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ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS & ECONOMICS
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**Factors Affecting Adoption of Mobile Banking: A Case Study on The
Commercial Bank of Ethiopia**

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February, 2026

Addis Ababa, Ethiopia

Approval Sheet

**ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
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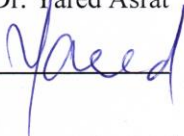
**Factors Affecting Adoption of Mobile Banking: A Case Study on
Commercial Bank of Ethiopia**

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DECLARATION

I hereby declare that this thesis entitled “**Factors Affecting Adoption of Mobile Banking: A Case Study on Commercial Bank of Ethiopia**” is my original work and has not been presented for any kind of degree award in any other universities and all sources of materials used for this thesis have been duly acknowledged.


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Acknowledgement

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Thank you all.

List of Abbreviations and Acronyms

ATM- Automated Teller Machines	ITU = International Telecommunications Union
CBE- Commercial Bank of Ethiopia	IVR = Interactive Voice Response
M-banking- Mobile banking	TRA = theory of reasoned action
E-banking – Electronic banking	
ICT - Information and Communication Technology	
NBE -National Bank of Ethiopia	
SMS -Short Message Service	
TOE -Technology organization and environment	
GSMA- Global system for Mobile Communication Association	
USSD -Unstructured Supplementary Service Data	
MNO- Mobile Network Operator	
PR - Perceived Risk	
PU - Perceived Usefulness.	
PEOU- perceived ease of use	
TAM -Technology Acceptance Model	
UTAUT - Unified Theory of Acceptance and Use of Technology	
Fin-Tech - Financial Technology	
WAP - Wireless Application Protocol	
DFS - Digital Financial service	
EE - Effort Expectancy	
PE - Performance Expectancy	

Abstract

This study was conducted to understand and analyze the factors influencing the adoption of M-banking with CBE as the case study and in the context of Addis Ababa, at selected branches of the bank. It was conducted by employing the Technology-Organization-Environment (TOE) framework, which mainly focus on examining determinants of M-banking adoption at firm level. A total of 139 valid responses were collected out of 155 questionnaires distributed to the randomly selected digital banking staffs of CBE at selected branches of Addis Ababa. The questionnaire's reliability was confirmed with a Cronbach's Alpha value of 0.90. This study adopted quantitative research approach and it is based on closed end questionnaires with 5-point Likert-scale. Multi stage sampling was employed to select respondents for this study. The collected data from respondents was analyzed using SPSS software version 23. A descriptive and regression analysis method was employed to analyze the collected data. In addition, interview was conducted on key informants to reinforce the quantitative findings. A secondary data was reviewed from several publications to support the findings of this study.

The result of the regression analysis shows that the most significant influence on M-banking adoption arises from the technological factors of the TOE framework. But organizational and environmental factors were found to have no statistical significance in the multiple regression, this is likely due to the shared variance which is observed in the correlation analysis among the independent variables. Overall, the regression model was able to explain 30.6% of the variance in m-banking adoption were organizational and environmental factors were found to be statistically insignificant likely due to the shared influence and suppression effects among the explanatory variables. The interview responses from key informants indicates that external barriers such as unstable national internet connectivity, internal challenges like frequent service interruptions, customers' need for physical receipts, and strong concerns about fraud and social-engineering were the main challenges that hindered the adoption of M-banking adoption at CBE.

Keywords: M-banking, adoption, TOE, CBE, technology, organization, environment

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CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Financial institutions are transforming their traditional in person service approaches into technology driven interactions. Nowadays, technologies like the Internet and mobile platforms play an important role in the banking sector and have emerged as a key avenue for mobile banking. The banking sector is undergoing a digital evolution and mobile banking as one of the main types of digital banking is emerging as a main tool for expanding financial inclusion through affordable, accessible, and convenient transactions using mobile devices (GSMA, 2023). These transformations in the financial institutions are driven not only by the requirements of customers but also depends on organizational related factors such as their capability to invest in technology, seamless system integrations and institutional readiness from the banking service providers.

In today's rapidly evolving market environment, the financial service sector has become highly competitive and banks are required to respond quickly to the dynamics of the market and customers' expectations. Technological innovations and developments have enabled the financial world to move towards the digital era. Now a days, customers are preferring towards digital services and want to use the services with minimal physical interactions and financial companies are driving this transformation (Skan, Dickerson & Masood 2015).

Digital banking includes a wide range of services, including online banking, mobile banking applications, and digital payment systems that enable users to access financial services conveniently and securely (Chandra sekhar & Kumar, 2023). In order to keep up with the changing market, banks are striving to improve their customer service delivery and productivity through adoption of mobile banking. (Nesibu, 2017). From the perspective of financial institutions or digital banking service providers, successful deployment of digital banking requires technological capability, organizations readiness and understanding the opportunities and threats of the external environments.

Now adays, Mobile banking has become a main channel for promoting financial inclusion, especially in regions with weak traditional banking infrastructure. Unlike mobile banking applications that require a bank account, mobile money services can be accessed with a basic mobile phone (Shirono et al., 2021). In this regard, Kenya's M-Pesa, introduced in 2007, illustrates how mobile money can quickly diffuse to reach underserved populations by providing secure, affordable, and convenient services.

In order to keep up with the market dynamics of the financial sectors banks are expected to continuously improve the quality of their service delivery. In Ethiopia, initiatives to expand financial inclusion have increasingly focused on digital transformation within the banking sector, where mobile banking is viewed as a key tool for reaching underserved groups (National Bank of Ethiopia, 2021). The rapid spread of mobile phones, particularly in urban areas, has enabled commercial banks to adopt digital technologies that improve service accessibility, lower operational costs, and contribute to national development objectives (GSMA, 2022). As a result, M-banking has been incorporated into the digital strategies of many Ethiopian banks. Services

such as balance checks, fund transfers, airtime purchases, and utility bill payments are available and can be completed without visiting the branches in person (Worku & Tadesse, 2020).

The Commercial Bank of Ethiopia, the country's largest state-owned financial institution, has made substantial investments in expanding its mobile banking platform to enhance efficiency and customer convenience (CBE, 2023). As part of this strategy, CBE has deployed its digital banking service across its nationwide branches network.

Mobile banking is a type of digital banking that enables banks to deliver financial services to customers through mobile phones using USSD or apps based. It is widely recognized as cost effective way of financial inclusion, especially for developing countries. (GSMA ,2023). In Ethiopia, given its large customer base and extensive branch network, the commercial bank of Ethiopia (CBE) is one of the leading financial institutions and one of the pioneers in providing M-banking service in the country.

However, rapid growth in infrastructure and platform deployments in the financial sector has not fully translated into practical usage. Many urban customers have continued to rely on traditional banking routes (NBE, 2023). Evidence from several studies indicates that while digital infrastructure is necessary, it is insufficient for the widespread adoption of mobile banking. Recent similar studies conducted in Ethiopia found that perceived usefulness, trust and ease of use are significant determinants of adoption of M-banking. (Yimer ,2024; Tiruneh,2024). But few studies have focused on examining the influence of external factors in adoption. In many developing markets, factors such as regulatory support, trust, digital literacy, and institutional readiness are critical for effective uptake (GSMA, 2023; World Bank, 2023).

As a result, an increasing number of studies are taking place to determine M-banking adoption. Scholars have used different theoretical models to examine the determinants of M-banking adoption. The most widely used theories include TAM, UTAUT, DOI which mainly focus at identifying the behavioral aspects of consumers. But this theoretical framework mainly focus on analyzing individual-level adoption behavior. As illustrated before, in order to improve the deployment of M-banking adoption studies has to go beyond examining individual level determinants of adoption and broaden their scope to analyze firm level determinants of M-banking adoption.

Therefore, this research aims to address the gap by focusing its study on examining firm level determinants of M-banking adoption by employing the TOE framework as framework as a guiding theoretical model. The study focuses on selected branches of the commercial bank of Ethiopia, which located in Addis Ababa. The findings of the study are expected to give insight on the level of impact of organization available resource and management support, technology related factors which includes system security and ease of use, environmental factors such as competition environment and ICT infrastructure in adoption of M-banking. Furthermore, findings of this research are expected to offer actionable recommendations for improving M-banking services for CBE or other banking institutions, while also contributing to the body of knowledge on studies related to information technology adoption determinants.

1.2 Statement of The Problem

Nowadays, in urban centers like Addis Ababa, where there is notable digital infrastructure development is relatively advanced, mobile banking is becoming a main channel for enhancing financial service delivery and increasing financial access. Nevertheless, as discussed by Reta, B. (2019) in developing markets still main transaction such as cash transfer, public utility payments, loans and savings, insurance and withdrawal are conducted via banking agents or through banks.

In Ethiopia several studies have shown the possible causes behind the limited adoption of M-banking. As emphasized by Gezahegn K. (2016), which is based on data gathered from survey questionnaire of bank customers, despite the very high mobile penetration rate adoption of M-banking services remains low due to perceived trust, perceived usefulness, and perceived risk of the technology. However, factors those could significantly affect adoption and which are related to firm level such as the environment ICT infrastructure and regulatory policies were not included.

Numerous studies have been conducted on examining the determinants of digital banking adoption, few have provided a comprehensive analysis in the context of Ethiopia. By gaining an in depth understanding of the factors and conditions that influence developing country's ability to fully adopt and realize its benefits, strategic implications can be generated for the researchers and practitioners regarding how to promote the growth of M-banking in the developing countries (Nesibu, 2017). As a result, improving the adoption of mobile banking enhancing financial inclusion in Ethiopia's urban centers, which is crucial for sustainable economic development. Furthermore, the existing research main focus on individual factors urges the need for a study in wider context and from the perspective of banking institutions by taking into consideration the technological, organizational and environmental factors.

Therefore, this study aims to better understand and investigate the factors in the adoption of M-banking at firm level based on a case study on the Commercial Bank of Ethiopia by focusing on selected branches which are located in Addis Ababa city using the TOE framework .

1.3 Objective of the study

1.3.1 General Objective

The general objective of this study is to examine and understand the factors influencing the adoption of mobile banking at Commercial Bank of Ethiopia based on selected branches those are located in Addis Ababa.

1.3.2 Specific Objectives

1. To evaluate the influence of technological factors on M-banking service at CBE.
2. To assess the impact environmental factors on M-banking adoption at CBE.
3. To understand the level of influence of organizational factors on CBE's capabilities on M-banking.
4. To determine which dimension of the TOE framework has the most significantly influence on M-banking adoption at CBE.

1.4 Research Question

1. To what extent do technological factors influence the delivery of mobile banking services?
2. What is the level of influence of environmental factors on adoption of M-banking?
3. To what extent do organizational factors, affect CBE's capability to adopt M-banking?
4. Which dimension of the TOE framework has the most significant influence on M-banking at CBE?

1.5 Significance of the Study

The study result and its recommendations could serve as input for managers in making informed decisions. In addition, it is believed to support stakeholders in the mobile banking market/sector to better understand the factors influencing its adoption as well as the challenges hindering it. As a result, it is expected to enable them to come up with better services and offers a better understanding of the current trends in M-banking technologies and their impact in their business.

Furthermore, this study will contribute to the growing body of knowledge in the study of mobile banking adoption factors. Generally, the findings of this study are expected to provide valuable insights for both financial institutions and policymakers. Particularly, this study will provide better

insight for Commercial Bank of Ethiopia in improving services, enhancing customer experience, and promoting broader financial inclusion in addis ababa.

Finally, this study is also expected to initiate further research in the topic and contribute for the body of knowledge on understanding technology adoption factors at firm level.

1.6 Scope of the Study

The study focuses on understanding the influencing factors of M-banking adoption, particularly in Commercial Bank of Ethiopia at selected branches which are located in Addis Ababa. Therefore, this study is geographically limited to Addis Ababa. Due to time and budget constraints, it is challenging to cover all the branches. Additionally, the study employed the TOE framework by focusing on examining the influence of technological, organizational and environmental factors on adoption of M-banking.

1.7 Limitation of the Study

Limitations are the characteristics which limit the scope and define the boundary of a given study and clarifying what is the research going to address and not able to addresses.(Research method.net ,2024). While the findings of the study are expected to provide valuable insights for banks and policy makers, there are some limitations. Due to time and budget constraints, this study focuses on the organizational-level factors. The individual level factors were not considered which could offer additional understanding of adoption behavior of consumers. The study is limited to Addis Ababa city, thus it may not reflect the conditions in rural areas where ICT infrastructure, financial literacy, and banking service overall lags significantly. So that, the findings of the study may not reflect the rural settings or context.

