



ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

**THE EFFECT OF DIGITAL SYSTEMS IN CORE BANKING ON
ENHANCING PERFORMANCE IN COMMERCIAL BANKS OF
ETHIOPIA.**

BY

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June 27, 2025

Addis Ababa, Ethiopia

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DECLARATION

I, the undersigned, declare that this thesis proposal is my original work, prepared under the guidance of Reta Megersa (PHD). All sources of materials used for the thesis proposal have been duly acknowledged. I further confirm that the thesis proposal has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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Endorsement

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

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JULY, 2025

ADDIS ABABA, ETHIOPIA

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Acronyms

API – Application Programming Interface

ATM – Automated Teller Machine

CBE – Commercial Bank of Ethiopia

CBS – Core Banking System

DOI – Diffusion of Innovation Theory

PEOU – Perceived Ease of Use

PU – Perceived Usefulness

TAM – Technology Acceptance Model

TOE – Technology–Organization–Environment Framework

UTAUT – Unified Theory of Acceptance and Use of Technology

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Abstract

Over the past ten years, the banking industry has undergone significant digital transformation, changing how financial services are offered and accessed. When it comes to implementing digital solutions like ATMs, CBE Birr, internet banking, mobile banking, and API integration, the Commercial Bank of Ethiopia (CBE) has led the way in Ethiopia. This study looks at how CBE's performance is affected by these digital systems in core banking. In particular, it examines how they affect customer performance assessment, transaction volume, and transaction value. Utilising secondary transaction data from CBE and structured surveys, a quantitative research approach was adopted. In order to assess established hypotheses, the data was analysed using regression, correlation, and descriptive statistics. The findings demonstrate that, despite ongoing challenges with digital literacy and infrastructure limitations, digital systems significantly improve the bank's operational performance. For banking institutions and regulators looking to enhance digital banking strategies and advance financial inclusion in developing nations like Ethiopia, the study offers crucial viewpoints.

Keywords: *Digital banking, Core banking systems, Mobile banking, Internet banking, CBE Birr, API integration, Bank performance, Ethiopia*

CHAPTER ONE

INTRODUCTION

1.1 Background Of the study

Over the past few decades, the financial services sector has seen significant technological breakthroughs that have profoundly changed the way banks operate globally. Core banking systems (CBS), internet banking, and mobile banking are examples of innovations that have centralized operations and enhanced operational performance. Banks can save operating costs, automate manual operations, and extend service delivery to neglected areas thanks to these solutions (Mori, 2024). By fusing cutting-edge digital solutions with conventional banking frameworks, these technologies have promoted financial inclusion and bolstered economic growth in developed economies (Jackson, 2024).

In the middle of the 20th century, developed countries started to introduce technology like ATMs, electronic payment systems, and integrated CBS, which marked the beginning of the shift from manual banking processes to completely automated systems. These developments made it possible to conduct transactions in real time, centralized data processing, and simplified regulatory compliance (Modak, 2024). Digital platforms like the internet and mobile banking revolutionized client experiences during the late 1990s, making financial services accessible around-the-clock. This change made banks more competitive in the digital era and gave them new chances to satisfy consumer demands (Abbas, 2024).

Digital banking technology have been used in emerging nations to address enduring infrastructure issues as well as to promote financial inclusion. By offering mobile banking solutions that smoothly connected with CBS, for instance, Kenya's M-Pesa transformed financial services and gave millions of unbanked people access to necessary banking services (Mansour & Bujosa, 2024). Neobanking systems, which use mobile platforms and blockchain technology to reduce operating costs and enhance service delivery, have also become important facilitators of financial inclusion (Modak, 2024). However, the full potential of digital transformation is hampered by issues that many African banks face, including inadequate digital literacy, cybersecurity concerns, and restricted internet access (Jackson, 2024).

When it comes to implementing digital banking technologies, Ethiopia, which has one of the biggest populations in Africa, has fallen behind its peers. The majority of Ethiopian banks used time-consuming, prone to mistakes manual procedures until recently. A major turning point in the nation's banking history was reached in 2012 when the Commercial Bank of Ethiopia (CBE) introduced the T24 Core Banking System. T24 made it possible for CBE to implement contemporary banking services like internet, mobile, and ATM banking, centralize its operations, and process transactions in real-time (Bekele, 2022). CBE became a leader in Ethiopia's digital transformation as a result of these innovations, which improved operational performance (Seyoum, 2019).

Ethiopia's digital revolution is nevertheless happening more slowly than in other African nations, notwithstanding these developments. Among the particular difficulties faced by Ethiopian banks are poor infrastructure, frequent power outages, and low internet penetration. Furthermore, legal obstacles impede innovation, and inadequate employee training and a lack of digital literacy among clients further impede the efficient use of digital technologies (Mansour & Bujosa, 2024). These obstacles highlight the significance of focused investments in cybersecurity, infrastructure, and education to enhance operational performance and optimize digital banking systems.

This study critically analyzes the ways in which digital systems integrated into core banking infrastructure such as ATMs, CBE Birr, internet banking, mobile banking, and API integrations affect the Commercial Bank of Ethiopia's (CBE) operational performance within the framework of Ethiopia's developing banking industry. The focus of the study is on quantifiable results, such as the quantity of transactions completed, their monetary value, and client opinions about the efficacy and quality of the services. The study aims to determine the degree to which digital platforms support service uptake, operational scalability, and perceived performance improvements within the bank's service ecosystem by combining institutional data with a customer performance perception survey.

1.2 Statement of the Problem

Global banking operations have undergone a fundamental transformation as a result of the digital revolution, with digital technology allowing banks to improve operational performance. But even with these developments, Ethiopia's banking industry still faces several obstacles, which causes it to develop more slowly than its African counterparts. While nations like South Africa and Kenya

have improved financial inclusion by utilizing modern core banking systems (CBS) and digital banking platforms like M-Pesa, Ethiopia still faces challenges incorporating these technologies into its banking operations (Hordofa, 2023; Berecha, 2016).

In order to modernize its operations and offer digital banking services like internet banking, mobile banking, and automated teller machines (ATMs), the Commercial Bank of Ethiopia (CBE), the nation's biggest bank, deployed the T24 Core Banking System in 2012. Although this was a big step in the direction of digital transformation, a number of obstacles have prevented these systems from reaching their full potential (Berecha, 2016). Particularly in rural and underprivileged areas, infrastructure obstacles like poor internet connectivity and frequent power outages have made it difficult to provide services. Customers become frustrated and lose faith in digital banking as a result of transaction failures and system outages caused by these infrastructure problems, which also compromise the dependability of digital platforms (Sisay, 2021).

Customers' and workers' poor levels of digital literacy also hinder the uptake and efficient usage of digital banking platforms. In rural Ethiopia, a large number of clients still do not have access to smartphones or the fundamental financial understanding needed to use online or mobile banking services. Institutionally, banks are unable to fully utilize their digital potential due to operational performance issues caused by inadequate training for bank staff on digital system management (Geressu, 2024). Another major factor impeding the adoption of breakthrough technologies is regulatory obstacles. The banking industry's ability to grow and innovate is hampered by stringent compliance requirements and delays in updating policies to allow for the integration of financial technology (fintech) (Hordofa, 2023).

Digital banking services continue to be a problem for customers. Issues such as poor user experience, system lags and lack of customer service are common complaints from customers. These flaws affect customer satisfaction and resistance to digital services. Developing new products and services that can improve customer experience is further hindered by the difficulty to link modern technology including Application Programming Interfaces (APIs) with core banking systems (Tilahun & Tafa, 2016).

Although digital banking in Ethiopia has been studied many times, most of the literature so far has focused on either technical problems or customer satisfaction separately. Overall studies that analyze the overall impact of digital technologies especially core banking systems on operational

performance and banking performance are rare. The importance of fintech in solving these problems and improving Ethiopia's financial environment has also been neglected (Sileshi, 2019).

This study attempts to fill these gaps by investigating the evolution of digital systems in core banking at the Commercial Bank of Ethiopia. It will examine the extent to which these systems have increased transaction speed, accuracy and customer perception on performance and identify the barriers that limit their effectiveness. Moreover, the study will assess the integration of digital banking systems with other financial technologies and propose practical solutions to overcome the challenges and optimize operational performance in the Ethiopian banking sector.

1.3 Research Questions

1. How does **Mobile Banking** affect the performance of the Commercial Bank of Ethiopia?
2. What is the impact of **ATM services** on the performance and service delivery of CBE?
3. How does **CBE Birr** usage influence the operational outcomes of CBE?
4. In what ways does **Internet Banking** contribute to CBE's performance?
5. What role does **API Integration** play in strengthening CBE's digital performance?

1.4 Objective

1.4.1 General Objective

To investigate the effect of key digital banking systems Mobile Banking, ATM services, CBE Birr, Internet Banking, and API Integration on the performance of the Commercial Bank of Ethiopia (CBE).

1.4.2 Specific Objectives

- To examine the impact of Mobile Banking usage on the operational performance of CBE.
- To assess how ATM services, contribute to service delivery and bank performance.
- To evaluate the effect of CBE Birr (digital wallet) on customer transactions and performance metrics at CBE.
- To analyze the role of Internet Banking in enhancing service quality and accessibility.
- To determine the influence of API Integration on CBE's digital ecosystem and overall performance.

1.5 Significance of the Study

This study is valuable for multiple stakeholders by showing how digital banking systems are affecting the Commercial Bank of Ethiopia (CBE). As the banking industry is going digital, understanding the impact of key technologies is crucial.

First, the research is useful for **CBE management and policy makers**, to get empirical evidence on how Mobile Banking, ATM, CBE Birr, Internet Banking and API Integration individually and collectively affect operational performance. This will inform investment and system upgrade decisions.

Second, the study contributes to the **academic field** by adding to the body of knowledge on digital banking in emerging economies, particularly in the Ethiopian context. It fills the gap in empirical research on specific digital tools and measurable performance outcomes.

Third, for **technology providers and fintech developers**, the findings will give direction on which services and integrations (e.g. mobile apps, CBE Birr) have the most impact so they can innovate and collaborate with banks.

Finally, the research is useful for **future researchers**, regulators and other banks to evaluate, benchmark or replicate CBE's digital banking approach in similar economic and infrastructural settings.

In summary, this study shows the role of modern digital banking systems in performance, efficiency and competitiveness in the Ethiopian banking industry using CBE as a case study.

1.6 Scope of the Study

This study only looks at how certain digital banking systems affect the performance of the Commercial Bank of Ethiopia (CBE). The study looks at five main digital service channels: Mobile Banking, ATM Services, CBE Birr, Internet Banking, and API Integration. We chose these variables because they are important to CBE's digital transformation strategy and have an impact on how well the company runs.

The study only looks at CBE's operations in Ethiopia and uses data from customer surveys and secondary data from internal bank performance records and digital transaction reports. The study's

time frame covers the last few years when CBE has actively used and grown these digital services, especially from 2020/21 to 2024/25.

Regression analysis, triangulation techniques, and descriptive statistics are used in this quantitative study to examine the connections between digital banking variables and general bank performance metrics like transaction volume, transaction value, and customer perception of performance.

The study does not thoroughly examine qualitative elements like employee opinions, the impact of regulations or third-party service providers, or evaluate other digital platforms that are not commonly used at CBE, like blockchain or artificial intelligence (AI)-based banking systems. Additionally, in order to keep the focus on the internal dynamics of CBE's digital systems, comparative analysis with other banks is excluded.

1.7 Delimitations of the Study

This study looks at five main digital banking services Mobile Banking, ATM Services, CBE Birr, Internet Banking, and API Integration as independent variables that affect how well the Commercial Bank of Ethiopia does its job. These variables were chosen because their usage rates can be measured, they can be integrated with core banking systems, and they are strategically important to the bank's digital initiatives. Because of either low adoption or a lack of data available at CBE at the time of the study, other services like POS systems, digital wallets other than CBE Birr, and new fintech partnerships are not included.

Also, the study only looks at data about CBE customers and operations, not comparisons with other banks or industry-wide benchmarks. The study also uses a quantitative survey and an analysis of secondary data.

1.8 Limitations of the Study

While the study gives us useful information about how digital systems can help banks do better, it also has some problems. For example, the fact that it relies on self-reported customer survey data means that there could be biases like social desirability bias and non-response bias. Also, the secondary data that comes from internal CBE sources might not be accurate or complete, which could affect the granularity of the results. The study looks at performance outcomes like customer

perceived performance, transaction value, and transaction volume, but it doesn't look at long-term strategic impacts or changes in customer behavior over time. Also, since the way people use technology and do digital banking can vary from region to region, the results might not fully represent CBE branches in remote or underbanked areas. Finally, the study doesn't take into account external factors like changes in regulations or the economy approach, intentionally leaving out qualitative perspectives such as customer interviews or staff feedback.

1.9 Definition of Key Terms

Digital Banking: The use of digital technology to provide banking services through electronic platforms such as mobile applications, internet portals, ATMs, and APIs. It enables customers to perform financial transactions without physically visiting bank branches.

Core Banking System (CBS): A centralized software platform used by banks to manage day-to-day operations such as account management, transaction processing, and customer relationship management. In Ethiopia, systems like T24 have modernized traditional banking.

Mobile Banking: A service that allows customers to conduct financial transactions using mobile devices. This includes balance inquiries, fund transfers, utility payments, and airtime purchases, accessible through apps or USSD codes.

Internet Banking: Also known as online banking, it refers to the use of internet-enabled devices to access and manage bank accounts, make transfers, and perform other financial activities via a bank's website.

ATM (Automated Teller Machine): An electronic banking outlet that allows customers to complete basic transactions such as cash withdrawals, balance checks, and fund transfers without the need for human interaction.

CBE Birr: A mobile wallet service provided by the Commercial Bank of Ethiopia that enables customers to make payments, transfer funds, and access banking services through their phones without needing a traditional bank account.

API Integration: Application Programming Interface (API) integration refers to the connection between different software systems. In the banking context, it allows third-party fintech applications to securely access and interact with core banking functions to enhance service delivery.

Bank Performance: In this study, it refers to the effectiveness and efficiency of banking operations, measured by transaction volume, transaction value, and customer performance perception in the Commercial Bank of Ethiopia.

Transaction Volume: The number of financial transactions completed over a specified period through digital banking platforms.

Transaction Value: The total monetary value of transactions conducted using digital systems within a given timeframe.

Customer Performance Perception: Customers' views and performance levels regarding the speed, reliability, convenience, and accessibility of banking services delivered through digital platforms.

1.10 Organization of the Paper

This study is organized into five main chapters, each structured to comprehensively address the research objectives and provide a logical flow of information:

- **Chapter One: Introduction**

This chapter presents the background of the study, the research problem, objectives, research questions, significance, scope, limitations, and definitions of key terms. It also outlines the overall structure of the paper.

- **Chapter Two: Review of Related Literature**

This chapter explores relevant theoretical foundations, empirical studies, and the conceptual framework. It provides a detailed review of digital banking systems such as mobile banking, internet banking, ATMs, CBE Birr, and API integration, with an emphasis on their relationship with bank performance.

- **Chapter Three: Research Methodology**

This chapter describes the research design, data sources, sampling techniques, data collection instruments, and methods of data analysis. It outlines how both primary (survey) and secondary (bank records) data were used to investigate the research problem.

- **Chapter Four: Results and Discussion**

This chapter presents the analysis and interpretation of data collected. It includes descriptive statistics, inferential analysis (e.g., regression), and discussion of findings in light of the hypotheses and literature.

- **Chapter Five: Summary, Conclusions, and Recommendations**

The final chapter summarizes the main findings, draws conclusions based on the results, and offers practical recommendations for the Commercial Bank of Ethiopia and other stakeholders. It also suggests areas for future research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The rapid advancement of digital technology has fundamentally altered the banking sector globally, including in developing countries like Ethiopia. Commercial banks are gradually adopting digital systems to boost operational effectiveness, enhance customer satisfaction, and stay competitive in a shifting financial environment. In this context, the literature review examines scholarly works and empirical studies that explore the role and impact of digital banking services on bank performance.

This chapter provides a comprehensive review of relevant theories and prior research that inform the current investigation. This article focusses on the key components of digital systems, including API integration, Internet banking, mobile banking, automated teller machines (ATM), and CBE Birr, the Commercial Bank of Ethiopia's digital wallet, and how these services impact the overall performance of commercial banks. The review's goals are to develop a conceptual framework that will guide the investigation, identify research gaps, and establish a strong theoretical foundation.

The literature's three main sections are the Conceptual Framework, which shows how the study's variables relate to one another; the Empirical Review, which summarises earlier research on each variable; and the Theoretical Framework, which outlines the relevant theories underlying the uptake and effectiveness of digital banking.

2.2 Theoretical Literature Review

2.2.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Fred Davis in 1989, is one of the most widely used theories to explain how people act when using technology. TAM is specifically made for the use of information systems and is based on the Theory of Reasoned Action (TRA). It implies that the two core concepts that influence users' adoption of a technology the most are:

- Perceived Usefulness (PU): The degree to which a person believes that using a particular system will enhance their performance.

- Perceived Ease of Use (PEOU): The degree to which a person believes that using the system will be simple.

These concepts have an impact on the user's attitude towards the system, which in turn affects how they plan to use it behaviorally and, ultimately, how they use it.

TAM helps explain why customers choose to use or not use the Commercial Bank of Ethiopia's (CBE) digital banking platforms, such as ATMs, CBE Birr, Internet banking, mobile banking, and API integration. For example, if customers think mobile banking is easy to use and useful for managing their finances, they are more likely to use it regularly. Regular use can improve customer satisfaction and operational effectiveness, which both improve the bank's overall performance.

TAM is especially helpful in developing nations like Ethiopia, where there are significant differences in internet penetration, technological literacy, and trust in digital systems. It enables practitioners and researchers to evaluate elements that affect user acceptance and to create more effective systems that satisfy the demands of a wide range of users.

TAM is an appropriate theoretical lens for your research because it has been successfully used in many studies pertaining to the adoption of digital banking. To make TAM even more reliable for examining technology adoption in intricate contexts like banking, Venkatesh and Davis (2000) expanded it to incorporate social influence and cognitive instrumental processes.

