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College of Business and Economics

Department of Account and Finance

The Impact of Digitalization on Bank Profitability: The Case of selected Commercial Banks in Ethiopia

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Statement of Declaration

I, the undersigned, declare that this is my original work and has not been submitted to any other college, institution or university for academic credit.

Signature:_____ Date:_____

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Statement of Certification

This is to certify that Mekdes Mekonnen Worku completed the thesis "The Impact of Digitalization on Bank Profitability: The Case of Selected Commercial Banks in Ethiopia." The work is unique and appropriate for submission to the Master of Business Administration in Finance.

Advisor:

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Date _____

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I hereby certify that the thesis entitled: **"The Impact of Digitalization on Bank Profitability: The case of selected commercial banks in Ethiopia"** and submitted in partial fulfillment of the requirements for the Degree of Master of Business Administration in Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Acronyms

ICT	Information and Communication Technology
CBE	Commercial Bank of Ethiopia
BOA	Bank of Abyssinia
ATM	Automated Teller Machine
POS	Point of Sale
ITM	Iterative Teller Machine
MW	Mobile Wallet
ROA	Return on Asset
ROE	Return on Equity
NBE	National Bank of Ethiopia
WWW	World Wide Web
PC	Personal Computer
PSS	Premium Switch Solutions
SPSS	Statistical Package for Social Science
PLS	Partial Least Square
BCG	Boston Consulting Group
NIBU	Number of Internet Banking User
VATMT	Value Transacted on Automated Teller Machine
VIBT	Value of Internet Banking Transaction
NMBT	Number of Mobile Banking Transaction
VMBT	Number of Mobile Transaction
GDP	Gross Domestic Product

ABSTRACT

This research examines the impact of digitization on commercial bank profitability in Ethiopia, using return on equity as a proxy for profitability. The study selected nine commercial banks operating in Ethiopia between 2018 and 2021 using secondary data and a purposive sampling technique. In addition, primary data was obtained by a questionnaire on 311 sample branches of the nine commercial banks that were chosen. Key variables were determined based on existing literature to reveal their link and impact on commercial bank profitability. Number of mobile banking transactions, ATM transaction value, internet banking transaction value, number of internet banking users, and mobile banking transaction value were the factors studied. The value of ATM transactions had a positive and significant impact on the bank's profitability as measured by return on equity, which may be related to the reduction of the bank's own overheads and transaction-related operational costs associated with hosting and serving the customer at a branch's counter as a result of making basic financial services more accessible to the customer. As a consequence of the findings, it was determined that digitalization has a beneficial impact on operational excellence and service quality, which would have resulted in higher commercial bank profitability. However, the study found that the number of Internet banking users and the value of mobile banking transactions are both negative and insignificant. The researcher recommended that commercial banks should consider commission based mobile and internet banking transaction and exert maximum effort to increase the number of active users. The researcher conclude that with the existing digitalization efforts of the Ethiopian banks goes with and supported by new national digital strategy of the country and ultimately brings better returns on investment.

Keywords: Digitalization; Commercial Banks; ROE; Profitability; Service quality and Operational excellence, National Digital Strategy.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Information and communication technology (IT) has brought super change on the financial institutions particularly it supports banking service, risk management and increase productivity. Information and communication technology investment has enabled the financial institutions to compute and be successful in digital banking transformation (Abbasi and Weigand, 2017).

Rapid advancements in information technology and computer networks, such as the Internet and telecommunication systems, enabled the global expansion of electronic commerce. The Internet's practically universal access has made it a useful business tool, spawning a new sort of economy known as the digital economy. The development of global connectivity which the Internet offers has made it a valuable business tool and the digital economy is a new sort of economy that was established (Shah and Clarke, 2009). Due to qualities such as speed, efficiency, cost reduction, and taking advantage of unique chances, digital banking has entered a new phase in the competition. This demonstrates that if a bank's investment increases profitability, the use of digital banking in the banking industry will be beneficial (Faiedh et al., 2004).

Digitalization has become predominant as industries and institutions including commercial banks strain to adopt better and effective method of service provision to their customers. It brought about a huge change in the financial sector specifically the support of banking service. As a result, financial institutions deploy a huge amount of investment on digitalization (Agboola M.G. et al, 2019). Digitalization facilitates the delivery of brick-and-mortar banking services to the customers through innovative technologies such as internet banking, mobile banking, mobile money, electronic commerce and other digital payment platforms. Internet and mobile digital banking deliver fast, efficient and effective service not only to the traditional banking service but also for the new innovated products as well. The availability of 3G and 4G internet technology and the expanded uses of smartphones

encourage financial institution to offer advanced digital technology to their existing client as well as to reach out the unbanked population (Abbasi and Weigand, 2017).

