 | 0.833 | | | | | | |
| **PTS** | 0.538 | 0.479 | 0.38 | 0.336 | 0.293 | 0.398 | 0.47 | 0.422 | 0.734 | | | | | |
| **PE** | 0.397 | 0.396 | 0.37 | 0.327 | 0.376 | 0.312 | 0.339 | 0.354 | 0.315 | 0.725 | | | | |
| **PV** | 0.381 | 0.401 | 0.316 | 0.332 | 0.331 | 0.406 | 0.524 | 0.346 | 0.519 | 0.256 | 0.717 | | | |
| **SI** | 0.418 | 0.428 | 0.542 | 0.554 | 0.433 | 0.463 | 0.256 | 0.376 | 0.357 | 0.276 | 0.332 | 0.709 | | |
| **TT** | 0.369 | 0.271 | 0.235 | 0.254 | 0.224 | 0.226 | 0.294 | 0.365 | 0.488 | 0.234 | 0.356 | 0.464 | 0.75 | |
| **UB** | 0.522 | 0.457 | 0.415 | 0.465 | 0.445 | 0.41 | 0.344 | 0.547 | 0.354 | 0.285 | 0.325 | 0.459 | 0.397 | 0.714 |

**Key for Constructs:**

**BI** – Behavioral Intention | **C** – Compatibility | **EE** – Effort Expectancy | **FC** – Facilitating Conditions | **HR** – Habit | **HM** – Hedonic Motivation | **I** – Innovativeness | **IR** – Intention to Recommend | **PTS** – Perceived Technology Security | **PE** – Performance Expectancy | **PV** – Price Value | **SI** – Social Influence | **TT** – Trust in Technology | **UB** – Use Behavior

**Heterotrait-Monotrait Ratio (HTMT) Table**

This study utilized the Heterotrait-Monotrait Ratio (HTMT) of correlations to evaluate the discriminant validity among the constructs in the proposed mobile banking adoption model for SMEs. Discriminant validity ensures that each construct in the model is empirically distinct from the others, confirming that constructs intended to measure different concepts do not overlap significantly.

HTMT values below 0.85 are generally accepted as indicative of satisfactory discriminant validity (Henseler, Ringle, & Sarstedt, 2015). As shown in the HTMT table, all correlation values

between the constructs remained below or close to this threshold, which supports the distinctiveness of each variable in the model. This further reinforces the reliability and validity of the measurement model used in this research.

Consequently, constructs such as Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), Trust in Technology (TT), and Behavioral Intention (BI) demonstrate appropriate discriminant validity, allowing for a robust interpretation of the structural relationships examined in the study.

Table 5: HTMT Correlations

| Constructs | BI | C | EE | FC | HR | HM | I | IR | PTS | PE | PV | SI | TT | UB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BI - Behavioral Intention | - | | | | | | | | | | | | | |
| C - Compatibility | 0.854 | - | | | | | | | | | | | | |
| EE - Effort Expectancy | 0.836 | 0.88 | - | | | | | | | | | | | |
| FC - Facilitating Conditions | 0.757 | 0.761 | 0.922 | - | | | | | | | | | | |
| HR - Habit | 0.764 | 0.957 | 0.805 | 0.751 | - | | | | | | | | | |
| HM - Hedonic Motivation | 0.782 | 0.985 | 0.949 | 1.02 | 0.789 | - | | | | | | | | |
| I - Innovativeness | 0.587 | 0.668 | 0.433 | 0.475 | 0.654 | 0.641 | - | | | | | | | |
| IR - Intention to Recommend | 1.014 | 0.644 | 0.551 | 0.613 | 0.604 | 0.671 | 0.61 | - | | | | | | |
| PTS - Perceived Technology Security | 0.939 | 0.817 | 0.664 | 0.558 | 0.482 | 0.734 | 0.797 | 0.726 | - | | | | | |
| PE - Performance Expectancy | 0.699 | 0.662 | 0.633 | 0.528 | 0.604 | 0.594 | 0.633 | 0.638 | 0.596 | - | | | | |
| PV - Price Value | 0.675 | 0.749 | 0.627 | 0.592 | 0.6 | 0.829 | 0.918 | 0.612 | 0.911 | 0.51 | - | | | |
| SI - Social Influence | 0.759 | 0.75 | 0.996 | 0.996 | 0.728 | 0.91 | 0.472 | 0.689 | 0.636 | 0.48 | 0.66 | - | | |
| TT - Trust in Technology | 0.626 | 0.443 | 0.399 | 0.401 | 0.366 | 0.405 | 0.49 | 0.624 | 0.835 | 0.417 | 0.62 | 0.86 | - | |
| UB - Use Behavior | 0.97 | 0.817 | 0.761 | 0.804 | 0.768 | 0.799 | 0.634 | 1.01 | 0.654 | 0.525 | 0.65 | 0.87 | 0.7 | - |

**Cross loadings**

The cross-loadings table presents the correlations of each indicator with all latent constructs in the model. For proper discriminant validity, an item should load higher on its associated

construct than on any other construct (Hair, Hult, Ringle, & Sarstedt, 2022). High cross-loadings between different constructs could indicate overlapping concepts and potential issues with construct distinctiveness. In this study, each item demonstrated a stronger relationship with its designated construct compared to others, confirming acceptable discriminant validity across the measurement model.