Commercial Bank of Ethiopia's unique status in being a government or state owned bank may give it unique advantages, such as huge access to fundings, regulatory support, and a dominant market position gave it special advantages. Thus, give CBE advantages in or benefits in technological capabilities from greater capital and infrastructure investment; its organizational readiness is enhanced by strong top management support; and have favorable environmental conditions such as in regulatory conditions and as a result achieve higher market dominance. Therefore, the results may not be entirely applicable to private banks or smaller financial institutions that operate under different constraints.

Despite these limitations, the study is expected to provide valuable insights that can guide future studies and for stakeholders in the banking and fintech sector.

1.8 Organization of the Study

This paper is organized into five chapters. The first chapter is the introductory section of the study, where the researcher gives a brief introduction for the research topic. The second chapter discusses mainly a review of literature. It includes the theoretical foundation and empirical studies conducted related to the study, identified research gap and the conceptual framework. The third chapter discusses about the research methodology. It includes the research design, research approach, sampling and the data analysis technique used for this study. The fourth chapter contains the results and discussion of the findings of this research. Finally, the last chapter is discussion and conclusion which includes the summary, conclusion, limitations and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the literature review on relevant topics for this study. It is divided into five sections. The first section provides a brief on mobile banking. It includes definition of key terms, an overview on digital banking as it is the broader set that includes mobile banking, the different types of business modes which are available in the sector, and means of delivery for M-banking. The second section discuss about the most widely employed theoretical models in technology adoption. It includes the TAM, UTAUT, DOI and TOE frameworks. The third section covers empirical literature review on selected studies related to factors influencing the adoption of M-banking. It includes a review of article and research from global, African and Ethiopian context by focusing on studies conducted on M-banking adoption factors.

After the empirical review of literature, the fifth section briefly discuss about the conceptual framework employed for this study based on review of the main theoretical models. Finally, the last topic of the chapter explains and discuss about the research gap identified by the researcher.

2.2 Overview of Mobile banking

Mobile banking is a subset of digital banking that delivers financial services using app based and USSD Plataform. Adoption of M-banking at CBE is also influenced by other banks M-banking and Fintech financial services providers. And below is the discussion for definition of key terms and related concepts and the common DFS (Digital Financial service) business models related to digital banking.

2.2.1 Definition of Key Terms

Below is a discussion and definition of some terms which are relevant and related to the topic of study on M-banking.

Mobile banking

The Alliance for Financial Inclusion (AFI, 2016) defines mobile banking as the use of a mobile phone to access banking services and carry out financial transactions. These services may be transactional, such as transferring funds, or non-transactional, such as checking account information. Mobile banking is widely regarded as a cost-effective solution for both banks and customers, offering personalized services and greater flexibility to users (Shankar & Rishi, 2020).

From a technical perspective, mobile banking operates through a combination of client-side and server-side applications that interact with a bank's core systems. Client-side applications are installed either on the customer's SIM card or directly on their mobile device, while server-side

applications are hosted externally on dedicated servers. Common server-side access technologies include USSD, IVR, SMS, and WAP (Muluaem, 2015).

The delivery of a mobile banking service to a consumer involves the participation of four primary stakeholders: a bank, Mobile Network Operator (MNO), a mobile banking technology Vendor, and the consumer. (Kurgel, 2007)

Mobile banking is categorized under one type of electronic banking.

Electronic Banking

Although various definition was given across different studies and publications, most emphasize a common theme. One of the earlier studies on E-banking defines it as “a new concept of conducting banking transactions and has captured the interest of many banks as an alternate way to traditional banking. It is a highly information intensive activity that depends heavily on information technology to acquire, process and deliver financial information to all users”. (Alkailani, 2016). The Alliance for Financial Inclusion (2016) define electronic banking as the delivery of banking products and services, including electronic payments, through digital channels. Common forms of E-banking include M-banking, internet or extranet banking, ATMs, and point-of-sale transactions. Kamrul (2009) defines E-banking as “a form of banking service where funds are transferred through an exchange of electronic signal between financial institutions, rather than exchange of cash, checks, or other instruments”. Some of the basic types of E -banking are: ATM, POS (Point of Sale), Intranet/Extranet banking, M-banking.

Fintech

Fintech refers to companies that develop software, services, and products supporting digital financial solutions, often associated with emerging technologies (AFI, 2016). The Financial Stability Board (2017) defines fintech as technology driven financial innovations that can create new business models, applications, processes, or products, with significant impacts on financial markets, institutions, and service delivery. In Ethiopia, Chapa and Arifpay are some examples of Fintech companies which offer digital financial services.

Mobile Money

World Bank (2019) defines mobile money as financial transactions and services made using mobile phones without the need a bank account. As discussed in Rovers (2021) mobile money is a collection of financial services performed through a mobile device. This study classified and summarized the array of possibilities the technology offers into three broad categories. The first is mobile payments. It generally includes person-to-person, government-to-person, and business-to-business payments. Secondly, mobile finance services include access to credit and saving plans in combination with bank partners (Bosire & Ntale, 2018; Donovan, 2012). And the third type is mobile banking services which allow users to make balance inquiries remotely using their mobile phones at any given time.

The figure below summarizes the three broad categories of mobile money discussed above.

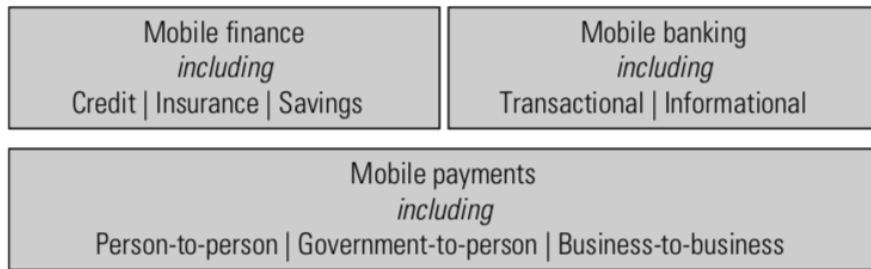


Figure 1 Types of Mobile Money Services

(Source: Donovan (2012))

Mobile money plays a major role in developing economies, it is available in 96% of countries, where fewer than one-third of the population hold accounts at formal financial institutions (GSMA, 2019). In response to the fast-growing market for mobile phones and the severe struggle of financial inclusion on the African continent, the British telecom company Vodafone decide to launch M-Pesa through its Kenyan subsidiary Safaricom (Burns, 2018). Following this M-Pesa, become the most widely known and successful product of mobile money after its launch in Kenya in March 2007, mobile money soon became a nearly universally accepted way of making financial transactions. (Rovers ,F.J. ,2021)

Mobile Network Operators (MNOs)

According to Infobip's definition (2024), a mobile network operator is a telecommunications company that provides wireless voice and data services to mobile phone subscribers. MNOs own or control all the elements needed to deliver services, including radio spectrum allocation, cell towers, base stations, SIM cards, and the core network for routing calls and data.

In Ethiopia, ethiotelecom is one example for MNO. These firms, often referred to as telcos, operate the infrastructure that enables mobile communication and related services.

2.2.2 Digital Financial Service Business Models

Wall Street Mojo (2025) defines Digital financial services as the use of technology to modernize the traditional way of banking. It includes a wide array of financial services provided through digital means, including payments, remittances, insurance, savings, & credit, as well as mobile banking.

DFS is a broad range of financial services accessed and delivered through a variety of digital channels, including payments, credit, savings, remittances, and insurance. (AFI,2016) It can be delivered through different business models, and it is commonly categorized into bank-led, non-bank-led led and partnership based on who controls the platform, manages customer relationships and bears regulatory responsibility. The common types of business models of DFS are mentioned below.

1.**Bank-led** (bank-based): The customer's primary contract is with a bank (the bank holds accounts/float; MNOs may provide connectivity or agent network). E.g CBE Birr

2.**non-bank-led** (MNO-led / third-party-led): The customer contracts with a non-bank provider (often an MNO) licensed to issue e-money; funds are safeguarded per regulation. Such as telebirr, M-Pesa, Chapa, Arifpay.

3.**Partnership** (Hybrid models): Banks, MNOs, and/or third parties jointly deliver the service common in markets where bank products (savings/credit) ride on an MNO wallet

2.2.3 M-banking service Delivery Channels (APP Vs USSD)

APP-based M-banking

App-based mobile banking allows customers to conduct financial transactions via a dedicated smartphone application by using internet connectivity. It is a more sophisticated fintech service that requires not only a smartphone but also an internet connection. It offers financial services through a banking app. E.g, CBE Birr is one type of M-banking that provides services such as account management, funds transfer, bill payments biometric authentication. It offers a user-friendly interface and enhanced security

USSD-based M-banking

It is a service delivery channel which allows customers to perform banking transactions via short codes on their mobile phones without the need for internet connectivity. It allows customers to do activities such as balance inquiry, funds transfer, bill payments. And the service is available on basic feature phones USSD-based M-banking is valuable for areas where there is limited access of internet connection or smartphone penetration. And its cost efficient. In Ethiopia and specifically in CBE, USSD delivery channel is vital for low-income customers as the penetration of smart phones is lower in rural areas as a result the usage of App based M-banking is limited in these areas. Even in urban areas, internet service is not reliable enough for usage of App based service.

Adoption of M-banking

Technology adoption refers to the stage or process in which technology or innovation is selected for usage by an individual or organization, (Wade, 2009).

This study aims to examine the effect of firm related or firm specific factors in adoption of M-banking based on a case study at CBE.

2.3 Review of theoretical frameworks

According to the definition of Datta (2010), technology adoption refers to the stage or process in which technology or innovation is selected for usage by an individual or organization. In information system technology research, several theories have been deployed for the study of adoption (Wade 2009). The most widely used theories in technology adoption are; the technology acceptance model (TAM) (Davis1986, Davis 1989, Davis et al. 1989), theory of planned behavior (TPB) (Ajzen 1985, Ajzen 1991), unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al. 2003), DOI (Rogers 1995), and the TOE framework (Tornatzky and Fleischer 1990). (Oliveira, T. and Martins, M. ,2011). TAM, TPB and UTAUT focus at analyzing the individual level factors. Each of these models offers an understanding on adoption, but they also have certain limitations, particularly in addressing influencing factors beyond the individual level.

Whereas, DOI and TOE frameworks are the ones that aim at understanding the firm level factors. Furthermore, as mentioned in Oliveira & Martins (2011), the TOE framework also includes an important component, environment context which is not included in DOI framework. This gap supports the rationale for applying the TOE framework for this study.

This section presents a review of the major theoretical models which are related to the topic of this study.

2.3.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model is widely recognized and employed framework with regard to the study of adoption of technologies in the information technology. This theory was introduced by Davis (1989). It aims to understand the intention of individuals to adopt technology based on the two main constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). (Davis,1989). According to Davis (1989), he defined PU as “the degree to which a person believes that using a particular system would enhance his or her job performance within the organizational context”. whereas he defined PEOU as "the degree to which a person believes that using a particular system would be free of effort." Moreover, Davis explained that user motivation can be understood through three elements: perceived ease of use, perceived usefulness, and attitude toward using the system. According to this framework, an individual’s overall willingness to adopt a system strongly influences actual usage. Attitude is primarily determined by PU and PEOU, with PEOU exerting a direct effect on PU.

A lot of studies have been conducted based on TAM for understanding adoption of M-banking. For example, Alalwan et al. (2016) examined mobile banking in Jordan and found that both PU and PEOU significantly shaped users’ intentions to adopt the service.

However, TAM primary focuses on influencing factors on adoption at individual’s level but it does not include organizational, cultural and environmental factors which are also significant factors in technology adoption. In addition, scholars argue that TAM’s simplicity makes it attractive, but it is also criticized for being narrow to capture the complexity of technology adoption. As a result, TAM often needs to be extended or combined with other models (such as UTAUT) to improve predictive accuracy. (Rahimi & Oh, 2024).

2.3.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

Introduced by Venkatesh et al. (2003), UTAUT was developed after a review and integration of eight well known theories in social studies. It includes the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), a combined Theory of Planned Behavior/Technology Acceptance Model (C-TPB- TAM), the Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (Ukpabi, et al. ,2018). These theories and models have been successfully deployed in different studies of branches of information science and innovation adoption, such as mobile apps, electronic shopping, mobile commerce, M -banking, and electronic financial services adoption. (Ukpabi, et al. 2018). Even though the original UTAUT conceptualization was tested in an organizational context, an extension of it UTAUT2 was introduced by Venkatesh, Thong, and Xu, (2012) for the study of adoption within the context of consumers. The seven constructs of UTAUT2 are; performance & effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit.