To serve its clients, the financial sector has traditionally relied significantly on high-cost infrastructure channels (branches, ATMs, POS machines). This paradigm has shifted with the advent of agent and mobile banking channels, as well as the emergence of more economical platforms like M-POS, allowing financial institutions to expand their infrastructure with lower-cost delivery methods. The emergence of new delivery models is transforming the economics of banking to reach those with low income, adding to the financial inclusion agenda for financial institutions. The number of traditional (ATM, POS) and nontraditional (agents) access points to financial services is rapidly expanding in Ethiopia. By using bank agent networks and micro financial institutions, Ethiopia has expanded its reach of access points outside of large urban regions; yet, there is still room for development. Despite the expansion, urban regions still have a significant concentration of branches, ATMs, and POS machines. Furthermore, consumers frequently report problems with ATMs and POS equipment, lowering overall demand for digital channels. Increased access to Cash-In, Cash-Out (CICO) infrastructure in urban and rural areas will be critical to growing digital payment usage. In metropolitan regions, ATM expansion will play a major part in the CICO infrastructure, with an increase in agent networks supporting it; in rural areas, the agent network will be the dominant CICO infrastructure. This takes into account and is based on the socioeconomic standards of the clients as well as the required business case for each infrastructure model. (National bank of Ethiopia, 2021).

Debit cards and automated teller machines (ATM) are widely used in Ethiopian banks, while credit cards have yet to be issued. The majority of Ethiopians lack credit cards, and internet access is slow, expensive, and unreliable. Ethiopia's connection to Secom's underground/sea fiber optic cable via Djibouti, however, has recently improved internet performance. International banking networks are connected to ATMs. International ATM cardholders can withdraw money from any ATM machine operated by Ethiopia's 18 commercial banks. ET Switch S.C., a commercial bank-owned corporation, was founded to promote bank-to-bank connectivity. The program is used by approximately 10 million ATM card holders across the country, according to ET Switch S.C. sources. (Ethiopia-Country Commercial Guide, 2021).

Ethiopian banks have begun to use mobile, internet, and card banking services to conduct primary internet transactions. These innovations came with the introduction of centralized, online real-time electronic banking solutions, which resulted in a rise in clients. The mechanism for delivering digital financial services still has a long way to go. Foreign companies are currently providing technical services for the country's numerous financial inclusion efforts. Ethiopia has now developed and tabled a proclamation to allow, regulate, and monitor e-commerce operations in the country (Ethiopia-Country Commercial Guide, 2021).

As the platform for most financial transactions and the potential to enhance financial inclusion, digital finance is becoming a strategic tool that offers to connect disparate industries. In Ethiopia, new trends are affecting Digital Financial Services (DFS), such as the launch of a national switch service that is jointly owned by all banks and is aiming to create interoperability through various channels such as ATMs, POS, Mobile Wallets, and bank accounts (ictet.org, 2021).

New technology advancement requires high investment on the area of digital banking and which has required the firm to deploy huge amount of capital that resulted in low profitability in short run. On the other hand, digitalization will harm the performance of Banks and the public money they protect. Banks will be facing a big challenge of cyber-attack unless they fortify their infrastructure. This way, the introduction of digitalization and the resulting openness of bank infrastructure networks can introduce this new type of risk to the banks; so that they will harm the financial capability, the type of spending they make, the morale of their management, employees, and customers, and brand damage to the banks (Bett, F. C. & Bogonko, J. B., 2017).

ICT concepts, methodologies, policies, and implementation strategies applied to financial services have become a major topic of debate and concern for all banks, as well as a requirement for local and global competitiveness Danaa (2016). The banking industry's service delivery standards have been significantly impacted by technological advancements. Customers can now make financial transactions outside of typical business hours using automated teller machines (ATMs) and mobile banking, in their most basic form individuals

can check their account balances and make payments without having to visit a bank using online banking. This is gradually transforming society into a cashless society, in which consumers are no longer need to pay for all of their purchases in cash, hence boosting customer relationship management (Mapesa, 2018).