Table 6. Cross loadings

| Items | BI | C | EE | FC | HR | HM | I | IR | PTS | PE | PV | SI | TT | UB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BI1 | 0.744 | 0.389 | 0.353 | 0.323 | 0.415 | 0.352 | 0.294 | 0.456 | 0.406 | 0.291 | 0.297 | 0.319 | 0.273 | 0.388 |
| BI2 | 0.722 | 0.347 | 0.379 | 0.326 | 0.302 | 0.278 | 0.262 | 0.367 | 0.42 | 0.284 | 0.242 | 0.289 | 0.276 | 0.396 |
| BI3 | 0.715 | 0.349 | 0.296 | 0.328 | 0.286 | 0.278 | 0.197 | 0.414 | 0.344 | 0.293 | 0.293 | 0.303 | 0.255 | 0.354 |
| C1 | 0.345 | 0.748 | 0.4 | 0.381 | 0.44 | 0.438 | 0.299 | 0.287 | 0.347 | 0.281 | 0.34 | 0.364 | 0.238 | 0.362 |
| C2 | 0.404 | 0.735 | 0.359 | 0.336 | 0.47 | 0.392 | 0.291 | 0.354 | 0.324 | 0.378 | 0.284 | 0.285 | 0.176 | 0.318 |
| C3 | 0.36 | 0.755 | 0.402 | 0.35 | 0.424 | 0.389 | 0.281 | 0.195 | 0.403 | 0.217 | 0.277 | 0.314 | 0.196 | 0.347 |
| EE1 | 0.369 | 0.44 | 0.765 | 0.432 | 0.4 | 0.461 | 0.191 | 0.245 | 0.287 | 0.335 | 0.291 | 0.451 | 0.154 | 0.333 |
| EE2 | 0.332 | 0.388 | 0.706 | 0.369 | 0.302 | 0.285 | 0.14 | 0.206 | 0.287 | 0.205 | 0.18 | 0.344 | 0.159 | 0.279 |
| EE3 | 0.335 | 0.304 | 0.726 | 0.408 | 0.373 | 0.371 | 0.2 | 0.228 | 0.262 | 0.268 | 0.218 | 0.392 | 0.207 | 0.298 |
| FC1 | 0.354 | 0.434 | 0.422 | 0.809 | 0.465 | 0.497 | 0.279 | 0.355 | 0.238 | 0.292 | 0.307 | 0.417 | 0.13 | 0.426 |
| FC2 | 0.354 | 0.347 | 0.424 | 0.764 | 0.355 | 0.437 | 0.226 | 0.26 | 0.266 | 0.25 | 0.224 | 0.449 | 0.292 | 0.331 |
| FC3 | 0.309 | 0.284 | 0.41 | 0.695 | 0.261 | 0.379 | 0.159 | 0.208 | 0.266 | 0.19 | 0.215 | 0.396 | 0.163 | 0.286 |
| HM1 | 0.282 | 0.406 | 0.402 | 0.371 | 0.3 | 0.744 | 0.152 | 0.239 | 0.265 | 0.196 | 0.241 | 0.294 | 0.191 | 0.3 |
| HM2 | 0.305 | 0.379 | 0.296 | 0.409 | 0.371 | 0.683 | 0.283 | 0.239 | 0.311 | 0.239 | 0.318 | 0.313 | 0.111 | 0.278 |
| HM3 | 0.299 | 0.372 | 0.393 | 0.455 | 0.289 | 0.701 | 0.292 | 0.281 | 0.268 | 0.225 | 0.301 | 0.375 | 0.182 | 0.294 |
| HR1 | 0.386 | 0.431 | 0.392 | 0.353 | 0.797 | 0.327 | 0.316 | 0.276 | 0.232 | 0.342 | 0.29 | 0.328 | 0.206 | 0.356 |
| HR2 | 0.31 | 0.439 | 0.336 | 0.395 | 0.72 | 0.319 | 0.281 | 0.298 | 0.219 | 0.225 | 0.223 | 0.285 | 0.12 | 0.353 |
| HR3 | 0.361 | 0.505 | 0.393 | 0.373 | 0.774 | 0.393 | 0.297 | 0.259 | 0.222 | 0.286 | 0.242 | 0.376 | 0.178 | 0.315 |
| I1 | 0.206 | 0.346 | 0.253 | 0.267 | 0.381 | 0.288 | 0.665 | 0.265 | 0.278 | 0.234 | 0.324 | 0.228 | 0.176 | 0.29 |
| I2 | 0.315 | 0.27 | 0.158 | 0.263 | 0.255 | 0.229 | 0.81 | 0.284 | 0.391 | 0.236 | 0.425 | 0.178 | 0.254 | 0.241 |