In mobile banking studies, UTAUT has been widely applied to assess both customer and employee adoption patterns. For instance, Baptista and Oliveira (2015) employed UTAUT2 the framework focused on Portugal and found that performance expectancy and hedonic motivation, and habit as main influencing factor on the intention to adoption and with moderator's collectivism, uncertainty avoidance which are within cultural factors. Recent studies have extended UTAUT to provide deeper insights: Ashraf & Varela-Neira (2022) applied an extended UTAUT2 framework to assess M-banking adoption in Spain, their findings showed that confirming that some UTAUT2 drivers fully mediate the effect that proactive personality has on consumer intention to adopt mobile banking and highlighting the relevance of proactive personality on all UTAUT2 drivers.

Despite its wide range of usage, there are some limitations to UTAUT. According to Daka and Phiri (2019) and Shaji et al. (2025), a key limitation of the UTAUT model in the context of digital banking is it often overlooks trust and security concerns, and its overemphasis on the innovation context of technology but not considering other factors are some of its limitations.

2.3.3 Diffusion of Innovation (DOI) Theory

The Diffusion of Innovation (DOI) theory, was introduced and developed by Everett Rogers (2003), provides an explanation on how new ideas and technologies spread within a social system over time. As Rogers (1983, p.239) explains, the diffusion of innovation is shaped by five key attributes: relative advantage, compatibility, complexity, trialability, and observability. His theory provides a framework for understanding how, why, and at what pace new ideas and technologies spread across societies, operating at both the individual and organizational levels. Innovations are communicated through specific channels over time within a specific social system, and adoption typically follows a normal distribution pattern (Rogers, 1983, p.249). Breaking this normal distribution into segments leads to the segregation of individuals into the following five categories. As he explains, "individuals possess different degrees of willingness to adopt innovations, and the portion of the population adopting an innovation is approximately normally distributed over time.

Based on that, they are categorized into five groups as innovators, early adopters, early majority, late majority, and laggards. (Rogers 1995).

Several empirical studies have used DOI in studies of M- banking adoption. For instance, an early study conducted by Pearson M. & Ahmad A. (2010) focusing on exploring influencing factors to adopt innovation or a new technology showed that relative advantage, compatibility, and trialability have a significant effect on attitude and consequently attitude significantly affects the intention to use internet banking. Ai Jabri M. al. (2012) found that relative advantage, compatibility, and observability have positive effect on adoption, but they found complexity and trialability have weaker role which is contrary to other similar studies. In Ethiopia, a study conducted by Entele (2019) on M-banking using a secondary data from NBE and employing innovation diffusion found perceived relative advantage, perceived complexity of usage, observability, trialability, perceived analog complement and trust on provider of the service significantly influence the decision to adopt M- banking.

Despite its strengths and deployment, DOI has its own imitations. One key limitation is it tends to overemphasize innovation attributes. Another limitation is not including environment context (Oliveira & Martins, 2011).

2.3.4 Technology–Organization–Environment (TOE)

The TOE framework has been widely used in prior studies to examine or understand factors influencing mobile banking adoption in organizations. (Mujahed, et al. ,2020). The TOE framework is an organization-level theory that explains the three different elements of a firm's context which influence adoption decisions. (Baker ,2012). This framework is consistent with the DOI (diffusion of innovation) theory but TOE framework also includes an important component, the environment context that DOI lacks (Olivera and Martins, 2011). It has been applied across different industries and research contexts due to its flexibility, allowing scholars to adapt the factors considered in each study (Baker, 2012). However, there are limited number of studies focusing on examining determinants of adoption at firm level.

According to Tornatzky and Fleischer (1990), organizations adoption of technology is overall shaped by three dimensions: the technological context, the organizational context, and the external environment.

TOE framework is employed for this study because of its holistic approach and its focus on firm level approach. Unlike models that focus mainly on individual behavior, TOE examines adoption at the organizational level, capturing how institutions collectively embrace new technologies (Mohammed et al., 2022). Awa et al. (2016) further argued that TOE incorporates both human and non-human actors, making it efficient in addressing traditional barriers to technology innovation. Empirical applications of TOE often vary in the specific factors chosen for analysis, which demonstrates its adaptability across different contexts (Baker, 2011, as cited in Opoku et al., 2016).

As noted by Kulkarni M.& Patil K. (2020), the particular factors or items or variables used for analysis in TOE framework researches may vary depending on the context of the studies and the specific attributes of the technology .

In this research, TOE is employed to provide a comprehensive understanding of mobile banking adoption in Ethiopia, with a focus on selected branches of the Commercial Bank of Ethiopia (CBE) in Addis Ababa. Below is the discussion for the three elements of TOE framework and the independent variables in each element.

2.3.4.1 Technological Factors

Tornatzky and Fleischer (1990) describe the technological dimension as containing both the internal technologies already in use and external technologies available in the marketplace. Baker (2011) noted that organizations must consider not only current systems but also emerging technologies that could be adopted. It also contains existing practices and equipment internal to the firm (Starbuck 1976), and available technologies external to the firm (Thompson et. al 1967).

The three variables which are under the technological factor are discussed below.

System Security

System Security in mobile banking primarily relates to confidentiality, requiring encrypted connections between devices and banks. Sharew (2021) identified frequent security concerns as a major barrier to electronic banking adoption. While mobile banking improves accessibility and reduces service delivery costs, customers often worry about risks due to the diversity of devices and platforms. In relation to system security, a study conducted by Aragaw (2018) have identified gaps in the digital banking sector mainly includes lack of biometric authentication, limited behavioral monitoring, and insufficient fraud detection technologies.

System Ease of Use

System complexity refers to how difficult a technology is perceived to be in terms of understanding, implementation, or integration into existing processes. Rogers (1983) found that higher complexity reduces the likelihood of adoption, as users may resist technologies, they find it difficult to operate.

Compatibility

Reflects the extent to which a technology aligns with existing practices, systems, and values. At / the individual level, it refers to consistency with prior experiences and user needs (Rogers, 1983). In mobile banking, compatibility determines how easily financial institutions can integrate new solutions into their infrastructure. Gyamfi et al. (2021) found that compatibility significantly influenced the adoption of mobile payment systems among small and medium enterprises in Ghana.

2.3.4.2 Organizational Factors

The Organizational factors include resources of the firm, its size, and the number of slack resources available (Baker, J. ,2012). It implies resources, leadership support, structure, and culture—that influence whether new technologies are successfully implemented (Tornatzky & Fleischer, 1990; Baker, 2011). In the context of this study, top management Support and resource availability were the main factors within organizations which are expected to have significance influence on M-banking adoption. Other organizational aspects, such as firm size, were excluded because some studies suggest their impact is not significant in adoption. For instance, in a study conducted in Kenyan banking sector found that firm size does not significantly influence adoption. Whereas Top management support, organization learning ability, competitive pressure was supported under significant factors. (Kabata & Maina ,2024).

Top Management Support

Management support is a key organizational factor in adoption and utilization of technology. The research finding by Wambui and Mugo (2021) indicates that top management has a significant and direct impact on the implementation of M-banking services within Kenyan commercial banks. Furthermore, this study emphasizes the responsibility on top managements to offer the required support for the project team for ensuring the success of M-banking services. Earlier studies carried out in Ethiopia have revealed that when bank leadership shows strong dedication to M-banking, it cultivates an environment of innovation and motivates staff to accept new technologies (Mezgebu, 2020).

Available Resource

As mentioned in the study of Zhu and Kraemer (2005) which is based on TOE framework and focusing on information technology payoff in E-business, the study found that financial resource availability has important contribution on E-business. And in the context of M-banking adoption resource availability enables banks to invest in infrastructure, staff training, and system upgrade which contributes for the success of adoption.

2.3.4.3 Environmental factors

Environmental context is the arena in which a firm conducts its business. Its industry, competitors, and dealings with the government (Tornatzky and Fleischer 1990. It is the external environment in which an organization operates and its conditions for supporting the development of E-banking services (Atinkut Ayal,2018). Below is the discussion for key elements employed in this study which are believed to significantly affect adoption of a technology.

ICT Infrastructure

The availability and reliability of network infrastructure, such as mobile networks, internet penetration and payment systems, have a significant influence on M-banking. In Ethiopian studies conducted on the adoption of technology consistently show that gaps in ICT infrastructure limit

customer access and trust, while improvements in connectivity and system integration enhance adoption (Bekema, 2019, Aragaw, 2018).

Regulatory Environment

The banking sector in Ethiopia is regulated by the central bank, the NBE, to ensure the health of the financial sector and improve the efficiency of service provision. (Lelissa & Kuhl,2018). Bank's regulatory variables are those variables used to control commercial banks' activities and its operational environment in a proper manner. These factors include but are not limited to, reserve requirements, capital requirements, and liquidity requirements, which determine how easily banks can convert their assets into cash and how much money they must maintain on hand as reserves. Excessive regulation may have negative impacts, even though it serves as a prudential tool to lessen the impact of economic crises on the stability of the financial system and consequent macroeconomic outcomes. (Yusuf & Shikur,2023).

Market Environment

Market competition is the extent to which a firm is influenced by competitors in the market (Chau et al., 2020). It refers to the pressure factor that the bank feels from its competitors in the financial field. This competition makes banks look for better technologies so as to raise their efficiency, increase their efficiency & deals, and increase the number of customers. (Mohammed, et al.2022). The intensity of competition in the financial sector often drives innovation. Competition also plays a major role in M-banking technology deployment. Banks often adopt technologies not only to attract customers but also to remain competitive with other mobile money service. Services given by one organization can attract the other who can then retaliate. It has been recognized that this pressure is a driving force for using the core banking technology by pressing organizations to constantly be on the hunt for a competitive edge. (Opoku et al. ,2016). Conversely, a study conducted by Bultum (2014) found that the lack of competition between the Ethiopian banking sector and foreign banks is considered a barrier for the adoption of the E-banking system.

2.4 Empirical Literature Review

Several studies were conducted to examined to understand the determinants of mobile banking adoption. This section covers a review of selected empirical studies from global, African, and Ethiopian contexts, including discussion of key findings, and the methodologies employed.

2.4.1 Global Empirical Studies

Scholars have applied different theoretical frameworks to investigate the factors influencing mobile banking adoption. As a result, enormous studies have been conducted worldwide, however due to resource constraints only a few selected studies have been reviewed in this study.

In a study conducted by Gokmenoglu and Kaakeh (2022) using a sample of 250 respondents in North Cyprus based on TAM model found that perceived usefulness, ease of use, perceived

reliability, consumer innovativeness, and perceived enjoyment have significant positive relationship on the intention to use M-banking services. In another study conducted in Jordan by Rababa et al. (2025) using TAM, examines user behavior across new banking technologies and resistance to adoption. Their findings showed that perceived usefulness was the strongest predictor of adoption, while perceived risk also encouraged usage. They also found that social influence mattered, but trust did not directly affect adoption intentions. Similarly, a study conducted by Alalwan et al. (2016) on Jordanian customers intention to use M-banking based on TAM, their result shows that behavioral intention is significantly influenced by perceived usefulness, perceived ease of use, and perceived risk. However, this studies frame work TAM, is solely focused on behavioral factors as it solely focused on behavioral related factors and have a conceptual gap relation to focus of analysis to this study.

In another study based in Portugal and conducted Baptista and Oliveira (2015), applying UTAUT reported that hedonic motivation, and habit were found to be the most significant antecedents of behavior intention, while effort expectancy and social influence were weaker.

Following the rapid digitization of banking service and as a result exposing financial institutions to wide range of Cybersecurity threats, a lot of studies have been made to examine the influence of cybersecurity threats on digital banking. In study conducted by Waliulla et al. (2025) to examine the influence of cybersecurity threats on digital banking security, adoption, and regulatory compliance by conducting a comprehensive review of 78 peer-reviewed articles published between 2015 and 2024. Their findings reveal that phishing and malware attacks remain the most commonly exploited cyber threats, leading to significant financial losses and consumer distrust. They also found that adoption increases when safeguards like multifactor authentication, biometrics are employed to combat unauthorized access, while AI-based fraud detection and block chain technologies offer promising solutions for securing financial transactions. In addition, they noted that the integration of third-party FinTech solutions causes additional security risks, which requires stringent regulatory oversight and cybersecurity protocols.