2.2.2 Diffusion of Innovation Theory (DOI):

Everett Rogers created the Diffusion of Innovation (DOI) Theory in 2003, which offers a thorough framework for comprehending the gradual adoption of new concepts and technologies within a social system. According to Rogers, adoption progresses in a bell-shaped curve, starting with innovators and early adopters and ending with laggards, early majority, and late majority. Five perceived attributes relative advantage, compatibility, complexity, trialability, and observability have a significant impact on adoption rate (Rogers, 2003).

DOI theory aids in the explanation of the Commercial Bank of Ethiopia's (CBE) adoption of digital banking services, including ATMs, internet banking, mobile banking, CBE Birr, and API integrations. For example, people are more likely to adopt services that are thought to provide

substantial time savings or convenience (relative advantage). Adoption rises when these systems fit users' lifestyles and capabilities (compatibility); complicated systems, on the other hand, may slow adoption. While trialability through limited use or demos can reduce resistance, observability—the ability to see the benefits—increases trust and encourages broader adoption. Additionally, DOI emphasizes the significance of social influence, as early adopters' word-of-mouth can change more general acceptance patterns.

By using DOI, CBE is able to divide up its client base, customize its messaging, and create rollout plans that take into account the factors that encourage and hinder the adoption of digital banking. Pilot programs, for instance, can increase trialability, and presenting success stories can increase observability and facilitate the integration of laggards into wider usage (Rogers, 2003).

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

Venkatesh et al. (2003) created the Unified Theory of Acceptance and Use of Technology (UTAUT), a thorough framework for explaining user intentions to adopt technology and the usage behaviour that follows. The theory offers a cohesive perspective by combining components from eight previous models of technology acceptance. Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions are the four fundamental constructs that UTAUT identifies as influencing a person's behavioural intention to use a technology.

UTAUT is very relevant to the Commercial Bank of Ethiopia's (CBE) digital banking services, including internet banking, ATM services, mobile banking, CBE Birr, and API integration. The degree to which consumers think that utilising a digital service will improve their banking efficiency is known as performance expectancy. Customers are more likely to use mobile banking, for example, if they believe it cuts down on transaction time. The ease of use of the technology is correlated with effort expectancy. User-friendly design and unambiguous instructions can greatly increase adoption rates in Ethiopia, where there is a wide range in digital literacy.

In collective societies like Ethiopia, where social networks, family, and peer opinions shape individual behavior, social influence is particularly significant. Others are more likely to follow when peers or well-known individuals use or recommend CBE's digital platforms. Additionally, important are enabling factors like customer service, internet access, and smartphone availability.

For example, despite its advantages, internet banking adoption may remain limited in the absence of dependable customer support or stable internet infrastructure.

For banks like CBE, UTAUT offers useful insights to improve user acceptance. Institutions can create focused strategies that enhance the initial adoption and ongoing use of digital banking platforms by addressing these four important determinants. The extended UTAUT2 model's suggestions for gender, age, and experience customization can also improve comprehension of user behavior across various client segments.

2.2.4 Technology Organization Environment (TOE) Framework

Tornatzky and Fleischer (1990) created the Technology Organisation Environment (TOE) framework, which is a fundamental theory for comprehending how organisations embrace technological advancements. According to this framework, an organization's decision to adopt and implement new technologies is influenced by three contextual dimensions: technological, organisational, and environmental. TOE is an extremely pertinent lens that can be used to analyse the adoption of digital banking platforms like mobile banking, CBE Birr, internet banking, ATM services, and API integration in the banking industry, and more especially within the Commercial Bank of Ethiopia (CBE).

The internal and external technologies that are pertinent to the organisation are included in the technological context. For instance, in the case of CBE, the ease of integration and use of mobile banking systems and ATM networks is directly impacted by their dependability, compatibility, and complexity. Adoption is lower for technologies that are seen as complicated or incompatible with current systems. On the other hand, innovations like API integration gain traction when they provide notable enhancements in real-time processing, data exchange, and service speed.

The bank's size, leadership support, IT infrastructure, and human resources are all part of the organizational context. Organizational preparedness is essential for CBE. Adoption is facilitated by a number of important elements, including a robust internal culture that supports digital transformation, adequate funding to invest in secure infrastructure, and qualified IT staff to oversee and maintain digital systems. Even if the technology is promising, implementation may be hampered by organizational inertia or a lack of leadership support.

The societal setting entails external factors impacting acceptance, such as rivalry, control, and demand from consumers. Environmental factors impacting CBE's decisions to improve its digital services in Ethiopia's changing banking environment include government programs encouraging digital finance, pressure from private banks to compete, and rising customer expectations for convenience. Furthermore, the market's demand and policy support for Ethiopia's drive towards financial inclusion have produced an atmosphere that is conducive to the growth of digital banking channels like CBE Birr and mobile banking.

Therefore, by focusing on both the technology and the larger organizational and environmental contexts that influence successful adoption, the TOE framework offers a comprehensive perspective. It pushes organizations like CBE to take a well-rounded approach that takes into account external market dynamics, technological readiness, and internal capabilities.

2.3 Empirical Literature Review

2.3.1 Mobile Banking

In the world of finance, mobile banking has become a game-changing invention. It eliminates the need for in-person branch visits by enabling consumers to access banking services like money transfers, bill payments, and account management through mobile devices. Shaikh and Karjaluoto (2015) state that perceived utility, usability, and trust are some of the factors that affect the adoption of mobile banking. Mobile banking has grown quickly in developed nations due to high smartphone usage and widespread internet penetration. Banks are using the technology to increase customer engagement and operational efficiency. Over 1.6 billion registered accounts worldwide have access to mobile money and banking services, according to the GSMA (2023), demonstrating a widespread trend towards digital finance.

Mobile banking has been essential to financial inclusion in Africa, particularly in areas with little access to conventional banking facilities. Mobile banking can help close gaps in financial access, as evidenced by the success of Kenyan platforms like M-Pesa. With more than 55% of adults in Sub-Saharan Africa having access to a mobile money account, mobile banking has grown significantly in this region, according to Demirgüç-Kunt et al. (2022) from the Global Findex Database. The prevalence of mobile phones, the absence of traditional banking establishments in rural regions, and government backing for online financial services are important motivators. But

issues like cyber security threats, digital literacy, and infrastructure constraints continue to be major obstacles.

Although it is still in its infancy, mobile banking has advanced significantly in Ethiopia in recent years. Broader digital financial services have been made possible by the liberalisation of the telecom industry and the growth of mobile networks. According to a study by Abebe and Nyirenda (2022), Ethiopian users' adoption of mobile banking is highly influenced by elements like perceived utility, trust, and service quality. Although accessibility has improved thanks to services like CBE Mobile and Hello Cash, regulatory and infrastructure issues have kept the overall adoption rate at a moderate level. The National Bank of Ethiopia (2023) reports that mobile banking transactions increased by more than 40% over the prior year, demonstrating an increase in customer confidence and service demand.

2.3.2 Automated Teller Machines (ATMs)

Since the 1970s, automated teller machines (ATMs) have been a key component of banking technology, significantly increasing consumer access to financial services outside of traditional branches. ATMs have remained relevant despite the growth of mobile and internet banking thanks to innovations like deposit functionality, touchscreen interfaces, and biometric security (Gu, Lee, & Suh, 2009). As part of multichannel service strategies that integrate digital convenience with cash access, financial institutions worldwide continue to invest in ATM networks.

By providing dependable cash services, ATMs in Africa support the expanding digital finance ecosystem, especially in regions where digital infrastructure is still in its infancy. Even though mobile money services like M-Pesa have become more popular, ATM networks are still essential for financial inclusion in places with poor mobile and data coverage, according to the African Development Bank (AfDB, 2021). According to research by Ejigu et al. (2016), customer satisfaction in African banking institutions is positively correlated with the convenience, dependability, and responsiveness of ATM services.

Despite being relatively new, Ethiopians are using ATMs more frequently. ATM deployment in Ethiopian commercial banks, including CBE, was predicted by bank size, profitability, and deposit ratios, according to Adane, Wale, and Meried's (2021) panel data study (2012–2016). Research on customer satisfaction reveals comparable patterns. According to a recent Heliyon study conducted

in the Afar region (Nigatu, Belete, & Habtie, 2023), customer satisfaction is closely correlated with the ATM service quality dimensions of convenience, fulfilment, ease of use, security/privacy, and reliability. Additionally, SERVPERF dimensions—tangibles, reliability, responsiveness, empathy, and assurance—have a significant impact on ATM satisfaction among CBE users, according to Tadesse & Bakala's (2021) logit analysis. Together, these Ethiopian studies demonstrate that users place a higher value on security and functional dependability when utilising ATMs, which directs CBE to concentrate on infrastructure development and user training to increase customer satisfaction even more.

2.3.3 CBE Birr (Mobile Money & Wallet Services)

Global trends in digital wallets and mobile money indicate a significant change in how people conduct business, particularly in areas where traditional banking is not as widely available. A landmark example of how mobile wallets can promote financial inclusion and economic growth is the success of M-Pesa in Kenya, which Safaricom has been expanding since 2007 (Mbiti & Weil, 2011). Digital wallet platforms have contributed to lower transaction costs, improved payment timeliness, and the provision of easily accessible financial services to marginalised communities in numerous nations. Peer-to-peer transfers, merchant payments, and bill settlements are examples of features that have changed consumer behaviour and the dynamics of the financial ecosystem (Evans & Pirchio, 2015).

Mobile money platforms are becoming more and more important financial tools throughout Africa, particularly in places where banks don't operate. The Global Findex Database (2021) indicated that over 50% of adults in Sub-Saharan Africa hold mobile money accounts, mainly for domestic payments and transfers. Platforms such as MTN Mobile Money, Orange Money, and EcoCash have proliferated, backed by partnerships with banks to offer integrated services and extend formal financial services (Demirgüç-Kunt et al., 2022). Regulatory limitations, fragmented interoperability, and low levels of digital literacy in some areas remain obstacles despite these advancements.

The Commercial Bank of Ethiopia's introduction of CBE Birr is a calculated move towards improving financial inclusion and updating payment systems in Ethiopia. Perceived usefulness, ease of use, trust, cost perceptions, and mobile network reliability are the main factors driving the

adoption of CBE Birr, according to research by Wondimkun (2024); these factors account for roughly 63% of customer usage variance. According to a different study by Tissassie (2022) that focused on college students, students' use of CBE Birr services is highly influenced by perceived risk, trust, and awareness. Furthermore, Tigabu, Mengesha, and Mulatu (2021) examined the agent-banking division of CBE Birr and found that network stability, institutional capacity, system quality, and service quality were important factors in uptake. Similar to this, Wassie's (2019) earlier research downplayed security concerns while emphasising perceived benefit, compatibility, trust, and financial literacy. Together, these studies indicate that infrastructure stability and trust-building continue to be key areas for sustainable growth, even though user perception, trust, and system/institutional readiness are critical for adoption.

2.3.4 Internet Banking

Customers can use electronic interfaces, such as websites or mobile apps, to conduct financial transactions through internet banking, also referred to as online banking. Convenience, cost savings, and the capacity to provide 24/7 services have been the main factors in its global rise (Daniel, 1999; Rajan & Zinand, 2020). According to numerous empirical studies, the main factors influencing broad adoption are trust, security, ease of use, and service quality (Nasri, 2011; Ilmudeen & Bao, 2019). For instance, Tunisian researchers combined the Theory of Planned Behaviour and the Technology Acceptance Model and found that adoption is greatly influenced by self-efficacy, security, privacy, and government support (Nasri, 2011).

The use of internet banking is growing in Africa, although it is still not uniform, especially between urban and rural areas. Lack of awareness, poor usability, low security confidence, and erratic internet access are the main obstacles to its adoption, according to a South African study. According to Ramavhona and Mokwena (2016), the researchers discovered that security, usability, and compatibility issues were major obstacles. The social environment, technological exposure, and system capability were also found to be important drivers in Tanzanian research; however, network instability and usability problems continue to impede advancements (Mswahili, 2021).

Due to low internet penetration and low levels of digital literacy, internet banking is still in its infancy in Ethiopia. However, among educated, urban populations, it is gaining traction. Adoption is greatly impacted by perceived risk, perceived ease of use, perceived usefulness, awareness, and

infrastructure, with perceived risk having the greatest impact, according to a 2021 study of CBE's Jimma City branches (Bekele, Amentie & Beyene, 2021). Experts advise banks to lower service fees, increase access through dependable network channels, raise awareness, and strengthen security procedures (Bekele et al., 2021). Although CBE's internet banking is superior to most in Ethiopia, anecdotal user feedback on sites like Reddit suggests that server lag and service reliability problems, especially on weekends, are still apparent.

2.3.5 API Integration

By facilitating smooth communication between banks, fintechs, and third-party service providers, Application Programming Interfaces (APIs) have revolutionised the contemporary banking ecosystem. Globally, APIs are essential to the Open Banking concept, which promotes innovation, enhances service personalisation, and improves customer experience (Zachariadis & Ozcan, 2017). APIs facilitate account aggregation, quicker payments, and sophisticated financial management tools in developed markets (Ng & Kwok, 2017). PwC (2020) claims that banks that use API integration benefit from enhanced customer engagement, better revenue streams, and greater agility.

Additionally, banks are legally required by the European PSD2 directive to make their infrastructure available to licensed third parties, which has led to a broad adoption of APIs (EBA, 2018). API integration is now crucial to digital transformation and platform-based banking models due to regulatory pressure and technological advancement (Serrano et al., 2021).

API integration is still developing in Africa. Although there isn't as much regulation as there is in Europe, market competition is forcing financial institutions to use API-driven services. According to research from Kenya and Nigeria, banking platforms with API support boost operational effectiveness and facilitate mobile-first innovations like payment gateways and mobile wallets (Ondiege et al., 2020). The growth of mobile money APIs has made it possible for banks to link with mobile platforms such as M-Pesa, increasing financial inclusion, according to GSMA (2021).

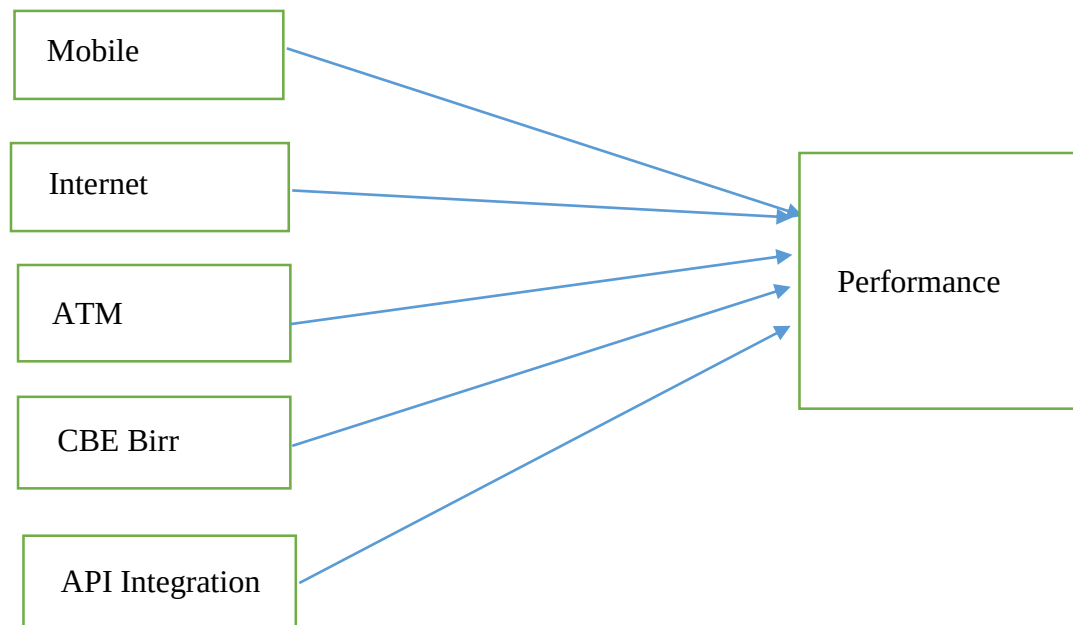
Notwithstanding the expansion, issues still exist, such as sparse developer ecosystems, a lack of standardisation, and cybersecurity worries. To speed up successful API integration in the area, the African Development Bank (AfDB, 2020) underlined the necessity of collaborative infrastructure, clear regulations, and investment in digital talent.

Although API integration is still relatively new in Ethiopia, it is becoming more popular as the country prioritises digital transformation. Banks and fintechs started investigating API-based services after the National Bank of Ethiopia (NBE) issued a directive in 2020 to liberalise digital finance. To enable USSD-based services, mobile banking, and payment gateways, for instance, the Commercial Bank of Ethiopia (CBE) has begun to offer a limited number of API-based integrations, particularly for business and government service platforms.

A study by Gashaw & Tadesse (2022) found that the absence of open standards, regulatory support, and local technical capacity are some of the main obstacles to the widespread use of APIs in Ethiopia. But according to digital finance projects like EthSwitch and Digital Ethiopia 2025, APIs are essential for promoting financial inclusion and facilitating interoperability. It is anticipated that the government's drive for digitisation will enhance API infrastructure, particularly as fintech companies become more prevalent in the market.

2.4 Conceptual Framework

In the context of the Commercial Bank of Ethiopia (CBE), the conceptual framework of this study was created to demonstrate the connection between organisational performance and digital banking technologies. The framework incorporates findings from previously reviewed empirical studies and is based on theories like the Diffusion of Innovation (DOI) and the Technology Acceptance Model (TAM).



Justification for Framework Design

According to TAM and DOI, this framework illustrates a relationship between technology and performance, with user adoption and the perceived value of technology playing a key role in performance enhancement. Every digital channel is an innovation whose implementation raises customer perception of performance, lowers costs, expands reach, and improves service delivery—all of which are important performance outcomes for CBE.

The framework directs the empirical examination of the relative contributions of each digital system to the operational success of the bank by presenting these tools as performance predictors.

2.5 Hypothesis

H1: Mobile Banking

- H_{01} : Mobile Banking has no significant effect on the performance of the Commercial Bank of Ethiopia.

- H₁₁: Mobile Banking has a significant positive effect on the performance of the Commercial Bank of Ethiopia

H2: ATM Services and Bank Performance

- H₀₂: ATM services have no significant effect on the performance of the Commercial Bank of Ethiopia.
- H₁₂: ATM services have a significant positive effect on the performance of the Commercial Bank of Ethiopia.