| I3 | 0.23 | 0.27 | 0.147 | 0.127 | 0.26 | 0.268 | 0.731 | 0.225 | 0.36 | 0.293 | 0.405 | 0.176 | 0.209 | 0.247 |
| IR1 | 0.447 | 0.326 | 0.29 | 0.336 | 0.307 | 0.311 | 0.314 | 0.814 | 0.354 | 0.313 | 0.355 | 0.362 | 0.34 | 0.432 |
| IR2 | 0.498 | 0.305 | 0.23 | 0.283 | 0.296 | 0.287 | 0.271 | 0.853 | 0.35 | 0.28 | 0.229 | 0.271 | 0.273 | 0.477 |
| PE1 | 0.374 | 0.359 | 0.347 | 0.307 | 0.348 | 0.249 | 0.229 | 0.304 | 0.192 | 0.872 | 0.188 | 0.264 | 0.191 | 0.263 |
| PE2 | 0.214 | 0.186 | 0.15 | 0.129 | 0.141 | 0.186 | 0.281 | 0.229 | 0.302 | 0.601 | 0.216 | 0.024 | 0.207 | 0.164 |
| PE3 | 0.248 | 0.293 | 0.275 | 0.246 | 0.298 | 0.247 | 0.263 | 0.232 | 0.24 | 0.676 | 0.175 | 0.273 | 0.12 | 0.177 |
| PTS1 | 0.399 | 0.347 | 0.278 | 0.235 | 0.259 | 0.293 | 0.296 | 0.369 | 0.714 | 0.299 | 0.358 | 0.243 | 0.365 | 0.269 |
| PTS2 | 0.337 | 0.364 | 0.277 | 0.216 | 0.194 | 0.283 | 0.37 | 0.192 | 0.711 | 0.165 | 0.373 | 0.223 | 0.355 | 0.281 |
| PTS3 | 0.439 | 0.349 | 0.283 | 0.282 | 0.194 | 0.301 | 0.374 | 0.348 | 0.776 | 0.222 | 0.41 | 0.312 | 0.358 | 0.236 |
| PV1 | 0.339 | 0.283 | 0.16 | 0.254 | 0.228 | 0.306 | 0.427 | 0.344 | 0.419 | 0.196 | 0.829 | 0.207 | 0.299 | 0.226 |
| PV2 | 0.176 | 0.362 | 0.329 | 0.282 | 0.316 | 0.396 | 0.29 | 0.17 | 0.249 | 0.211 | 0.555 | 0.283 | 0.186 | 0.253 |
| PV3 | 0.276 | 0.269 | 0.262 | 0.21 | 0.219 | 0.23 | 0.398 | 0.199 | 0.423 | 0.166 | 0.74 | 0.268 | 0.266 | 0.247 |
| SI1 | 0.253 | 0.278 | 0.408 | 0.461 | 0.32 | 0.405 | 0.239 | 0.3 | 0.224 | 0.211 | 0.18 | 0.719 | 0.33 | 0.359 |
| SI2 | 0.24 | 0.23 | 0.324 | 0.363 | 0.201 | 0.253 | 0.096 | 0.163 | 0.217 | 0.138 | 0.202 | 0.592 | 0.405 | 0.209 |
| SI3 | 0.373 | 0.378 | 0.42 | 0.378 | 0.376 | 0.335 | 0.204 | 0.319 | 0.304 | 0.228 | 0.303 | 0.8 | 0.292 | 0.388 |
| TT1 | 0.318 | 0.231 | 0.192 | 0.26 | 0.186 | 0.191 | 0.175 | 0.308 | 0.334 | 0.161 | 0.245 | 0.344 | 0.813 | 0.352 |
| TT2 | 0.259 | 0.148 | 0.183 | 0.141 | 0.073 | 0.136 | 0.228 | 0.298 | 0.428 | 0.139 | 0.278 | 0.31 | 0.734 | 0.251 |
| TT3 | 0.245 | 0.224 | 0.153 | 0.153 | 0.24 | 0.179 | 0.275 | 0.212 | 0.353 | 0.233 | 0.29 | 0.397 | 0.698 | 0.277 |
| U1 | 0.417 | 0.371 | 0.326 | 0.368 | 0.385 | 0.346 | 0.245 | 0.455 | 0.241 | 0.244 | 0.21 | 0.304 | 0.232 | 0.77 |

| Items | BI | C | EE | FC | HR | HM | I | IR | PTS | PE | PV | SI | TT | UB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U2 | 0.382 | 0.323 | 0.325 | 0.295 | 0.312 | 0.249 | 0.253 | 0.345 | 0.293 | 0.111 | 0.234 | 0.354 | 0.313 | 0.667 |
| U3 | 0.315 | 0.281 | 0.234 | 0.331 | 0.249 | 0.28 | 0.237 | 0.366 | 0.223 | 0.257 | 0.254 | 0.326 | 0.308 | 0.702 |