Given the recent global economic downturn, it is critical for banks to develop a tough and steadfast customer base in order to weather tougher economics and more competition. The concept of providing outstanding service while also selling consumer goods is an effective way to meet customers' requirements while also engaging them. Given that many banks offer similar goods in a competitive market, banks are paying close attention to service delivery in order to gain a competitive advantage. "Banks that provide high-quality services gain a competitive advantage in terms of increased revenue, customer loyalty, and retention." (Kumar et al., 2010)

Every institution in the world is being knocked on the door by fast developing information and communication technologies, and Ethiopian banks will never be exceptional. Cash is still the most common form of payment in Ethiopia, and electronic payment systems are still in their infancy. In the face of rapid spread of electronic payment systems in both the developed and developing worlds, Ethiopia's financial sector cannot afford to be an outlier in terms of adopting the technology. Digital cash and digital wallets have mostly supplanted the use of cash. After barter, currency, paper money (checks), and now digital cash, this can be said to constitute the fourth stage of evolution (Gardachew, W. 2010).

Ethiopia's banking industry is preparing to develop capacity and modernize the financial system by utilizing cutting-edge technologies that can be found anywhere in the world. E-banking first appeared in Ethiopia in late 2001, when the country's largest state-owned commercial bank (CBE) deployed ATMs to provide services to local customers. In recent years, Commercial Bank of Ethiopia and other private commercial banks are also implementing different kinds of e-banking services such as Internet banking, mobile banking, ATM (Automated Teller Machine) and POS (Point of Sale Terminal) channels (Gardachew, W. 2010).

Therefore, the current study is to determine the impact of digitalization to improve customer experience and satisfaction with digital technologies; enhance efficiency by automating and standardizing processes and excel digital service quality which leads to profitability of the commercial banks**.**

1.2 Statement of the Problem

Digital strategy is a critical component of the overall organizational strategy and should be guided by the business' vision, mission, and overall strategy, as well as market conditions. There are three fundamental engagement models for banks: become a digital bank, introduce standalone digital channels or products, or establish subsidiaries to operate digital banking activities. Offering digital financial services does not have to be an all or nothing approach. All three routes to digitization allow institutions to move forward on a digital journey, with large or small investments, taking large or smaller risks (IFC, 2018).

Commercial banks in Ethiopia are investing a large amount of capital in digital banking in order to remain in a competitive and dynamic environment (National bank of Ethiopia. (2021).This considerable investment must be used to develop a fully integrated e-banking business. As a result, it is vital that e-banking innovations are founded on a thorough analysis of the costs associated in order to avoid detrimental consequences on bank performance. On the one hand, bank performance is closely tied to the efficiency and effectiveness of electronic banking, yet to avoid losses associated with electronic banking, strict controls and regulations are required (Josiah, A. and Nancy, k. 2012)

Solomon, W. (2016) investigated the role of e-banking on commercial banks' financial performance in Ethiopia. The study selected ten commercial banks operating in Ethiopia between 2013 and 2015 using secondary data and a purposive sampling technique. To determine their link and influence on commercial banks' ROA, the value or price of POS transactions, debit card transactions, the number of automated teller machine terminals, the number of point of sale terminals, and market share were utilized as explanatory variables. The study's findings revealed that all of these factors had a positive and considerable impact on the financial performance of the commercial bank as evaluated by ROA, which enhanced profitability.

Elias, G. (2019) looked at the role of e-banking on commercial bank financial performance in Ethiopia, using return on equity as a proxy for profitability. The study selected ten commercial banks operating in Ethiopia between 2015 and 2018 using secondary data and a selective sampling technique. Number of ATM terminals, number of debit cards, Number of mobile banking users, Value of ATM transactions, Value of mobile banking transactions, bank size, and inflation rate were identified as explanatory variables to reveal their link and influence on commercial bank financial performance. The study found that the number of mobile banking users and the value of ATM transactions had positive and significant effects on bank profitability as measured by return on equity, indicating that increasing the number of mobile banking users and the value or price of ATM transactions had a positive impact on commercial bank financial performance by making basic financial services more accessible by reducing the time and distance to the nearest bank branch. According to the study, emphasizing and improving on awareness generation, as well as the major internal drivers, could improve e-banking practice and commercial bank performance in Ethiopia.

