DETERMINANTS OF MOBILE MONEY GROWTH: THE CASE OF FIVE SELECTED EAST AFRICAN COUNTRIES

A thesis submitted to Addis Ababa University School of commerce for partial Fulfillment of the requirements for the degree of MSc in corporate finance with specialty in investment management (CFIM)

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Declaration

I, the undersigned, declare that this thesis is my own original work and has not been presented in any other University. All sources of materials used for this thesis have been duly acknowledged.

Declared by

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Endorsement

This thesis has been submitted to Addis Ababa University, Collage of Business and Economics School of commerce for examination with my approval as a university supervisor.

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This is to certify that the thesis prepared by Abay Gebeyaw Bnalfew, entitled "determinants of mobile money growth: the case of five selected east African countries" and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Corporate Finance with specialty in investment Management complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Contents

Acronyms

ANOVA – Analysis of Variance

ATM – Automated Teller Machine

DOI – Diffusion of Innovation Theory

FAS – Financial Access Survey

GSMA – Global System for Mobile Communications Association

IMF – International Monetary Fund

ITU – International Telecommunication Union

KYC – Know Your Customer

NBE – National Bank of Ethiopia

SPSS – Statistical Package for the Social Sciences

TAM – Technology Acceptance Model

UTAUT – Unified Theory of Acceptance and Use of Technology

VIF – Variance Inflation Factor

WB – World Bank

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Abstract

In East Africa, mobile money has emerged as a key driver of financial inclusion, enabling individuals without bank accounts to access essential financial services. This study examines the factors that influence the growth of mobile money account in five chosen East African nations, with a particular emphasis on network coverage, mobile device ownership, banking penetration, regulatory policies, and mobile money agents. Utilizing a quantitative research methodology, the study analyzes the connections between independent factors and the rise of mobile money using multiple linear regression analysis in SPSS and secondary data from 2019 to 2023.

The result indicates that the availability of mobile money agents, the banking penetration, network coverage, and the percentage of mobile devices ownership all have a positive influence on the number of registered mobile money accounts. The study does discover, however, that the Mobile Money Regulation Index (MMRI) has a notable adverse effect, indicating that too strict rules can prevent uptake. These results emphasize how crucial it is to maintain regulatory framework balance in order to promote innovation and safeguard consumers.

The study suggests that governments use flexible regulatory strategies that promote the use of mobile money while upholding security requirements in light of the findings. To increase accessibility, mobile money service providers could use technology infrastructure and grow their agent networks. Future studies should look at consumer behavior while using mobile money in various economic circumstances and investigate the precise elements of regulatory rules that influence its uptake.

Keywords: Mobile money, financial inclusion, mobile money agents, banking penetration, regulatory framework, network coverage, East Africa

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Mobile money has revolutionized how we manage our financial activities by offering a simple and accessible alternative to conventional banking. From transferring funds and paying bills to making purchases, mobile money has become essential to modern life. A few taps on a mobile device allow us to send money to family and friends, settle utility bills, and even access small loans. The rapid growth of mobile money has not only improved financial access for many but has also driven economic advancement.

Mobile money utilizes advanced technologies to deliver financial services to populations with limited access to traditional banking systems. Through mobile devices and cellular networks, it offers a widely available solution that replaces or supplements conventional banking. Biometric validation, data encryption, and integration with social and messaging apps enhance transaction security and user experience. These features enable both individuals and enterprises to perform transfers, settle bills, and access other financial services securely and conveniently.

Organizations such as Global System for Mobile Communications Association (GSMA) and the International Monetary Fund (IMF) define mobile money as a technology-enabled service that allows users to conduct transactions without the need for a formal bank account. GSMA defines mobile money as a financial service conducted via mobile devices. The IMF describes it as a digital financial tool for sending, receiving, and storing funds through mobile money accounts, supported by agent networks. In contrast, mobile or internet banking typically requires linking to formal bank accounts and is accessed through digital apps.

The benefits of mobile money are particularly pronounced among low-income and rural populations. Mobile money services (MMS) offer secure platforms for storing, withdrawing, depositing, and transferring funds, often at a lower cost and with greater ease compared to conventional banks. They support a wide array of transactions, including domestic and cross-border transfers, bill payments, salaries, everyday purchases, savings,

access to loans, and financial insurance. MMS also enable cash-to-digital conversions via agents, cardless transactions, or bank transfers, making the service flexible and accessible for diverse users. As such, mobile money plays a vital role in enhancing financial inclusion and empowering underserved communities.

Recent data highlights the global expansion of mobile money. In 2023, the industry recorded a 12% increase in registered accounts, reaching 1.75 billion globally. Transaction volume grew by 23% to 85 billion, while total transaction value rose to $1.4 trillion — a 14% increase. Active 90-day accounts hit 642 million (11% growth), while 30-day active accounts grew by 9% to 435 million. Agent networks also expanded, with 18.6 million registered agents (22% growth) and 8.3 million active agents (14% increase). These figures underscore the rising significance of mobile money in global financial ecosystems (GSMA, 2024).

Despite this progress, financial exclusion remains a global issue. As of 2021, 1.4 billion adults were unbanked, lacking access to both traditional financial institutions and mobile money platforms. However, this represents a steady improvement from 2.5 billion in 2011 and 1.7 billion in 2017 (World Bank, 2021).

Mobile money adoption varies by region, each with unique growth trends (GSMA, 2024):

South Asia: 401 million registered accounts (11% growth), 89 million active users (8% growth), 12 billion transactions (+13%), $214 billion in value (+17%).

East Asia and Pacific: 374 million registered accounts (+3%), 77 million active users (+6%), 9 billion transactions (+10%), $196 billion in value (+14%).

Latin America and the Caribbean: 48 million registered accounts (-13%), 19 million active users (-13%), 1 billion transactions (+6%), $38 billion in value (+11%).

Middle East and North Africa: 71 million registered accounts (+10%), 9 million active users (+41%), 719 million transactions (+57%), $30 billion in value (+40%).

Europe and Central Asia: 26 million registered accounts (+8%), 6 million active users (+11%), 391 million transactions (+13%), $7 billion in value (+14%).

Sub-Saharan Africa: 835 million registered accounts (+19%), 234 million active users (+12%), 62 billion transactions (+28%), $912 billion in value (+12%).

East Africa, in particular, leads in mobile money adoption with 372 million registered accounts and 118 million monthly active users. In 2024, it processed 38 billion transactions worth $488 billion, supported by a strong network of 1.4 million active agents.

1.2. Statement of the problem

Mobile money offers a transformative opportunity to advance financial inclusion, especially among the unbanked. Nevertheless, the factors driving its growth in East African countries have not been thoroughly explored in existing research.

Mobile money providers, policymakers, regulators, and other stakeholders often struggle to identify the key determinants influencing mobile money growth in the region. This lack of clarity highlights the need for further investigation, as mobile money has the potential to provide unbanked populations with access to financial services and contribute significantly to financial inclusion.

In the East African context, some studies have been conducted concerning mobile money growth, with the aim of identifying its determinants. For example, the study titled "Determinants of Mobile Money Adoption and Use in Burundi" by Arcade, Jean, and Michel examines factors such as age category, education level, membership in savings and loans associations, and household size. Their study finds that these are primary factors determining the likelihood of mobile money adoption in Burundi. Additionally, the probability of mobile money use appears to be influenced by education level, place of residence, and overall well-being. Similarly, Wambari, A., & Mwaura, M. (2020) conducted a study titled "Determinants of Mobile Money Technology Adoption in Rural Areas of Kenya", using age, years of education, employment status, and ownership of bank accounts as independent variables. Another study by Centellegher et al. (2018), titled "Understanding and Predicting its Adoption and Use in a Developing Economy", considers mobile phone usage patterns, social network characteristics, and geographic mobility as independent variables.

Although the previous studies have used valuable variables, they did not consider other potentially influential factors such as the Mobile Money Regulation Index (MMRI), number of mobile device owners, banking penetration, number of mobile money agents, and network coverage. These factors remain underexplored in the East African context. As a result, mobile money growth across the region is still not sufficiently understood, making it difficult for service providers, policymakers, and regulators to implement effective strategies. Furthermore, to the best of the researcher's knowledge, no comprehensive study has been conducted on the determinants of mobile money growth in East Africa that includes these specific variables. Therefore, this study is necessary to fill these identified gaps by deploying the above-mentioned independent variables.

1.3. Basic research questions

This research has the below listed questions.

1. What is the relationship between regulatory policies (as measured by the Mobile Money Regulation Index) and mobile money growth?
2. How does the number of mobile device owners' impact mobile money growth?
3. What effect has banking penetration on mobile money growth?
4. What is the impact of number of mobile money agents has on the growth of mobile money?
5. How does network coverage influence the growth of mobile money?