**Key for Constructs:**

**BI** – Behavioral Intention | **C** – Compatibility | **EE** – Effort Expectancy | **FC** – Facilitating Conditions | **HR** – Habit | **HM** – Hedonic Motivation | **I** – Innovativeness | **IR** – Intention to Recommend | **PTS** – Perceived Technology Security | **PE** – Performance Expectancy | **PV** – Price Value | **SI** – Social Influence | **TT** – Trust in Technology | **UB** – Use Behavior

## 5.2 STRUCTURAL MODEL.

PLS estimation with 5,000 bootstrapped samples was conducted to test the significance of the hypothesized relationships in the model. The results are presented in Table 5 and Figure 1. The figure shows R-squared values for behavioral intention to use mobile banking applications. Overall, the model explained 25.8% of the variance in the construct of behavioral intention to use mobile banking applications, indicating that the factors being studied (such as ease of use, usefulness, trust, etc.) account for about one-fourth of the reasons why people decide to use mobile banking. Additionally, 14.2% of the usage behavior of mobile banking applications suggests that actual mobile banking usage is influenced by additional factors not captured in this study.

Table 7: Path coefficients

| Relationships | β | T values | P values | Result |
|---|---|---|---|---|
| Behavioural intention to use -> Use behaviour | 0.326 | 5.462 | < 0.000 | Supported |
| Compatibility -> Behavioral intention to use | 0.118 | 1.749 | 0.08 | Not-supported |
| Effort expectancy -> Behavioral intention to use | 0.141 | 2.182 | 0.029 | Supported |
| Facilitating conditions -> Behavioral intention to use | 0.088 | 1.480 | 0.139 | Not-supported |
| Facilitating conditions -> Use behavior | 0.266 | 4.268 | < 0.000 | Supported |
| Hedonic motivation -> Behavioral intention to use | -0.008 | 0.126 | 0.899 | Not-supported |
| Innovativeness -> Behavioral intention to use | -0.018 | 0.313 | 0.755 | Not-supported |
| Intention to recommend -> Behavioral intention to use | 0.311 | 5.364 | < 0.000 | Supported |

| Relationships | β | T values | P values | Result |
|---|---|---|---|---|
| Perceived technology security -> Behavioral intention to use | 0.226 | 3.231 | 0.001 | Supported |
| Performance expectancy -> Behavioral intention to use | 0.083 | 1.445 | 0.149 | Not-supported |
| Price value -> Behavioral intention to use | 0.011 | 0.167 | 0.867 | Not-supported |
| Social influence -> Behavioral intention to use | 0.010 | 0.162 | 0.871 | Not-supported |
| Trust in technology -> Behavioral intention to use | 0.037 | 0.689 | 0.491 | Not-supported |
| Habit | 0.124 | 1.892 | 0.059 | Not-supported |
| Trust in technology -> Use behaviour | 0.209 | 3.378 | 0.001 | Supported |

Regarding hypothesis testing, the Table  indicates that effort expectancy significantly and positively impacts behavioral intention to use mobile banking applications ( = 0.141, p = 0.029). This suggests that consumers who perceive the low effort required to use mobile banking apps have higher intentions to use them. Facilitating conditions significantly and positively impacted the actual use behavior of mobile banking applications ( = .266, p < .000).

The results suggest that if applications are more facilitative to use, consumers will have high use. Furthermore, intentions to recommend and perceive technology security also significantly and positively impact behavioral intentions to use ( = .311, p < 0.000;  = .226, p = 0.001). This suggests that individuals who intend to recommend banking applications to other users and perceive them to be secure have higher intentions to use them.

To ensure construct distinctiveness, discriminant validity was assessed through multiple methods. The Fornell-Larcker criterion confirmed that the square root of each construct's AVE was greater than its correlations with other constructs (Fornell & Larcker, 1981). Additionally, the cross-loadings table demonstrated that each indicator loaded higher on its associated construct than on any other construct, aligning with recommendations by Hair et al. (2022). Finally, the Heterotrait-Monotrait ratio (HTMT) values were all below the conservative threshold of 0.85, further confirming discriminant validity (Henseler, Ringle, & Sarstedt, 2015). Collectively, these results confirm the reliability and discriminant validity of the measurement model.