According to studies made on digital banking, such as Solomon, W. (2016) and Elias, G. (2019), have been undertaken on the role of e-banking on the financial performance of commercial banks in Ethiopia. Other Ethiopian research on the other hand, focused on the acceptance of e-banking, as well as its challenges and prospects in the Ethiopia banking system. Ayana, G. (2010) Barriers and Drivers of e-banking adoption in Ethiopia; Gardachew, W. (2010) on the challenges and opportunities of electronic banking practices in Ethiopia, and Million, (2013) on impact of electronic banking on customer satisfaction. This shows that more research has to be done on the impact of digital banking on commercial banks profitability in Ethiopia.

This study, therefore; tries to determine the influence of digital banking on profitability of commercial banks in Ethiopia by including variables such as internet banking users and value of transactions made through internet banking, which have not yet been discussed in previous studies performed on the Ethiopian context, and is proxy to digital banking and commercial banks profitability. The researcher also tried to show the effect of digitalization on operational excellence and service quality of selected commercial banks operating in

Ethiopia. And, the result will help the stakeholders to make decision on how wisely to invest more funds on digital banking products and services.

1.3 Research Questions

- Does digitalization affect the profitability of the commercial banks?
- Does digitalization have impact on operational excellence of the commercial banks?
- Does digitalization affect service quality of the commercial banks?

1.4 Objective of the Study

The general objective of the study is to find out the impact of digitalization on the profitability of commercial banks in Ethiopia. The relation of the study specifically established:

- The impact of ATM on profitability of commercial banks;
- The impact of Mobile banking on profitability of commercial banks;
- The impact of Internet banking on profitability of commercial banks;
- The effect of digitalization efforts of the commercial banks to bring operational excellence;
- The effect of digitalization efforts to bring service quality to the commercial banks;

1.5 Research Hypothesis

H1: Value of ATM transaction has positive and significant impact on ROE Commercial banks in Ethiopia

H2: Number of internet banking users has positive and significant impact on ROE of commercial banks in Ethiopia

H3: Value of transaction executed by internet banking has positive and significant impact on ROE of commercial banks in Ethiopia

H4: Number of Mobile banking transaction has positive and significant impact on ROE of commercial banks in Ethiopia.

H5: Value of transaction executed by Mobile banking has positive and significant impact on ROE of commercial banks in Ethiopia.

H6: Digitalization has impact on the operational excellence of commercial banks in Ethiopia.

H7: Digitalization has impact on service quality of commercial banks in Ethiopia.

1.6 Significance of the Study

Digitalization is a ubiquitous influence nowadays, impacting many industries, including the banking sector. Banks are facing tremendous competitive pressure and the need for the development of digital opportunities is urgent to ensure future success. As a result, the question is not if or whether digitization affects the Bank's profitability, but rather how. The way business is done is being challenged, and it must be modified to the changing market conditions. The topic of digitalization has been discussed for more than 20 years, but not until recently banks discovered this topic as present and of strategic relevance. Digitalization in banking along with other factors, such as changing customer experience on digitalization, operational excellence, accessibility option and increasing regulatory frameworks, is a relevant influencing factor for banks.

The finding of the study will be of great importance at identifying the impact of digitalization as a strategic theme on the commercial banks' profitability to enable the decision makers of the banks how to wisely invest on digitalization. It also gives a light for policy makers and regulatory bodies in assessing the legal frameworks and policy and procedures on digital regulation and implementation of the services.

The study will allow researchers and scholars to use the study for reference. It can provide additional knowledge of electronic banking and form the basis upon which further research will be done.

1.7 Delimitation/Scope of the Study

The objective of this study is to examine how implementation of digitalization affects profitability, operational excellence and service quality of commercial banks in Ethiopia. The study is limited to nine commercial banks out of the eighteen private banks and one state-owned commercial bank. The questioners are developed only for employees of the institutions while external stake holders doesn't include such as customer feedback. Selection of dependent variable, Return on Equity (ROE) which fit the study was

also part of limitation. Because there are many variables which determinants of performance but not relevant for this study the researcher needs to choose the more appropriate variables so that it is suitable with the independent variables, Value of ATM transaction, Number of Internet banking user, Value of internet banking transaction, Number of mobile banking transaction and Value of mobile banking transaction. The data was verifiable since it came from each selected banks head office and commercial banks published annual audited financial statements. However, the study has limitation to the degree of precision of the data obtained from the secondary source.