1.4. Objectives of the study

1.4.1. General Objective

The primary objective of this research is to determine the critical factors driving the growth of mobile money in East Africa.

1.4.2. Specific Objectives

This research has the aim to analyze the relations between the selected independent variables and mobile money growth. Such as:

1. To assess the relationship between regulatory policies (Mobile Money Regulation Index) and mobile money growth.
2. To examine the impact of the percentage of mobile device owners on mobile money growth.
3. To understand how banking penetration affects mobile money growth.
4. To explore the effect of number of mobile money agents has promoting growth of mobile money.
5. To evaluate the effect of network coverage on growth of mobile money.

1.5. Significances of the study

This research will have contribution for mobile money service providers, policymakers, academics and research.

For Mobile Money Providers: The research will help mobile money providers understand what drives adoption, allowing them to tailor services and to better reach their target market.

For policy makers (Governments): The findings will inform policymakers on how to promote financial inclusion and modernize financial services through mobile money.

For academics and the Public: The research will raise awareness about mobile money in East Africa, leading to greater acceptance and financial empowerment.

For research: The study will serve as a reference for further research on mobile money growth, allowing scholars to build upon the findings and advance knowledge in this area.

1.6. Scope of the study

This thesis investigates the determinants of mobile money growth in East Africa in the case of five selected East Africa countries by taking panel data 2019 to 2023. It examines the relationships between the following factors and the number of registered mobile money accounts:

1. Mobile Money Regulation Index
2. Percentage of mobile device owners
3. Banking penetration ratio

4. Number of mobile money agents and
5. Network coverage

This research investigates the factors influencing mobile money growth in East Africa.

1.7. limitations of the study

This study has some limitations to consider:

Limited Timeframe: The study analyze data from 2019 to 2023. While a longer period might offer stronger results, it's important to consider the relatively short history of mobile money services. Factors influencing may change significantly over time.

Another limitation of this paper is that the study focuses almost on the supply side. This limit understanding of the whole mobile money growth determinants because the demand side factors which affect it is not considered.

Additionally, Micro and macro-economic factors which can play a role in mobile money growth is not included in this study. Microeconomic factors at the individual and household levels can significantly impact growth mobile money. These factors include age, gender, education level, income, occupation, financial literacy, family size, location (urban vs. rural), risk aversion, trust in financial institutions, and perceived benefits of mobile money. For instance, younger individuals with higher education levels and incomes may be more likely to adopt mobile money due to their familiarity with technology and financial literacy.

Macroeconomic factors also play a crucial role in shaping mobile money growth. These can influence the growth of mobile money. Government policies, such as monetary policies and taxation, can influence the cost and accessibility of mobile money. Additionally, the level of competition among mobile money providers can impact on growth of mobile money. By excluding these factors, the study can maintain a focused scope and avoid unnecessary complexity. However, it's important to acknowledge their potential influence and consider incorporating them in future research if resources and time permit.

1.8. Definition of terms

Mobile financial services - These are financial operations made accessible through mobile devices, allowing individuals to perform both financial transactions and informational tasks using their phones. This category includes a range of services such as sending or receiving money, checking balances, accessing savings, obtaining credit, and subscribing to insurance—all via mobile platforms (GSMA, 2024).

A mobile money account, often referred to as a mobile wallet, is a type of electronic money account managed by an e-money provider and primarily accessed through a mobile device.

An active mobile money account refers to an account through which at least one financial transaction has been performed within a specified timeframe, commonly within the past 30 or 90 days

E-money, or electronic money, refers to a digital representation of stored value that is maintained in the accounts of users, agents, and service providers involved in mobile money systems.

Unbanked – Individuals who lack access to a formal financial institution and do not possess a transaction or savings account within the regulated banking system.

Underbanked refers to individuals who, despite having access to a basic transactional account through a formal financial institution, continue to experience limited access to a broader range of financial services. These individuals may face constraints in conducting secure or cost-effective money transfers, and often lack affordable options for saving, credit, or insurance.

1.9. Organization of the paper

This paper has five chapters. First chapter comprise background, statement of the problem, research objectives, research questions, significance, scope, limitation, definition of terms and structure of the study. Chapter two contain literature review on the conceptual frame work of variables and empirical knowledge about the area of the study. Chapter three present the research methodology which contain the research approach, design, data

collection and method of data analysis. Chapter four present the analysis and interpretation of data which comprise the descriptive statistics and Inferential statistics of regression analysis of all variables deployed in this study. Chapter five provide conclusion, recommendations and future research suggestion.

CHAPTER TWO

LITERATURE REVIEW

2. Introduction

This chapter explores literatures related to the growth of mobile money services. It examines relevant theories and real-world studies (empirical findings) gathered from numerous sources such as books, academic journals, research papers, and online resources. These sources help for the development of a conceptual framework that explains the factors influencing mobile money adoption.

2.1. Theoretical review

Numerous theoretical frameworks have been proposed to explain why individuals adopt new technologies. These models explore various factors that influence user acceptance, and have been applied to the study of mobile financial services and mobile banking adoption.

Prominent theories include the Technology Acceptance Model (TAM), Diffusion of Innovation theory and Unified Theory of Acceptance and Use of Technology (UTAUT). Researchers have frequently employed these established frameworks for their studies, and some have integrated existing models or introduced new constructs to address specific research objectives.

2.2.1. Technology Acceptance Model

The Technology Acceptance Model (TAM), developed by Davis (1989), is a widely used theoretical basis for understanding the acceptance & use of innovative technology. The model suggests that two key reasons influence user acceptance: Perceived Usefulness and Perceived Ease of Use.

Perceived Usefulness: denotes the degree to which individuals trust that adopting a technology will enhance their performance. In the context of mobile money, users are more likely to register and use it if they perceive the service as beneficial for conducting financial transactions conveniently and efficiently.

Perceived ease of use: represents how easy to use a particular system. If mobile money services are user-friendly and accessible through widespread agent networks and mobile devices, the growth of it is increase.

2.2.2. Unified Theory of Acceptance and Use of Technology (UTAUT)

Proposed by Venkatesh et al. (2003), extends previous technology acceptance models by incorporating additional factors that drive adoption. The model identifies four core determinants of the likelihood to use a technology:

Performance Expectancy – The degree to which users believe that adopting a technology will improve their financial transactions. In mobile money services, performance expectancy is influenced by factors such as bank penetration and network coverage, which affect users' confidence in the reliability and efficiency of mobile money.

Effort Expectancy – The effortless use and learning curve associated with mobile money. The presence of widespread mobile money agents and user-friendly platforms facilitates effort expectancy.

Social Influence – The impact of social networks, family, and peers in influencing growth of mobile money. Mobile money growth is often driven by word-of-mouth and trust in the system.

Facilitating Conditions – The external infrastructure, policies, and resources supporting the use of mobile money. The MMRI serves as a key facilitating condition, as a favorable regulatory framework enhances trust and stability in the mobile money ecosystem.

2.2.3. Diffusion of Innovation Theory (DOI)

Developed by Everett Rogers (1962), describes how innovative technologies, products, or services reach to a population over time. The theory categorizes adopters into five groups: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. These groups represent the different stages of adoption, influenced by factors such as accessibility, perceived benefits, and external conditions.

Innovators – These are the first users of mobile money, including tech-savvy individuals and businesses eager to explore digital financial services. They are willing to take risks

and experiment with mobile money platforms, often before widespread infrastructure is in place.

Early Adopters – Key influencers such as merchants, mobile money agents, and financial institutions that encourage broader adoption. The existence and availability of MM distribution network has a vital role in accelerating this phase by offering cash-in and cash-out services, making MM more practical for users.

Early Majority – Individuals who begin using mobile money after seeing its benefits and widespread acceptance. At this stage, network coverage and bank penetration significantly impact adoption, as users seek reliability and financial integration between traditional banking and mobile financial services.

Late Majority – Skeptical users who adopt mobile money only after it becomes widely used and necessary for daily transactions. The Mobile Money Regulatory Index (MMRI) influences this phase, as a well-structured regulatory environment builds trust and reduces perceived risks associated with mobile money.

Laggards – The last group to adopt mobile money, often due to resistance to change, lack of access to technology, or limited financial literacy. The percentage of mobile device subscriptions directly affects their adoption, as mobile phones are the primary tool for mobile money transactions.

2.3. Definition of Mobile money

As per GSMA, MMS is characterized by three key features: (1) it allows transferring of money and handling payments via a mobile phone; (2) it's accessible to individuals without traditional banking services; and (3) it offers a link of physical points for transactions, such as mobile money agents, that cater to the unbanked, beyond conventional bank branches and ATMs.