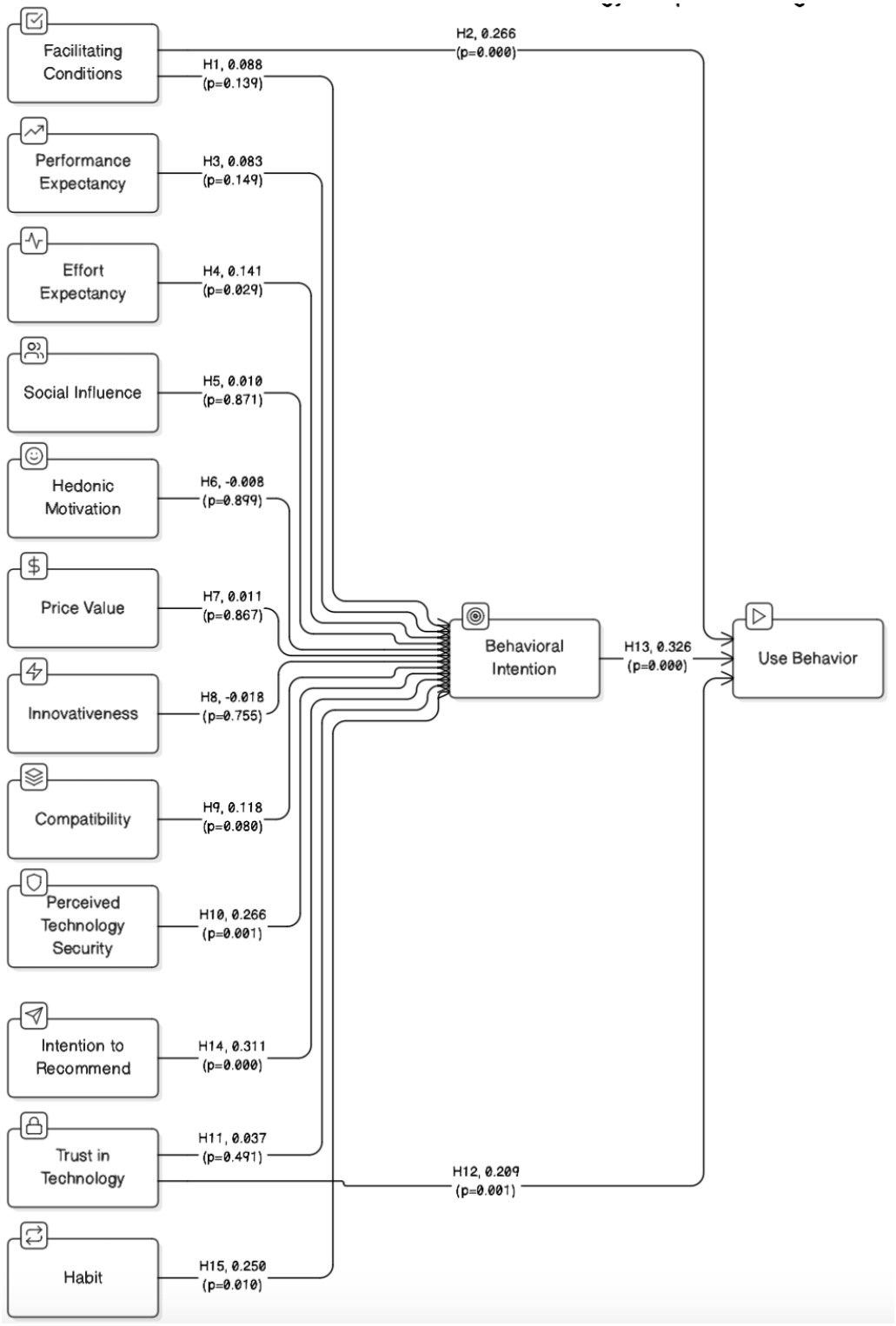



Figure 2: Final Research Model

As for the results **β = 0.326, p < 0.001.** This is a strong, statistically significant relationship. It confirms a foundational principle of the UTAUT2 model: **SMEs that intend to use mobile banking will likely follow through with actual usage.** Behavioral intention is, therefore, a critical determinant of use behavior. ($\beta$ = 0.209, $p$ < 0.001; $\beta$ = 0.326, $p$ < 0.000).

## 6. DISCUSSION

The partial least squares structural equation modeling (PLS-SEM) method was applied to the research model for data analysis. This technique is known for being variance-based and for its exploratory and predictive capabilities (Hair, Hult, Ringle, & Sarstedt, 2014; Ringle, Sarstedt, & Straub, 2012). SmartPLS 4 (Ringle, Wende, & Becker, 2015) was the software used to evaluate both the measurement and structural models.