Regulation also plays a critical role in adoption of M-banking banking. Ofodile et al. (2024) presented a comprehensive comparative review of digital banking regulations in Nigeria and USA. They found that Nigeria's digital banking regulations are more focused on promoting financial inclusion and mitigating systematic risks which reflects the countries developing status and the need for addressing a large unbanked population. While USA's regulations are comprehensive and sophisticated and it gives more emphases on consumer protection, data privacy. In another study conducted in central Asia to examine the regulatory framework of central Asia by Mamadiyarov and Karshiev (2024), they found that regulatory fragmentation, weak cybersecurity measures, and a lack of consumer protection are main challenges for digital banking adoption and the researchers recommend the need for prioritizing consumer protection measures and implementing adaptive regulatory frameworks.

In addition to TAM and UTAUT based studies, several empirical studies have also applied the DOI theory to explain M-banking adoption focusing on the innovation attributes. One of this study is conducted Saudi Arabia by Ibrahim M. Al-Jabri and M. Sadiq Sohail, based on data collected from 330 actual M-banking users. They found that relative advantage, compatibility, and observability have positive impact and perceived risk having negative impact on adoption.

However, contrary to extant literatures, trialability and complexity have no significant effect on adoption. Similarly, the study did not focus on the firm level determinants of mobile banking having clear conceptual gap to this study.

In a study investigating how the dimensions of TOE framework influence the digital business ecosystem (DBE) and in turn, how this ecosystem impacts the adoption of Islamic Mobile Banking (IMB) conducted by Abdurrahman (2024) a customer-centric perspective unlike previous literatures focused on internal organizational factors. It employed a quantitative approach; they collected data from 985 IMB users in Indonesia. The findings reveal that DBE significantly influences IMB adoption, particularly when moderated by customer behavior as an environmental factor. Factors such as PU and ease of use within the technological domain, firm reputation and innovation within the organizational domain, and PR and sharia compliance as environmental factors all positively and significantly impact DBE. Furthermore, the study found that DBE serves as a crucial mediator between all dimensions of the TOE framework and IMB adoption. This study employed the same theoretical framework with this study; however, it has different perspective with respect to the focus of analysis.

From the perspective of organization or firm level studies on M-banking determinants, a literature review by Mujahed, Ahmed and Samikon (2020) which is based on the TOE framework, they classify the factors that influence mobile banking adoption using the three contexts suggested by the Technology, Organization and Environment (TOE) framework. Their finding suggests that the influences of these factors vary across studies.

Overall, most of the studies focus on individual- level determinants of M-banking and most of empirical studies are based on TAM, UTAUT and DOI. And in most of the studies, PU and PEOU are repeatedly found to positively influence users' intention to adoption of M-banking. And perceived risk also hindering adoption. But other factors such as innovativeness, social influence and habit were found to be significant in some studies but varying depending on the studies context. In addition, the empirical reviews have shown the impact of security, cybersecurity threats regulatory environment and their influence on users trust on M-banking usage. However, despite those insights, most of the studies mainly emphasize on individual level factors, but limited studies on organization level influences. As a result, this study seeks to address this gap by employing TOE based framework

2.4.2 Review of African Empirical Studies

In Africa, several studies have been conducted in mobile banking to understand the determinant of adoption and promote financial inclusion among underserved populations.

One of the notable comprehensive studies is conducted by Mahmoud (2019), who analyzed mobile money adoption across seven African countries (Egypt, Kenya, Ghana, Tanzania, Uganda, Zimbabwe, and Rwanda) based on panel data from 2013–2017. The researcher used regression models, and measured adoption through registered and active subscriber ratios. His finding showed that distribution networks, service pricing, regulatory frameworks, GDP, education, and the number of providers significantly influenced adoption. Wider agent networks and supportive regulation were positively associated with both registration and usage, while high service fees, low

literacy, and even higher GDP per capita were negatively correlated in some contexts. However, this study analyzed mobile money adoption factors but it does not specifically address determinants of mobile banking provided specifically by banking institutions in addition it is not based on a theoretical framework, thus presented a gap in objective and methodology to this study.

In another study by Ukpabi et al. (2023) examined on mobile banking usage in Nigeria, integrating UTAUT2 with gratification and privacy theories. Their findings show that facilitating conditions, social influence, and privacy concerns were critical antecedents of sustained adoption. Education moderated the effect of facilitating conditions, while age strengthened the role of social influence, reflecting Nigeria's collectivist culture. Privacy concerns, however, reduced usage, highlighting the impact of cyber fraud and data breaches. Hedonic features such as interactivity and enjoyment also enhanced satisfaction and continuance intention. Despite these insights, the study's limitations include its single-region sample, cross-sectional design, and narrow focus on Nigeria, which restrict generalizability. The authors recommend longitudinal and cross-country studies to capture regional differences more effectively. In addition, the study is mainly focused on individual perceptions of innovation attributes while underestimating external factors such as the environmental context thus having clear conceptual gap with this study.

In a study conducted in South Africa by Chingapi (2021) using the TOE framework to study the factors impacting mobile payment adoption on small medium enterprises (SMEs) identified that convenience, ease of use, trust in service providers, system features, device features and issues, cost fees, company image and credibility, are the main factors impacting mobile payment adoption. Similarly, Kanyamuna and Phiri (2020) in Zambia highlighted consumer trust, mobile network infrastructure, and perceived usefulness as direct influences on adoption, stressing the role of system security and network reliability. But the study has clear methodological difference to this study; as it employed qualitative research approach and the study is has narrowly focused on mobile payment adoption.

In another study conducted by Hornuf, Safari, and Voshaar (2024) based on a meta-analysis of 67 studies on mobile fintech adoption across Sub-Saharan Africa. Using TAM, UTAUT/UTAUT2, and TOE frameworks, they found that perceived usefulness and ease of use were consistently strong predictors. Trust in providers, infrastructure reliability, and regulatory support also shaped outcomes. However, they noted that most research remains fragmented, country-specific, and heavily focused on consumer behavior, with limited attention to organizational readiness, regulatory quality, and competition from fintechs.

Opoku et al. (2016) studied core banking deployment in Ghana using the TOE framework. Their findings showed that complexity, relative advantage, top management support, firm size, and environmental pressures such as competition and customer expectations influenced adoption. Unlike studies centered on deterministic consumer theories, this research emphasized organizational perspectives, reinforcing the need for TOE-based approaches in Africa.

Overall, these studies highlight that while perceived usefulness and ease of use remain central, contextual factors such as education, culture, regulatory frameworks, and organizational readiness are equally critical. This supports the relevance of TOE in examining mobile banking adoption by incorporating institutional and environmental factors.

2.4.3 Review of Ethiopian Empirical Studies

In Ethiopia M-banking adoption remains comparatively lower than other sub-Saharan African countries (GSMA, 2025). A lot of empirical studies have been carried out to understand the factors influencing adoption and understand the enablers and barriers of M-banking. However, most of these studies focus at individual level. Few of these studies are discussed below.

In a study conducted by Matios (2018) among customers of four private banks in Addis Ababa namely in United, Dashen, Wegagen, and Birhan International Bank by employing TAM and UTAUT frameworks. Data were collected from 246 respondents through structured questionnaires and analyzed via multiple regression. The finding revealed that EE, PU, ease of use, perceived cost, and mobile phone usage experience significantly influenced adoption, while PE, PR, and trust were insignificant. The limited role of risk and trust was attributed to the early stage of M-banking development in the time of the study. In another study by Mulualem (2015) investigated determinants of adoption in selected Addis Ababa branches using TAM. Based on 294 were valid responses out of 400 distributed questionnaires. The finding showed that perceived usefulness (PU) and perceived ease of use (PEOU) positively influenced adoption, while perceived risk (PR) had a negative effect. The researcher recommended expanding future studies to include broader samples for greater generalizability. In another study conducted by Haile (2015) applied UTAUT to the Commercial Bank of Ethiopia and found that effort expectancy, performance expectancy, and trust positively influenced adoption, whereas perceived risk and cost had negative effects.

However, in all the above studies, the theoretical frameworks are solely focused on the effect of behavioral perspectives or consumers related factors in adoption of M-banking and but did not consider the influence of organization or firm related factors on M-banking adoption.

Similarly, Abebe (2019) studied four banks—Abay, Wegagen, Lion International, and Cooperative Bank of Oromia—using TAM and TOE frameworks. The study highlighted PU and PEOU as major drivers of agency banking adoption, while barriers included weak legal frameworks, poor ICT infrastructure, limited competition, insufficient government support, and perceived risk. The researcher acknowledged limitations due to the cross-sectional design, which restricts causal inference, and suggested integrating additional constructs for a more comprehensive understanding.

Sharew (2021) explored E-banking adoption at the Bank of Abyssinia using TOE, employing both quantitative and qualitative methods based on 167 clerical staff. His findings found security concerns as the most significant barrier, in addition customer resistance, inadequate workforce training, weak managerial efficiency, insufficient government support, poor public awareness, ICT failures, political instability, low literacy, and economic challenges. Despite these barriers, opportunities such as strong demand, government initiatives limiting cash transactions, and improved security measures were noted. The study's limitation lies in its focus on clerical staff, which may not fully capture customer perspectives.

A study by Bultum (2014) analyzed adoption of E-Banking System in Ethiopian banking industry using TOE. Key obstacles included security risks, lack of trust, weak regulatory frameworks, poor ICT infrastructure, and limited competition between local and foreign banks. To address those challenges, the researcher recommends establishing a clear set of legal frameworks on use of

technology, and investing on ICT infrastructure. However, nowadays or at the time in which this research is conducted, as foreign banks have been allowed to enter the market so that this issue of lack of competition cannot be considered as significant barrier in E-banking adoption.

Wondwossen and Tsegai (2019) similarly identified infrastructure gaps, low digital literacy, and security concerns as major barriers. Abebe (2020), applying TOE, examined digital banking transformation and highlighted organizational capability and regulatory support as critical enablers. However, few studies have focused on adoption from the perspective of bank employees or decision-makers within institutions such as the Commercial Bank of Ethiopia (CBE).

Overall, while numerous Ethiopian studies emphasize individual-level factors such as PU, PEOU, and trust though organizational and institutional perspectives remain underexplored. Mujahed et al. (2020) argue that technological, organizational, and environmental factors are crucial for adoption, but their relative influence varies across studies. This gap underscores the importance of TOE-based research that integrates organizational readiness, regulatory frameworks, and infrastructure capacity to better explain mobile banking adoption in Ethiopia.

2.5 Conceptual Framework

This study aimed to determine the factors influencing adoption of M-banking from the perspective banking institutions and specifically based on a case study on the Commercial bank of Ethiopia. The conceptual frame work is developed after a review of relevant theoretical framework and empirical studies which mainly focus on examining determinants of M-banking adoption at firm level and specifically focusing on banking institution. Unlike theoretical models such as TAM and UTAUT those mainly focus their analysis on individuals' behavioral aspects.

Therefore, the TOE framework is selected for this study it well suited to achieve the objective of the study as it provides a broader perspective. TOE allows the researcher to consider the technological readiness of the bank, organizational related factors, and the external environments factors such as regulatory or market-related impact in adoption.

The figure below shows the conceptual framework of this study including the dependent and independent variables deployed in the study.