2.3.1. Mobile Banking vs Mobile money

MM is a technological service that permits users to manage transactions like receiving, storing, and spending money directly through their mobile phone, without the need for a bank account. Whereas, Mobile banking is the integration of mobile phones with personal

or business bank accounts, enabling customers to utilize their phones for various banking services including withdrawals, transfers, bill payments, and checking account balances McCarthy (2018)

2.3.2. Development of Mobile money: Worldwide and African trend

The global expansion of the mobile money sector has been remarkable. The first mobile money service was introduced in 2001, and within five years, six different schemes had been launched worldwide. By the close of 2015, the number of mobile money services had grown to 271, spanning across 93 countries, with 13 new services introduced that year (GSMA, 2016). The success of M-Pesa, which debuted in Kenya in 2007, acted as a catalyst for the spread of mobile money across Africa. Since then, mobile money adoption in Africa has led global growth, although the services are also gaining significant traction in regions such as Latin America, East Asia, and South Asia. Sub-Saharan Africa represented roughly 52% of all active mobile money services in 2014 and 2015, though half of the new launches during those years occurred outside of Africa, particularly in Latin America and the Caribbean (Scharwatt et al., 2015; GSMA, 2016). In 2015, South Asia accounted for over a third of all registered mobile money accounts. Additionally, regions like Europe & Central Asia, as well as the Middle East and North Africa, have seen mobile money services increase by as much as 50% (GSMA, 2016).

The rapid expansion and widespread adoption of mobile money is reshaping the financial landscape across Africa. As a viable cashless alternative, mobile money offers a significant shift in how financial services are accessed, enabling millions of unbanked individuals to manage and store their money directly through mobile devices.

Mobile money has significantly transformed Africa's financial landscape, with the continent leading the world in adoption rates. As reported by the GSMA, the total number of mobile money accounts worldwide reached approximately 1.6 billion by 2022, with Africa representing over 781 million of these accounts. This accounts for almost half of the global total, and the region also leads in transaction volumes, with over 45 billion transactions worth more than $836 billion recorded that year. While East Africa continues to lead the charge, countries in West Africa, including Côte d'Ivoire, Ghana, and Senegal, have experienced substantial growth, largely driven by progressive regulatory changes.

2.4. Empirical review

2.4.1 Dependent Variable

Number of Mobile money account

A key indicator of mobile money growth is the number of registered mobile money account. The growth in registered mobile money users is influenced by several factors, including the service provider's distribution network, the total number of active mobile money providers, and the prevailing regulations regarding registration, such as Know Your Customer (KYC) processes, among others Mahmoud (2019)

2.3.2. Independent Variables

GSMA Mobile Money Regulation Index

Empirical research indicates a substantial relationship exist between the GSMA MMRI and the growth of mobile money account. Notable studies include:

"Exploring the Relationship Between Mobile Money Regulation and Usage" by Bahia, Sanchez-Vidal, and Taberner (2020): This study leverages the MMRI and the 2017 WB Findex, finding that an empowering governance, as measured by the MMRI, is strongly associated with higher mobile money usage. On average, a ten-percent increase in a country's MMRI score corresponds to a three-percentage point rise in mobile money usage.

"Mobile Money and Consumer Protection: An Analysis of Regulatory Frameworks in Sub-Saharan Africa" by Kaffenberger and Totolo (2019): Utilizing the MMRI, this research identifies consumer protection as the most significant predictor of the number of mobile money users. The study emphasizes that robust consumer protection regulations are crucial for fostering trust and encouraging mobile money adoption.

These studies collectively highlight that more enabling regulatory environments, as quantified by higher MMRI scores, are associated with increased mobile money adoption and subscriber growth.

The regulatory environment of the nation is a main factor in the broad adoption of mobile money. Flexibility in legislation will aid in service improvement. For example, flexible

agent regulations can be used to increase accessibility, and ease KYC standards can be used to streamline the registering method for popular MMS. (Juliet Maina, 2018).

Furthermore, fostering a productive working relationship with all mobile money authorities is a key factor in the success of any mobile money services; the financial and telecommunications regulators are the most prevalent in emerging nations. (Rajiv Lal, Ishan Sachdev, 2015). Due to the importance of regulation, it is essential to consider factors related to the regulatory framework, such as authorization processes, consumer protection measures, transaction limits, Know Your Customer (KYC) requirements, and the structure of agent networks, all of which fall under the oversight of governments and central banks As a instrument of the rise of MM across all nations, the MMRI was created using the earlier data. (GSMA Intelligence, 2018).

Mobile money agents.

Empirical research underscores an important relationship between the proliferation of MM agents & the growth of mobile money account. The expansion of agent networks enhances availability of mobile money services, leading to increased adoption. Notable studies include:

"Mobile Money and Economic Activity: Evidence from Kenya" by Suri and Jack (2016): This study utilized data from the expansion of the M-PESA agent network in Kenya and found that it improved mobile money services access, facilitated by a denser agent network, led to higher local economic activity. The presence of more agents made it easier for individuals to use mobile money services, thereby increasing adoption rates.

"Mobile Money: Understanding and Predicting its Adoption and Use in a Developing Economy" by Centellegher et al. (2018): Analyzing data from M-PESA, this research highlighted that the accessibility of MM agents is a crucial factor influencing both the acceptance and continued use of MMS. A well-distributed agent network reduces transaction costs and increases user trust, thereby boosting mobile money account growth.

These studies collectively highlight that the expansion and availability of MM distribution networks are pivotal in driving the adoption and growth of MMS.

So as to draw in and keep consumers, MMS must improve the quality of their offerings through agent. In addition to the availability of MM operator's outlets, expanding the agent distribution is essential for providing customers with mobile money services. Agents are usually either small independent retailers that the Operator has signed up or retail stores that are directly owned by the Operator (Mussime D. and Alinda F (2016)

Cash-deposit/cash-withdrawal, account registration, and over-the-counter transactions are among the services that agents offer, and they are usually situated close to the clients they will be serving. They may also assist with service marketing and consumer education. As a result, clients mostly interface with system through agents. (Rajiv Lal, Ishan Sachdev, 2015).

The key elements that will boost the agent network's adoption of mobile money are first, make it easier cash in and cash out of the MM services. This will allow them to deposit money into the service (converting actual currency into e-money) and withdraw money from it (converting e-money into physical cash) in a simple manner at any time and from any location. The second thing that agents must do is make sure they have sufficient cash and e-money on hand to complete the customer's transaction. (Rajiv Lal, Ishan Sachdev, 2015).

Percentage of mobile device owners

Mobile money services rely on transactions made via mobile phones. There is a greater potential user base for mobile money adoption when there are more people using mobile devices. (Afawubo, K., et al., 2020)

Banking Penetration

Studies have shown that the association between bank penetration and MM is complex and can vary depending on specific market conditions. For instance, Ali and Ali (2016) found a positive correlation between bank penetration and MM adoption in emerging economies. They argue that existing banking infrastructure can provide a solid foundation for mobile money services, as banks can leverage their existing customer base and distribution networks to promote and support mobile money adoption.

However, other studies have suggested that a high level of bank penetration can also hinder mobile money growth. Humphreys and Radelet (2012) contend that in some cases, individuals may prefer to use traditional banking services over mobile money if they already have access to bank accounts. This could be due to reasons such as trust in established financial institutions or concerns about the security of mobile money transactions.

Network coverage

Several empirical studies have examined the connection between network coverage and MM growth. Notable works include:

"The Impact of Network Coverage on Adoption of Fintech Platforms and Financial Inclusion" by Getahun Tadesse Ayele and Lemma W. Senbet (2023). This study analyzes data from 12,735 individuals across 9 sub-Saharan African countries, highlighting that increased mobile network coverage positively influences the adoption of financial technologies and enhances financial inclusion.