This study provides important insights into the adoption of mobile banking among small and medium-sized enterprises (SMEs), offering a new perspective that refines the traditional UTAUT2 model assumptions. The findings reveal that trust, while not a direct influencer of behavioral intention, plays a crucial role in actual usage behavior. This observation supports previous research by Zhou (2012) and Gefen et al. (2003), emphasizing that trust in digital services builds over time through consistent and positive experiences rather than forming solely during the initial decision-making phase. The results indicate that SMEs evaluate mobile banking systems based on service reliability and secure user experiences, linking trust-building with long-term usage rather than just adoption intent.

**Facilitating conditions** emerged as a significant factor enabling usage behavior, consistent with findings from Venkatesh et al. (2003) and Oliveira et al. (2014). Interestingly, while UTAUT2 suggests that facilitating conditions influence both intention and behavior (Venkatesh et al., 2012), in this study, their impact was limited to actual use. This divergence indicates that SMEs often assume infrastructural support at the intention stage but only recognize its critical importance during sustained engagement with the system, especially in contexts with digital limitations. Contrary to expectations set by the Technology Acceptance Model (TAM) (Davis, 1989) and social influence studies (Abu-Shanab & Pearson, 2007), perceived usefulness and social influence were not significant predictors of behavioral intention.

This finding aligns with studies by Pikkarainen et al. (2004) and Oliveira et al. (2014), which suggest that, in high-risk contexts such as mobile banking, practical concerns—particularly security, operational compatibility, and simplicity—take precedence over perceived enjoyment and peer influence. For SMEs, decision-making prioritizes risk mitigation rather than social validation, which often guides consumer behavior.

Similarly, cost considerations did not significantly affect adoption decisions. While earlier works (e.g., Chong, 2013; Luarn & Lin, 2005) highlighted pricing strategies as critical drivers, the findings align more closely with Oliveira et al. (2016), showing that in business contexts, SMEs are willing to invest in services that offer operational reliability and robust security. In this study, SMEs were less sensitive to pricing models and focused more on reducing operational risks and ensuring business continuity. A key finding was the influence of the intention to recommend on behavioral intention, reinforcing the importance of positive advocacy. This result is consistent with Alalwan et al. (2017) and Susanto et al. (2016), who

highlighted the role of satisfied users as powerful promoters in digital service ecosystems. Unlike traditional peer influence models, this advocacy arises from genuine satisfaction and trust rather than passive conformity to social norms.

The study's reliable validation through HTMT and cross-loading tables further strengthens these findings. HTMT values below 0.85 confirm discriminant validity (Henseler, Ringle, & Sarstedt, 2015), and strong cross-loadings ensure the clear separation of constructs.

In summary, mobile banking adoption among SMEs is primarily driven by trust, security, usability, and strong infrastructural support rather than cost savings, social pressure, or general perceptions of usefulness. These findings suggest that financial institutions need to redesign mobile banking solutions for SMEs, emphasizing security features, usability enhancements, and reliable infrastructure instead of relying solely on pricing strategies or peer-driven marketing efforts.

## 6.1 Theoretical Implications

The results reinforce the suitability of UTAUT2 as a foundational model to assess technology adoption. Behavioral intention was confirmed as a strong predictor of use behavior, consistent with Venkatesh et al. (2012). In addition, perceived technology security and intention to recommend were significant positive influencers of behavioral intention, aligning with prior work by Oliveira et al. (2016) and Wamukekhe (2024). These results validate the relevance of trust-related constructs in the financial technology domain.

Notably, trust in technology emerged as a direct predictor of use behavior but not of behavioral intention. This suggests that while trust may not drive the initial intent to adopt mobile banking, it becomes a decisive factor in continued and actual usage. This supports the argument by McKnight et al. (2002) that trust develops through user experience and shapes long-term engagement. Unlike several traditional technology acceptance studies, performance expectancy, social influence, price value, compatibility, hedonic motivation, and innovativeness did not significantly affect behavioral intention. This shift emphasizes that Kenyan SMEs may prioritize reliability, security, and user support over social trends or cost-saving benefits when evaluating financial tools.

## 6.2 Practical Implications.

The findings offer several valuable insights for financial service providers, policy-makers, and developers:

This study sheds light on vital insights that financial institutions, developers, and policymakers should consider when designing mobile banking strategies specifically tailored for small and medium-sized enterprises (SMEs). First and foremost, establishing and maintaining trust is essential—not only at the point of initial adoption but also throughout the customer's ongoing

relationship with the service. This underscores the necessity for organizations to deliver consistent service quality, demonstrate transparency in their operations, and provide responsive customer support. By prioritizing these elements, financial institutions can foster a sense of reliability and build long-term loyalty among SME customers, encouraging them to engage more fully with mobile banking solutions.