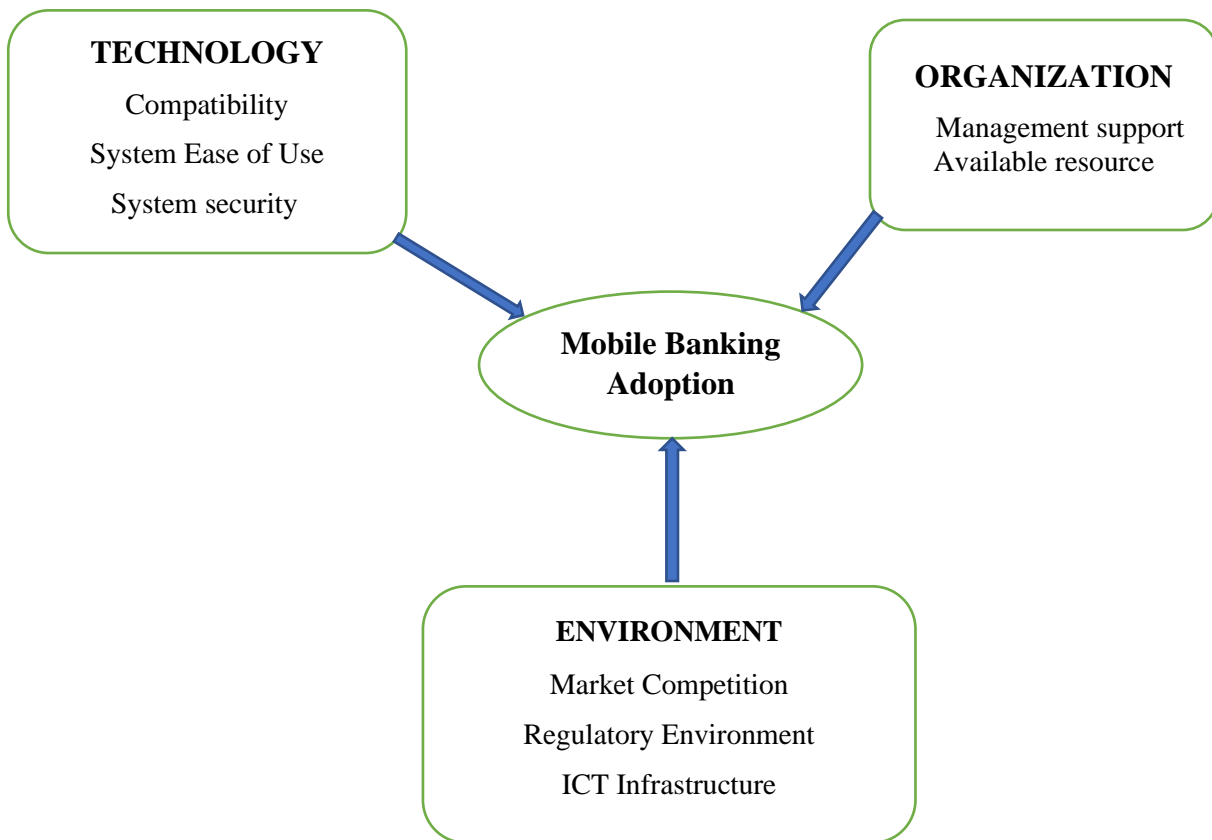


Figure 2 Conceptual Framework

(Adapted from Tornatzky & Fleischer, 1990)

As shown above in the figure, the dependent variable of this study is Mobile banking adoption. And the independent variables are those mention under the technological, environmental and organization factors in the figure.

2.6 Identified Research Gap

In Ethiopian context, several studies have been conducted by researchers to determine the influencing factors of M-banking adoption behavioral factors which are focused at examining enablers and hinders of adoption at the individual level. And these studies have employed different theoretical models in technology adoption studies which are mainly based on TAM, UTAUT, and DOI theory. These models have been extensively applied in studies assessing user level adoption of mobile banking and digital financial services. While these frameworks offer useful insights, they are generally focused on individual level, often neglecting the impact of institutional level or firm related factors in adoption of M-banking.

By identifying this gap, this study adopts the Technology-Organization-Environment (TOE) framework, which is better suited for examining the influencing factors related to the firm or at the level of institution on M-banking adoption based on a case study art CBE.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter explains the research methodology adopted for this study. It includes the research approach, design of the research, the target population, sampling technique, and data analysis techniques, validity, reliability and ethical considerations.

3.1 Research Approach and Design

Research Approach

To conduct a given study, researchers commonly use three approaches. These are quantitative, qualitative and mixed research approach. The quantitative research approach mainly uses closed-ended and numeric data (may sometimes include open-ended questions.) and it employs statistical procedure to reach its findings. Quantitative approach is used for testing or verifying theories and measurements that can be quantifiable. While the qualitative approach uses open-end questions, texts or image data non-numeric values (Cresswell, J.& Cresswell, W.2023). In mixed research, approach data are interpreted by both qualitative and quantitative assumptions (Creswell, 2009). This research adopts a quantitative research approach, it specifically used survey research method. Survey research provides a quantitative or numerical description of a population trends, attitudes or opinions by studying a sample of that population. Questionnaire is used for data collection to generalize from a sample to a population. (Fowler ,2008)

Research Design:

According to Robson (2002), research design is generally classified into 3 categories: exploratory, descriptive and explanatory types. Exploratory is often used when the aim is to discover new insights, ask questions and to investigate a certain phenomenon. Descriptive design focus on presenting accurate account of people, events and situations, so it is commonly used to describe an existing condition. The main characteristics of this method is that the researcher has no control over the variables, he/she can only report what has happened or what is happening (Kothari, 2004). But explanatory design focuses on identifying or explaining causal relationship between variables (Saunders et al.2016; Robson 2002).

This study adopted both descriptive and explanatory research design. The descriptive is used for presenting the factors affecting M-banking adoption in CBE, while the explanatory research design was used to examining the relationships between the technological, organizational and environmental factors influencing adoption of M-banking.

3.2 Target population and unit of Analysis

3.2.1 Target population

A study population refers to all people the researcher aims to make inferences about population, many often consider to people only. Population does not necessarily mean a number of people. It can also refer to total quantity of the things or cases which are the subject of a research. (Etikan, Musa and Alkassim,2015).

For this research, the target population of the study CBE staffs located in randomly selected branches of Addis Ababa city.

3.2.2 Unit of Analysis

The unit of analysis for this study is the commercial bank of Ethiopia. It is based on the response of staffs of the digital banking team which are selected using the sampling method explained below.

3.3 Sampling

Sampling can be defined as the process of obtaining information about an entire population by examining only a part of it.

3.3.1 Sampling Technique

This study employed multi stage sampling technique. First, 4 districts were randomly selected out of the 10 districts of CBE branches which are located in Addis Abeba and also including the head office of CBE. Then on the second stage questionnaires were distributed to the randomly selected digital banking staffs within those branches.

The digital banking staff members were identified and selected as the target population for this study as their professional roles and knowledge is directly related to the objectives of this study.

Based on the report of HR/MIS, the total number of employees which are located in Addis Ababa and specifically working within the digital banking department is 254. Out of this, 136 of them are located at the head office and the remaining 118 are located across the 10 districts of Addis Ababa.

3.3.2 Sample Size

The sample size of the study is determined by using Yamane formula as shown below.

$n = N / (1 + N (e^2))$ Where,

n = the required sample size

N = Total number of Population and

e = is the margin of error (0.05 is used for a 95% confidence interval)

By applying the formula:

$$n = 254 / (1 + 254(1 + (0.05)^2))$$

$$n = 155$$

Therefore, the sample size for this study is 155 respondents.

The following table show how samples are proportionally drawn from the target population by using purposive sampling method.

Table 1 Sample Size per Branch

No.	Branch/District Name	No. of Population	No. of Sample
1	Abiy Branch (HQ)	136	104
2	Megenagna Branch (District)	10	7
3	Kirkos Branch (District)	13	10
4	Arada Branch (District)	12	8
5	Merkato Branch (District)	12	10
Total		183	139

3.4 Data Source and Method of Data Collection

3.4.1 Data Source

In order to achieve the objective of this study, this study mainly used primary data using questionnaire. Primary data are first-hand information data collected specifically for the research project being undertaken. It can be collected through observation, interviews, or the use of questionnaires (Saunders et al., 2009, as cited in Endale,2017). In addition to the primary data, secondary data source is used for developing the theoretical foundation of this study, building the conceptual framework, and also for supporting interpretations of the primary data analysis.

3.4.2 Method of Data Collection

The primary data is gathered from professionals working at selected CBE banks located in Addis Ababa. And it is collected by distributing close ended questionnaires. The questionnaires are based on 5-point Likert scale ranging from 1 to 5. Where; Strongly Agree (SA) = 5, Agree (A) = 4, Neutral (N) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1.

Part 1 of the questionnaire consists of Likert items assesses about the dependent variable adoption

of M-banking practice at CBE. Part 2 of the questionnaire items aimed at assessing factors affecting the adoption of mobile banking practice in Commercial Bank of Ethiopia.

3.5 Measurement of Variables

This research employed the questionnaire items mainly from Tewodros (2021) and also other studies and adapted to the context this study. The questionnaire has a total of 29 items which are all closed-ended. 24 questionnaire items were used to measure the 8 independent variable, were each of the eight independent variables have 3 questionnaire items to assess their influence on the dependent variable M-banking adoption. The remaining 5 of the questionnaire items were used to assess the dependent variable M-banking adoption. The responses to the measurement items were scaled using the five-point Likert scales, from (1) ‘strongly disagree’ to (5) ‘strongly agree’.

Below is the discussion for the dependent and independent variables deployed in this study.

3.5.1 Technological Factors

The technological context refers to both the internal technologies currently in use within CBE and the external technologies available in the marketplace, as outlined by Tornatzky and Fleischer (1990) and reinforced by Baker (2011). The technological factors of this study include the following sub-components:

a) System Security

System Security in mobile banking primarily relates to confidentiality, requiring encrypted communication between devices and banks. In Ethiopian studies show that the absence of biometric authentication, weak behavioral monitoring, and insufficient fraud detection technologies increase vulnerability and fear among users (Sharew, 2021; Aragaw, 2018).

b) System Ease of Use

System complexity tells us as how simple or difficult is a technology is to understand and operate. Based on Rogers (1983), system complexity reduces the likelihood of adoption because users resist technologies that require additional effort or advanced skills.

c) System Compatibility

Compatibility reflects the extent to which a technology aligns with existing practices, systems, and values. At the individual level, it refers to consistency with prior experiences and user needs (Rogers, 1983). In mobile banking, compatibility determines how easily financial institutions can integrate new solutions into their infrastructure. Gyamfi et al. (2021) found that compatibility significantly influenced the adoption of mobile payment systems among small and medium enterprises in Ghana. High compatibility reduces resistance, minimizes transition challenges, and enables faster adoption.

3.5.2. Organizational Factors

According to Tornatzky & Fleischer (1990) and Baker (2011), organizational factors represent internal conditions such as structure, leadership, culture, and resource capability that influence whether a firm can implement new technologies. In the context of M-banking, this study employed top management support and resource availability as the most influential organizational factors. Strong managerial commitment ensures strategic alignment, vision, and reduced resistance to change, while adequate financial and human resources enable banks to invest in infrastructure, training, and security systems necessary for successful implementation (Bultum, 2014; Worku, 2023). These two elements have repeatedly been recognized as the main drivers of technology adoption as a result, they were prioritized for this study. Other organizational aspects, such as firm size, internal structure, or organizational culture, were excluded because prior evidence suggests their impact is not significant.

a) Top Management Support

Top management support refers to the commitment, involvement, and leadership provided by managers towards adoption of new technology. strong managerial support ensures strategic alignment, motivates employees, reduces resistance to change, and accelerates the adoption of new systems. Studies from Kenya A study by Wambui and Mugo (2021) has found that top management has a direct and significant effect on the implementation of M-banking projects in commercial banks in Kenya. In studies conducted in Ethiopia shows that when bank leadership demonstrates a strong commitment to M-banking, it fosters a culture of innovation and encourages staff to embrace new technologies. (Wambui & Mugo, 2021; Mezgebu, 2020).

b) Resource Availability

Resource availability refers to the adequacy of financial, human, and technical resources needed to implement and sustain mobile banking systems. As Bultum (2014) notes, A study by Bultum (2014) highlights that banks with adequate resources are more likely to adopt E-banking systems, as they can invest in the necessary infrastructure and provide training for is staff.

3.5.3 Environmental Factors

Environmental context is the arena in which a firm conducts its business, its industry, competes with its competitors, and collaborates with its suppliers and deals with regulatory pressures. (Mujahed et al., 2020). As noted by Atinkut Ayal (2018). environmental factor is the external environment in which an organization operates and its conditions for supporting the development of E-banking services. In the environment context, following 3 key sub factors were identified as having significant effect in the adoption of technology, specifically in M-banking.

a) ICT Infrastructure

The availability and reliability of network infrastructure, such as mobile networks, internet penetration and payment systems, have a significant influence on M-banking. In Ethiopian studies conducted on the adoption of technology consistently show that gaps in ICT infrastructure limit

access and while improvements in connectivity and system integration enhance adoption (Bekema, 2019; Aragaw, 2018).

b) Regulatory Environment

The banking sector in Ethiopia is regulated by the central bank, the NBE, to ensure the health of the financial sector and improve the efficiency of service provision. (Lelissa & Kuhil, 2018). Bank's regulatory variables are those variables used to control commercial banks' activities and its operational environment in a proper manner. While regulation protects financial stability, excessive or rigid regulation may slow technological innovation and restrict M-banking expansion (Lelissa & Kuhil, 2018; Yusuf & Shikur, 2023).

c) Market Competition

Market competition is the extent to which a firm is influenced by competitors in the market (Chau et al., 2020). Competition also plays a major role in M-banking technology deployment. It has been recognized that this pressure is a driving force for using the core banking technology by pressing organizations to constantly be on the hunt for a competitive edge. (Opoku et al., 2016). Conversely, a study conducted by Bultum (2014) found that the lack of competition between the Ethiopian banking sector and foreign banks is considered a barrier for the adoption of the E-banking system.