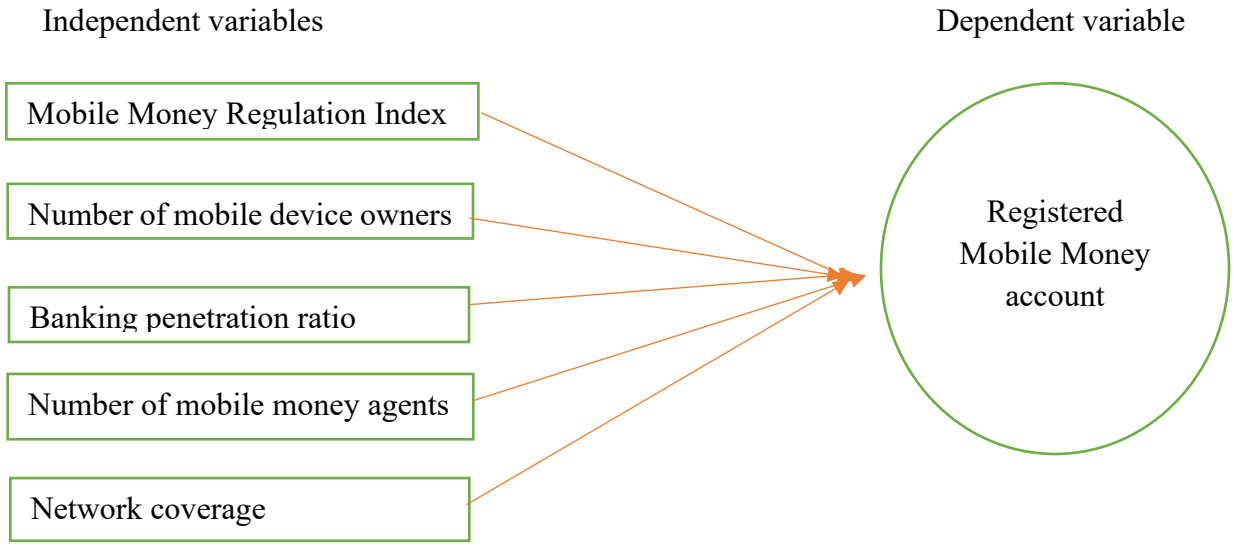
"Is Better Access to Mobile Networks Associated with Increased Mobile Money Adoption? Evidence from the Micro-data of Six Developing Countries" by Tchamyou, Vanessa S. (2022). This research investigates mobile money adoption determinants in rural African areas, finding that improved mobile network access significantly boosts mobile money usage.

"An empirical examination of why mobile money schemes ignite in some developing countries but flounder in most" by William Jack and Tavneet Suri (2024). It studies the effect of network accessibility of MM usage in 6 developing countries, including Kenya, Bangladesh, and Nigeria, concluding that better network access correlates with higher mobile money adoption rates.

These studies collectively underscore the critical role of robust mobile network coverage in fostering the adoption and growth of mobile money services.

2.4. Conceptual framework

A conceptual framework visually illustrates the connections between variables or key constructs in a study. Drawing from both theoretical perspectives and empirical findings from prior research, several factors have been identified as influencing the growth of mobile money. Accordingly, the adapted conceptual framework is presented below:



Source: researcher compilation

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Study area

This research analyzes the factors influencing mobile money adoption in Ethiopia. It leverages secondary data from the Central Banks of each country, GSMA, World Bank, IMF and other sources to study the association between the selected independent variables & the dependent variable - the number of mobile money accounts.

3.2. Research Approach

This study follows a quantitative approach, utilizing variables that have been previously employed in empirical research. The research adopts a quantitative methodology with the objective of identifying a specific model to explain the factors influencing mobile money growth.

3.3. Research Design

This study adopts an explanatory research design and employs a multiple linear regression model to investigate the relationship between mobile money growth and the factors influencing its growth. The explanatory design is appropriate as it aims to identify and quantify causal relationships between variables. Specifically, the model estimates the impact of key independent variables—agent density (AGE), regulatory environment (REG), banking penetration (BANK), mobile device ownership (DEVIC), and network coverage (NETC)—on the dependent variable, mobile money adoption. This approach allows for simultaneous assessment of multiple predictors and, when applied to panel data, accounts for both temporal and cross-sectional variations. Moreover, it controls for unobserved heterogeneity across countries, thus yielding more robust and generalizable results to support effective policy formulation.

3.4. Population & Samples

3.4.1. Research Population

The population for this study comprises East African countries, as they represent the broader landscape of mobile money growth and financial inclusion within the region. East

Africa has been a leader in mobile money innovations, with varying levels of adoption across different countries.

3.4.2. Sampling Technique

This study employs non probability sampling technique of purposive sampling, selecting the five countries based on the availability of relevant data. Purposive sampling is appropriate because it allows the study to focus on countries with accessible and comparable data, ensuring a more practical and meaningful analysis of mobile money growth determinants.

3.4.3. Sample and Sample Size

Given the scope of the study and the need for analysis, a sample of 5 East African countries has been selected: Ethiopia, Kenya, Rwanda, Tanzania, and Uganda. These countries are chosen due to their diverse mobile money growth rates, regulatory environments, and economic structures, making them suitable for assessing the determinants of mobile money growth. These countries together represent over 60% of East Africa's population (over 300 million people) and account for more than 90% of the region's registered mobile money accounts, making them ideal for a representative and data-rich analysis of mobile money growth determinants.

3.5. Sources and Type of Data

3.5.1. Type of data

This research utilizes existing data known as secondary data, to examine the factors influencing mobile money growth in East Africa. By leveraging these pre-existing datasets can save time and resources while gaining valuable insights into the factors driving mobile money growth in the region.

3.5.2. Sources of data

This research uses different sources of data like MMPs, GSMA, IMF, WB, NBE, and others. Sources for each independent variables and dependent variable:

Mobile Money Regulation Index: This data obtained from GSMA. It involves reports or datasets outlining the regulatory environment of MMS in each country.

Number of MM Agents: Data on this can retrieved from the Central Bank of each country and IMF: FAS.

Banking Penetration: The World Bank was a source for this metric.

Mobile Device penetration. This data was found from ITU and WB reports or datasets on national mobile phone penetration.

Network coverage: The WB was a source of network coverage data of each country.

3.7. Methods of data collection

This study utilize data from various sources covering the period from 2019 to 2023. The variables, including the number of registered MM accounts and the number of agents, was extracted from IMF: FAS, WB and each country's central bank website or database. For mobile money regulatory index data was collected from GSMA mobile money regulatory index or GSMA mobile money metrics dataset, and banking penetration and network coverage data was collected from World Bank databases and IMF: FAS database. Additionally, information on the penetration of mobile device obtained from ITU.

This study utilizes panel data, which encompasses both cross-sectional elements (multiple countries observed within a single year) and time series dimensions (tracking the same countries from 2019 through 2023).

3.8. Variables construction (measurement issues)

As outlined in the previous literature review, various factors influence the expansion of mobile money services. Based on these findings, relevant independent variables have been carefully chosen for this study. In parallel, the growth of mobile money is represented by a single dependent variable—namely, the number of registered mobile money accounts. This metric has been selected as it effectively reflects the key factors that are likely to impact the development of mobile money usage.

Dependent Variables	**Description**	**Source**	
Registered Mobile Money accounts	The total count of registered mobile money users over time	IMF:FAS and World Bank	
Independent Variables	Definition	Source	Expected Relation
Mobile Money Regulation Index	The MMRI evaluates countries based on how supportive their regulatory environments are for the growth and use of mobile money services.	GSMA Mobile Money Metrics Website	+
Mobile Money Network (agent) Distribution	The overall number of established mobile money agent points	IMF: FAS	+
Banking Penetration	The number of commercial bank branches available for every 100,000 adults	World Bank: The Global Findex Database	+

Mobile device penetration	The proportion of adults, out of every 100, who own mobile phones.	World Bank	+
Network coverage	Percentage of population covered by a mobile-cellular network – This indicator shows the proportion of a country's population that lives within the range of a mobile-cellular signal, regardless of whether they subscribe to or use mobile services	ITU	+

3.9. Research Hypothesis

Given the way the variables were defined and measured, the following hypotheses were formulated for testing:

Null Hypothesis (H_{01}): An increase in the number of mobile money agents is not closely associated with a rise in the registration of mobile money accounts.

Alternative Hypothesis (H_{11}): An increase in the number of mobile money agents is closely associated with a rise in the registration of mobile money accounts.

Null Hypothesis (H_{02}): There is no significant relationship between network coverage and number of registered mobile money accounts.

Alternative Hypothesis (H_{12}): There is a significant relationship between network coverage and number of registered mobile money accounts.

Null Hypothesis (H_{03}): There is no significant positive relationship between governmental regulations index and number of mobile money accounts.

Alternative Hypothesis (H_{13}): There is a significant positive relationship between governmental regulations index and number of mobile money accounts.

Null Hypothesis (H_{04}): There is no significant relationship between bank penetration and number of mobile money accounts.

Alternative Hypothesis (H_{14}): There is a significant relationship between bank penetration and number of mobile money accounts.

Null Hypothesis (H_{05}): There is no significant relationship between number of mobile device owners and number of mobile money accounts.

Alternative Hypothesis (H_{15}): There is a significant relationship between number of mobile device owners and number of mobile money accounts.

3.10. Method of data analysis

In the context of analyzing relationships involving two or more independent variables, it is referred to as multiple correlations. The equation describing such relationships is the multiple regression equation, computed using various statistical packages. In social studies, researchers commonly utilize statistical software for analysis Gujarati (2004). This study employed SPSS (Statistical Package for the Social Sciences) for data analysis. SPSS provides sophisticated tools for regression, forecasting, and data management. It allows to analyze quantitative input data, including features like paired-difference tests & factor analysis. SPSS can be utilized to analyze data statistically, identify relationships among variables, and generate predictions for future trends. The author believes that utilizing SPSS for analyzing quantitative data aligns well with the research's purpose.