H3: CBE Birr and Bank Performance

- H₀₃: CBE Birr has no significant effect on the performance of the Commercial Bank of Ethiopia.
- H₁₃: CBE Birr has a significant positive effect on the performance of the Commercial Bank of Ethiopia.

H4: Internet Banking and Bank Performance

- H₀₄: Internet Banking has no significant effect on the performance of the Commercial Bank of Ethiopia.
- H₁₄: Internet Banking has a significant positive effect on the performance of the Commercial Bank of Ethiopia.

H5: API Integration and Bank Performance

- H₀₅: API Integration has no significant effect on the performance of the Commercial Bank of Ethiopia.
- H₁₅: API Integration has a significant positive effect on the performance of the Commercial Bank of Ethiopia.

CHAPTER THREE

RESEARCH METHODS

3.1 Introduction

This research methodology describes the methodical framework and approaches used to examine how digital systems in core banking can improve the Commercial Bank of Ethiopia's (CBE) performance. The study examines the effects of digital technologies on operational and overall bank performance, with a particular focus on the T24 Core Banking System, mobile banking, internet banking, and API integration.

Using a mixed-methods approach, primary data gathered from structured customer surveys is supplemented by quantitative analysis of secondary transactional data gathered from CBE. This method enables a thorough evaluation of the impact of digital banking systems on performance indicators.

Transaction volumes, amounts, and usage statistics spanning several years are included in the secondary data, which is examined to find patterns and enhancements in performance that can be linked to the adoption of digital systems. Additional quantitative information pertinent to the study is provided by the survey data.

Throughout the study, all ethical guidelines were closely followed, including those pertaining to data integrity, confidentiality, and informed consent.

3.2 Research Approach

The impact of digital systems in core banking on improving the performance of the Commercial Bank of Ethiopia (CBE) was investigated in this study using a quantitative research methodology. Since the goal of the research is to use numerical data to measure the relationships between digital banking systems and performance indicators, the quantitative approach was chosen.

The type of data gathered supports the decision to use a quantitative approach. Two primary sources of quantitative data are used in the study.

- Secondary data gathered from CBE's internal databases, such as transaction volumes, statistics on digital usage, and service trends over a number of years.

- Customers' numerical answers about their use of digital banking channels were obtained through structured questionnaires with Likert-scale items.

This method enables statistical analysis, objective measurement, and generalisation of results. It facilitates the assessment of trends, relationships, and patterns that show how digital systems enhance institutional performance.

Creswell (2014) asserts that when testing objective theories by analysing the relationship between variables through statistical procedures is the aim, the quantitative approach is suitable. This supports the study's objective of evaluating the effect of digital banking systems on bank performance through empirical means.

3.3 Research Design

This study used a combination of descriptive and explanatory research designs to investigate the impact of digital systems in core banking on the performance of the Commercial Bank of Ethiopia (CBE). To characterise the current state, trends, and usage patterns of digital banking platforms including the T24 Core Banking System, internet banking, mobile banking, CBE Birr, and APIs as well as their relationship to institutional performance indicators, a descriptive design was employed to systematically collect and analyse data. It gave the researcher a factual depiction of the digital environment by allowing them to observe, document, and assess current conditions without changing any variables. In addition, the explanatory design sought to determine and elucidate the causal links between the implementation of digital systems and their effects on customer reach, operational efficiency, and bank performance. This dual approach is supported by the integration of survey data (quantitative customer responses) and secondary data (institutional records), which enables a more thorough understanding of the mechanisms through which digital systems affect performance outcomes as well as an accurate description of them. According to Kothari (2004), explanatory research is necessary for testing hypotheses and comprehending cause-and-effect dynamics, both of which are critical for the goals of this study, whereas descriptive research is best for summarising the features of a population.

3.4 Population, Sample Size and Sampling Techniques

3.4.1 Research Population

The entire group of people who are pertinent to the research goal is referred to as the research population. Customers of Commercial Bank of Ethiopia (CBE) who live in Addis Ababa and actively use digital banking services like ATMs, internet banking, mobile banking, and CBE Birr make up the study's population. These clients are essential to comprehending how digital systems impact banking performance since they are the main users of digital platforms.

3.4.2 Sample Size

To ensure a **statistically valid** and **generalizable** study, the sample size will be determined based on the total **customer base, employee population, and industry recommendations for survey-based studies**.

The **Yamane (1967) formula** will be used to determine the minimum number of customers required for the survey:

$$n = N/(1 + Ne^2)$$

Where:

- n = Sample size
- N = Total customer population (CBE's active digital banking users)
- e = Margin of error (5%)

Methodologically and practically, the chosen sample size of 150 is supported. As Ethiopia's most urbanised and technologically savvy region, Addis Ababa offers access to a wide range of CBE clients who frequently utilise digital channels like internet banking, ATMs, CBE Birr, and mobile banking. Due to resource limitations, it would be impractical to survey the entire population; therefore, 150 was selected to maintain feasibility and guarantee data reliability.

For survey-based quantitative research in large populations, Saunders et al. (2019) state that a minimum of 100–200 respondents is generally acceptable, particularly when backed by secondary data. The analysis in this study is further strengthened by the inclusion of institutional digital performance data, which makes the sample size that was selected adequate and suitable.

3.4.3 Sampling Techniques

A non-probability convenience sampling technique was used because the CBE customer base in Addis Ababa is large and dispersed. Customers who were available and willing to participate during the survey period at specific CBE branches had to be chosen for this. This approach works well for descriptive studies like this one and enables useful data collection with limited resources, even though it does not ensure complete population representation.

Purposive sampling was employed to extract pertinent institutional data for secondary data analysis from CBE's digital transaction and core banking databases. To support the goals of the study, data specifically pertaining to the performance of digital systems, such as transaction volumes, usage rates of digital platforms, and year-over-year variations, was purposefully chosen.

3.5 Data Gathering Instruments

To enhance the reliability and richness of the data collected, this study employed **two primary data gathering instruments**: structured **questionnaires** and review of **secondary data records**. These tools were selected to align with the study's mixed-methods approach, ensuring both quantitative measurement and contextual understanding.

3.5.1 Questionnaire

The primary data collection instrument was a **structured questionnaire** designed to gather quantitative data from **Commercial Bank of Ethiopia (CBE) customers in Addis Ababa**. The questionnaire included **close-ended Likert-scale items** focused on customer usage, access, and perception of digital banking services, including mobile banking, internet banking, ATM, and CBE Birr. This method was selected for its efficiency in gathering standardized data from a large group of respondents and its suitability for statistical analysis.

3.5.2 Document Review (Secondary Data)

In addition to customer surveys, **secondary data** was gathered from CBE's internal digital banking performance reports and publicly available annual reports from **2020/21 to 2024/25**. These documents provided insights into key performance metrics such as digital transaction volumes, growth trends, and digital-to-total transaction ratios. The document review served as a validation

mechanism for primary findings and enabled comparison between customer experiences and institutional outcomes.

The integration of both survey data and institutional performance reports strengthens the study's validity through **data triangulation**.

3.6 Procedures of Data Collection

The data collection process for this study was conducted systematically to ensure accuracy, reliability, and ethical compliance. The following steps were undertaken:

- 1. Preparation of Instruments**

The questionnaire was carefully designed and pre-tested with a small group of CBE customers to ensure clarity, relevance, and completeness of the questions. Necessary revisions were made based on the feedback.

- 2. Obtaining Permissions**

Formal permission was obtained from the Commercial Bank of Ethiopia management to conduct the study and access internal secondary data. Consent was also secured from branch managers in Addis Ababa where data collection took place.

- 3. Recruitment of Respondents**

Using convenience sampling, customers visiting selected CBE branches in Addis Ababa were approached and informed about the purpose of the study. Those willing to participate were given questionnaires to complete.

- 4. Data Collection from Customers**

The structured questionnaires were self-administered by respondents at the bank branches. The researcher and trained assistants were available to clarify questions and assist when needed. This process took approximately **three weeks** to complete to ensure sufficient sample size.

- 5. Collection of Secondary Data**

Simultaneously, secondary data on digital banking performance were collected from the bank's internal databases and published reports covering the last five years (2020/21 to 2024/25).

- 6. Data Verification and Storage**

Completed questionnaires were checked for completeness daily. The collected data were coded and securely stored to maintain confidentiality. Secondary data were reviewed for accuracy and consistency.

7. Ethical Considerations

Throughout the data collection process, informed consent was obtained from all participants. Confidentiality was assured by anonymizing responses, and participants were informed that their participation was voluntary, with the right to withdraw at any time.

3.7 Pilot Testing

Before the primary data collection, a pilot test was carried out to guarantee the precision and understandability of the research tool. Assessing respondents' comprehension of the questions and confirming the validity and reliability of the questionnaire items were the main goals.

Pilot Example

Convenience sampling was used to choose 30 respondents in total from the target population, which included Commercial Bank of Ethiopia employees and customers. Despite not taking part in the final data collection, these respondents had traits in common with the primary study population.

Validity Testing

Academic specialists and banking professionals were consulted in order to evaluate the face and content validity. To make sure the instrument appropriately captured the constructs being studied, their input was utilised to revise items that were unclear or unnecessary (e.g., mobile banking, ATM usage, core banking system, API integration, and perceived performance).

Testing for Reliability

The internal consistency of the Likert-scale items under each variable was measured using Cronbach's Alpha in SPSS to evaluate reliability.

Table 1 Pilot testing sample (IBM SPSS 27)

Variable	No. of Items	Cronbach's Alpha	Interpretation
Mobile Banking	5	0.87	High Reliability
ATM Services	5	0.83	High Reliability

CBE Birr	4	0.81	High Reliability
Internet Banking	5	0.85	High Reliability
API Integration	4	0.80	Acceptable Reliability
Bank Performance	6	0.88	High Reliability

According to **George and Mallery (2003)**, a Cronbach's Alpha value of **0.7 or above** is considered acceptable for social science research. All constructs in this study achieved scores above this threshold, indicating that the questionnaire is **reliable**.

Adjustments Made

Based on pilot results:

- Some items were reworded for clarity.
- Redundant or confusing questions were removed or merged.
- The final instrument reflected a concise and clear format to enhance respondent understanding.

3.8 Method of Data Analysis

The collected data were analyzed using both **descriptive** and **inferential** statistical techniques to address the research objectives effectively.

Descriptive Statistics

Initially, **descriptive statistics** such as **frequency distributions, percentages, means, and standard deviations** were computed to summarize and describe the demographic characteristics of respondents, as well as their usage patterns and perceptions of CBE's digital banking services. These measures provided a clear overview of the data distribution and central tendencies.

Correlation Analysis

To examine the strength and direction of relationships between the independent variables (digital banking platforms such as mobile banking, internet banking, ATM, and CBE Birr) and the performance-related variables, **Pearson's correlation analysis** was conducted. This helped identify the degree to which variations in digital system usage corresponded with changes in performance indicators.

Regression Analysis

Multiple regression analysis was used to evaluate the predictive impact of digital systems on the bank's performance. This made it possible for the study to account for other variables and measure how each digital banking channel affected performance outcomes. The findings of the regression analysis shed light on the relative significance of each digital platform in improving the operational efficacy of the bank.

Triangulation

By combining several data sources and methodologies, data triangulation was used to improve the validity and reliability of the study's conclusions. Secondary data from CBE's internal digital banking records and performance reports covering five years (2020–21 to 2024–25) were used to triangulate the primary data from customer surveys. Cross-verification of the results was made possible by this method, which lessened the bias associated with single-method studies and gave researchers a more thorough grasp of how digital systems affected the bank's performance.

SPSS version 27 was used for all statistical analyses, guaranteeing thorough data handling and interpretation.

3.9 Ethical Considerations

Ethical principles were strictly observed throughout the research process to ensure the rights and dignity of all participants were protected. The following measures were implemented:

- **Informed Consent:** All participants were fully informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time without any penalty. Consent was obtained before administering the questionnaires.
- **Confidentiality and Anonymity:** Respondents' identities were kept confidential. Personal identifiers were removed, and data were reported in aggregate form to protect privacy.
- **Data Security:** All collected data, both primary and secondary, were securely stored in password-protected files accessible only to the researcher to prevent unauthorized access.
- **Permission from CBE:** Formal permission was obtained from the Commercial Bank of Ethiopia to collect data from customers and to access secondary digital banking performance records.

- **Non-maleficence:** The study ensured no harm or discomfort was caused to participants during data collection.

By adhering to these ethical standards, the research upheld the integrity of the study and protected the welfare of all involved.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the analysis and interpretation of data gathered from multiple sources to assess the effect of digital systems in core banking on enhancing performance at the Commercial Bank of Ethiopia (CBE). The study combines secondary data from publicly accessible institutional records and internal performance reports with quantitative data from customers. A thorough evaluation of the operational impact attributable to digital banking systems is made possible by this multi-source approach.

By providing quicker, safer, and more convenient service delivery, digital systems like mobile banking, CBE Birr, internet banking, ATM services, and API-integrated payment channels have completely changed traditional banking operations. However, factors like infrastructure support, customer adoption, integration with core banking platforms like T24, and implementation quality all affect how effective they are. To determine which systems significantly improve performance and how, a thorough analysis is necessary.

In the first part of the chapter, secondary data from the Commercial Bank of Ethiopia (CBE) is analysed. The main focus is on digital banking performance metrics, including the amount and value of transactions across platforms, including internet banking, CBE Birr, mobile banking, ATM services, and API usage over a five-year period. This offers a fundamental comprehension of the trends in the bank's digital transformation.

The chapter then goes on to analyse the primary data that was gathered using a structured questionnaire. It starts by outlining the general response rate and the demographic traits of survey participants. The usage patterns and opinions of customers regarding the different digital banking channels are then investigated using descriptive statistics. Lastly, inferential statistical methods, such as regression and correlation analyses, are used to assess the connections between the use of digital services and perceived performance metrics like customer perception, accessibility, and dependability.

4.2 Secondary Data Analysis

4.2.1 Overview of Transaction Trends (2020/21 – 2024/25)

An overview of the changes in customer transaction behaviour over the past five years, specifically between digital channels and traditional branch-based banking at the Commercial Bank of Ethiopia (CBE), is given in this section.

Total Value and Volume of Transactions (2020–21–2024–25)

The overall volume and value of transactions processed by CBE have increased dramatically over the course of the five fiscal years. The total number of transactions (both digital and branch) grew by more than 237%, from 789.8 million in 2020–2021 to over 2.66 billion in 2024–2025. In the meantime, the overall transaction value increased by nearly 210%, from ETB 10.84 trillion to ETB 33.58 trillion.

Table 2 Total Transaction Volume and Value` (2020/21 – 2024/25)

Year	Total Transactions	Total Amount (ETB)
2020/21	789,802,829	10.84 trillion
2021/22	903,800,211	14.34 trillion
2022/23	1,322,895,727	22.71 trillion
2023/24	1,792,501,995	24.54 trillion
2024/25	2,662,620,932	33.58 trillion

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

Shift from Branch to Digital Channels

Transactions are increasingly being facilitated by digital channels. Digital channels accounted for 64.4% of all transactions in 2020–21. This increased to 83.2% by 2024–2025, demonstrating Ethiopia's significant and obvious move towards digital banking.

Table 3 Total Transaction Volume (2020/21 – 2024/25)

Year	Digital Transactions	Digital % of Total
2020/21	508,942,671	64.44%
2021/22	639,828,640	70.79%

2022/23	1,010,310,467	76.37%
2023/24	1,404,393,858	78.35%
2024/25	2,214,455,379	83.17%

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

In order to serve clients at scale, CBE is increasingly depending on digital platforms such as internet banking (IB), CBE Birr, mobile banking, and ATMs.

4.2.2 Comparative Summary: Digital Channels vs Branch Transactions (2020/21 – 2024/25)

The total number and value of transactions made over the previous five years through branch banking and digital channels are contrasted in this section. At the Commercial Bank of Ethiopia (CBE), the comparison emphasises the swift expansion and growing prominence of digital financial services.

Total Number of Transactions

Over the five-year period from 2020–2021 to 2024–2025, the Commercial Bank of Ethiopia (CBE) clearly shows a divergence in growth trajectories in the total number of customer transactions processed through digital channels and traditional branch banking. About 508.9 million transactions took place through digital channels in 2020–2021, while only about 280.9 million were conducted through branches. Since then, digital transactions have grown significantly annually. The number of digital transactions increased by 25.7% to 639.8 million in 2021–2022, and then by 57.9% in 2022–2023, when it reached over 1.01 billion transactions. With 1.40 billion digital transactions in 2023–2024—a growth rate of 39.0%—this upward trend persisted. By 2024/25, digital transaction volume had climbed to over 2.21 billion, marking another significant year-over-year increase of 57.7%. Over the course of five years, digital channels added roughly 1.7 billion transactions, representing a growth of over 335% over the baseline year.

Table 3 Total Number of Transactions and YoY Growth

Fiscal Year	Digital Channels (Txn)	Branch Transactions (Txn)	YoY Growth (Digital)	YoY Growth (Branch)
2020/21	508,942,671	280,860,158	—	—
2021/22	639,828,640	263,971,571	+25.7%	–6.0%
2022/23	1,010,310,467	312,585,260	+57.9%	+18.4%
2023/24	1,404,393,858	388,108,137	+39.0%	+24.2%
2024/25	2,214,455,379	448,165,553	+57.7%	+15.5%

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

Branch transactions, however, exhibited a more moderate and erratic pattern. The number of transactions handled by branch banking decreased by 6.0%, from 280.9 million in 2020–21 to 264.0 million in 2021–2022. However, the subsequent years saw moderate recovery and gradual growth. Branch transactions rose 18.4% year over year to 312.6 million in 2022–2023. Following this, there were 388.1 million in 2023–2024 (a 24.2% increase) and 448.2 million in 2024–2025 (a 15.5% increase over the previous year). Branch transactions increased by about 167.3 million over the course of the five-year period, which translates to a cumulative growth of about 59.5%.

According to the comparison, digital channels grew more steadily and strongly in every year. A discernible change in customer behaviour and service utilisation patterns was highlighted by the gradual widening of the gap between digital and branch transaction volumes. Digital transactions increased quickly and consistently every year, whereas branch transactions grew sporadically and more slowly. This suggests that institutions are shifting towards electronic banking platforms.