Moreover, the enabling conditions for effective mobile banking include factors such as dependable network infrastructure, readily available customer service, and accessible support from agents or local representatives. Significant investment in creating robust infrastructure—particularly in rural and underserved regions—can profoundly influence ongoing usage and engagement rates. By ensuring these areas have reliable connectivity and support, institutions can empower SMEs to adopt mobile banking with confidence, knowing they can access help when needed. Secondly the study reveals that the intention to recommend a service is a compelling driver of behavioral intentions. This highlights the strategic importance of cultivating user advocacy. By sharing authentic testimonials and encouraging satisfied customers to engage with their networks, financial institutions can create strong word-of-mouth momentum, ultimately accelerating organic growth in adoption rates among SMEs willing to try new solutions based on peer recommendations.

The third interesting fact from the study , while several traditional factors typically drive technology adoption—such as perceived enjoyment and peer influence—these are shown to have a limited effect on SMEs. Instead, a focus on operational simplicity, heightened security protocols, and robust system functionality emerges as the dominant decision-making factors. Financial service providers must prioritize the implementation of strong security measures, such as multi-factor authentication, encryption of sensitive data, and user-friendly designs featuring intuitive interfaces. Additionally, a commitment to comprehensive user support—with tutorials, responsive help desks, and personalized assistance—will significantly reduce the barriers that SMEs face when considering the transition to mobile banking. The data implies that SMEs will make mobile banking investments whenever they recognize the service as providing secure operations alongside performance reliability and efficient functions hence cost of the service doesn't seem to be a hindrance.

Finally, the findings clearly illustrate that relying solely on cost incentives or peer referrals is insufficient to drive widespread adoption. SMEs often value attributes such as performance reliability and data security far above mere pricing discounts. As such, financial institutions should strategically align their marketing and product development efforts to spotlight the operational value and security enhancements of their mobile banking services. By effectively communicating these benefits, institutions can make a compelling case that resonates with SME customers who are seeking reliable and secure financial solutions tailored to their unique needs. Financial institutions should resolve their infrastructure hindrances alongside improving support systems to help SMEs benefit from digital banking solutions without restriction.

## 6.3 Limitations and Future Research

Although the study yielded significant insights, it has a few limitations. First, the data was collected using a cross-sectional survey, limiting the ability to track behavioral change over time. Future research should consider longitudinal studies to assess adoption patterns across different growth stages of SMEs. Second, the sample was focused on Kenyan SMEs, which may limit the generalizability of the findings to other regions. Comparative studies across East Africa or other developing markets could offer broader insights.

Additionally, qualitative research could further explore nuanced user experiences and barriers that quantitative models may overlook. Future research could also integrate environmental and sustainability constructs, explore the role of regulatory frameworks, or test the applicability of UTAUT2 in post-pandemic recovery strategies among SMEs.

## 6.4 Conclusion

Research findings demonstrate how Mobile banking services fundamentally impact the electronic commerce adoption processes of small and medium enterprise businesses in Kenya. The UTAUT2 model helps the research discover major adoption influencers, including user trust, convenience, and security measures. Through mobile money services, SMEs obtain unrestricted secure payment methods, which help them break through distribution obstacles to gain wider market exposure. USSD technology plays a pivotal role in low-tech settings in providing financial access to rural areas and underserved communities, as per the research findings.

This paper offers practical insights for entrepreneurs, policymakers, and service providers, grounded in an empirical analysis of the UTAUT2 model. The findings show that trust, usability, and infrastructural access are critical enablers of mobile banking use among SMEs. These results call for collaborative efforts between government entities (such as the Ministry of ICT and the Central Bank), mobile operators, and private sector innovators to ensure security, accessibility, and capacity-building within the SME ecosystem.

Furthermore, digital skills training and policy incentives could accelerate the digital transformation of Kenya's informal and formal businesses. Investment in USSD infrastructure, tailored support services, and trust-enhancing features—such as fraud protection and multilingual customer support—would increase mobile platform adoption and active usage.

As mobile banking continues to expand its role in Kenya's economic landscape, stakeholders must prioritize inclusive digital finance strategies that not only support innovation but also empower entrepreneurs with the confidence, tools, and training to grow their businesses through secure and efficient mobile solutions.

The study delivers essential information that helps policy leaders, digital commerce stakeholders, and banking institutions in Kenya and other developing markets. Mobile money is an essential economic power resource that minimizes differences between conventional banking institutions and digital financial systems. Mobile banking helps develop sustainable e-commerce and boost SMEs' growth through its fostering effect on financial inclusivity. Future investigations must analyze how developing technologies will improve financial inclusion success and digital commercial development to sustain mobile money's economic advancement in developing areas.