3.11. Research Model specification

Model specification involves the identification and selection of relevant variables that will be incorporated into a statistical or econometric model. Model specification is the process of determining which independent variables to include and exclude from a regression equation (MacCallum, 1995). This research used the below model to define the relationship between independent variables and the dependent variable mathematically.

$$\mathbf{RMMS_{it}} = \boldsymbol{C} + \boldsymbol{\beta}\mathbf{1AGE_{it}} + \boldsymbol{\beta}2\boldsymbol{REG}_{it} + \boldsymbol{\beta}3\mathbf{BANK_{it}} + \boldsymbol{\beta}\mathbf{4DEVIC_{it}} + \boldsymbol{\beta}\mathbf{5NETC_{it}} + \varepsilon_{it}$$

Where:

.i =Country (1 to 5)

t = Year (1 to 5

RMMSit= Registered Mobile Money accounts in country i at time t

AGEit= Number of Mobile Money agent in country i at time t

REGit= Mobile Money Regulation Index in country i at time t

BANKit= Banking Penetration i at time t

$DEVIC_{it}$= Number of mobile device owners i at time t

$NETC_{it}$=Network coverage i at time t

ε_{it}= Error term

CHAPTER FOUR

DISCUSSION AND INTERPRETATION

4.1. Introduction

This chapter presents the data analysis and interpretation of the study's findings, based on the results obtained from SPSS regression analysis and various statistical tests. The analysis includes descriptive statistics, correlation analysis, and multiple regression results to examine the relationship between the independent variables and the number of registered mobile money accounts. Key statistical tests, such as the Durbin-Watson test for autocorrelation and variance inflation factor (VIF) for multicollinearity, are also assessed to ensure the model's reliability and validity. The interpretation of results focuses on the significance, direction, and strength of each predictor's effect, providing insights into the factors influencing mobile money adoption.

4.2. Descriptive statistics of key variables

Before proceeding with the estimation, it is essential to examine the properties and behavior of the study variables through descriptive statistical analysis to better understand their distribution, central tendencies, and variability.

Table 4.1: Summary descriptive statistics

Variable	Mean	Median	Max	Min	Std. Dev.
MPS/100 people)	80.89	81.86	122.97	36.73	24.37
Lg_MMA	5.37	5.37	6.09	4.11	0.54
MMRI	87.69	88	97.5	76	6.55
Network Coverage	96.79	98	99.07	95	1.63
Bank penetration ratio	4.04	4	14	2	2.72
Log_RMMA	7.42	7.49	7.89	6.56	0.35

Source: SPSS Output

The descriptive statistics offer key insights into variables influencing mobile financial inclusion. The Mobile Phone Subscription (MPS) per 100 people has a mean of 80.89 and a median of 81.86, indicating high mobile access, though the wide range (36.73 to 122.97) and standard deviation of 24.37 suggest regional disparities. The log of Mobile Money Accounts (Lg_MMA) shows a mean and median of 5.37, with a standard deviation of 0.54, reflecting a moderately consistent distribution of mobile money account ownership. The Mobile Money Readiness Index (MMRI) averages 87.69, with a median of 88 and a relatively low standard deviation of 6.55, suggesting a generally supportive environment for mobile money services. Network coverage is nearly universal, with a mean of 96.79%, a median of 98%, and minimal variation (standard deviation of 1.63), indicating that infrastructure is not a major barrier. In contrast, the bank penetration ratio is low, with a mean of 4.04, a median of 4, and a higher variability (standard deviation of 2.72), pointing to uneven access to formal banking services. The log of Registered Mobile Money Accounts (Log_RMMA), with a mean of 7.42, median of 7.49, and a low standard deviation of 0.35, indicates a relatively uniform distribution of registered mobile money accounts across regions. Overall, the data highlight strong mobile infrastructure and readiness but reveal a gap in traditional banking services, emphasizing the vital role of mobile money in advancing financial inclusion.

4.2 Results of a multiple linear regression and their analysis

Table 4.2 Model summary

Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.977[a]	0.955	0.943	0.17633	0.955	80.783	5	19	0.000	2.057
a. Predictors: (Constant), Log_MMA, Ncoverage, MMRI, Bankpen, MPS										
b. Dependent Variable: Log_RMMS										

Source: SPSS Output

The Model Summary table presents the results of a multiple linear regression analysis, evaluating how well the predictor variables (Log_MMA, Ncoverage, MMRI, Bankpen, and MPS) explain the variance in the dependent variable (Log_RMMS). The regression model is identified as Model 1, indicating that this is the first and only model being presented.

The multiple correlation coefficient (R = 0.977) measures the strength of the relationship between the observed values of Log_RMMS and the predicted values based on the linear combination of the independent variables. A value of 0.977 indicates a very strong positive correlation, suggesting that the predictor variables are highly related to the dependent variable. Furthermore, the R-squared value (0.955) represents the proportion of variance in Log_RMMS explained by the predictors. This implies that 95.5% of the variation in Log_RMMS is accounted for by the independent variables, demonstrating a strong model fit.

To account for the number of predictors and sample size, the Adjusted R-Squared value (0.943) is used. This adjustment provides a more conservative estimate of the model's explanatory power, particularly when multiple predictors are included. The small difference between R-squared (0.955) and Adjusted R-squared (0.943) suggests that adding additional predictors would not significantly enhance the model's fit. Similarly, the R Square Change (0.955) indicates the total amount of variance explained, since this is the only model in the analysis.

The F-statistic (80.783) tests the overall significance of the model. It is calculated based on the ratio of explained variance to unexplained variance, with df1 = 5 (representing the number of predictors) and df2 = 19 (calculated as the total sample size, N = 25, minus the number of predictors and the constant term). The corresponding p-value (Sig. F Change < 0.001) is extremely small, confirming that the model is highly statistically significant. This means that the likelihood of obtaining these results by chance is very low, reinforcing the strength of the model.

Finally, the Durbin-Watson statistic (2.057) assesses the presence of autocorrelation in the residuals. This statistic ranges from 0 to 4, with a value close to 2 indicating no significant

autocorrelation. Since the obtained value is 2.057, it suggests that the residuals are independent, which is a desirable characteristic in linear regression analysis.

The findings from the Model Summary table indicate that the multiple regression model is statistically significant and provides a strong explanation of the variation in Log_RMMS. The predictor variables (Log_MMA, Ncoverage, MMRI, Bankpen, and MPS) exhibit a strong relationship with the dependent variable, and the absence of autocorrelation suggests that the model is well-specified. These results confirm the robustness of the regression model and its suitability for predicting Log_RMMS based on the selected predictors.

Table 4.3. ANOVA (Analysis of Variance)

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.558	5	2.512	80.783	.000[b]
	Residual	0.591	19	0.031		
	Total	13.149	24			
a. Dependent Variable: Log_RMMS						
b. Predictors: (Constant), Log_MMA, Ncoverage, MMRI, Bankpen, MPS						

Source: SPSS output

The ANOVA (Analysis of Variance) table evaluates the overall significance of the regression model predicting Log_RMMS using the predictor variables Log_MMA, Ncoverage, MMRI, Bankpen, and MPS. It decomposes the total variation in Log_RMMS into components: regression, which represents the variation explained by the predictor variables, and residual, which accounts for the unexplained variation or error in the model. The sum of these two components forms the total variation, providing insight into the effectiveness of the model.

Sum of Squares

The regression sum of squares (12.558) quantifies the portion of the total variation in Log_RMMS that is explained by the predictor variables. Conversely, the residual sum of squares (0.591) represents the unexplained variation, which accounts for the difference between the actual and predicted values. The total sum of squares (13.149) is the sum of the regression and residual components, representing the overall variability in Log_RMMS.

Degrees of Freedom

Degrees of freedom (df) help determine the statistical significance of the model. The regression df (5) corresponds to the number of predictor variables in the model. The residual df (19) is calculated as the total sample size (N = 25) minus the number of predictors (k = 5) minus one (for the constant term). The total df (24) is derived from the sample size minus one, which represents the total degrees of freedom available in the dataset.

Mean Square

The mean square for regression (2.512) is obtained by dividing the regression sum of squares by the regression degrees of freedom (12.558 / 5 = 2.512), while the mean square for residual (0.031) is calculated by dividing the residual sum of squares by the residual degrees of freedom (0.591 / 19 = 0.031). These values are essential for computing the F-statistic.