For all constructs of the study, a 5-point Likert scale measurement is deployed, starting with 1 to represents strong disagreement to scale 5 for strong agreement.

3.5.4 Mobile Banking Adoption

As shown in the conceptual framework, the dependent variable of this study is mobile banking adoption. According to the definition of Wade (2009) technology adoption refers to the stage or process in which technology or innovation is selected for usage by an individual or organization, Within the context of this study, M- banking adoption refers to the extent in which a firm has effectively implemented, integrated, and used mobile banking services. The study is conducted based on a case study on the Commercial bank of Ethiopia on selected branches of Addis Ababa city.

A total of 5 questionnaire items were used to assess M-banking adoption practice at CBE, using a 5-point Likert scale. Overall the questionnaire items on M-banking adoption (i.e the dependent variable) assess and measures the availability of information at CBE on guiding users how to use M-banking, availability of differentiated M-banking services compared to competitors , and the frequency of usage of M-banking services.

3.6 Data Analysis Technique

The researcher analyzed the collected data using SPSS version 23 software, employing descriptive analyses of means and standard deviations, as well as regression analysis to explain the relationship between the dependent variables. To analyze the reliability of the questionnaire items, Cronbach's Alpha was used. Cronbach's alpha is a reliability coefficient that indicates how well items in a set are positively correlated to one another. As stated in Sekaran and Bougie (2010), the closer Cronbach's alpha is to 1, the higher the internal consistency reliability and the greater the reliability of the instrument.

3.7 Ethical Considerations

Ethical considerations were taken into account throughout this study. The researcher has ensured the study adheres to basic ethical standards. Participation in the survey was voluntary, and respondents were informed about aim of the research beforehand. The anonymity and confidentiality of the participants were strictly maintained, and the data collected were used solely for academic purposes. In addition, the researcher has acknowledged all sources used for avoiding plagiarism.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1. Introduction

This section presents and discusses the results of the study. It includes the descriptive analysis and presentation of the regression results of the study. The data analyses were performed using SPSS software. In addition to the analysis data gathered through questionnaire, interview was conducted with key informants from the digital banking managers of the selected branches of CBE. This will provide better insight on understanding the factors influencing the adoption of mobile banking.

The following sections are included in the chapter.

- Response Rate and Statistical Tools Used
- Validity and Reliability
- Methods of Data Analysis

4.2 Response Rate and Statistical Tools Used

A total of 155 questionnaires were prepared and distributed to the respondents. Out of 155 questionnaires distributed, 139 were returned with complete response, and the rest 16 were discarded due to missing and incomplete response. This yielded a valid response rate of approximately 90%, which was used for the analysis. Thus, a sample of 139 valid responses was returned with complete response, representing a response rate of 90% approximately. Based on this data, the analysis of the study was conducted. The reliability of the questionnaire items was assessed using Cronbach's Alpha. The statistical tools employed in this study were descriptive statistics and regression analysis. For the analysis, SPSS software version 23 was employed.

4.3 Validity and Reliability

Validity and reliability are the two fundamental elements in the evaluation of a measurement instrument in research works. Instruments can be conventional knowledge, skill or attitude tests, clinical simulations or survey questionnaires.

4.3.1 Validity

Validity refers to the extent in which a research instrument accurately measures what it intends to measure. Validity is concerned with how well the concept is defined by the measure(s), whereas reliability relates to the consistency of the measure(s). (Hair et al.,2019).

To ensure content validity, this study adopted questionnaire items from prior empirical research and modified them to fit the mobile banking context. reviewing relevant literature those align with the framework of this study. This study attempted to address the validity of the measurement instrument. To further ensure the validity, the measuring instrument was reviewed by academic supervisor to confirm the relevance and clarity of the construct items.

4.3.2 Reliability

Reliability is the extent to which any measuring instrument or procedure yields the same result on repeated trials. If multiple measurements are taken, the reliable measures will all be consistent in their values. It differs from validity in that it relates not to what should be measured, but instead to how it is measured. (Hair et al.,2019).

Without the ability to use research tools and procedures that yield consistent measurements, researchers would be unable to satisfactorily conclude, formulate theories, or make claims about the generalizability of their research. (Writing@CSU,2024).

Table 2 Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	Number of Items
.900	29

survey data SPSS output

In order to evaluate the reliability of a measuring instrument, researchers often use Cronbach's alpha, it is expressed as a number between 0 and 1. (Tavakol and Dennick,2011). Cronbach's alpha is used to ensure the internal consistency of the construct items. According to George & Mallery (2003), so as to accept the instrument the value of alpha should be greater than 0.7 .

As shown in the above Cronbach's Alpha reliability test statistics, the entire collection of items is reliable as the coefficient of Cronbach's Alpha is 0.900 which is greater than the acceptable standard value of 0.7. This indicates a high internal consistency on the questionnaire items under the same variable category. It also indicates respondents who tended to select high scores for one item also tended to select high scores (within the same category) for the others and vice versa.

4.4 Descriptive Statistics

This study employed descriptive statistics in order to summarize respondents perceptions regarding the dependent variable M-banking adoption practice at CBE and also the independent variables which are under the technology, organization and environmental factors. Specifically, it includes mean, and standard deviation to summarize the survey data.

Table 3 Descriptive Statistics for the

	N	Minimum	Maximum	Mean	Std. Deviation
TECHNOLOGY	139	1.67	5.00	3.9001	.67471
ORGANIZATION	139	1.67	5.00	3.7770	.82570
ENVIROMENT	139	1.67	5.00	3.3213	.69848
Valid N (listwise)	139				

survey data SPSS output

The Likert scale questionnaire items of this study ranges between 1 to 5 points, where:

1 stand for indicating strong disagreement, 2 Disagree, 3 for neutral, 4 agree and 5 for strong agreement. After calculating the average values for the sub-items (which are already introduced in the conceptual framework and briefly explained in chapter 2) under technology, organization and environment, the following interpretations are made.

Technology Factors

After calculating the combined average mean of the technological factor (which includes system security, system ease of use and system compatibility), the technology dimension of the TOE framework was found to have the highest mean of 3.9 with a standard deviation of 0.67471. This implies that respondents have generally agreed on the importance of technological factors in adoption of M-banking. In addition, the relatively moderate standard deviation suggests that the different respondents of the study have held fairly consistent views on their response.

Organizational factors

Similarly, after calculating the combined average mean of organizational factors (which includes top management support, available resource) we get a mean of 3.77 with a standard deviation of 0.82570. This implies that overall, respondents have moderately agreed on the perceived importance of organizational factors on M-banking adoption. In addition, the higher standard deviation implies participants of the held some degree of variations on their response.

Environmental Factors

The combined average mean of the environmental factors (which includes ICT infrastructure, regulatory environment and market competition) is 3.32 with standard deviation of 0.70. In contrast to technology and organization has the lowest mean of 3.32 with standard deviation of 0.70. This implies that respondents of this study have overall perceived environmental factors are neither strongly enabling nor inhibiting factors in adoption of M-banking.

4.5 Mobile banking Practice at Commercial Bank of Ethiopia

In addition to the analysis of the closed end questionnaire distributed to respondents, managers of the digital banking were interviewed as key informant. This supports the findings of this study to better understand the practice of M-banking at the Commercial Bank of Ethiopia (CBE), managers from the digital banking department were interviewed. CBE has several departments but the researcher focused on the digital banking department based on the objective of the study. The digital banking division is mainly responsible for mobile and internet banking services. It includes the sub-divisions namely; card banking, agent banking, mobile banking, and internet banking. Mobile banking is one of the core subdivisions, tasked with expanding digital service delivery.

Mobile banking operations at the Commercial Bank of Ethiopia (CBE) has several internal and external challenges that affect its adoption. As per the response of one of the digital banking managers, despite the availability of mobile banking services, customer awareness is still limited. Mentioning that even well-educated clients of the bank often prefer to visit branches for simple transactions that could have been completed through ATMs or mobile app platforms.

According to the response on another digital-banking managers interviewed, one of the major internal system related challenges in M-banking is service interruptions. Disruptions occur both intentionally when the bank schedules planned core-banking upgrades or maintenance and unintentionally. And these intentional disruptions are not indicators of instability of the system, rather it helps ensure the deployment and integration of advanced features and achieve banks digital transformation strategy. The other system failure is unintentionally which is due to failures in internal infrastructure components. Temporary outages reduce service availability and user confidence, a pattern also reported in empirical studies of digital banking in developing countries (Getachew, 2021). CBE emphasizes on ongoing system upgrades and infrastructure investments in order to ensure uninterrupted digital service delivery (CBE Annual Report, 2023–24).

In relation to external business environment factors, overall, the digital banking managers highlighted that unstable national internet connectivity is a significant barrier to its adoption and facilitation of digital banking services. the bank's app-based platform communicates over commercial data networks, the bank

does not pay third parties for app transactions; conversely, the USSD channel imposes recurring telecom fees on the bank. Managers also raised operational customer-side problems such as SIM loss, SIM recycling/reassignment, and reactivation, which create identity and access conflicts with previously registered mobile-banking numbers, resulting in a decrease in the number of M-banking users. These practical issues align with national assessments and international studies, which show that network reliability and SIM lifecycle problems hinder digital payment uptake (NBE, 2024; UNCDF/Migrant Money, 2023). One key informant also noted that recent central-bank policy has been supportive—for example, the National Bank of Ethiopia’s adoption of an interoperable QR-code Standard (mandating a national QR standard) is intended to increase interoperability and user confidence; similar central-bank QR mandates in other countries have been linked to higher QR adoption (NBE Interoperable QR Standard, 2024; research on QRIS/Central bank policy effects).

In response to why many customers including educated users still visit branches, the digital banking team managers overall respond that as several transactions require physical receipts (e.g., certain school-fee payments, some business settlements), and concerns about fraud and social engineering make some clients prefer face-to-face services.

With regard to service channel strategy, as per the response of the key informants, CBE is providing both USSD and app-based mobile banking but actively encourages app use because it is more secure, easier to upgrade, and does not require per-session telecom fees paid by the bank; by contrast, USSD usage creates direct operational costs for the bank. Finally, a respondent claimed that CBE allocates about 70% of its annual IT/digital budget toward digital-banking facilitation; this is reported as interview evidence in this study but could not be confirmed from publicly available budget breakdowns in the CBE Annual Report (the report does, however, show very large volumes through digital channels, indicating strong institutional emphasis on digital services). Where possible, findings above are compared with prior studies and central-bank policy documents to show agreement or divergence with existing evidence.

4.6 Correlation analysis

The purpose of this analysis is to examine the relation between the dependent variable and the independent variables technology, organization, and environment using Pearson correlation analysis.

Pearson Correlation Between the Dependent and Independent Variables

Table 4 Pearson Correlation Between the Dependent and Independent Variables

		MBA
TECHNOLOGY	Pearson Correlation	0.556**
	Sig (2-tailed)	< 0.0.1
	N	139
ORGANIZATION	Pearson Correlation	0.262**
	Sig (2-tailed)	< 0.0.1
	N	139
ENVIROMENT	Pearson Correlation	0.270**
	Sig (2-tailed)	< 0.0.1
	N	139
** Correlation is significant at the level of 0.01 level (2-tailed)		

As shown in the correlation analysis output above, all three elements of TOE are both significantly and positively correlated with M-banking adoption. The first element of TOE (i.e., technology), has shown the highest correlation value ($r=0.566$) with the dependent variable: implying a strong positive relationship or association exists between technological factors (which includes system security, system ease of use and system compatibility) with adoption of M- banking. Then, it is followed by the moderate association

The correlation between environmental factors and adoption of M-banking is ($r = 0.270$) which implies that the moderate association exists between the two independent variables. And the lowest correlation ($r=0.262$) was observed between organizational factors and the dependent variable.

In all cases of the correlation between the dependent and independent variables of the study, their p-value is below 0.01, which implies statistical significance correlation exists among them. So that the significance correlation between the dependent and independent variables satisfies the prerequisite to conduct the multiple regression analysis for the study.