Banks profitability determinants except ROA and ROE which used as proxy variable to measure profitability are mostly categorized into two broad factors which are internal and external factors (Sarwar, Mustafa, Abid & Ahmad, 2018). While, under these investigations the study considered only the internal factor to measure profitability of the Bank.

Therefore, the study measured the impact of digitalization on profitability without inclusions of external determinants such as GDP, inflation and others. The application of digitalization is a recent issue in commercial banks of the country. To enable us to determine the impact of digitalization on the profitability of the commercial banks, the secondary data was collected and analyzed for the time periods covering only the periods from 2018 to 2021.

1.8 Organization of the Study

The study is organized in the following form: The first chapter is introductory which consists of general background, statement of the research problem, basic research questions, research hypothesis, objectives of the study, significance of the study, and delimitation/scope of the study. The second chapter summarized related literature review of theoretical and empirical studies in the study of digital banking and its impact on profitability. Chapter three is the Methodology part; which contained design of the study, population and sampling techniques of the study, data type and instrument, sources of data collection, and methods of data analysis. Analysis and data interpretations are presented in chapter four. The final chapter presents conclusion, recommendation and area for further study.

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews the existing literature on the effect of digital banking on banks profitability. In particular, theoretical review where various theories on digital banking are reviewed, empirical reviews done by previous researchers on effects of digital banking on banks profitability are reviewed. This chapter provides the concept of digital banking versus operational excellence and service quality, important terms of digitalization and determinants of bank profitability. It also identifies the knowledge gap and shows the conceptual framework of the study.

2.1. Theoretical Review

The study reviewed different theories to establish the impact of digital banking on bank profitability.

2.1.1. Impacts of Digitalization on Bank Profitability and Performance

The world is undergoing a rapid digital transformation, dubbed the fourth industrial revolution by some. Several economies and private businesses have begun the process of digital transformation. Ethiopia is expected to follow Ethiopia's lead. The Ministry of Innovation and Technology has released the National Digital Transformation Strategy, which outlines significant changes aimed at transforming Ethiopia into a digital nation by 2025. Payments are a critical enabler for this change, and since technology allows for faster and more frictionless data (and money) transfers in the modern day, a stable and ethical digital payments ecosystem is required.

A service for digital banking activity has become a hot topic in the financial business in the new millennium (Wadesango, N., & Magaya, B., 2020). Digitalization has been known to affect the performance of commercial Banks, both positively and adversely. In the past decade various scholars from different corners of the world have studied the various effects of digitalization on profitability, operations and service quality of commercial banks. There are also researches made in the African continent, especially in countries like Rwanda, Nigeria, and Kenya where there are relatively better digital banking experiences. These

countries have clear digital vision and policy frameworks. Although very few, local researches have been made in order to determine the effects of digitalization on the performance of Ethiopian commercial Banks.

2.1.2. Digital Banking

The act of conducting banking and financial transactions without the use of cash, coin, or bills is known as digital or cashless banking (Kamboh and Leghari, 2016). The early stages of the digital banking journey have largely focused on enhancing existing offerings with new, technology-enabled services in order to improve customer accessibility and value. Electronic banking is also known as digital banking, cashless banking, electronic banking, internet banking, online banking, virtual banking, web-based banking, remote electronic banking, phone banking, and so on Pery-Quatey (2018). Digital banking provides the characteristics that will propel banks into a competitive future by assisting them in identifying new niche markets that will drive innovation and create jobs.

E-banking is the delivery of a broad range of value-added products and services to bank clients through electronic and telecommunication networks (Steven, 2002). For years, banks have used e-banking platforms to connect with foreign and domestic consumers and do business. Banks began to use electronic channels to receive instructions and provide their products and services to their clients as the WWW (World Wide Web) and the Internet grew in popularity in the latter half of the 1990s. Despite the fact that the content and capabilities of the products and services offered by banks via the internet vary, they are all referred to as Internet banking or E-banking. A customer can use the internet (electronic banking) to access his or her bank account.

2.1.3. Definition of Important Terms and Concepts

For the scope of this research the following definitions of important terms and explanation of ideas will apply:

2.1.3.1. Digitalization

Digitalization is defined as the creation of a new customer experience on the outside and an efficient, effective operating model on the inside, both of which are enabled by digitalization

and the underlying technology, processes, and structures. Digitalization largely focused on enhancing the present offering by introducing new, technology-enabled services that would improve client accessibility and value. Mobile apps, e-wallet solutions, online banking, APIs, and personal finance management (PFM) tools are the most well-known examples (Shukla, R., 2016).