F-Statistic and Significance

The F-statistic (80.783) is derived by dividing the regression mean square by the residual mean square (2.512 / 0.031 = 80.783). This statistic tests the null hypothesis that all regression coefficients are equal to zero, meaning that the predictor variables have no significant effect on Log_RMMS. The p-value (Sig. = 0.000) is associated with the F-statistic and indicates the probability of obtaining the observed results if the null hypothesis were true. A p-value less than 0.05 signifies that the regression model is statistically significant. In this case, the p-value is less than 0.001, indicating that the

likelihood of the observed results occurring by chance is extremely low. Therefore, the model is highly significant in predicting Log_RMMS.

Table 4.4 Regression Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.998	2.567		1.557	0.136
	MPS	0.016	0.002	0.544	8.906	0.000
	MMRI	-0.037	0.006	-0.322	-6.201	0.000
	Ncoverage	0.090	0.027	0.169	3.321	0.004
	Bankpen	0.120	0.014	0.504	8.867	0.000
	Log_MMA	1.087	0.096	0.718	11.323	0.000
a. Dependent Variable: Log_RMMS						

Source: SPSS output

The table presents the regression coefficients for predicting Log_RMMS based on independent variables (MPS, MMRI, Ncoverage, Bankpen, and Log_MMA).

Table 4.5. Unstandardized Coefficients (B & Std. Error)

Variable	B (Unstandardized)	Interpretation
MPS	0.016	A 1-percent increase in MPS increases Log_RMMS by 0.016 percent.
MMRI	-0.037	A 1-unit percent in MMRI decreases Log_RMMS by 0.037 percent.
Ncoverage	0.090	A 1-percent increase in Ncoverage increases Log_RMMS by 0.090 percent.
Bankpen	0.120	A 1-percent increase in Bankpen increases Log_RMMS by 0.120 percent.
Log_MMA	1.087	A 1-percent increase in Log_MMA increases Log_RMMS by 1.087 percent, the strongest effect.

Source: SPSS output

The B (Beta coefficient) represents the expected change in Log_RMMS for a one-unit increase in the corresponding predictor variable, while holding all other variables constant. The Standard Error indicates the precision of the coefficient estimate, with lower values suggesting greater reliability.

The results indicate that MPS has a positive effect on Log_RMMS, with a B value of 0.016, meaning that a one-unit increase in MPS leads to a 0.016-unit increase in Log_RMMS. Conversely, MMRI exhibits a negative relationship with Log_RMMS, as evidenced by a B value of -0.037, indicating that a one-unit increase in MMRI results in a 0.037-unit decrease in Log_RMMS. Ncoverage has a B value of 0.090, suggesting that a one-unit increase in Ncoverage leads to a 0.090-unit increase in Log_RMMS. Similarly, Bankpen has a B value of 0.120, signifying a 0.120-unit increase in Log_RMMS for every additional unit of Bankpen. Among all variables, Log_MMA exerts the strongest influence, with a B value of 1.087, indicating that a one-unit increase in Log_MMA results in a 1.087-unit rise in Log_RMMS.

These findings suggest that while all predictor variables significantly impact Log_RMMS, Log_MMA has the most pronounced effect, followed by Bankpen, Ncoverage, and MPS, whereas MMRI negatively influences the dependent variable.

Table 4.6 Standardized Coefficients (Beta)

Variable	Beta (Standardized)	Strength of Influence
Log_MMA	0.718	Strongest positive predictor.
MPS	0.544	Second strongest positive predictor.
Bankpen	0.504	Moderate positive predictor.
Ncoverage	0.169	Weak positive predictor.
MMRI	-0.322	Negative predictor, implying an inverse relationship.

Source: SPSS output

The standardized coefficients (Beta) measure the relative impact of each predictor by standardizing all variables to the same scale (mean = 0, standard deviation = 1). A higher absolute Beta value indicates a stronger influence on the dependent variable, Log_RMMS. Among the predictors, Log_MMA has the highest Beta value (0.718), making it the strongest positive predictor. MPS follows as the second strongest positive predictor (0.544), while Bankpen (0.504) exhibits a moderate positive effect. Ncoverage has a relatively weak positive influence (0.169). Conversely, MMRI (-0.322) serves as a negative predictor, indicating an inverse relationship with Log_RMMS.

Table 4.7 t-statistic & Significance (Sig.)

Variable	t-value	p-value (Sig.)	Interpretation
MPS	8.906	< 0.001	Significant positive effect.
MMRI	-6.201	< 0.001	Significant negative effect.
Ncoverage	3.321	0.004	Significant positive effect.
Bankpen	8.867	< 0.001	Significant positive effect.
Log_MMA	11.323	< 0.001	Most significant positive effect.

Source: SPSS output

The t-value (t-statistic) measures the strength and significance of each predictor in the regression model. It is calculated by dividing the coefficient (B) by its standard error. A higher absolute t-value indicates a stronger relationship between the predictor and the dependent variable. Generally, a t-value greater than 2 or less than -2 suggests statistical significance.

It assesses whether each coefficient significantly differs from zero, with a p-value (Sig.) below 0.05 indicating statistical significance. In this study, all predictors exhibit p-values lower than 0.05, confirming their significant contribution to the model. Furthermore, the 95% confidence intervals for B define the range within which the true coefficient value is expected to fall 95% of the time. Since none of these confidence intervals include zero, it can be concluded that all independent variables significantly influence the dependent variable, reinforcing the robustness of the model.

4.3. Test of hypothesis

H1: There is a significant positive relationship between the number of mobile money agents and the number of registered mobile money accounts.

Variable: Log_MMA (Log of Mobile Money Agents)

t-value: 11.323 (High positive effect)

p-value: < 0.001 (Highly significant)

✅ Accepted (A strong and significant positive relationship exists)

H2: There is a significant relationship between network coverage and the number of registered mobile money accounts.

Variable: Ncoverage (Network Coverage)

t-value: 3.321 (Moderate positive effect)

p-value: 0.004 (Statistically significant)

✅ Accepted (A significant relationship exists)

H3: There is a significant positive relationship between the governmental regulations index and the number of mobile money accounts.

Variable: MMRI (Mobile Money Regulation Index)

t-value: -6.201 (Negative effect)

p-value: < 0.001 (Highly significant)

❌ Rejected (There is a significant negative relationship instead of a positive one)

H4: There is a significant relationship between bank penetration and the number of mobile money accounts.

Variable: Bankpen (Bank Penetration)

t-value: 8.867 (High positive effect)

p-value: < 0.001 (Highly significant)

✅ Accepted (A strong and significant relationship exists)

H5: There is a significant relationship between the number of mobile device owners and the number of mobile money accounts.

Variable: Mobile Device (Number of Mobile Device Owners)

t-value: 8.906 (High positive effect)

p-value: < 0.001 (Highly significant)

✅ Accepted (A strong and significant relationship exists)

Table 4.8 Correlations (Zero-order, Partial, Part)

Variable	Zero-order	Partial	Part
MPS	0.697	0.898	0.433
MMRI	-0.017	-0.818	-0.302
Ncoverage	0.251	0.606	0.161
Bankpen	0.008	0.897	0.431
Log_MMA	0.730	0.933	0.551

Source: SPSS output

Zero-order correlation measures the relationship between each independent variable and Log_RMMS without accounting for other predictors, providing a raw assessment of their associations. Partial correlation, on the other hand, evaluates the connection between a predictor and Log_RMMS while controlling for the influence of other variables, offering a clearer picture of each variable's independent effect. Part correlation represents the unique contribution of each predictor to Log_RMMS, highlighting the extent to which a variable explains variance in the dependent variable beyond the influence of other predictors. Among the variables, Log_MMA (0.933 partial, 0.551 part) and MPS (0.898 partial, 0.433 part) exhibit the strongest unique contributions to Log_RMMS, indicating their significant role in mobile money growth. Conversely, MMRI (-0.818 partial, -0.302 part) negatively affects Log_RMMS, suggesting that stricter regulatory frameworks may hinder the expansion of mobile money services.

Table 4.9 Multicollinearity test

Variable	Tolerance	VIF	Interpretation
MPS	0.634	1.578	No multicollinearity.
MMRI	0.878	1.139	No multicollinearity.
Ncoverage	0.918	1.089	No multicollinearity.
Bankpen	0.733	1.364	No multicollinearity.
Log_MMA	0.588	1.701	Slight collinearity but acceptable.

Source: SPSS output

Tolerance measures the extent to which an independent variable is not correlated with other predictors in the model, calculated as 1 - R^2. A low tolerance value (below 0.1) indicates potential multicollinearity, meaning the variable shares a strong linear relationship with other independent variables. Similarly, the Variance Inflation Factor (VIF) quantifies how much the variance of a coefficient is inflated due to multicollinearity. A VIF greater than 10 is considered problematic, suggesting that the predictor is highly correlated with others, which may distort the reliability of the regression coefficients.