Table 5 Correlation between the Independent Variables

		TECHNOLOGY Composite	ORGANIZATION Composite	ENVIROMENT _Composite
TECHNOLOGY Composite	Pearson Correlation	1		
	Sig. (2-tailed)	.000		
	N	139		
ORGANIZATION Composite	Pearson Correlation	.625**	1	
	Sig. (2-tailed)	.000		
	N	139	139	
ENVIROMENT Composite	Pearson Correlation	.566**	.567**	1
	Sig. (2-tailed)	.000	.000	
	N	139	139	139

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis table above between the independent variables shows that technology, organization and environment are correlated positively and significantly with one other at significant level of $P < 0.01$. Specifically, technology is moderately correlated with organization ($r=0.625$), and organization with environment have Pearson correlation ($r=0.567$) and technology with environment ($r= 0.566$). The correlations values among the independent variables implies they tend to move together which causes shared or overlapping variance among them. When predictors are correlated with each other, their unique contribution in variation on the dependent variable becomes smaller. In turn, this may cause the multiple regression coefficient magnitude sign to change when they are entered together, even though the bivariate relationship of the independent variables to the dependent variable is positive.

As discussed in Hair et al. (2019) suppression effect is the instance in which the expected relationships between independent and dependent variables are hidden or suppressed, and causing the magnitude or even the sign of the regression coefficients to change. This implying the independent variables with negative coefficients namely organization and environment have lower correlations with the dependent variable. (Hair et al ,2019).

4.7 Regression Analysis

The regression analysis was employed to examine the influence of technological, organizational, and environmental factors on mobile banking adoption, which is guided by the TOE framework. The model specification is presented as follows:

$$MBA = \beta_0 + \beta_1(TEC) + \beta_2(ORG) + \beta_3(EF) + \varepsilon \quad \text{Where,}$$

MBA = Mobile Banking Adoption

TEC = Technology factors

ORG = Organizational factors

EF = Environmental

ε = is the error term

4.7.1 Model Summary

Table 6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.567 ^a	.321	.306	.63634

SPSS output

Interpretation of R² and Adjusted R²

The R² values indicate the explanatory power of the model to explain the dependent variables. And adjusted R² value, which takes into account the loss of degrees of freedom associated with adding extra variables, was inferred to see the explanatory powers of the models. As shown above in the table, the R-squared statistics and the adjusted R-squared statistics of the model were 32.1 % and 30.6 % respectively implies that the model is a good fit. The adjusted R-squared indicates that 30.6 % of the variations in adoption in M-banking at CBE were explained by the independent variables included in the model. However, 67.9% of the variations in adoption of M-banking was explained by other factors that are not included in the model.

4.7.2 Analysis of Variance

Table 7 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.842	3	8.614	21.273	.000 ^b
	Residual	54.665	135	.405		
	Total	80.507	138			

a. Dependent Variable: MBA

b. Predictors: (Constant), ENVIRONMENT, TECHNOLOGY, ORGANIZATION

The Analysis of Variance (ANOVA) table shows an F-statistic of 21.273 with $P < 0.01$. Since the p-value is less than the significance level, the null hypothesis that states the independent variables have no collective influence on M-banking adoptions is rejected. Thus, The ANOVA table confirms that the TOE framework which encompasses technological, organizational, and environmental factors significantly predicts M-banking adoption at CBE.

4.7.4 Interpretation of the Regression Coefficients

The regression model summarizes on the combined effect of the independent variable on the dependent variable M-banking. And the equation below shows the model with the substituted values.

$$MBA = 1.72 + 0.737(TEC) - 0.12(ORG) - 0.026(EF) + \epsilon$$

Below is a discussion for the regression coefficients on their influence on M-banking adoption. It is based on the table of output of the regression analysis, as shown below.

Table 8 Interpretation of the Regression Coefficients

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.722	.334		5.149	.000		
	TECHNOLOGY_Composite	.737	.109	.651	6.770	.000	.544	1.838
	ORGANIZATION_Composite	-.121	.089	-.131	-1.361	.176	.543	1.842
	ENVIROMENT_Composite	-.026	.100	-.024	-.261	.795	.605	1.652

a. Dependent Variable: MBA_Composite

1. Technology Factors: The technological element of the TOE framework has shown a statistically significant positive influence ($\beta = 0.737$, $p < 0.05$) on adoption. This result strongly supports the assumption of this study that technological factors are a primary determinant of M-banking adoption.

2. Organization Factors: As shown above, the negative value of the coefficient ($\beta = -0.121$, $p > 0.05$) implies that as the organization factor increases, the dependent variable tends to decrease, while holding other factors constant. However, since the p-value (0.176) is much greater than 0.05, organization factors is not statistically significant predictor of adoption at the 5% significance level.

3. Environment Factors: With coefficient $\beta = -0.026017$, $p > 0.05$, similar to the organizational factor, the p-value (.795) of the environment factor is much greater than 0.05, this implies that environment element of TOE framework is not statistically significant in predicting adoption at the 5% level.

Furthermore, the negative value of the coefficient ($\beta = -0.026$) implies as the impact of environment factor increases, adoption tends to decrease while keeping other factors constant.

Overall, in the multiple regression coefficient technology and environment have negative coefficients, however in the bivariate regression relationship between these two TOE elements and the dependent variable is positive. This is likely caused by the shared variance and suppression effect among the explanatory variables, rather than a true inverse relationship among them and the dependent variable.

As discussed in Hair et al. (2019) suppression effect is the instance in which the expected relationships between independent and dependent variables are hidden or suppressed, and causing the magnitude or even the sign of the regression coefficients to change.

4.8.4 Regression Diagnostics

For this study analysis, before running the regression analysis, the necessary diagnostic tests were conducted in order to ensure the validity of the model. It includes a test for multicollinearity (tolerance and VIF), normality of the residuals (using Q-Q plot and histogram), and homoscedasticity by scatterplot of the residuals. As shown by the results of these tests below, the assumption for a linear regression model is met.

4.8.4.1 Multicollinearity Check

Multi collinearity test was conducted in order to determine the correlation of the independent variables. Multicollinearity refers to the extent to which an independent variable can be explained by other independent variables in the analysis and if too high this can have harmful effect on the regression.

Two approaches were utilized in order to determine the presence of multicollinearity among the independent variables in this study. Namely, Tolerance test and Variance Inflation Factor (VIF), where the one is the reverse of the other. According to Hair et al. (2019), as the tolerance value grows smaller, the one independent variable is more highly predicted by the other independent variables (collinearity). a tolerance value close to 0.1 (equivalent to $VIF > 10$) indicates serious multicollinearity issue and a tolerance value should be high, which means a small degree of multicollinearity. (Hair et al. ,2019).

Table 9 Multicollinearity Check:

Collinearity Statistics		
Independent Variable	Tolerance	VIF
Technology	0.544	1.838
Organization	0.543	1.84
Environment	0.605	1.65

SPSS Output

The tolerance was used to assess the degree of shared variance among the independent variables. A tolerance value below 0.2 indicates a possible Multicollinearity problem, and below 0.1 indicates serious multicollinearity. (Hair et al. 2019) But, in this study, as shown from the output of the collinearity statistics table tolerance value for technology (0.544), organization, and environment (0.605) are all above 0.20, indicating that none of the independent variables are excessively explained by the other.

Similarly, their respective VIF values of the TOE elements which is calculated simply by inverting of the tolerance and their value shown above, all far below the critical value 10, which implies the regression model does not suffer from a multicollinearity problem.

4.8.4.2 Normality and Homoscedasticity

Normality is the degree to which the distribution of the sample data corresponds to a normal distribution. Whereas, homoscedasticity refers to the assumption that dependent variable exhibit equal levels of variance across the range of predictor variables. (Hair et al. ,2019)

Normality Check (Standardized Residuals Graph)

As shown below in the standardized residual plot, the residuals are approximately normally distributed across a range of values, which supports the assumption that homoscedasticity (i.e., constant variance of the errors) is met. Thus, implying that the regression model does not suffer from a heteroskedasticity problem.

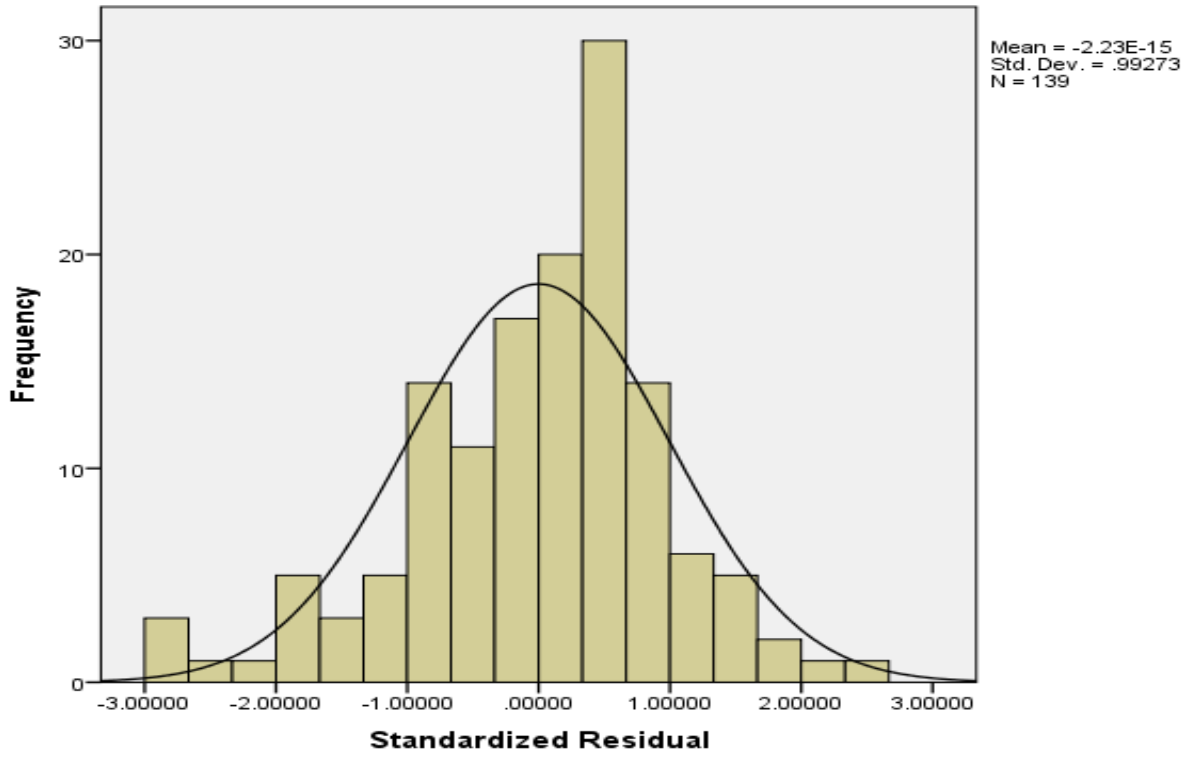


Figure 3 Standardized Residuals Graph

Q-Q Plot of the standardized residuals

The Q-Q plot of the standardized residuals below shows that the points or the error terms are closely aligned along the straight line or ideal normal distribution line. Indicating that the residuals are approximately normally distributed. This implies the normality of the residuals assumption of the regression model is met.

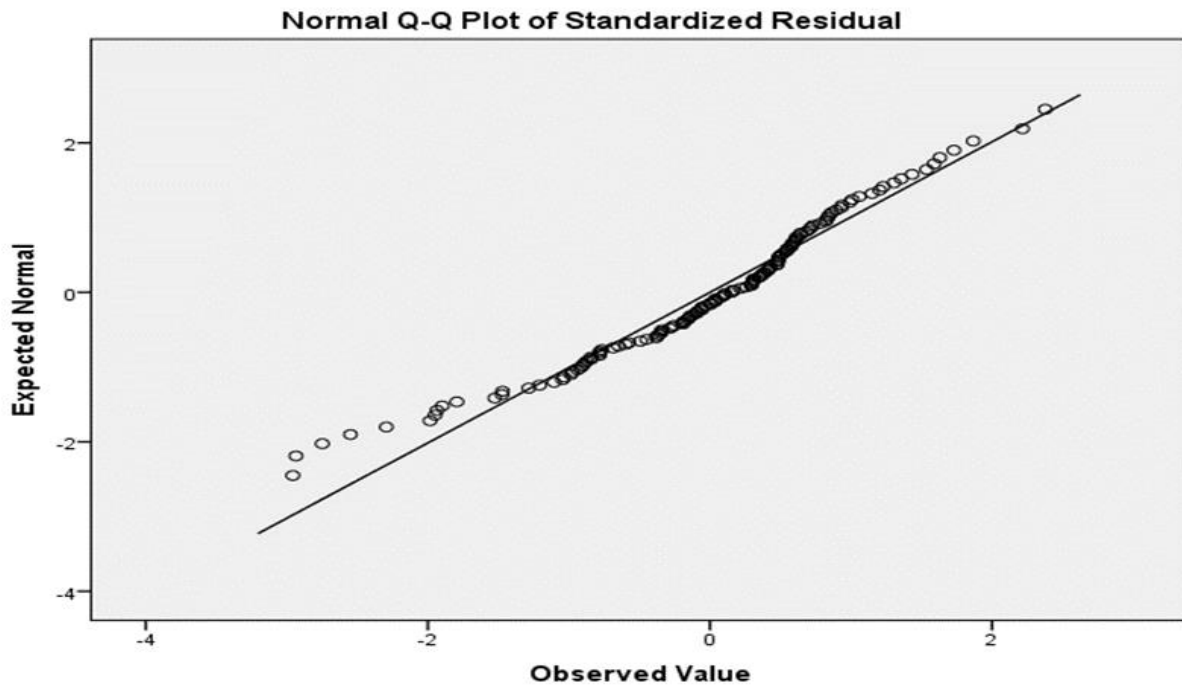


Figure 4 Q-Q Plot of The Standardized Residuals

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Summary of Major Findings

This study examined the factors influencing the adoption of mobile banking at the Commercial Bank of Ethiopia (CBE) using the Technology–Organization–Environment (TOE) framework. While previous research theoretical models often focused on individual-level models such as TAM, TPB, and UTAUT, this research focused on examining the effect of institutional-level factors on mobile banking adoption. It is based on a case study of CBE staffs working in randomly selected branches in Addis Ababa city. A total of 139 valid responses were collected, yielding a response rate of 90.0%, and the reliability of the questionnaire instrument was confirmed with a Cronbach’s Alpha of 0.900.