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## APPENDIX A UTAUT2 MODEL CONSTRUCTS FOR SMES USING MOBILE BANKING (M-PESA)

| Constructs | Items | Source |
|---|---|---|
| **Performance Expectancy** | PE1 - Using mobile banking (Mpesa) enhances my ability to conduct business transactions efficiently. | Adapted from Venkatesh et al. (2012) |
| | PE2 - Mobile banking (Mpesa) improves financial management for my SME. | |
| | PE3 - Mobile banking enables faster and more secure transactions. | |
| **Effort Expectancy** | EE1 - Mobile banking services are easy to use for business transactions. | Adapted from Venkatesh et al. (2012) |
| | EE2 - Learning to use mobile banking (Mpesa) for e-commerce is straightforward. | |
| | EE3 - My staff can easily operate mobile payment platforms with minimal training. | |
| **Social Influence** | SI1 - Other SME owners recommend mobile banking for business transactions. | Adapted from Venkatesh et al. (2012) |
| | SI2 - The government or financial institutions promote mobile payment adoption in my industry. | |
| | SI3 - The adoption of mobile banking is encouraged within my business network. | |
| **Facilitating Conditions** | FC1 - I have access to the necessary resources to use mobile banking for my business. | Adapted from Venkatesh et al. (2012) |
| | FC2 - I have sufficient knowledge to utilize mobile banking effectively for e-commerce. | |
| | FC3 - Mobile banking integrates well with my existing business operations. | |
| **Hedonic Motivation** | HM1 - Using mobile banking for business transactions is enjoyable and convenient. | Adapted from Venkatesh et al. (2012) |

| Constructs | Items | Source |
|---|---|---|
| | HM2 - The user interface of the mobile banking system makes transactions engaging. | |
| | HM3 - I feel empowered to manage my business finances through mobile banking. | |
| **Price Value** | PV1 - Mobile banking services offer good value for my business at a reasonable cost. | Adapted from Venkatesh et al. (2012) |
| | PV2 - The benefits of mobile banking outweigh the associated transaction fees. | |
| | PV3 - Mobile banking provides a cost-effective solution for SME payments. | |
| **Innovativeness** | I1 - I actively explore new mobile banking solutions to improve my business operations. | Adapted from Yi et al. (2006) |
| | I2 - I am usually one of the first among my peers to adopt new financial technologies. | |
| | I3 - I enjoy experimenting with new USSD-based payment methods for my business. | |
| **Compatibility** | C1 - Mobile banking fits seamlessly into my business transactions and financial processes. | Adapted from Moore & Benbasat (1991) |
| | C2 - Using mobile banking aligns with my business payment preferences. | |
| | C3 - Mobile banking supports my e-commerce operations effectively. | |
| **Perceived Technology Security** | PTS1 - I feel secure using mobile banking for SME transactions. | Adapted from Cheng et al. (2006) |
| | PTS2 - I trust mobile banking to protect my financial and customer data. | |
| | PTS3 - Mobile banking platforms have sufficient security measures for my business. | |
| **Behavioural Intention to Adopt** | BI1 - I intend to continue using mobile banking for my SME transactions. | Adapted from Venkatesh et al. (2012) |

| Constructs | Items | Source |
|---|---|---|
| | BI2 - I plan to integrate mobile banking fully into my business operations. | |
| | BI3 - I will encourage my business partners to use mobile banking. | |
| **Intention to Recommend** | REC1 - I would encourage fellow SME owners to consider using mobile banking solutions. | Self-developed |
| | REC2 - I am likely to promote the benefits of mobile banking adoption to other businesses. | |
| **Trust in Technology (TTF)** | TTF1 - I trust mobile banking applications to operate reliably without failures. | Adapted from McKnight et al. (2002) |
| | TTF2 - I believe mobile banking service providers prioritize user security and privacy. | |
| | TTF3 - I feel comfortable storing and managing financial data using mobile banking apps. | |
| Use Behavior<br><br>Habit | B1 – I frequently use mobile banking for my day-to-day business transactions.<br>UB2 – Mobile banking is integrated into my regular SME operations.<br>UB3 – I rely on mobile banking services to manage most of my business payments.<br><br>HR - Using Mpesa for business payments has become a routine part of my business operations | Adapted from Venkatesh et al. (2012) |

# APPENDIX B ETHICS COMMITTEE REPORT

This is to certify that
Project No.: **INFSYS2025-3-43207**
Project Title: **Mobile Banking and the Propagation of E-Commerce in Kenya through Reliable Payment Solutions**
Principal Researcher: **Denis Kuria**

according to the regulations of the Ethics Committee of NOVA IMS and MagIC Research Center this project was considered to meet the requirements of the NOVA IMS Internal Review Board, being considered **APPROVED** on 3/4/2025.

It is the Principal Researcher's responsibility to ensure that all researchers and stakeholders associated with this project are aware of the conditions of approval and which documents have been approved.

The Principal Researcher is required to notify the Ethics Committee, via amendment or progress report, of
- Any significant change to the project and the reason for that change;
- Any unforeseen events or unexpected developments that merit notification;
- The inability of the Principal Researcher to continue in that role or any other change in research personnel involved in the project.

Lisbon, 3/4/2025


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