Total Transaction Value (ETB)

Although branches still handle a larger share of total transaction value, the Commercial Bank of Ethiopia's (CBE) five-year trend in transaction value shows a notable shift towards digital channels. The initial dominance of branch banking in high-value transactions is evident in the ETB 10.12 trillion in branch transactions and the ETB 717.9 billion in digital channels processed in 2020–21. Nonetheless, the subsequent years showed a remarkable rise in the value of digital transactions.

Table 4 Total Transaction Value and YoY Growth

Fiscal Year	Digital Channels (Value)	Branch Transactions (Value)	YoY Growth (Digital)	YoY Growth (Branch)
2020/21	717.9 billion	10.12 trillion	—	—
2021/22	1.54 trillion	12.80 trillion	+114.5%	+26.5%
2022/23	3.52 trillion	19.20 trillion	+128.5%	+49.9%
2023/24	7.05 trillion	17.49 trillion	+100.4%	–8.9%
2024/25	11.81 trillion	21.78 trillion	+67.5%	+24.5%

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

The amount processed through digital channels more than doubled to ETB 1.54 trillion by 2021–2022, a 114.5% YoY increase. In 2022–2023, this trend gained even more traction as the value of digital transactions reached ETB 3.52 trillion, the highest increase in the observed period at 128.5 percent. The value of digital transactions doubled once more in 2023–2024, reaching ETB 7.05 trillion, a 100.4% increase from the year before. The value eventually increased to ETB 11.81 trillion in 2024–2025, although the growth rate slowed to 67.5%. Over the course of five years, the value of digital transactions more than sixteen times increased, indicating that customers are becoming more confident about using digital channels for higher-value transactions.

In the meantime, although more slowly and irregularly, the value of branch transactions increased as well. The value of branch transactions increased by 26.5% from ETB 10.12 trillion in 2020–21 to ETB 12.80 trillion in 2021–2022. In 2022–2023, there was a greater increase, reaching ETB 19.20 trillion, or 49.9% growth. This trend, however, reversed in 2023–2024, as the transaction value dropped by 8.9% to ETB 17.49 trillion. A slight recovery was evident in the last year, 2024–2025, when value increased to ETB 21.78 trillion, a 24.5% increase over the previous year. Branch banking continued to be the most popular channel in terms of total transaction value during this time, despite these variations.

However, the noticeably faster growth rates for digital channels in every year point to a radical change in the way the bank provides services. Consumer confidence in digital platforms like internet banking, CBE Birr, mobile banking, and ATM services is reflected in the rising number

of high-value digital transactions. It also highlights CBE's continuous efforts to expand digital infrastructure that can manage high-volume and high-value financial operations.

4.2.3 Channel-Specific Growth Trends (2020/21 – 2024/25)

The transaction volumes and values for each digital channel—Mobile Banking & USSD, CBE Birr, Internet Banking (IB), and ATM—are thoroughly examined in this section, with an emphasis on their growth patterns and year-over-year (YoY) performance.

Mobile Banking & USSD

The analysis of Mobile Banking and USSD transactions at Commercial Bank of Ethiopia (CBE) from 2020/21 to 2024/25 reveals a robust and accelerating growth pattern in both transaction volume and value. Approximately 73.1 million transactions totalling ETB 299.89 billion were made through USSD and Mobile Banking during the 2020–21 fiscal year. At the time, the initial figure represents a modest foundation for digital financial services.

Table 5 Mobile Banking & USSD transactions and YoY Growth

Fiscal Year	No. of Transactions	Transaction Value (ETB)	YoY Growth (Txn)	YoY Growth (Value)
2020/21	73,103,000	299.89 billion	—	—
2021/22	203,653,146	961.29 billion	+178.6%	+220.6%
2022/23	458,607,390	2.58 trillion	+125.2%	+167.9%
2023/24	767,760,777	5.61 trillion	+67.4%	+117.9%
2024/25	1,444,360,664	9.82 trillion	+88.1%	+74.9%

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

The next year, 2021–2022, saw a sharp increase in transactions to 203.7 million, a remarkable 178.6% year-over-year (YoY) increase. As a result, the transaction value increased by 220.6% from the previous year to ETB 961.29 billion, almost tripling. This quick growth demonstrates how mobile platforms are becoming more and more accepted by consumers as a dependable and easy way to conduct financial transactions.

In 2022–2023, the upward trend persisted, as the volume of transactions more than doubled once more to 458.6 million (+125.2% YoY growth). The transaction value also rose significantly to ETB 2.58 trillion, a remarkable 167.9% increase over 2021–2022. These numbers show a steady increase in the importance of USSD channels and mobile banking within CBE's digital ecosystem.

With transactions reaching 767.8 million, representing a 67.4% YoY growth, the growth pace in 2023–2024 slowed slightly but stayed robust. Additionally, the transaction value increased dramatically to ETB 5.61 trillion (+117.9%). This stage shows how the channel matured as it handled a larger percentage of the bank's overall transaction load in terms of both volume and money.

With 1.44 billion transactions processed by 2024–2025—an increase of 88.1% from the year before—Mobile Banking and USSD emerged as the most popular digital channels. During this time, the transaction value increased by 74.9% year over year to ETB 9.82 trillion. The total volume of transactions indicates strong penetration and broad trust in mobile platforms, even though growth rates have somewhat slowed down from prior years.

All things considered, it is evident from the data that USSD and mobile banking have become the most popular digital channels at CBE, with exponential growth in both value and usage. Their ongoing growth is indicative of larger developments in Ethiopia's financial sector, which include increased digitisation, better mobile infrastructure, and strengthened financial inclusion initiatives led by the bank.

CBE Birr

The CBE Birr transaction data from 2020–2021 to 2024–2025 shows a very dynamic pattern, with an initial decline followed by a significant recovery and exponential growth in the following years. Approximately 62.95 million transactions totalling ETB 7.78 billion were made through CBE Birr during the fiscal year 2020–21. This baseline year shows the channel's operational state prior to the onset of notable oscillations.

Table 6 CBE Birr transactions and YoY Growth

Fiscal Year	No. of Transactions	Transaction Value (ETB)	YoY Growth (Txn)	YoY Growth (Value)
2020/21	62,949,580	7.78 billion	—	—
2021/22	30,498,152	5.54 billion	–51.6%	–28.8%
2022/23	51,939,531	15.37 billion	+70.3%	+177.3%
2023/24	61,744,202	53.50 billion	+18.9%	+248.0%
2024/25	159,446,909	138.33 billion	+158.2%	+158.6%

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

In 2021/22, both the volume and value of transactions experienced a sharp decline. Approximately 30.5 million transactions were made, a 51.6% drop from the year before. Similarly, transaction value dropped by 28.8%, down to ETB 5.54 billion. This decline might be the result of transitional difficulties brought on by system updates, shifting consumer preferences, or outside economic factors that impact usage.

But in 2022–2023, the channel made a strong comeback, with nearly 52 million transactions, a 70.3% increase from the previous year. With a 177.3% increase to ETB 15.37 billion, the transaction value showed even more notable growth. This notable recovery highlights the CBE Birr platform's growing user base and restored customer trust.

In 2023–2024, growth picked up even more speed, with transaction volumes increasing slightly by 18.9% to about 61.74 million. Surprisingly, the transaction value increased by 248.0% from the previous year to ETB 53.5 billion. Customers were likely transacting larger sums on average, as indicated by this disproportionate increase in value relative to volume, which also suggests that the platform was becoming more trusted for larger financial transactions.

With the number of transactions more than doubling to 159.4 million (+158.2%) and the transaction value rising to ETB 138.33 billion, a 158.6% increase year over year, the upward trend continued to be strong in 2024–2025. CBE Birr's rising prominence as a key digital payment channel within the bank's ecosystem is reflected in this impressive growth trajectory.

In summary, while CBE Birr experienced a temporary dip in usage in 2021/22, it has since demonstrated strong recovery and rapid expansion, both in transaction count and monetary value. This pattern shows how widely accepted it is and how important it is to Ethiopia's digital banking environment.

Internet Banking (IB)

During the five years between 2020–2021 and 2024–2025, CBE’s Internet Banking channel saw significant growth in both transaction volume and value. Beginning with a comparatively low baseline of 174,983 transactions in 2020–21, with a transaction value of ETB 17.27 billion, the channel immediately demonstrated robust growth.

Table 7 Internet Banking transactions and YoY growth

Fiscal Year	No. of Transactions	Transaction Value (ETB)	YoY Growth (Txn)	YoY Growth (Value)
2020/21	174,983	17.27 billion	—	—
2021/22	320,174	105.79 billion	+83.0%	+512.6%
2022/23	713,274	275.96 billion	+122.8%	+160.9%
2023/24	1,026,310	570.64 billion	+43.9%	+106.8%
2024/25	1,709,233	958.93 billion	+66.5%	+68.0%

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

The value of transactions increased significantly by more than 512.6% to ETB 105.79 billion in 2021–2022, while the number of transactions nearly doubled, rising by 83.0% to 320,174. This dramatic rise in value significantly outpaced the growth in transaction volume, suggesting that Internet banking was quickly taking the lead as the preferred method for carrying out more significant financial transactions.

With the number of transactions more than doubling to 713,274—a 122.8% year-over-year increase—the growth trend persisted strongly into 2022–2023. Additionally, the transaction value increased by 160.9% to ETB 275.96 billion. This sustained double-digit growth confirms Internet Banking’s expanding role as an important digital channel for CBE’s customers

The upward trajectory persisted in 2023–2024, despite a slight slowdown in growth rates. While the value nearly doubled (+106.8%) to ETB 570.64 billion, the volume of transactions increased by 43.9% to over 1 million transactions. The ongoing significant rise in transaction value demonstrates the growing confidence and use of the Internet Banking platform by customers for high-value payments.

According to the most recent data for 2024–2025, the channel saw 1.7 million transactions, a 66.5% increase. The value of those transactions increased by 68.0% to ETB 958.93 billion. This sustained growth reflects the solidifying position of Internet Banking as a mature and widely adopted digital banking channel

All things considered, Internet Banking has shown robust, steady growth in both transaction volume and value, highlighting its growing importance in CBE's digital financial services environment, especially for clients making higher-value transactions.

ATM (Automatic Teller Machine)

Between 2020–2021 and 2024–2025, the Commercial Bank of Ethiopia's ATM channel showed consistent growth in both transaction volume and value. About 372.7 million transactions totalling ETB 392.93 billion were made in the base year 2020–2021.

Table 8 ATM transactions and YoY growth

Fiscal Year	No. of Transactions	Transaction Value (ETB)	YoY Growth (Txn)	YoY Growth (Value)
2020/21	372,715,108	392.93 billion	—	—
2021/22	405,357,168	466.88 billion	+8.8%	+18.8%
2022/23	499,050,272	650.42 billion	+23.1%	+39.3%
2023/24	573,862,569	812.93 billion	+15.0%	+25.0%
2024/25	608,938,573	891.38 billion	+6.1%	+9.7%

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

With an 8.8% increase to over 405 million transactions in 2021–2022, the number of transactions grew steadily each year. At the same time, the transaction value increased by 18.8% to ETB 466.88

billion. This suggests that during this time, ATM usage was growing both in terms of volume and in terms of money.

The volume of ATM transactions increased by 23.1% to almost 499 million in 2022–2023, and the value of those transactions increased by 39.3% to ETB 650.42 billion. Customers' increased reliance on ATMs for larger cash withdrawals and transfers is indicated by the notable increase in transaction value relative to volume, which also points to an increase in average transaction size.

With transactions rising 15.0% to 573.9 million and transaction value rising 25.0% to ETB 812.93 billion in 2023–2024—albeit at a somewhat slower rate—the growth momentum persisted. This consistent expansion demonstrates the ATMs' ongoing significance in the CBE's service mix.

While transaction value increased by 9.7% to ETB 891.38 billion in 2024–2025, transaction volume growth further slowed to 6.1%, reaching just under 609 million transactions. The data shows that ATMs continue to be a popular channel, supporting a sizable portion of cash-related banking activities, even though growth rates have slowed.

The number and value of transactions through the ATM channel have consistently increased, highlighting its significance as a physical touchpoint in CBE's multi-channel banking environment, particularly for cash withdrawals and in-person banking requirements.

API Transactions and Growth Analysis (2020/21 – 2024/25)

This section analyses the volume and value of transactions processed through different API channels for the Commercial Bank of Ethiopia's Mobile Banking & USSD API, CBE Birr API, and Branch API transactions over five fiscal years.

Table 9 API transactions and YoY growth

Fiscal Year	Mobile Banking & USSD API (No. of Transactions)	Mobile Banking & USSD API (Transaction Value, \$)	CBE Birr API (No. of Transactions)	CBE Birr API (Transaction Value, \$)	Branch API (No. of Transactions)	Branch API (Transaction Value, \$)
2020/21	31.5 M	\$2.39 B	2.33 M	\$610.5 M	2.53 M	\$584.1 M

2021/22	99.1 M	\$8.00 B	2.38 M	\$576.7 M	3.17 M	\$642.0 M
2022/23	191.1 M	\$19.39 B	1.99 M	\$499.9 M	3.94 M	\$899.7 M
2023/24	260.6 M	\$44.46 B	2.50 M	\$1.75 B	7.60 M	\$2.22 B
2024/25	448.4 M	\$75.77 B	4.71 M	\$5.78 B	7.22 M	\$2.76 B

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

On the Mobile Banking & USSD API channel, both the volume and value of transactions significantly increased. In 2020–21, it processed about 31.5 million transactions, with a total value of about \$2.39 billion. Over the next four years, the volume grew quickly, reaching over 448 million transactions in 2024–2025, with a \$75.77 billion transaction value. This illustrates how customers are increasingly selecting USSD and mobile digital banking services because of their accessibility and usability.

In 2020–21, the CBE Birr API had 2.33 million transactions totalling \$610 million. The following years saw a slight fluctuation in transaction volume, which declined through 2022–2023 before rising sharply to over 4.7 million transactions by 2024–2025. Although it fluctuated as well, the transaction value reached an impressive peak of \$5.78 billion in 2024–2025. This pattern points to a slow uptake of the CBE Birr platform followed by a significant spike in recent years, which may be related to a rise in merchant acceptance and consumer confidence.

The Branch API transactions began with 2.53 million transactions worth \$584 million in 2020/21. Over the five years, transaction volume grew to over 7.2 million by 2024/25, with the transaction value rising to nearly \$2.76 billion. While branch API transactions and values have increased, their scale and growth rate are significantly lower compared to digital channels, underscoring the ongoing transition toward digital banking.

Table 10 Year-over-Year Growth transaction volume and value for each channel

Fiscal Year	YoY Growth Mobile Banking & USSD API (Transactions)	YoY Growth Mobile Banking & USSD API (Transaction Value)	YoY Growth CBE Birr API (Transactions)	YoY Growth CBE Birr API (Transaction Value)	YoY Growth Branch API (Transactions)	YoY Growth Branch API (Transaction Value)
2021/22	+214.19%	+235.37%	+2.19%	-5.54%	+25.14%	+9.92%
2022/23	+92.86%	+142.29%	-16.24%	-13.31%	+24.13%	+40.13%
2023/24	+36.39%	+129.31%	+25.35%	+250.45%	+93.10%	+147.23%
2024/25	+72.03%	+70.44%	+88.51%	+229.73%	-5.08%	+23.95%

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

YoY growth rates for the USSD API channel and mobile banking were consistently very high. Starting from a base, its transaction volume increased by 214.19% between 2020–2021 and 2021–2022, and it continued to grow by double digits in the following years, including 2024–2025, when it increased by 72.03%. Transaction values also demonstrated remarkable growth, with a 142.29% increase between 2021–2022 and 2022–2023, highlighting growing usage and transaction sizes.

The growth of the CBE Birr API was more erratic. Some years saw negative growth in the number of transactions (-5.54% in 2021–2022 and -13.31% in 2022–2023), but later years saw a sharp recovery, with increases of 88.51% and 229.73% in 2023–2024 and 2024–2025, respectively. Transaction values likewise showed a similar erratic pattern, but they concluded with robust growth in the last few years.

The volume and value of branch API transactions increased moderately and steadily. With the exception of a slight drop of -5.08% in 2024–2025, transaction volume growth varied but was generally positive. Transaction value increased significantly, rising 147.23% in 2022–2023, most likely due to larger average transaction sizes.

4.2.4 Analysis of Channel Contributions to Total Digital Growth

The relative share and impact of each channel on the entire CBE digital transaction ecosystem are assessed in this section, along with the platforms that are spearheading the change and the ways in which their functions have changed.

Digital Transactions Volume Share by Channel

The Commercial Bank of Ethiopia (CBE) saw a major shift in the way its digital banking platforms were used between the fiscal years 2020–2021 and 2023–2024. The most remarkable trend observed is the rapid and consistent increase in the use of Mobile Banking and USSD services, which have gradually overtaken traditional digital platforms like ATMs, once the dominant channel for customer transactions.

Table 11 Digital Transactions Volume Share by Channel

Year	Mobile Banking & USSD	Share	ATM	Share	CBE Birr	Share	Internet Banking	Share	Total Digital
2020/21	73.1M	14.4%	374.4M	73.6%	63.6M	12.5%	0.14M	0.03%	508.9M
2021/22	225.4M	33.3%	379.2M	56.0%	68.3M	10.1%	0.25M	0.04%	673.1M
2022/23	557.2M	46.9%	466.7M	39.3%	93.9M	7.9%	0.39M	0.03%	1.19B
2023/24	973.2M	56.1%	549.8M	31.7%	86.6M	5.0%	0.9M	0.05%	1.73B

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

In 2020/21, ATM services accounted for the lion’s share of digital transaction volume, comprising approximately 73.6% of total digital transactions with 374.4 million transactions. Just 73.1 million USSD and mobile banking transactions were made during that time, accounting for just 14.4% of all digital volume. Internet banking remained insignificant, with only 0.14 million transactions, or 0.03% of the total digital volume, while CBE Birr, the bank’s mobile wallet platform, saw modest usage of 63.6 million transactions (12.5%). With digital channels still in their infancy, this preliminary data shows a client base that is still dependent on ATM infrastructure.