The analysis indicates that there is no severe multicollinearity among the independent variables, as all Variance Inflation Factor (VIF) values are below 2, which is well within the acceptable threshold. Among the predictors, Log_MMA has the highest VIF value of 1.701, but this remains within a safe range, suggesting that multicollinearity is not a significant concern in the model.

Table 4.10 Residuals Statistics

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	15.4638	18.1594	17.2072	0.72337	25
Residual	-0.36375	0.39004	0.00000	0.15689	25
Std. Predicted Value	-2.410	1.316	0.000	1.000	25
Std. Residual	-2.063	2.212	0.000	0.890	25
a. Dependent Variable: Log_RMMS					

Source: SPSS output

This table describes the distribution of predicted values and residuals, which are essential for assessing the overall fit and assumptions of the regression model.

The residual statistics provide valuable insights into the accuracy and reliability of the regression model. The predicted values of Log_RMMS range from 15.4638 to 18.1594, with a mean of 17.2072, closely aligning with the actual values, indicating a good model fit. The standard deviation of .72337 suggests a moderate spread of predicted values around the mean, and the sample size is 25.

Examining the residuals, the largest negative residual is -0.36375, while the largest positive residual is 0.39004. The mean residual is 0.00000, confirming that the model is unbiased, with errors randomly distributed around the regression line. The standard deviation of residuals (.15689) measures the typical prediction error, further supporting model accuracy.

The standardized predicted values range from -2.410 to 1.316, with a mean of 0.000 and a standard deviation of 1.000, confirming that the predictions are properly scaled.

Similarly, standardized residuals fall between -2.063 and 2.212, with a mean of 0.000 and a standard deviation of 0.890, suggesting an appropriate residual distribution. Since approximately 95% of standardized residuals fall within ±2 standard deviations, the assumption of normality is upheld.

Overall, the residual analysis confirms that the model performs well, with residuals centered around zero and normally distributed. This supports key assumptions of linear regression, particularly the normality of errors. The residuals remain within an acceptable range. The findings provide strong evidence that the regression model is statistically sound and accurately captures the relationship between the independent variables and Log_RMMS.

Effects of Independent Variables on mobile money growth

Log_RMMS = 3.998 + 1.087(Log_MMA) + 0.120(Bankpen) + 0.090({Ncoverage) + 0.016(MPS) - 0.037(MMRI) + 0.15689

CHAPTER FIVE

RESULT, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

In this chapter, the study's findings and conclusion are presented along with a comparison to earlier empirical studies and a recommendation. The results show that the number of registered mobile money accounts is significantly impacted by mobile money agents, network coverage, bank penetration, mobile device ownership, and government regulations. There are several noticeable changes, especially with regard to the impact of regulatory frameworks, even though the majority of the conclusions are consistent with previous research. These findings are used to provide practical recommendations to improve the expansion of mobile money. These are followed by ideas for further study to fill in the gaps and examine new developments in the sector.

5.2. Results

The results of this study reveal a strong and statistically significant relationship between key determinants and the growth of mobile money, measured by the number of registered accounts. Mobile money agents, network coverage, bank penetration, and mobile device ownership were all found to positively influence mobile money adoption. Conversely, the Mobile Money Regulatory Index (MMRI) showed a significant negative effect, suggesting that overly strict regulatory frameworks may hinder adoption rather than promote it. This finding contradicts the work of Bahia, Sanchez-Vidal, and Taberner (2020), who reported that a supportive regulatory environment encourages mobile money growth. Similarly, while Kaffenberger and Totolo (2019) emphasized the role of consumer protection in building trust, this study implies that excessive compliance requirements may reduce accessibility, especially for underserved populations.

Consistent with previous literature, the results highlight the critical importance of mobile money agents. Log_MMA recorded the highest positive effect among the variables, reinforcing the conclusions of Suri and Jack (2016), who argued that an extensive agent network greatly enhances access and adoption by lowering transaction barriers. Similarly, Centellegher et al. (2018) noted that agents play a key role in reducing costs and increasing

the availability of services. The current study confirms that as agent presence increases, so does the number of registered accounts—further emphasizing the need for strategic policies that support agent recruitment, training, and liquidity management.

The positive influence of network coverage (Ncoverage) aligns with the findings of Ayele and Senbet (2023) and Tchamyou (2022), who underscored the importance of mobile connectivity in digital financial inclusion. Improved network infrastructure not only expands geographic coverage but also facilitates easier transactions, especially in rural areas. Likewise, the effect of bank penetration supports the conclusions of Ali and Ali (2016), who found that existing financial infrastructure contributes to broader mobile money usage. However, this study also acknowledges the perspective of Humphreys and Radelet (2012), who cautioned that in highly banked environments, the appeal of mobile money might be reduced due to already existing financial alternatives.

Finally, mobile device ownership showed a significant and positive impact on mobile money adoption, affirming that technology access is a foundational enabler for digital finance. These results, taken together, highlight the interplay between infrastructure, regulatory environment, and accessibility in shaping mobile money usage. While prior studies often focus on one dimension, this study contributes a more integrated view—showing that success in mobile money growth depends on a careful balance of supportive regulation, wide agent presence, strong connectivity, and technology access.

5.3 Conclusion

This research investigated the main drivers behind the growth of mobile money services, particularly focusing on the number of registered users. By applying a multiple linear regression model, the study found that the presence of mobile money agents, wider network coverage, greater banking reach, and mobile device ownership all have a strong and positive influence on mobile money adoption. However, the findings also revealed that tighter regulatory environments can negatively affect the uptake of such services. This outcome adds a new perspective to existing literature by showing that while regulations are crucial for stability and protection, overly strict policies may actually discourage growth and limit access, especially for underserved populations.

The study's results reinforce the importance of infrastructure—both human and technological—in scaling up mobile financial services. Previous studies have also emphasized the role of agents, connectivity, and banking systems in enhancing financial inclusion. What sets this study apart is the insight that regulation, while necessary, must be carefully calibrated. If compliance becomes too burdensome, it can prevent potential users from accessing services. Therefore, achieving the right regulatory balance is vital to supporting innovation and expanding access to mobile money platforms.

5.4 Implications

The outcomes of this study offer practical lessons for decision-makers, financial institutions, and mobile money operators. Policymakers are encouraged to revisit existing financial regulations to ensure they support, rather than slow down, the growth of mobile financial services. Regulatory frameworks should be flexible, proportionate, and designed to both protect users and allow service providers the space to innovate and grow.

For financial service providers, the study highlights the urgent need to expand mobile money agent networks and strengthen service delivery, especially in rural areas where access remains limited. Investment in agent training, liquidity management, and infrastructure can help build user trust and reliability. Collaborative efforts among telecom companies, regulators, and financial institutions will also be key to accelerating mobile money adoption and improving financial inclusion outcomes.

5.5. Recommendations

Based on the study's results, the following actionable recommendations are proposed to support the sustainable growth of mobile money services:

Regulatory Reform:

Regulators should develop balanced policies that simultaneously encourage innovation and protect consumers. Simplifying procedures such as Know Your Customer (KYC) requirements can reduce entry barriers for users and service providers, especially in

underserved communities. Policymakers are encouraged to adopt a flexible, risk-based regulatory approach and actively collaborate with mobile money operators and telecom authorities to create an enabling environment.

Agent Network Expansion:

Mobile money providers must intensify efforts to grow and strengthen their agent networks. This includes investing in recruiting new agents, providing comprehensive training, and ensuring agents have sufficient liquidity to serve customers effectively. A robust agent network will improve customer trust and increase financial inclusion, particularly in rural and remote areas.

Infrastructure and Access Enhancement:

Service providers should leverage existing telecommunications infrastructure to extend mobile money services to areas with limited connectivity. Partnerships with telecom companies and local stakeholders can facilitate better network coverage and increase service reliability. Additionally, outreach and education campaigns targeting rural populations can help raise awareness and drive growth.

5.6. Future Research suggestion

Future research should explore the nuanced effects of regulatory frameworks on mobile money adoption. While this study found a negative effect of MMRI, qualitative research could examine specific regulatory components—such as transaction limits, agent restrictions, and licensing requirements—that may be restrictive. Comparative studies across different regulatory environments could further clarify the conditions under which regulations foster or hinder mobile money growth.

Additionally, further research should investigate the interplay between banking penetration and mobile money adoption in different economic contexts. While this study found a positive effect, other research suggests that traditional banking services may act as a substitute for mobile money. Future studies could analyze consumer preferences and

behavioral factors influencing the choice between mobile banking and mobile money services. Expanding the research scope to include emerging digital payment platforms and their impact on financial inclusion would also be valuable.

Reference

Adano Duba Habane, 2012. "The relationship between mobile money transfers and economic growth in Kenya.