As discussed in the previous chapter, the descriptive analysis output showed that respondents have generally agreed on the importance of technological factors on M- banking adoption. Also, on organizational factors respondents have overall agreed its perceived importance on adoption of M-banking. However, environmental factors which has shown the lowest average mean, which implies respondents of this study overall perceived that environmental factors are neither strongly enabling nor inhibiting factors in the adoption of M-banking.

The result of the regression analysis has shown that the most significant influence from the TOE dimension arises from technological factors, it has shown the strongest association with M-banking adoption. Overall, the regression model of the study significantly explains the variation in M-banking adoption at firm level within the context of the study. Although organizational and environmental variables have negative coefficients in the multivariate regression model, this was likely due to shared variance among the independent variables and technology was found to have absorbed the predictive power.

In addition, interviews with the digital banking managers mentioned the main challenges that need to be addressed those are; system downtime causing service interruptions, unstable national internet connectivity, the customer need for physical receipts, and concerns about fraud and social engineering.

5.2 Conclusion

By using the TOE framework as a guiding theoretical framework, this study has analyzed the influencing factors of M-banking adoption based on the Commercial Bank of Ethiopia as the case study. The study findings indicate that adoption of M-banking is mainly driven by the technological element of the TOE framework. While CBE has implemented a reliable system with sufficient basic features, achieving high adoption rates demands moving from basic functionalities to robust, uninterrupted reliability and improved security.

In response to the first research question, the study's finding shows that technological factors, which included system security, system ease of use, and system compatibility, have shown a strong influence on the adoption of M-banking. This implies the importance of having a secure, reliable, and user-friendly technological platform for financial institutions.

In response to the second and third research questions focusing on the impact of organization and environment elements of TOE, the bivariate regression model of the dependent variable shows a positive relation with organization and environment TOE elements. This implies that top management support, and firm available resources, ICT infrastructure, regulatory environment, and market environment positively contribute to adoption. However, in the multiple regression model, the beta coefficient of organization and environment is negative, implying an inverse relationship between the dependent variable versus organization and technology elements of TOE. Consequently, the unique contribution of organization and environment is reduced to statistical insignificance in the multivariate regression analysis.

The last question of this research aims at identifying which dimension of the TOE element has the most significant influence arise from in predicting adoption. The result of the regression analysis has shown that the technology element of TOE has the most significant influence in predicting the adoption of mobile banking in the context of CBE.

Overall, the dominant technology factor accounts for the majority of the predictive power among all three and effectively absorbs the shared variance. Consequently, the unique contribution of the Organization and Environment factors is reduced to statistical insignificance in the multivariate regression analysis.

The findings of this study are consistent with a recent study conducted by Sharew T. (2021) and Gessesse (2025), which identifies technological factors as the primary determinant of adoption in the Ethiopian context. This study has identified technological factors as a significant determinant of adoption. However, the findings of this study also differ from prior studies. One of these is a study conducted by Bultum (2014), which found that the biggest obstacles to adoption are environmental issues, particularly the absence of a legal or regulatory framework and inadequate ICT infrastructure. Although the environment used to be a key obstacle, recent advancements in national connectivity and regulation have lessened the impact of the environment-related factors.

Unlike prior studies, which primarily focused on customer perceptions or individual-level factors, this research contributes to the existing body of knowledge by focusing its analysis of M-banking adoption factors at firm-level.

5.3 Recommendations

Based on findings of the study, the following recommendations were made.

1. **Cooperate with MNO's (Mobile Network Operators):** The bank should actively work on and coordinate with MNO's (Ethiotelecom and Safaricom) to address the issue of unstable national internet connectivity revealed by the findings of this study and response of the managers of the digital banking staff. This will ensure service reliability.
2. **Strengthen Acceptance of Digital transaction Confirmations:** CBE should work with government bodies, and business organizations to ensure recognition and acceptance of digital transactions confirmations as proof of payment, thereby reducing the need for customers visit of branches for physical receipts.
3. **Support Interoperability and Digital Trust:** NBE should continue to support standards like the QR-code as it will improve the usage of digital banking services across different platforms. Furthermore, regulatory bodies must establish clearer, faster, and more robust processes for addressing SIM lifecycle issues (loss, recycling) so as to minimize identity mismatch and maintain and increase the adoption of M-banking.

5.3.1 Recommendations for Future Research

1. Integrate individual level adoption models: Future studies should address the limitations of the TOE framework by incorporating it with frameworks those focus on individual behavioral factors (such as TAM or UTAUT).

2. Conduct Comparative Studies Across Different Banks: Perform a comparative study between CBE and its competitors.as it will improve the generalizability of the findings through broader perspective. Furthermore, it will address or help identify firm specific factors.

3. Broaden the Research Scope: This study is mainly based on the response of the digital banking staff within the selected branches of CBE in Addis Ababa city. So to increase its generalizability power the researcher recommends future researchers to broaden the scope of the research outside Addis Ababa and including other banking institutions.

5.4 Limitations of the Study

Below are the limitations identified in this study:

1. This study was restricted to examining the effect of M-banking adoption from the perspective of digital banking professionals. Incorporating the perspective of consumers of the bank M-banking services in future studies could improve its generalizability into wider perspective.
2. The study is based on cross-sectional data at CBE and captures respondents' opinion at single point in time, as result the finding may not fully reflect emerging or long-term trends and.
3. Individual level factors were not included only focused firm level, which may have benefited from wider perspective understanding on adoption determining factors from the consumer's side.
4. The study generalizability is based on Addis Ababa the capital city and based on a case study at CBE. This may create significant geographic limitation because the results do not account on rural context, this may create limitation on the applicability of the study findings in rural Settings of the country. In addition, caution should be taken on its applicability of the findings to Private or other banks.

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ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF BUSINESS ADMINISTRATION

Research Title: Factors Affecting Adoption of Mobile Banking: A Case Study on Commercial Bank of Ethiopia

Name of Researcher: Matiyas Worku

Contact Email Address: maty84w@gmail.com

Dear Sir/Madam,

I am a postgraduate student of MBA, currently undertaking the aforementioned research in a partial fulfillment of the award of Masters of Business Administration at Addis Ababa University. The general purpose of the study is to identify factors affecting the adoption of mobile banking in Addis Ababa within the context of CBE bank. I believe that the study result would benefit not only the bank but also other stake holders in the area.

As staff member and professional working at the banking sector, you are one of the respondents selected to participate in this study. I kindly request you to assist me in giving me correct and complete information so that it is possible to come up with valid findings for this study. The information you give will be treated with strict confidentiality and is solely for academic purpose.

Thank you in advance for your kind cooperation in filling up this questionnaire.

Part 1: Questions related to Mobile Banking adoption practice at Commercial bank of Ethiopia.

Please provide your answer by **circling** on the number using the scale given below.

1=**Strongly Disagree** | 2=**Disagree** | 3=**Neutral** | 4 = **Agree** | 5 = **Strongly Agree**

No	Mobile banking adoption Practice at CBE					
1	The Bank gives information on its website or other media on how to use mobile banking for new users.	1	2	3	4	5
2	The mobile banking services of the bank are provided by multiple languages.	1	2	3	4	5
3	CBE provides differentiated mobile banking products and services compared to competitors.	1	2	3	4	5
4	Commercial bank of Ethiopia is improving and updating its mobile banking services continuously.	1	2	3	4	5
5	Most of our customers regularly use CBE’s mobile banking service.	1	2	3	4	5

Part 2: Questions related to factors affecting the adoption of mobile banking practice at CBE.

Please provide your answer by **circling** on the number using the scale given below.

1=**Strongly Disagree** | 2 = **Disagree** | 3 = **Neutral** | 4 = **Agree** | 5 = **Strongly Agree**

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No	TECHNOLOGICAL FACTORS					
	System Security					
1	CBE's M-banking system implements strong authentication method for ensuring only authorized users can access accounts.	1	2	3	4	5
2	CBE has reliable mechanism in place to detect and prevent fraudulent M-banking transactions.	1	2	3	4	5
3	Our M-banking system employs effective security system for ensuring customers data privacy and confidentiality.	1	2	3	4	5
	System Ease of Use					
4	Our bank provides clear guidelines and simple registration process for m-banking.	1	2	3	4	5
5	Our M-banking system is user friendly and easy for bank staff to operate and manage.	1	2	3	4	5
6	Our bank can integrate and update M-banking function without difficulty when needed.	1	2	3	4	5
	System Compatibility					
7	The mobile banking system align well with our existing IT Infrastructure	1	2	3	4	5
8	Mobile banking integrates seamlessly with our bank internal processes.	1	2	3	4	5
9	Mobile banking technology fits our organizational culture.	1	2	3	4	5
	2.ORGANIZATIONAL FACTOR					
	Available Resource					
10	There is adequate human resource to implement mobile banking projects in CBE.	1	2	3	4	5

11	Our bank has adequate internal ICT infrastructure to effectively support M-banking adoption.	1	2	3	4	5
12	CBE Staffs are well trained to effectively manage and operate mobile banking systems.	1	2	3	4	5
	Management Support					
13	Top management is readily available for decision making and advice on the implementation of M-banking ventures.	1	2	3	4	5
14	Top management is committed to adopting new technologies.	1	2	3	4	5
15	Our top management actively engage in developing a vision and formulating strategies to leverage mobile banking service effectively.	1	2	3	4	5
	ENVIRONMENTAL FACTOR					
	ICT Infrastructure					
16	ICT infrastructure of the city is sufficient for proper and efficient delivery of mobile banking service.	1	2	3	4	5
17	Internet connection of the city is sufficient enough to support App based mobile banking.	1	2	3	4	5
18	There is stable network availability in the city to reliably support USSD based mobile banking.	1	2	3	4	5
	Regulatory Environment					
19	Regulations by NBE are clear and timely, supporting the rollout of new digital products in our bank.	1	2	3	4	5
20	NBE's regulatory requirements allow flexibility for innovation in M-banking services.	1	2	3	4	5
21	Meeting regulatory requirements (such as reserve, capital, liquidity) is manageable and does not hinder the operation of digital banking at CBE.	1	2	3	4	5
	Market Competition					

22	Competition from Fintechs and telecom based mobile wallets (e.g Tele-birr, M-pesa) pressures our bank to improve mobile banking services.	1	2	3	4	5
23	Competition in the financial sector influenced our bank initial decision to adopt mobile banking.	1	2	3	4	5
24	Competitors digital innovations are pressuring our bank to accelerate mobile banking rollout and innovation.	1	2	3	4	5

Thank you again for your cooperation!

Part 3: Interview questions for digital banking managers of CBE (key informants).

1. How is the digital banking division structured at CBE?
2. Why do many customers including well educated ones still use or prefer to visit branches for services those could have been performed through M-banking?
3. What internal system related challenges are affecting the smooth delivery of M-banking?
4. What are the external technological related challenges those affect the smooth delivery of CBE's digital banking services?
5. How does the regulatory environments and changes affect M-banking operation and adoptions?
6. What initiatives is CBE taking to increase the adoption of M-banking?