But in 2021–2022, this distribution started to change significantly. Usage of USSD and mobile banking increased to 225.4 million transactions, more than doubling the volume of the previous year and raising its share to 33.3%. ATM transactions, on the other hand, grew marginally in

absolute terms to 379.2 million, but their relative share decreased to 56.0%, suggesting that their growth rate is slowing down in comparison to mobile channels. While Internet Banking continued to play a minor role, accounting for only 0.25 million transactions (0.04%), CBE Birr also saw a slight increase to 68.3 million transactions (10.1%).

In 2022–2023, the trend was even more noticeable. The volume of transactions through USSD and mobile banking more than doubled to 557.2 million, accounting for 46.9% of all digital transactions and surpassing ATM usage for the first time. Although ATM transactions continued to rise in volume (466.7 million), its share significantly dropped to 39.3%, reflecting a clear shift in customer preference. Although its share dropped to 7.9%, CBE Birr also saw an increase to 93.9 million transactions, indicating that although users are transacting more, the platform is expanding more slowly than Mobile Banking. With 0.39 million transactions, internet banking usage stayed extremely low, keeping its share below 0.05%.

USSD and mobile banking had solidified their position as the main digital transaction channels by 2023–2024. Over half of CBE's digital transaction volume, or 56.1% of all digital transactions, were mobile transactions, which totalled 973.2 million. Despite reaching 549.8 million transactions, ATM usage only accounted for 31.7% of all transactions, which is a sharp contrast to its 73.6% share just three years ago. CBE Birr's share dropped to 5.0% as its usage marginally decreased to 86.6 million transactions. Only 0.9 million transactions, or 0.05% of the total volume, were made through internet banking.

In conclusion, the Commercial Bank of Ethiopia has undergone a substantial digital transformation over the past four years. With their rapid growth from 14.4% to 56.1% of the volume of digital transactions, mobile banking and USSD services have emerged as the leading digital channel. This shift is a result of rising mobile usage, better digital literacy, and perhaps specific bank initiatives to promote mobile adoption. In contrast, platforms like CBE Birr and Internet Banking have either plateaued or lost relative importance, and ATM usage, although still significant in volume, has lost its dominance. According to the data, CBE's digital service delivery is now based on mobile-first banking, and any future innovations or digital strategies will probably focus on bolstering and growing this channel.

Digital Transactions Value Share by Channel

Over the five years from 2020–2021 to 2024–2025, the Commercial Bank of Ethiopia (CBE) saw a notable increase in the value of digital transactions, along with notable shifts in the proportional contributions of each service channel. As a result of a shift in consumer behavior towards mobile-first solutions and broader trends in digital adoption, mobile banking and USSD channels have emerged as the main drivers of digital transaction value.

Table 12 Digital Transactions Value Share by Channel

Year	Mobile Banking & USSD	Share	Internet Banking	Share	ATM	Share	CBE Birr	Share	Total Value
2020/21	299.8B	41.8%	13.1B	1.8%	392.1B	54.6%	12.8B	1.8%	717.8B
2021/22	944.5B	54.6%	54.2B	3.1%	657.9B	38.0%	74.9B	4.3%	1.73T
2022/23	2.4T	62.1%	127.9B	3.3%	873.4B	22.6%	471.6B	12.2%	3.87T
2023/24	5.6T	60.7%	458.9B	5.0%	865.4B	9.4%	190.5B	2.1%	9.23T
2024/25	9.82T	52.7%	958.9B	5.1%	891.4B	4.8%	138.3B	0.7%	11.87T

Source: (CBE digital and branch transaction reports, 2020/21–2024/25)

At 392.1 billion birr, or 54.6% of the total digital value of 717.8 billion birr, ATM transactions made up the largest portion of digital transaction value in the fiscal year 2020–2021. With a transaction value of 299.8 billion birr (41.8%), USSD and mobile banking came in second and third, respectively. With 1.8% contributions of 13.1 billion birr and 12.8 billion birr, respectively, Internet Banking and CBE Birr had a negligible impact. These numbers show a period of transition during which digital channels were still gaining popularity and ATM usage continued to dominate because of its established presence and familiarity with customers.

In 2021–2022, a noticeable change started to appear. For the first time, the value of USSD and mobile banking transactions more than tripled to 944.5 billion birr, boosting their share to 54.6% and overtaking ATM transactions. With 657.9 billion birr, the ATM channel continued to make a substantial contribution, but its share decreased to 38.0%, suggesting a relative decrease in the use of high-value transactions. A significant increase in CBE Birr to 74.9 billion birr (4.3%) indicates

that wallet-based services are becoming more and more popular, especially for micro and retail payments. Although it was still less common than other channels, internet banking also increased to 54.2 billion birr, or 3.1%.

This shift picked up speed in 2022–2023, when the value of USSD and mobile banking skyrocketed to 2.4 trillion birr, accounting for 62.1% of the 3.87 trillion-birr total value of digital transactions. Although the value of ATM transactions increased to 873.4 billion birr in absolute terms, its proportional share dropped precipitously to 22.6%, highlighting the decreased dependence on physical banking infrastructure. CBE Birr's significant growth to 471.6 billion birr, or 12.2%, is indicative of its function in enabling frequent, low-value transactions. 3.3% of the total value, or 127.9 billion birr, came from Internet Banking.

The value of USSD and mobile banking transactions nearly doubled to 5.6 trillion birr in 2023–2024, retaining its 60.7% market share of all digital transactions, which totalled 9.23 trillion birr. Additionally, internet banking saw a notable rise to 458.9 billion birr (5.0%), suggesting a growing but still specialised market among corporate and digitally literate users. At 865.4 billion birr, ATM transactions stayed largely consistent, but its share dropped to 9.4%, indicating a clear shift in consumer preferences away from cash-based services. Conversely, CBE Birr experienced a sharp decline in value to 190.5 billion birr, reducing its market share to 2.1%, perhaps as a result of competition from mobile apps with more features.

The digital value ecosystem was dominated by USSD and mobile banking channels by 2024–2025, reaching 9.82 trillion birr, though their share slightly declined to 52.7%, probably as a result of more evenly distributed growth across other channels. Internet banking's continued growth to 958.9 billion birr, or 5.1%, shows how important it is becoming for higher-value or business-related transactions. It's interesting to note that, although ATM usage stayed relatively constant at 891.4 billion birr in absolute terms, its share decreased even more to just 4.8%, confirming its declining significance in value-based digital services. The fact that CBE Birr only contributed 138.3 billion birr, or 0.7%, indicates that its use is waning or that other mobile services are replacing it.

All things considered, this five-year trajectory shows a significant shift in the digital service environment of the CBE. In terms of transaction value, mobile banking and USSD platforms have continuously surpassed other channels, confirming their crucial role in digital financial inclusion and service provision. A strategic shift towards integrated mobile platforms that provide accessibility, speed, and convenience is further demonstrated by the decline in the value and relative share of ATM and CBE Birr usage. The consistent increase in Internet banking also demonstrates how urban and business users are becoming more digitally savvy. All of the data together highlight how crucial it is to keep funding online and mobile infrastructure as CBE moves away from traditional banking and towards a future driven by technology.

4.2.5 Interpretation and Strategic Implications

A revolutionary change in consumer behaviour, technology adoption, and the general structure of digital banking services is revealed by the Commercial Bank of Ethiopia's (CBE) five-year analysis of digital transaction value by service channel. The value of transactions made through USSD and mobile banking channels increased exponentially from 299.8 billion birr in 2020–2021 to 9.82 trillion birr in 2024–2025, which is the most notable trend. Wider network coverage, rising smartphone penetration, and CBE's ongoing investment in mobile platforms all contribute to the high customer preference for mobile-based financial services.

At the same time, ATM transactions' share of the total digital value fell dramatically, from a commanding 54.6% in 2020–2021 to a mere 4.8% in 2024–2025. This decrease indicates a move away from transactions reliant on cash and towards digital alternatives. The ATM channel, though still relevant in specific use cases such as cash withdrawal and deposits, appears to be losing its strategic value as mobile and online platforms continue to mature.

The value of the bank's digital wallet service, CBE Birr, increased dramatically until 2022–2023, after which it fell precipitously in the years that followed. This shows that using low-value, high-volume payments to promote financial inclusion has had some initial success. But its recent drop in share and absolute value (from 12.2% in 2022–2023 to 0.7% in 2024–2025) could be a sign of new competition from other mobile channels, feature redundancy, or the need to redefine the service to stay relevant.

Internet Banking experienced steady growth in both value and share, increasing from 13.1 billion birr (1.8%) in 2020/21 to 958.9 billion birr (5.1%) in 2024/25. Although still lagging behind Mobile Banking, this trend indicates a strengthening digital presence among corporates and tech-savvy users. The growth in this segment suggests an opportunity for CBE to expand tailored services such as online business banking, digital loan origination, and enhanced security features for high-value users.

From a strategic perspective, CBE should keep making mobile banking innovations its top priority as the primary conduit for digital transformation. Maintaining growth and expanding into underbanked and rural areas will require improving the mobile banking app's usability, speed, and security in addition to making ongoing investments in USSD services for feature phone users. Furthermore, ATM and CBE Birr channels shouldn't be completely phased out, even though their growth may not be as rapid. Alternatively, they can be incorporated into a more comprehensive Omni channel approach that guarantees inclusivity and takes into account a range of consumer preferences.

The necessity for strategic investments in digital infrastructure designed for SMEs and enterprise clients is further highlighted by the rising value of Internet banking transactions. CBE can establish itself as a digital leader for both corporate and retail clients by promoting online self-service, secure authentication procedures, and business dashboards.

In summary, the trends show that internet and mobile banking are not only improving operational efficiency but also changing the way that clients engage with the bank. To maintain digital leadership in Ethiopia's changing financial ecosystem, CBE must strategically respond by shifting resource allocation towards digital infrastructure, updating product strategies around dwindling channels, and consistently innovating.

4.3 Primary Data Analysis

4.3.1 Demographic Profile of Respondents

The demographic details of the survey participants are shown in this section. Out of the 150 questionnaires distributed, 144 valid responses were obtained, yielding a high response rate of

96%, which is deemed appropriate and representative for social science research (Mugenda & Mugenda, 2003).

Table 13 Demographic Profile of Respondents (IBM SPSS version 27)

Variable	Category	Frequency (n)	Percent (%)
Age Group	18–25	34	23.6
	26–35	40	27.8
	36–45	39	27.1
	46–60	31	21.5
Gender	Male	80	55.6
	Female	64	44.4
Education Level	Secondary	28	19.4
	Diploma	48	33.3
	Degree	68	47.2
Employment Status	Government	20	13.9
	Private Sector	51	35.4
	Retired	19	13.2
	Self-employed	20	13.9
	Student	26	18.1
	Unemployed	8	5.6

According to the respondents' age distribution, the largest percentage (27.8%) are in the 26–35 age range, followed by the 36–45 (27.1%), 18–25 (23.6%), and 46–60 (21.5%) age groups. This suggests that the vast majority of responders fall within the age range of those who are economically active.

In terms of gender, 55.6% of the respondents were male and 44.4% were female, indicating a relatively balanced gender representation among CBE customers.

Regarding educational qualifications, 47.2% of the respondents held a degree, 33.3% had a diploma, and 19.4% had completed only secondary education. This implies that the bank's digital service users have a comparatively high level of education, which may affect their comprehension and uptake of digital banking services.

According to an analysis of employment status, the majority of respondents (35.4%) worked in the private sector, followed by students (18.1%), independent contractors (13.9%), government employees (13.9%), retirees (13.2%), and unemployed people (5.6%). This distribution shows a wide range of occupations among the clientele.

It is crucial to comprehend these demographic factors because they reveal trends in consumer preferences and behaviour, especially when it comes to using online banking services. According to earlier studies, age, occupation, and educational attainment all have a big impact on how people adopt technology (Davis, 1989; Venkatesh et al., 2003).

4.3.2 Customer Relationship with Commercial Bank of Ethiopia (CBE)

By examining the respondents' length of time as customers, frequency of use of CBE's digital services, and preferred digital platforms, this section delves into the extent and character of their relationship with the Commercial Bank of Ethiopia (CBE).

Table 14 Customer Relationship with Commercial Bank of Ethiopia (IBM SPSS version 27)

	Category	Frequency (n)	Percent (%)
Length of Relationship with CBE	Less than 1 year	18	12.5
	1–3 years	35	24.3
	4–6 years	42	29.2
	Over 6 years	49	34.0

34% of respondents said they had been CBE customers for more than six years, followed by 29.2% who had been customers for four to six years, 24.3% for one to three years, and 12.5% for less than a year. This suggests that a sizable percentage of CBE's clients have remained loyal to the bank over the years, perhaps as a result of their satisfaction with its offerings.

36.1% of respondents said they use CBE's digital banking services on a weekly basis, 25.7% said they use them daily, another 25.7% said they use them monthly, and only 12.5% said they use them infrequently. These findings imply that most respondents use digital platforms on a regular basis, indicating that CBE customers have a high degree of adoption of digital services.

22.9% of respondents said they only used ATM services, while others mentioned a combination of services when looking at the specific digital platforms they used. 20.8% used both mobile banking and ATMs, 18.1% used both ATM and CBE Birr, another 18.1% used just CBE Birr, 17.4% used both mobile banking and CBE Birr, and 2.8% used all three platforms. This variety shows that, based on their requirements and preferences, CBE clients are using a combination of established and new digital banking platforms.

These results are consistent with research showing that consumers are more likely to embrace and trust digital platforms the longer and more often they engage with banking services (Pikkarainen et al., 2004; Zhou, 2012). Convenience, accessibility, and knowledge of service features can also influence platform preferences.

4.3.3 Usage Behavior of CBE Digital Services

The respondents' usage patterns of CBE's digital services are shown in this section, with particular attention paid to the frequency of use and the platforms used.

Table 15 Usage Behavior of CBE Digital Services (IBM SPSS version 27)

	Category	Frequency (n)	Percent (%)
Frequency of Using Digital Services	Daily	37	25.7
	Weekly	52	36.1
	Monthly	37	25.7
	Rarely	18	12.5
Digital Platforms Used	ATM only	33	22.9
	CBE Birr only	26	18.1

	ATM & CBE Birr	26	18.1
	ATM & Mobile Banking	30	20.8
	Mobile Banking & CBE Birr	25	17.4
	ATM, Mobile Banking & CBE Birr	4	2.8

According to the findings, over 60% of the respondents are regular users of digital channels, with 36.1% using CBE digital banking services weekly and 25.7% using them daily. Additionally, 25.7% use digital services monthly, and 12.5% use them rarely. These findings point to a generally high degree of use of CBE's online resources.

Regarding platform preference, a significant 22.9% of users stated that they only used ATM services, which is still a well-known and widely available channel. Other pairings demonstrate the growing use of contemporary digital platforms.

- 20.8% use both ATM and Mobile Banking,
- 18.1% use ATM and CBE Birr,
- another 18.1% use CBE Birr only,
- 17.4% use Mobile Banking and CBE Birr, and
- a small but notable 2.8% use all three services: ATM, Mobile Banking, and CBE Birr.

This distribution demonstrates the increasing dependence on mobile-based services, particularly CBE Birr, which is being utilised in conjunction with mobile banking and conventional ATM services. The preference for using multiple platforms may indicate a demand for flexibility, ease of use, and access to different banking functionalities across platforms.

These trends align with earlier research that found factors like perceived usefulness, digital literacy, and ease of access influence multi-platform engagement and service frequency (Alalwan et al., 2016; Martins et al., 2014). Growing consumer trust and reliance on digital banking services are also reflected in the comparatively high usage frequency.

4.3.4 Descriptive Statistics for Variables

Key statistical indicators that characterise the trends of survey responses must be carefully examined in order to comprehend how customers view digital banking platforms. By displaying

the average tendencies (mean), variability (standard deviation), and range of responses across each variable, descriptive statistics are essential for condensing vast amounts of data into information that is meaningful (Gravetter & Wallnau, 2016). The Commercial Bank of Ethiopia (CBE) can conduct an initial assessment of the efficacy and adoption levels of digital banking tools by looking at user ratings of ATM usage, internet banking, mobile banking, CBE Birr, and overall performance. These observations serve as the empirical foundation for additional inferential analysis and are essential for determining the advantages and disadvantages of service delivery. Businesses like CBE can improve service quality, user satisfaction, and digital engagement by measuring how consumers evaluate different digital platforms.

Table 16 Descriptive Statistics for Variables (IBM SPSS version 27)

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
MB	144	2.40	5.00	3.8458	.82605
IB	144	3.00	3.00	3.0000	.00000
ATM	144	3.00	5.00	4.2889	.64722
CBE_Birr	144	3.00	4.80	3.7069	.71855
performance	144	2.40	5.00	4.1042	.70521
Valid N (listwise)	144				

On a five-point Likert scale, Mobile Banking (MB) scored an average of 3.85, with a standard deviation of 0.83, according to the results. This implies that consumers generally agree with or are only mildly pleased with mobile banking services. Response variability suggests a moderate degree of variation in user experiences, which may be brought about by differences in users' network access, transaction success rates, or app familiarity.

On the other hand, Internet Banking (IB) showed no variation in responses, with a mean of 3.00 and a standard deviation of 0.00. This is out of the ordinary and could indicate either low usage, ignorance, or that every respondent gave a default or neutral response. Since the lack of variation might indicate underuse of the service, more research is necessary.

With the highest mean rating of 4.29, ATM services were seen favourably by users. The comparatively low standard deviation of 0.65 suggests that responses were generally positive,

demonstrating that customers view ATM services as dependable, well-established, and widely used. This is consistent with earlier studies showing that ATM services are essential to digital banking, particularly in developing nations where internet penetration may be low. (Al-Hawari, 2011).

CBE Birr, the mobile wallet platform of the bank, achieved a mean score of 3.71 with a standard deviation of 0.72. Compared to ATMs and mobile banking, this suggests a generally favourable but somewhat more diverse user perception. The disparity could be explained by varying degrees of smartphone accessibility, digital literacy, or customer service for CBE Birr transactions.

Last but not least, the performance variable, which gauges how consumers view digital banking's contribution to the bank's overall performance and service delivery, had a high mean of 4.10 and a standard deviation of 0.71. This implies that consumers view digital banking as a useful instrument for improving time savings, convenience, and operational performance. The findings are consistent with research like Parasuraman et al. (2005), who identified performance as a crucial aspect of e-service quality, and Davis (1989), who highlight the significance of perceived usefulness in technology adoption.