Afawubo, K., Couchoro, M. K., Agbaglah, M., & Gbandi, T. (2020). Mobile money adoption and households' vulnerability to shocks: Evidence from Togo. Applied Economics, 52(10), 1141–1162. https://doi.org/10.1080/00036846.2019.1659496

Alemu, G., Ferede, T., & Fiorito, A. (2021). Identifying binding constraints on digital payment services in Ethiopia: An application of a decision tree framework.

Bahia, K., Sanchez-Vidal, E., & Taberner, C. (2020). Exploring the relationship between mobile money regulation and usage. World Bank Global Findex Survey.

Centellegher, S., De Nadai, M., Caraviello, M., & Lepri, B. (2018). Mobile money: Understanding and predicting its adoption and use in a developing economy. Proceedings of the 2018 World Wide Web Conference, 1–10. https://doi.org/10.1145/3178876.3186050

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution. World Bank.

Fanta, A. B., Mutsonziwa, K., Goosen, R., Emanuel, M., & Kettles, N. (2016). The role of mobile money in financial inclusion in the SADC region.

GSMA. (2024). The state of the industry report on mobile money. Retrieved from https://www.gsma.com

Gujarati, D. (2004). Basic econometrics (4th ed.). McGraw-Hill.

Humphreys, M., & Radelet, S. (2012). The impact of banking penetration on mobile money adoption. Journal of Financial Services Research, 21(3), 154-171.

IMF. (2023, October 3). IMF releases the 2023 financial access survey results. Retrieved from http://data.imf.org/FAS.

Jack, W., & Suri, T. (2024). An empirical examination of why mobile money schemes ignite in some developing countries but flounder in most. Journal of Economic Perspectives, 38(1), 12-34.

Jensen, K. A. (2017). Mobile money adoption in East Africa: A cross-country study of best- and least-performing countries.

Juliet, M. (2018). Mobile money policy and regulatory handbook. GSMA Mobile Money.

Kaffenberger, M., & Totolo, E. (2019). Mobile money and consumer protection: An analysis of regulatory frameworks in Sub-Saharan Africa.

MacCallum, R. C. (1995). Model specification: Procedures, strategies, and related issues. In R. H. Hoyle (Ed.), Structural equation modeling: Concepts, issues, and applications (pp. 16–36). Sage Publications.

Mahmoud, Z. (2019). Determinants of mobile money adoption. International Telecommunications Society (ITS) Conference, Aswan, Egypt.

Martinez-Cid, R., & Pernas, G. (2017). The puzzle of mobile money markets: An example of Goldilocks conditions.

McCarthy, J. (2018). The difference between e-money, mobile money & mobile banking. Bank4YOU Group.

MacCallum, R. C. (1995). Model specification: Procedures, strategies, and related issues. Psychological Methods, 1(1), 19–31. https://doi.org/10.1037/1082-989X.1.1.19

National Bank of Ethiopia (NBE). (2024). Financial stability report. Retrieved from https://nbe.gov.et/

Rogers, E. M. (2003). Diffusion of innovations (5th ed.). Free Press.

Suri, T. (2017). Mobile money. Annual Review of Economics, 9, 497–520. https://doi.org/10.1146/annurev-economics-063016-103638

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425–478.

World Bank. (2021). Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19.

Appendex

SPSS Regression Result

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation
Bankpen	25	12.23	2.26	14.49	4.663	.74019
Log_MMA	25	1.98	4.11	6.09	5.3624	24.9218285503
Log_RMMS	25	3.06	15.10	18.16	17.2072	6.51614
MMRI	25	22.00	76.00	98.00	88.0192	1.38984
MPS	25	86.24	36.73	122.97	81.43	3.1026173589318
Ncoverage	25	4.07	95.00	99.07	97.1624	.48882
Valid N (listwise)	25					

Descriptive Statistics							
	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Bankpen	.6205234	3.102617	9.626	2.003	.464	4.009	.902
Log_MMA	.09776	.48882	.239	-.925	.464	.929	.902
Log_RMMS	.14804	.74019	.548	-.937	.464	1.184	.902
MMRI	1.30323	6.51614	42.460	-.273	.464	-.696	.902
MPS	4.98	24.92	621.098	.139	.464	-.591	.902
Ncoverage	.27797	1.38984	1.932	-.485	.464	-1.194	.902
Valid N (listwise)							

Correlations							
		Log_RMMS	MPS	MMRI	Ncover	Bankpen	Log_MMA
Pearson Correlation	Log_RMMS	1.000	.697	-.017	.251	.008	0.730
	MPS	.697	1.00	.285	.100	-.356	.567
	MMRI	-.017	.285	1.000	.222	-.057	.197
	Ncoverage	.251	.100	.222	1.00	.133	.045
	Bankpen	.008	.356	.057	.133	1.000	-.477
	Log_MMA	.730	.567	.197	.045	-.477	1
Sig. (1-tailed)	Log_RMMS	.	.000	.469	.113	.485	.000
	MPS	.000	.	.084	.317	.040	.002
	MMRI	.469	.084	.	.143	.394	.173
	Ncoverage	.113	.317	.143	.	.263	.415
	Bankpen	.485	.040	.394	.263	.	0.008
	Log_MMA	.000	.002	.173	.415	.008	.

a. Dependent Variable: Log_RMMS

b. All requested variables entered.

Model Summary[b]

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
				R Square Change	F Change	df1
.977	.955	.943	.17633	.955	80.783	5

Model Summary[b]		
Change Statistics		
df2	Sig. F Change	Durbin-Watson

19	.000	2.057

a. Predictors: (Constant), Log_MMA, Ncoverage, MMRI, Bankpen, MPS

b. Dependent Variable: Log_RMMS

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	12.558	5	2.512	80.783	.000[b]
	Residual	.591	19	.031		
	Total	13.149	24			

a. Dependent Variable: Log_RMMS

b. Predictors: (Constant), Log_MMA, Ncoverage, MMRI, Bankpen, MPS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations
		B	Std. Error	Beta			Zero-order
	(Constant)	3.998	2.567		1.557	.136	
	MPS	.016	.002	.544	8.906	.000	.697
	MMRI	-.037	.006	-.322	-6.201	.000	-.017
	Ncoverge	.090	.027	.169	3.321	.004	.251
	Bankpen	.120	.014	.504	8.867	.000	.008
	Log_MMA	1.087	.096	.718	11.323	.000	.730

Coefficients[a]					
Model		Correlations			
		Partial	Part	Tolerance	VIF
1	(Constant)				
	MPS	.898	.433	.634	1.578
	MMRI	-.818	-.302	.878	1.139
	Ncoverage	.606	.161	.918	1.089
	Bankpen	.897	.431	.733	1.364
	Log_MMA	.933	.551	.588	1.701

a. Dependent Variable: Log_RMMS

Coefficient Correlations[a]							
Model			Log_MMA	Ncoverage	MMRI	Bankpen	MPS
	Correlations	Log_MMA	1.000	-.043	-.058	.363	-.451
		Ncoverage	-.043	1.000	-.194	-.179	-.070
		MMRI	-.058	-.194	1.000	-.034	-.203
		Bankpen	.363	-.179	-.034	1.000	.140
		MPS	-.451	-.070	-.203	.140	1.000
	Covariances	Log_MMA	.009	.000	-3.262E-5	.000	-7.852E-5
		Ncoverage	.000	.001	-3.097E-5	-6.547E-5	-3.435E-6
		MMRI	-3.262E-5	-3.097E-5	3.475E-5	-2.684E-6	-2.170E-6
		Bankpen	.000	6.547E-5	-2.684E-6	.000	3.449E-6
		MPS	-7.852E-5	-3.435E-6	-2.170E-6	3.449E-6	3.292E-6

a. Dependent Variable: Log_RMMS

Collinearity Diagnostics[a]						
Dimension	Eigenvalue	Condition Index	Variance Proportions			
			(Constant)	MPS	MMRI	Ncoverage
1	5.644	1.000	.00	.00	.00	.00
2	.301	4.328	.00	.02	.00	.00
3	.047	10.933	.00	.77	.01	.00
4	.004	35.802	.00	.03	.52	.00
5	.003	46.469	.02	.16	.46	.02
6	9.376E-5	245.355	.98	.01	.01	.98

Collinearity Diagnostics[a]			
Model	Dimension	Variance Proportions	
		Bankpen	Log_MMA
1	1	.01	.00
	2	.59	.00
	3	.21	.00
	4	.08	.53
	5	.09	.47
	6	.02	.00

a. Dependent Variable: Log_RMMS

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	15.4638	18.1594	17.2072	.72337	25
Residual	-.36375	.39004	.00000	.15689	25
Std. Predicted Value	-2.410	1.316	.000	1.000	25
Std. Residual	-2.063	2.212	.000	.890	25

a. Dependent Variable: Log_RMMS