In conclusion, the descriptive statistics demonstrate that consumers have favourable opinions of CBE's online banking offerings, especially its ATM and mobile banking services. The consistent response for online banking, however, points to a possible area for development, education, or additional study. Overall, the results show how crucial digital banking is becoming to improving CBE's banking performance and customer perception.

4.3.1 Inferential Statistics

Pearson correlation

A Pearson product-moment correlation analysis was conducted to investigate the linear relationship between the Commercial Bank of Ethiopia's perceived service performance and the use of digital banking services. Finding the direction and strength of relationships between different digital channels—Mobile Banking (MB), Automated Teller Machines (ATM), and CBE Birr—and consumers' perceptions of overall banking performance was the aim of this study.

Table 17 Two tailed Pearson correlation (IBM SPSS version 27)

		Correlations				
		performance	MB	ATM	CBE_Birr	API
Pearson Correlation	performance	1.000	.832	.643	.156	.444
	MB	.832	1.000	.333	.233	.376
	ATM	.643	.333	1.000	-.307	.140
	CBE_Birr	.156	.233	-.307	1.000	.313
	API	.444	.376	.140	.313	1.000

Because there was no variation among the 144 participants, Internet Banking (IB), one of the measured variables, was not included in the analysis (3.00). Because Pearson's correlation necessitates variability across observations, this lack of variance makes the variable statistically inappropriate for correlation analysis (Field, 2013). The consistent answers imply that either respondents were not familiar with Internet banking or it was not available or in use when the data was gathered. Variables with zero standard deviation are usually left out of research designs because they don't provide any valuable information for correlation calculations (Pallant, 2020).

Several important relationships were found by the analysis. First, a moderate and statistically significant positive correlation ($r = 0.832$) was found between performance and Mobile Banking (MB). This suggests that consumers who regularly utilise and are pleased with mobile banking services are more likely to have a favourable opinion of the bank's overall performance. This result is consistent with a larger body of research showing that mobile banking is essential for improving customer satisfaction, service accessibility, and operational effectiveness in developing nations (Alalwan et al., 2016).

Second, there was a noteworthy positive correlation between performance and CBE Birr usage ($r = 0.156$). CBE Birr, a locally created mobile money platform that is incorporated into CBE's offerings, seems to significantly influence how customers view digital performance and service quality. This demonstrates the value of digital financial services in advancing performance improvement and financial inclusion.

Only a weak correlation ($r = 0.643$) was found between ATM usage and performance, suggesting that customers who regularly use and are happy with ATM services are more likely to think

favourably of the bank's overall performance. Despite their continued necessity for cash withdrawal and balance checks, ATMs' limited functionality in comparison to mobile platforms may lessen their influence on opinions of overall performance.

An interesting finding emerged in the form of a significant negative correlation between ATM and CBE Birr usage ($r = -0.307$, $p < 0.01$). This points to a substitution effect, in which users who depend more on CBE Birr are less likely to use ATMs. Customers may favour mobile transactions over traditional ATM interactions as digital literacy and mobile penetration rise, particularly in urban or semi-urban areas.

These findings highlight the positive correlation between consumers' opinions of banking performance and digital service channels, specifically mobile banking and mobile wallet platforms like CBE Birr. Therefore, CBE could improve its operational performance, customer retention, and service delivery by continuing to invest in and promote these digital platforms.

4.3.1 Regression Analysis

Regression Analysis: Assumption Testing

It is crucial to confirm that the data meet the statistical assumptions needed for reliable estimation and inference before performing multiple linear regression. According to Field (2013) and Pallant (2020), these presumptions include linearity, homoscedasticity, multicollinearity, independence of errors, and normality of residuals.

Linearity

According to the linearity assumption, the independent and dependent variables must have a linear relationship. Scatterplots of standardised residuals against predicted values can be used to evaluate this. Linearity is suggested by a pattern that is uniformly distributed and approximately random (Pallant, 2020).

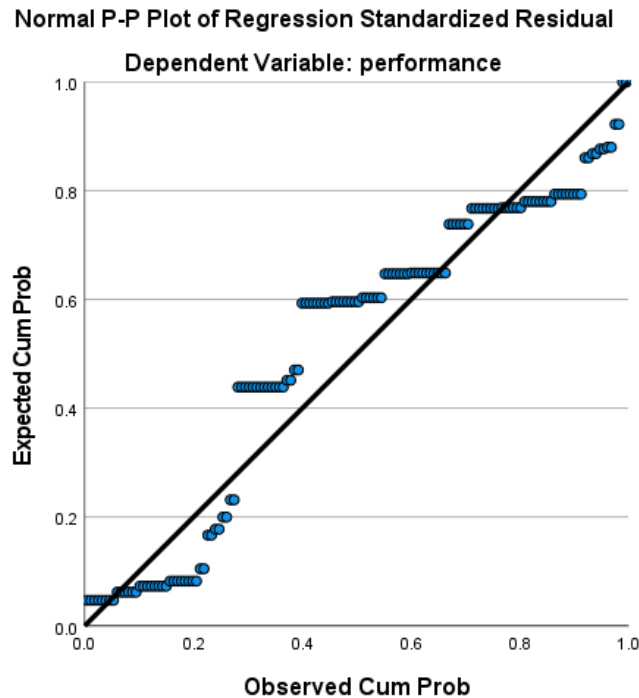


Figure 2 Normal P-P plot of Regression Standard Residual (IBM SPSS version 27)

Most of the data points, which represent the observed standardised residuals, closely match the diagonal line, as shown in the plot. If the residuals had a perfect normal distribution, this diagonal line would represent the expected distribution. Strong evidence that the residuals are roughly normally distributed can be found in the observed points' general proximity to this line, especially at the extremes of the distribution. Although there are slight variations from the diagonal line, especially in the middle of the cumulative probabilities, these variations are not significant enough to point to a serious breach of the normalcy assumption. Thus, it can be inferred from the visual examination of the P-P plot that the regression model that predicts "performance" largely satisfies the assumption of normally distributed residuals. This result validates the reliability of statistical conclusions drawn from the regression analysis, including confidence intervals and hypothesis testing.

Independence of Errors

The Durbin-Watson statistic is used to determine if residuals are independent. Uncorrelated residuals are indicated by values near 2 (Field, 2013). There was no autocorrelation in this analysis since the Durbin-Watson value was within the permitted range of 1.5 to 2.5.

The Durbin-Watson statistic, which assesses the existence of autocorrelation in a regression model's residuals, was used to evaluate the assumption of independence of errors. The Durbin-Watson value in this analysis was 2.254, which is quite near to the optimal value of 2. As a result, the assumption of independence is satisfied and there is no discernible autocorrelation among the residuals. For assuming error independence, a Durbin-Watson statistic of 1.5 to 2.5 is typically regarded as appropriate (Field, 2013). Since the observed value falls comfortably within this range, it can be concluded that the residuals are independent, thereby supporting the validity of the regression model in terms of this key assumption.

Multicollinearity

High levels of intercorrelation between independent variables are known as multicollinearity, and they can skew regression coefficients and inflate standard errors. Tolerance statistics and the Variance Inflation Factor (VIF) are used to test this. Multicollinearity is not an issue if the VIF is less than 10 and the tolerance is greater than 0.1 (Field, 2013; Pallant, 2020).

Table 18 Multicollinearity (IBM SPSS version 27)

Predictor Variable	Tolerance	VIF
Mobile Banking (MB)	0.718	1.392
ATM	0.718	1.392
CBE Birr	0.717	1.395
API	0.790	1.267

All of the predictors in this analysis—API, CBE Birr, ATM, and Mobile Banking (MB)—showed VIF values between 1.267 and 1.395 and tolerance values between 0.717 and 0.790, both of which fall well within acceptable bounds. In particular, CBE Birr had a tolerance of 0.717 and a VIF of 1.395, whereas MB and ATM both had a tolerance of 0.718 and a VIF of 1.392. The API variable had the lowest VIF (1.267) and the highest tolerance (0.790). These numbers strongly imply that multicollinearity is not an issue in this model and that there is not an excessive correlation between the independent variables.

Homoscedasticity

In a regression model, homoscedasticity is the presumption that the variance of the residuals stays

constant at all levels of the predicted values. Because heteroscedasticity (unequal variances) can skew standard errors, making hypothesis tests and confidence intervals unreliable, this assumption is essential (Field, 2013).

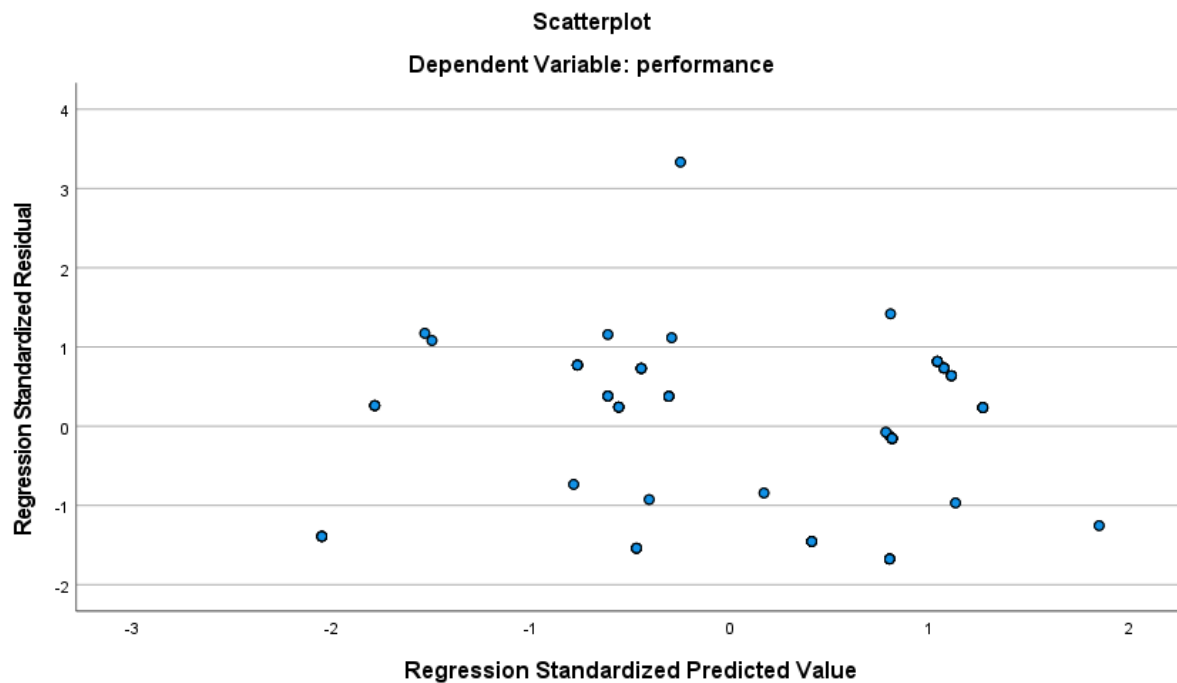


Figure 3 Homoscedasticity (IBM SPSS version 27)

With no discernible patterns like a funnel shape (widening or narrowing), clustering, or curvature, the residuals in the scatterplot appear to be randomly distributed around the horizontal axis (zero line). Throughout the range of standardised predicted values, the point distribution is comparatively uniform. This randomness suggests that the homoscedasticity assumption is largely met.

Normality of Residuals

Histograms and normal probability plots (P-P plots) were used to evaluate the residuals' normality. The histogram should have a bell-shaped curve and the points in the P-P plot should be closely aligned with the diagonal line if the residuals are normally distributed (Pallant, 2020). These requirements were ostensibly satisfied in this investigation.

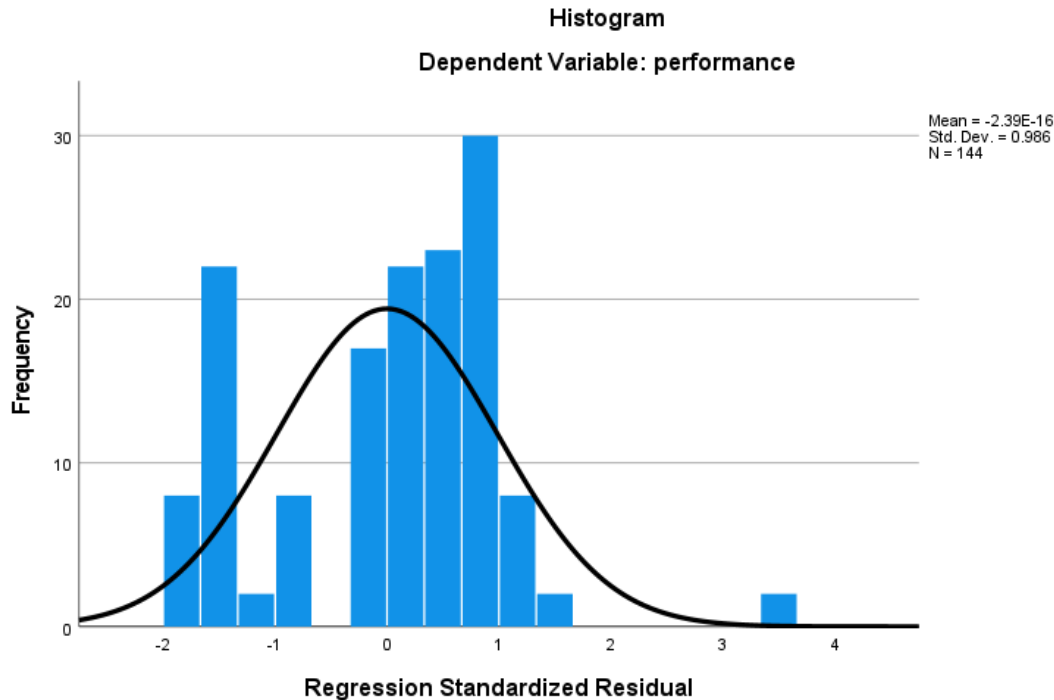


Figure 4 Normality of Residuals (IBM SPSS version 27)

A normal distribution is indicated by the distribution's roughly bell-shaped appearance. The majority of the residuals are centred, especially within the ± 1 standard deviation range from the mean. A crucial prerequisite for normality is that the residuals be symmetrically distributed around zero, as indicated by this clustering. The residuals' mean is roughly zero (Mean = $-2.39\text{E}-16$), and their standard deviation is extremely near to one (Std. Dev. = 0.986), both of which are characteristics of a typical normal distribution. Although there are minor deviations, such as a slight right skewness and a few outliers above +2, these are not substantial enough to invalidate the assumption of normality. The robustness of this assumption is further supported by the Central Limit Theorem, given the sample size of 144. Thus, the validity of inferential statistics obtained from the regression model is supported by the visual examination of the histogram, which indicates that the assumption of normally distributed residuals is reasonably met (Field, 2013).

4.3.5 Regression Analysis Results

Regression analysis of the impact of digital banking channels, including API (Application Programming Interface), ATM (Automated Teller Machine), MB (Mobile Banking), and CBE_Birr (the bank's mobile wallet), on the overall performance of the Commercial Bank of Ethiopia shows a high degree of explanatory power. The multiple correlation coefficient (R), as

indicated by the model summary, is 0.933, indicating a very strong positive linear relationship between the dependent variable (performance) and the combined independent variables. More significantly, the coefficient of determination (R Square) is 0.870, meaning that the combined effects of API, ATM, MB, and CBE_Birr can account for roughly 87.0% of the performance variation. This illustrates a very successful model for taking performance variations in response to modifications in these digital service channels into account.

Table 19 Model summary of Regression Analysis Results (IBM SPSS version 27)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.933 ^a	.870	.867	.25753	.870	233.336	4	139	.000

Furthermore, the model's strong predictive power is confirmed by the Adjusted R Square value of 0.867, which accounts for the number of predictors used. The average separation between the observed values and the predicted regression line is indicated by the standard error of the estimate, which is 0.25753. A model that predicts performance outcomes more accurately is indicated by a lower standard error.

The regression model's strength is further confirmed by the F-change statistic, which stands at 233.336, and its corresponding significance level, Sig. F Change = .000. This F-test determines if the regression model fits the data more accurately than a model without any predictors. The model is statistically significant because the p-value is significantly lower than the standard cutoff of 0.05. This indicates that the four predictors have significantly improved prediction performance, and there is less than a 0.1% chance that this outcome happened by accident.

Table 20 Analysis of Variance of regression analysis (IBM SPSS version 27)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.899	4	15.475	233.336	.000 ^b
	Residual	9.218	139	.066		
	Total	71.117	143			

The results of the ANOVA (Analysis of Variance) provide more evidence for this conclusion. Out of a total sum of squares of 71.117, the regression sum of squares is 61.899, and the residual sum of squares (unexplained variance) is 9.218, respectively. The strength of the model is confirmed by the fact that the regression component, not the residual, accounts for the majority of the variance. The regression model is highly significant overall, according to the ANOVA table, which also shows an F-statistic of 233.336 with 4 and 139 degrees of freedom and a significance level of .000. Practically speaking, this indicates that the four digital banking service channels work together to explain and forecast the bank's performance.

4.3.6 Regression Coefficients

After adjusting for the impact of the other variables in the model, the regression coefficients shown in the table provide information about the distinct contributions made by each predictor variable Mobile Banking (MB), Automated Teller Machines (ATM), CBE Birr, and Application Programming Interface (API) to the performance of the Commercial Bank of Ethiopia..

		Coefficients ^a				
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.846	.219		-3.872	.000
	MB	.518	.031	.607	16.848	.000
	ATM	.503	.039	.461	12.801	.000
	CBE_Birr	.118	.035	.120	3.331	.001
	API	.109	.033	.114	3.307	.001

a. Dependent Variable: performance

The regression equation derived from the analysis can be expressed as:

$$\text{Performance} = -0.846 + 0.518(\text{MB}) + 0.503(\text{ATM}) + 0.118(\text{CBE_Birr}) + 0.109(\text{API})$$

According to the constant term ($B = -0.846$, $p < 0.001$), the expected performance score would be -0.846 if all predictor variables were held at zero. The intercept offers a baseline for comparison, even though it is not practically interpretable in this situation because a score of zero for these online banking services is impractical.

With a highly significant t-value ($t = 16.848$, $p < 0.001$) and the strongest standardised coefficient ($\beta = 0.607$) among the predictors, Mobile Banking (MB) is the most significant predictor of performance. This suggests that, assuming all other factors remain unchanged, performance greatly improves as mobile banking usage or efficacy rises.

In a similar vein, ATM services showed a significant and statistically significant effect ($\beta = 0.461$, $t = 12.801$, $p < 0.001$), indicating that they significantly improve bank performance. The positive coefficient suggests that higher perceived or actual performance outcomes are linked to greater reliance on ATM services.

Additionally, CBE Birr demonstrated a significant but comparatively smaller contribution ($\beta = 0.120$, $t = 3.331$, $p = 0.001$), suggesting that although this mobile payment platform is helpful, its impact on performance is less pronounced than that of MB and ATM.

Finally, API (Application Programming Interface) also had a significant positive impact ($\beta = 0.114$, $t = 3.307$, $p = 0.001$), indicating that API-enabled system integration capabilities contribute to the improvement of organisational performance through innovation in digital banking in a supportive yet significant way.

In conclusion, all four digital service variables were found to be statistically significant predictors of performance, with mobile banking being the most dominant, followed by ATM usage. These findings are consistent with earlier research in the field of digital banking that highlights the importance of self-service platforms and mobile technology in enhancing customer satisfaction and banking efficiency (Gomber et al., 2017).

4.4 Triangulation Analysis

I. Introduction to Triangulation

This section aims to combine insights from primary customer survey data and secondary data acquired from the Commercial Bank of Ethiopia (CBE). A more thorough understanding of the ways in which digital systems, such as Mobile Banking (MB), ATM services, CBE Birr, and APIs, impact the bank's performance is made possible by this dual viewpoint. By using a variety of data sources to confirm, contrast, and enhance findings, triangulation helps to increase the validity of findings (Creswell & Plano Clark, 2018).

II. Convergent Evidence: Where the Data Aligns

All four digital banking variables—mobile banking, ATM, CBE Birr, and API—showed significant areas of convergence when survey data and secondary data from the Commercial Bank of Ethiopia (CBE) were combined. Data on institutional performance and customer perception aligned most strongly with mobile banking (MB). According to the survey's findings, a sizable percentage of participants said they frequently used and were satisfied with the mobile banking platform, praising its speed, convenience, and ease of use. In line with this, secondary data from CBE showed that between 2020–2021 and 2024–2025, there was a consistent rise in the quantity and overall value of mobile banking transactions. The regression output further supports this, showing that Mobile Banking contributed significantly and statistically significantly to overall bank performance, with the highest standardised beta coefficient ($\beta = .607, p < .001$). A high degree of agreement between the two data sources was also evident in ATM services. While CBE's transaction reports verified steady ATM usage and transaction volumes over the years, customers indicated a continued reliance on ATMs for standard transactions like withdrawals and balance enquiries. This was confirmed by regression results, which showed a strong standardised effect ($\beta = .461, p < .001$), suggesting that ATM use is a significant predictor of performance outcomes.

The results also converged in the case of CBE Birr. Although survey participants gave it a slightly lower satisfaction rating than ATMs and mobile banking, widespread use was still noted, especially for local payments and fund transfers. The perception is consistent with CBE's digital performance records, which demonstrate a sharp increase in the CBE Birr platform's user adoption and transaction value, particularly following integration with USSD and mobile interfaces. A

positive and statistically significant effect of CBE Birr on performance was also confirmed by the regression analysis ($\beta = .120$, $p = .001$), indicating its increasing influence. Similarly, it was discovered that APIs played a beneficial role across datasets, despite being less obvious to the typical customer. Technically savvy survey respondents, such as developers or business clients, recognised the advantages of API integrations, especially when it came to enabling automated services and third-party fintech apps. This opinion was corroborated by CBE's internal digital reports, which demonstrated that corporate clients and partners were using API services more frequently. The significance of API for institutional performance was further supported by the positive and statistically significant regression coefficient ($\beta = .114$, $p = .001$). Together, these convergences show how consumers' actual experiences with digital services closely resemble operational and transactional data, confirming the overall dependability and performance impact of digital transformation.

III. Divergent Evidence: Where the Data Differs or Contradicts

Although the majority of the indicators showed strong convergence, some areas showed differences between the secondary data from CBE and the responses from the customer survey. These divergences are valuable, as they highlight nuanced user experiences or institutional dynamics that may not be fully visible from one data source alone.

Mobile banking demonstrated some divergence in customer perception, even though it was the best-performing factor in the regression analysis ($\beta = .607$, $p < .001$) and had strong growth in CBE's transactional data. A small but notable segment of survey respondents expressed concerns about mobile app reliability, frequent system errors, and lack of multilingual support. These opinions run counter to the overwhelmingly positive institutional metrics, indicating that even though usage is high, the user experience's qualitative elements still need to be improved.

Another area of difference was the services offered by ATMs. Although the bank's quantitative data shows steady growth in the quantity and value of transactions, some survey participants expressed discontent because of frequent machine failures, cash shortages, and security issues, particularly in rural areas. Transactional volume data does not directly show these service-related issues, but customer feedback makes them evident.

The usage of CBE Birr revealed a disparity between the high adoption rates recorded in CBE's records and its comparatively smaller impact on customers' perceptions of performance. Despite being statistically significant in the regression model ($\beta = .120$, $p = .001$), a number of respondents characterised CBE Birr as having few features and being prone to delays during peak hours. This could suggest that even though CBE Birr is widely used, its flexibility and dependability are still lacking.

An intriguing deviation was offered by Internet Banking (IB). The survey data revealed comparatively lower awareness and usage among average retail customers, despite the CBE data showing steady growth in IB services. Corporate clients use the service more frequently, which causes institutional data to be skewed upward. In order to increase adoption across demographics, this points to a digital literacy gap and the necessity of more extensive customer education and service personalisation.

The majority of survey participants hardly acknowledged API integration, despite it performing well in institutional metrics and regression outcomes ($\beta = .114$, $p = .001$). Although the general public rarely interacts directly with APIs, the system plays a significant role in enabling essential features (such as mobile apps and fintech partnerships). This discrepancy draws attention to a prevalent problem with tech-driven services: Despite their high institutional value, backend innovations are frequently invisible to end users, leading to low awareness.

The significance of combining various data sources is highlighted by these discrepancies. Customer surveys offer experience-based insights that might not be found in transaction logs or performance dashboards, but secondary data offers broad institutional trends. By filling in these gaps, particularly in the areas of service quality, system dependability, and digital literacy, the Commercial Bank of Ethiopia's digital banking initiatives can become even more inclusive and effective.

IV. Complementary Insights: Where Data Adds Nuance

Although areas of agreement and disagreement between the datasets have been clarified by convergent and divergent evidence, combining customer survey data with secondary data from the Commercial Bank of Ethiopia (CBE) also yields complementary insights. Together, the datasets

provide dimensions that the others are unable to capture, resulting in a more complex understanding of the ways in which digital banking systems affect performance.

In addition to being a major factor in the performance of the institution ($\beta = .607$), mobile banking is also a channel that is intricately woven into consumers' everyday financial lives. According to survey responses, users place a high value on fund transfers, airtime top-up features, and convenience. Secondary data, on the other hand, measures this preference through consistently increasing transaction values and counts. When taken as a whole, these statistics validate the scope and user-centred value of mobile banking, confirming its strategic significance.

Strong institutional performance and customer reliance are demonstrated by ATM services, particularly when it comes to cash-based transactions. However, by emphasising regional differences, the survey data provided more nuance. While rural users reported limited access and service interruptions, urban users gave ATM services high ratings. This disparity is essential for creating equitable banking solutions, but it would not be apparent using secondary metrics alone. These findings imply that although ATMs improve overall performance, fair infrastructure development is still crucial.

Although CBE Birr is widely used, survey results show that it is more of a supporting channel than a primary one. Complementary information, however, shows that CBE Birr is particularly useful for P2P (peer-to-peer) transfers and small, rapid transactions. This function enhances services like mobile banking, demonstrating that CBE Birr makes a contribution by expanding the variety and adaptability of transaction options rather than just by volume.

Despite being statistically under-represented in customer survey responses, Internet Banking (IB) is an essential back-end function for business operations and high-value client servicing. The complementary insight in this case is that, although IB is not a major tool for the typical customer, it is essential for CBE's corporate services and strategic partnerships, which, despite being under-represented in customer sentiment, greatly enhance overall bank performance.

Although it is not immediately apparent to clients, API integration is the backbone of the bank's digital ecosystem, enabling interoperability, mobile service dependability, and fintech applications. The smooth functioning of mobile channels and third-party integrations is proof of

its impact, even though survey responses might not fully reflect this. This demonstrates how backend infrastructure has a significant but indirect impact on institutional performance and customer perception. This complements the idea that APIs are the "invisible enablers" of front-end functionality.

These complementary findings show the interdependence of technological infrastructure, user experience, and institutional performance. Customer surveys provide operational and experiential depth, while secondary data provides a strategic overview. Through this integration, CBE leadership can see what is happening and why it matters to end users through a dashboard and a user compass.

4.5 Hypothesis Testing Result

Hypothesis Testing Result – Mobile Banking

The study tested the null hypothesis (H_{01}) in order to investigate how Mobile Banking affected the Commercial Bank of Ethiopia's (CBE) performance: The performance of CBE is not significantly impacted by mobile banking. With a p-value of .000 and a standardised beta coefficient (β) of 0.607, the regression analysis showed that mobile banking had a statistically significant positive impact. The null hypothesis is strongly refuted by this result, which is significantly below the traditional significance level of 0.05. As a result, the alternative hypothesis (H_{11}) is approved, demonstrating that mobile banking has a major and favourable impact on the Commercial Bank of Ethiopia's performance. According to this research, operational performance, customer perception, and overall financial performance are all significantly impacted by the growing use and adoption of mobile banking services.

Hypothesis Testing Result – ATM Services

According to the hypothesis H_{02} , there is no discernible impact of ATM services on the Commercial Bank of Ethiopia's (CBE) performance. A standardised beta coefficient of 0.461 and a p-value of .000 were found in the regression output, indicating statistical significance at the 0.05 level. We can reject the null hypothesis (H_{02}) and accept the alternative (H_{12}), which holds that ATM services significantly improve performance, because of this strong significance. This research emphasises how ATM infrastructure can improve customer satisfaction, ease in-branch traffic, and increase service accessibility, all of which improve bank performance.

Hypothesis Testing Result – CBE Birr

Hypothesis H_{03} made the assumption that the digital wallet platform CBE Birr has no discernible impact on performance. Nonetheless, the regression results demonstrated statistical significance with a p-value of .001 and a standardised beta coefficient of 0.120. We can confidently reject the null hypothesis (H_{03}) and accept H_{13} because the p-value is less than the 0.05 threshold, indicating that CBE Birr has a positive impact on bank performance. The outcome illustrates how the use of mobile wallets promotes financial inclusion, boosts transaction volumes, and aids in the expansion of digital banking at CBE.

Hypothesis Testing Result – Internet Banking

Since every respondent gave the same answers, there was insufficient variation in the survey responses, making it impossible to perform the hypothesis testing for Internet banking. Because statistical analysis techniques like regression depend on variance to identify significant relationships, this uniformity invalidates them. Nonetheless, the consistent answers might indicate that users have a similar of the Commercial Bank of Ethiopia's (CBE) internet banking services. The value of Internet banking transactions increased steadily from 13.1 billion birr in 2020–2021 to 958.9 billion birr in 2024–2025, which is consistent with secondary data trends that support this qualitative insight. The data indicates that Internet banking is becoming more popular, particularly among corporate and technologically savvy users, even though testable statistical results are lacking.

Hypothesis Testing Result – API Integration

The null hypothesis (H_{05}) asserted that there was no significant impact on API integration. With a p-value of .001 and a standardised beta coefficient of 0.114, the regression output is significantly below the significance level of 0.05. This enables us to conclude that API integration significantly improves bank performance and reject H_{05} in favour of the alternative (H_{15}). This finding emphasises the increasing significance of automated services, fintech collaborations, and system interoperability—all of which are made feasible by API usage and enhance operational efficiency and customer support.

Table 21 Hypothesis Testing Result (IBM SPSS version 27)

Hypothesis Code	Variable	Null Hypothesis (H₀)	Alternative Hypothesis (H₁)	Beta Coefficient	Sig. (p-value)	Decision
H ₀₁ / H ₁₁	Mobile Banking (MB)	MB has no significant effect on CBE performance.	MB has a significant positive effect on CBE performance.	0.607	.000	Reject H₀₁, Accept H₁₁
H ₀₂ / H ₁₂	ATM Services	ATM has no significant effect on CBE performance.	ATM has a significant positive effect on CBE performance.	0.461	.000	Reject H₀₂, Accept H₁₂
H ₀₃ / H ₁₃	CBE Birr	CBE Birr has no significant effect on CBE performance.	CBE Birr has a significant positive effect on CBE performance.	0.120	.001	Reject H₀₃, Accept H₁₃
H ₀₅ / H ₁₅	API Integration	API has no significant effect on CBE performance.	API has a significant positive effect on CBE performance.	0.114	.001	Reject H₀₅, Accept H₁₅

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The purpose of this study was to examine how the Commercial Bank of Ethiopia's (CBE) performance was affected by a number of digital banking systems, including Internet banking, CBE Birr, automated teller machines (ATM), mobile banking, and API integration. To obtain thorough insights, the analysis integrated secondary institutional data from the bank with data from customer surveys. With a standardised beta coefficient (β) of 0.607 and a significance level of $p < 0.001$, the results of the regression analysis demonstrated that mobile banking had the greatest positive impact on performance. This finding is supported by the customer survey, which revealed a high rate of mobile banking adoption, particularly among younger demographics, due to its convenience and accessibility. This was supported by CBE's secondary data, which demonstrated a steady rise in the volume and value of mobile banking transactions over the previous several years.

ATM services also had a significant positive impact on performance, with $\beta = 0.461$ and $p < 0.001$. Consumers reported using ATMs frequently, especially for basic functions like checking their balance and withdrawing cash. The data indicated a shift towards mobile platforms among specific customer groups, despite the fact that ATM usage is still stable. Although ATM transaction volumes are significant, secondary data verified that mobile banking is outpacing their growth.

Despite having a lower coefficient ($\beta = 0.120$, $p = 0.001$), CBE Birr's contribution to performance was likewise statistically significant. According to survey results, it is very popular among people without smartphones and is frequently used for utility payments and peer-to-peer transfers. This is consistent with secondary data showing that by reaching users in rural and semi-urban areas, CBE Birr plays a critical role in financial inclusion.

Additionally, there was a statistically significant positive correlation between performance and the API integration variable ($\beta = 0.114$, $p = 0.001$). Despite being backend tools that clients cannot see directly, APIs have helped CBE's operational performance and service delivery by facilitating automation, interoperability, and collaborations with fintech companies. The bank's secondary

data showed an increasing trend in the use of APIs, particularly in partner integration and core banking procedures.

Despite being excluded from the final regression model because of multicollinearity issues, triangulation analysis and descriptive statistics revealed that Internet banking does make a small performance contribution. Corporate and technologically savvy clients are its primary users, especially for formal business-related transactions and large transfers. However, internet banking is still underutilised when compared to mobile banking and CBE Birr. This is mostly because users prefer mobile channels and internet access is restricted in some places.

In conclusion, the results show that digital banking systems, particularly ATM and mobile banking services, are essential for improving performance at the Commercial Bank of Ethiopia. Although mobile banking is the most popular and influential, backend innovation and financial accessibility are greatly aided by services like CBE Birr and API integration. All things considered, it seems that CBE's digital transformation process is greatly improving inclusiveness, customer performance perception, and institutional performance.

5.2 Conclusion

The purpose of this study was to investigate how the Commercial Bank of Ethiopia's performance was affected by digital banking systems, particularly Internet banking, CBE Birr, ATM services, mobile banking, and API integration. The study, which was based on a quantitative methodology, made use of both primary data from customer surveys and secondary data from CBE's internal reports to ensure a thorough and triangulated analysis of the effects of the digital transformation.

The results show that CBE's operational and financial performance is greatly enhanced by digital banking systems. Based on customer survey responses and statistical regression analysis, mobile banking was found to be the most significant of these. Its strategic role in promoting customer performance perception and institutional growth is highlighted by its broad adoption, user-friendliness, and rising transaction volume. ATM services, despite being more conventional, also demonstrated a noteworthy contribution to performance, underscoring their continued significance, particularly among clients who lack access to mobile technology or prefer in-person interactions.

By providing clients in underserved and rural areas with easily accessible and user-friendly services, CBE Birr has been found to play a crucial role in promoting financial inclusion. Its value in reaching the unbanked population is demonstrated by its positive, albeit moderate, effect on performance. API integration also strengthened the technological foundation of CBE's digital services by improving internal efficiency, innovation, and partnership opportunities—despite not directly interacting with customers. Despite being excluded from the final regression because of multicollinearity, Internet banking's role in certain banking functions and its moderate usage by corporate clients nevertheless contribute to the total digital capacity.

The reliability of the results is strengthened by the triangulated analysis, which verifies a high degree of alignment between institutional performance indicators and customer perceived performance. Although there were some differences in the adoption of Internet banking, these were explained by differences in infrastructure, technology, and demographics.

In conclusion, the Commercial Bank of Ethiopia is performing much better thanks to the digital systems it has implemented. The findings emphasise how crucial it is to keep funding mobile platforms, update ATM infrastructure, grow services like CBE Birr, and incorporate backend technologies like APIs. Together, these resources help CBE achieve its goal of providing effective, inclusive, and customer-focused banking services, establishing the bank as a pioneer in Ethiopia's digital financial sector.

5.3 Recommendation

A number of suggestions are made to improve the Commercial Bank of Ethiopia's (CBE) performance by strategically developing and optimising its digital banking systems in light of the study's findings and triangulated insights.

Recommendation By variables

Mobile Banking

According to the study, CBE's banking performance is greatly improved by mobile banking. As a result, it is advised that the Commercial Bank of Ethiopia keep funding innovations and infrastructure for mobile banking. The bank should place a high priority on user-friendly interfaces, intuitive app design, and multilingual options catered to the varied clientele in order to

guarantee wider adoption. Targeted digital literacy initiatives would also aid in closing the digital divide, particularly among older populations and in rural areas. Maintaining user satisfaction and trust also depends on ensuring reliable security protocols, quick transaction processing, and consistent uptime. Additionally, proactive customer service for users of mobile banking will improve service quality and promote continued use.

ATM Services

Additionally, it was discovered that ATM services significantly and strongly affected banking performance. CBE should increase ATM coverage in order to further enhance this channel, particularly in areas with limited access to banking services. All deployed ATMs must be operational, secure, and provide basic services like fund transfers, bill payment, and account enquiries in addition to cash withdrawals. The system will become more secure and inclusive by adding features like biometric verification and improving ATM interfaces with multilingual support. Furthermore, putting in place systems for customer feedback and real-time maintenance tracking will help quickly address outages and service interruptions.

CBE Birr

Although it was less substantial than that of ATMs and mobile banking, CBE Birr's contribution to performance improvement was statistically significant. CBE should simplify wallet-to-wallet and wallet-to-bank transactions and expedite onboarding procedures in order to realise its full potential. The practical application of CBE Birr can be expanded by forging closer ties with utility service providers, public transportation providers, and retail retailers. Additionally, the bank ought to launch marketing initiatives to inform clients of its advantages and offer rewards for consistent use. Last but not least, maintaining system security and conducting frequent audits are critical to fostering public trust in the mobile wallet platform.

API Integration

Performance was positively impacted by API integration, underscoring its function in facilitating innovation and seamless connectivity. In order to facilitate the creation of new digital goods and services within safe, legal frameworks, CBE should aggressively open its APIs to reputable third-party fintechs. Internally, APIs can be used to enhance departmental interoperability and enable effective data sharing. Furthermore, improved decision-making and individualised customer service can be facilitated by real-time analytics driven by APIs. Putting money into developer

portals and API management systems first will also be essential to creating an environment that encourages innovation.

Internet Banking

Internet banking is a key component of CBE's digital environment and was included in the triangulated analysis even though it was not included in the regression model. The bank should improve its online banking platform to make it more responsive, accessible, and user-friendly on a range of devices in order to increase its efficacy. To keep customers' trust, stronger multi-factor authentication procedures ought to be implemented. Additionally, customer education initiatives and targeted promotions can raise awareness of and usage of online banking services. Additionally, the bank should use internet banking analytics to identify usage patterns and adjust its offerings.

Strategic-Level Recommendations

The Commercial Bank of Ethiopia (CBE) ought to implement a long-term Digital Transformation Strategy that views digital systems as essential facilitators of performance, efficiency, and customer satisfaction rather than just as auxiliary tools. The results show that platforms like CBE Birr, API integration, ATMs, and mobile banking are important performance drivers. Therefore, ongoing investment in cutting-edge digital technologies, backed by a strong leadership commitment to innovation, must be a key component of CBE's strategic focus. To ensure alignment with the bank's overarching strategic goals, a centralised digital innovation unit should be set up to supervise and coordinate all transformation initiatives. CBE will also be able to work with fintech partners and develop value-added services for clients by adopting open banking principles through secure API integration, strengthening its competitive advantage in the financial services industry.

Organizational-Level Recommendations

To facilitate the successful deployment and expansion of digital systems, CBE should improve its internal capabilities and human capital at the organisational level. Upskilling staff members via frequent instruction in cybersecurity, digital literacy, and providing exceptional customer service in a digital setting is part of this. To promote the smooth implementation of digital initiatives, cross-functional cooperation between the IT, operations, and customer support teams should be strengthened. Furthermore, a strong framework for monitoring and evaluation (M&E) should be

created in order to use key performance indicators (KPIs) to evaluate each digital channel's performance. The company should reward groups and individuals who make contributions to digital improvements in order to foster an innovative culture internally. Furthermore, more data-driven decision-making, service personalisation, and proactive customer engagement may be made possible by increased internal data analytics capability.

Implications for Future Research

Understanding how digital systems—like ATM services, Internet banking, CBE Birr, mobile banking, and API integration—improve the Commercial Bank of Ethiopia's (CBE) performance has been greatly aided by the current study. Future research is still needed in a few crucial areas, though. First, the lack of variation in survey responses, especially in domains like Internet banking, emphasises the necessity of qualitative research techniques like focus groups or in-depth interviews to delve deeper into user perceptions, organisational difficulties, and cultural barriers to digital adoption. Second, the findings would be more broadly applicable and provide comparative insights into digital transformation in various banking contexts if the scope was extended beyond CBE to include private and rural banks. Third, evaluating the long-term effects of digital systems on bank performance and customer loyalty may benefit greatly from longitudinal research. Finally, more study is needed to determine how cybersecurity preparedness and regulatory frameworks affect the resilience and efficacy of digital banking services in Ethiopia's changing financial environment.

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APPENDIX (Customer questionnaires')

St. Mary's University
School of Graduate Studies
Masters of Business Administration

Questionnaire to be completed by customers of Commercial banks of Ethiopia

Dear Participants

My name is Elias Yeshanew, a graduate student at St. Mary's University. I am conducting a research study titled **"The Effect of Digital Systems in Core Banking on Enhancing Performance in Commercial Bank of Ethiopia (CBE)"**, as part of the requirements for my MBA degree. Your participation in this questionnaire is highly valued and will greatly contribute to the success of this research. The information you provide will be kept **strictly confidential** and used **solely for academic purposes**.

Instructions:

- Do **not** write your name anywhere on the questionnaire.
- For multiple-choice questions, mark your answer with an **"X"** or **"√"** in the appropriate box.
- If you have any questions or need clarification, please feel free to contact me at:

☎ 0934 885 911

✉ eliasyeshanew@gmail.com

Thank you in advance for your time and cooperation!

Section 1: Demographic Information

1. What is your age group?

☐ 18–25 ☐ 26–35 ☐ 36–45 ☐ 46–60 ☐ Above 60

2. What is your gender?

☐ Male ☐ Female

3. What is your highest level of education?

☐ No formal schooling ☐ Primary ☐ Secondary ☐ Diploma ☐ Degree or above

4. What is your job?

☐ Government ☐ Private ☐ Self-employed ☐ Student ☐ Unemployed ☐ Retired

5. How long have you been a customer at CBE?

☐ Less than 1 year ☐ 1–3 years ☐ 4–6 years ☐ Over 6 years

6. How often do you use CBE digital services?

☐ Daily ☐ Weekly ☐ Monthly ☐ Rarely ☐ Never

Section 2: Digital System Usage and Availability (Likert Scale Statements)

The following statements are designed to help assess your perceptions of various **Digital System Usage and Availability** and how they contribute to the Enhancing Performance of BGI Ethiopia. Please read each statement carefully and respond by placing an “X” or “√” in the number (from 1 to 5) that best reflects your level of agreement.

If you are unsure about any statement or feel it does not apply to your role, you may leave it blank.

Rating Scale:

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

Please place an “X” or a tick (√) in the box that best represents your response for each item.

1	Mobile Banking	Scales				
		1	2	3	4	5
1.1	I use the CBE mobile banking app to send money or check my balance.					
1.2	The mobile banking app is easy to use.					
1.3	The mobile app works quickly without many problems.					
1.4	I feel my money and information are safe when using the mobile app.					
1.5	Mobile banking has helped me avoid long lines at the bank.					
2	Internet Banking	Scales				
		1	2	3	4	5
2.1	I have used CBE internet banking on a computer or phone browser.					
2.2	Internet banking works well even during busy hours.					
2.3	I can do most of my banking online without visiting a branch.					
2.4	I feel confident using internet banking for big transactions.					
2.5	Internet banking has made my banking experience more convenient.					
3	ATM Use	Scales				
		1	2	3	4	5
3.1	I often use CBE’s ATMs to get or send money.					
3.2	I can find ATMs nearby when I need them.					
3.3	The ATM works well most of the time.					

3.4	ATMs save me time compared to going inside the bank.					
3.5	Using an ATM feels safe and secure for my transactions.					
4	CBE Birr	Scales				
		1	2	3	4	5
4.1	I use CBE Birr to buy airtime, pay bills, or send money.					
4.2	CBE Birr is easy to use.					
4.3	I am happy with how CBE Birr works.					
4.4	CBE Birr has made banking easier for me.					
4.5	CBE Birr helps me manage money even without going to the bank.					
5	API-Based Services	Scales				
		1	2	3	4	5
5.1	I have used CBE to pay bills like electricity, water, or taxes.					
5.2	Paying bills or recharging my phone is easy through CBE's digital system.					
5.3	These services work well and save me time.					
5.4	API-based services on CBE platforms are convenient and useful.					
5.5	CBE's bill payment features are better than paying in person.					
6	Perceived performance	Scales				
		1	2	3	4	5
6.1	CBE's digital services perform efficiently and reliably.					
6.2	CBE's digital services improve the overall quality of my banking experience.					
6.3	The speed and accuracy of CBE's digital services enhance my productivity.					
6.4	I believe CBE's digital services perform better than traditional (in-person) banking.					
6.5	CBE's digital services deliver the performance I expect from a modern banking system.					

ቅድስት ማርያም ዩኒቨርሲቲ
የድህረ ምረቃ ትምህርት ቤት
የንግድ አስተዳደር ማስተረከ

በኢትዮጵያ ንግድ ባንኮች ደንቦች የሚሞላ መጠይቅ ነው።

ውድ ተሳታፊዎች

የቅድስት ማርያም ዩኒቨርሲቲ ተመራቂ ተማሪ ኤልያስ የሻነው እባላለሁ። “የዲጂታል ሲስተምስ በኮር ባንኪንግ በኢትዮጵያ ንግድ ባንክ አፈጻጸም ላይ ያለው ተፅዕኖ” በሚል ርዕስ ለ MBA ዲግሪዬ የምርምር ጥናት እያካሄድኩ ነው። በዚህ መጠይቅ ውስጥ ያለዎት ተሳትፎ በጣም የጎላ ነው እናም ለዚህ ምርምር ስኬት ትልቅ አስተዋፅኦ ይኖረዋል። ያቀረቡት መረጃ በሚስጥር የሚያዝ ሲሆን ለአካዳሚክ ዓላማዎች ብቻ ጥቅም ላይ ይውላል።

መመሪያዎች፡-

- በመጠይቁ ላይ በማንኛውም ቦታ ስምዎን ይጻፉ.
- ለምርጫ ጥያቄዎች መልስዎን በተገቢው ሳጥን ውስጥ "X" ወይም "✓" ምልክት ያድርጉ.
- ማንኛውም ጥያቄዎች ካሉዎት ወይም ማብራሪያ ከፈለጉ እባክዎን በሚከተለው ሊያገኙኝ ይችላሉ፡-

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ስለ ጊዜዎ እና ትብብርዎ አስቀድመን እናመሰግናለን!

ክፍል 1፡ የስነ ሕዝብ አወቃቀር መረጃ

1. የዕድሜ ምድብ ስንት ነው?

☐ 18–25 ☐ 26–35 ☐ 36–45 ☐ 46–60 ☐ ከ 60 በላይ

2. ጾታዎ ምንድን ነው?

☐ ወንድ ☐ ሴት

3. ከፍተኛ የትምህርት ደረጃዎ ምንድን ነው?

☐ መደበኛ ትምህርት የለም። ☐ አንደኛ ደረጃ ☐ ሁለተኛ ደረጃ ☐ ዲፕሎማ ☐ ዲግሪ

ወይም ከዚያ በላይ

4. ስራህ ምንድን ነው?

☐ መንግስት ☐ የግል ☐ በራስ የሚተዳደር ☐ ተማሪ ☐ ሥራ አጥ ☐ ጡረታ

5. በኢትዮጵያ ንግድ ባንክ ምን ያህል ጊዜ ደንበኛ ሆነህ ቆየህ?

☐ ከ1 አመት በታች

☐ 1-3 ዓመታት

☐ 4-6 ዓመታት

☐ ከ6

ዓመታት በላይ

6. CBE ዲጂታል አገልግሎቶችን ምን ያህል ጊዜ ይጠቀማሉ?

☐ በየቀኑ

☐ በየሳምንቱ

☐ ወርሃዊ

☐ አልፎ አልፎ

☐ በጭራሽ

ክፍል 2: የዲጂታል ስርዓት አጠቃቀም እና ተገኝነት (Likert ልኬት መግለጫዎች)

የሚከተሉት መግለጫዎች ስለ ተለያዩ ሰዎች ያለዎትን ግንዛቤ ለመገምገም እንዲያግዙ የተነደፉ ናቸው። **የዲጂታል ስርዓት አጠቃቀም እና ተገኝነት** እና ለቢጂኦይ ኢትዮጵያ አፈጻጸም እድገት እንዴት አስተዋፅዖ ያደርጋሉ። እባክዎ እያንዳንዱን መግለጫ በጥንቃቄ ያንብቡ እና በማስቀመጥ ምላሽ ይስጡ "X" ወይም "✓" የእርስዎን የስምምነት ደረጃ በተሻለ በሚያንጸባርቀው ቁጥር (ከ 1 እስከ 5)።

ስለማንኛውም መግለጫ እርግጠኛ ካልሆኑ ወይም በእርስዎ ሚና ላይ እንደማይተገበር ከተሰማዎት ባዶ ሊተውት ይችላሉ።

የደረጃ አሰጣጥ ልኬት:

1 = በጣም አልስማማም 2 = አልስማማም 3 = ገለልተኛ 4 = እስማማለሁ 5 = በጣም እስማማለሁ

እባክዎ ለእያንዳንዱ ንጥል የእርስዎን ምላሽ በተሻለ የሚወክል "X" ወይም ምልክት (✓) በሰጥኑ ውስጥ ያስቀምጡ።

1	የሞባይል ባንኪንግ	ሚዛኖች				
		1	2	3	4	5
1.1	ገንዘብ ለመላክ ወይም ቀሪ ሒሳቤን ለማረጋገጥ CBE የሞባይል ባንኪንግ መተግበሪያን እጠቀማለሁ።					
1.2	የሞባይል ባንኪንግ መተግበሪያ ለመጠቀም ቀላል ነው።					
1.3	የሞባይል መተግበሪያ ያለ ብዙ ችግሮች በፍጥነት ይሰራል።					
1.4	የሞባይል መተግበሪያን ስጠቀም ገንዘቤ እና መረጃዬ ደህና እንደሆኑ ይሰማኛል።					

1.5	የሞባይል ባንክንግ በባንክ ውስጥ ረጅም መስመሮችን እንዳስወግድ ረድቶኛል።					
2	የበይነመረብ ባንክ	ሚዛኖች				
		1	2	3	4	5
2.1	CBE የኢንተርኔት ባንክን በኮምፒውተር ወይም በስልክ አሳሽ ተጠቅሜያለሁ።					
2.2	የኢንተርኔት ባንክንግ ስራ በሚበዛበት ሰዓት እንኳን በደንብ ይሰራል።					
2.3	ቅርንጫፍን ሳልጎበኝ አብዛኛውን የባንክ ስራዬን በመስመር ላይ ማድረግ እችላለሁ።					
2.4	ለትልቅ ግብይቶች የኢንተርኔት ባንክን በመጠቀም በራስ መተማመን ይሰማኛል።					
2.5	የኢንተርኔት ባንክንግ የባንክ ልምዴን የበለጠ ምቹ አድርጎታል።					
3	የኤቲኤም አጠቃቀም	ሚዛኖች				
		1	2	3	4	5
3.1	ገንዘብ ለማግኘት ወይም ለመላክ ብዙ ጊዜ የCBE's ATMs እጠቀማለሁ።					
3.2	በምፈለጋቸው ጊዜ ኤቲኤሞችን በአቅራቢያ አገኛለሁ።					
3.3	ኤቲኤም ብዙ ጊዜ በደንብ ይሰራል።					
3.4	ኤቲኤሞች ወደ ባንክ ከመሄድ ጋር ሲነፃፀሩ ጊዜ ይቆጥቡኛል።					

3.5	ኤቲኤም መጠቀም ለኔ ግብይቶች ደህንነት እና ደህንነት ይሰማኛል።					
4	CBE Birr	ሚዛኖች				
		1	2	3	4	5
4.1	የአየር ሰአት ለመግዛት፣ ሂሳብ ለመክፈል ወይም ገንዘብ ለመላክ CBE ብር እጠቀማለሁ።					
4.2	ንግድ ባንክ ብር ለመጠቀም ቀላል ነው።					
4.3	የኢትዮጵያ ንግድ ባንክ ብር እንዴት እንደሚሰራ ይስተኛ ነኝ።					
4.4	ንግድ ባንክ ብር ባንኪንግ ቀላል አድርጎልኛል።					
4.5	ንግድ ባንክ ብር ሰልጤው ገንዘብ እንድይዝ ይረዳኛል።					
5	ኤፒአይ ላይ የተመሰረቱ አገልግሎቶች	ሚዛኖች				
		1	2	3	4	5
5.1	እንደ መብራት፣ ውሃ ወይም ታክስ ያሉ ክፍያዎችን ለመክፈል CBE ተጠቅሜያለሁ።					
5.2	በ CBE ዲጂታል ሲስተም ሂሳብ መክፈል ወይም ስልኬን መሙላት ቀላል ነው።					
5.3	እነዚህ አገልግሎቶች በደንብ ይሰራሉ እና ጊዜ ይቆጥቡኛል.					
5.4	በሲቢኢ መድረኮች ኤፒአይ ላይ የተመሰረቱ አገልግሎቶች ምቹ እና ጠቃሚ ናቸው።					
5.5	CBE የሂሳብ አከፋፈል ባህሪያት በአካል ከመክፈል የተሻሉ ናቸው።					
6	አጠቃላይ እርካታ	ሚዛኖች				

		1	2	3	4	5
6.1	የ CBE ዲጂታል አገልግሎቶች በብቃት እና በአስተማማኝ ሁኔታ ይሰራሉ።					
6.2	የኢትዮጵያ ንግድ ባንክ ዲጂታል አገልግሎቶች የባንክ ልምድን አጠቃላይ ጥራት ያሻሽላሉ።					
6.3	የCBE ዲጂታል አገልግሎቶች ፍጥነት እና ትክክለኛነት ምርታማነቱን ያሳድጋል።					
6.4	የCBE ዲጂታል አገልግሎቶች ከባህላዊ (በአካል) የባንክ አገልግሎት የተሻለ እንደሚሰሩ አምናለሁ።					
6.5	የኢትዮጵያ ንግድ ባንክ ዲጂታል አገልግሎቶች ከዘመናዊ የባንክ ሥርዓት የምጠብቀውን አፈጻጸም ያቀርባሉ።					