Different firms are being pushed to reassess their existing business models and operating methods as a result of new prospects brought on by digitalization, or to focus on finding fresh market opportunities Bouwman et al. (2019). The way banks and other financial institutions learn about, communicate with, and please clients is changing dramatically as a result of digitalization. Understanding digital client behavior, preferences, choices, likes, dislikes, and stated as well as implicit needs is the first step toward digitalization. (Kamra, 2019).

2.1.3.2. Key Enablers for Digitalization

Digitalization in banking industry can be facilitated through digital enablers which mainly includes: Digitalize customer experience; Digitalize products and services; Digitalize organization and Digitalize operations (Shukla, R., 2016)

Digitalize customer experience: Taking full control of customer experience and managing the stated or unstated needs of existing and new customers and develop business model accordingly. Customers can promptly adapt to the digital world expecting seamless multichannel experience and consistent service. They label their experience on three basic issues: How well companies understand their needs; simplicity of doing business; and how delightful it is.

Digitalize products and services: Traditional banking practice has focused on increasing sales targets rather than understanding the needs of customers. Recently, banks are more interested to become customer centric. Digitalization can provide billions of customers with minimum cost and affordable price. To maintain competitive edge in the industry, banks need to develop innovative products and services that meet customer needs.

Digitalize organization: Most banks have not structured their internal organization and governance policy according to the multichannel organization. Most efforts have been made to digitalize the front end while ignoring the back-end impact on the operation. To support the digital banking journey a complete restructure on the existing system required.

Digitalize operations: The digital world becomes possible as customers, competitors and even regulatory agencies fully engaged in the transparency and convenience of anywhere banking system. Banking does not guarantee customer loyalty instead it can identify opportunities by looking at the overall customer life cycle, enabled better customer service through the practice of digital marketing and customer service strategies and focus on improving customer experiences.

2.1.4. The Application of Digitalization in Business

The use of digital technologies to streamline corporate operations, boost efficiency, and improve customer experience is known as digitalization (Prause, 2020). Customers' need for satisfaction is one of the primary roles of digitization, which is changing as a result of the construction of a more comfortable and prompter contact between the client and the organization. The following are the goals of corporate digitalization:

- Product or service improvement: innovative technologies such as the creation of mobile banking applications on smart phones, online banking, e-wallet and other digital products have made banks to optimize their processes efficiency, its quality, attractiveness, ease of use and delivery to their customers.
- Automation of production and other internal processes of the company: While significantly reducing costs with the help of new payment modalities and cashless transactions and optimizing production processes to preserve the environment, save human, money and time resources, and also improve the standard of living in general.
- Increased number of clients: the growth of financial technologies in financial institution particularly in banking sector increase the number of customers in the use of mobile application and online banking losing interest on traditional banking. Digitalization of the financial institutions contributes a great deal on how banks carry out their performance to avoid customer loss.

2.1.5. Banking practice in Ethiopia

Modern banking in Ethiopia began in 1905 with the founding of Abyssinian Bank, which was founded on a fifty-year deal with the Anglo-Egyptian National Bank. In 1908, three foreign banks, the Socite Nationale d'Ethiope pour le Développement de l'Agriculture et du, Banque de l'Indochine, and Compagnie de l'Afrique Orientale, were created (Pankhurst, R.,1963). As Geda (2006) points out these institutions have been chastised for being wholly owned by foreigners. The Ethiopian government purchased Africa's first national bank in 1931, renaming it Bank of Abyssinia after the Abyssinian Bank, which had only been in operation for a few years before being closed owing to the Italian invasion. Several Italian bank branches had been established by the time of the Italian invasion.

During the five years of Italian occupation, banking activity increased (1936-41). Italy's banks were quite active. Barclays Bank was established following Ethiopia's independence from Italy's brief occupation, and it remained in operation in Ethiopia between 1941 and 1943, thanks to Britain's strategic planning throughout World War II (Gedey 1990; in Geda, 2006). In 1943, the Ethiopian government established the Ethiopian State Bank. Before being reformed into the National Bank of Ethiopia (the Central Bank, re-established in 1976) and the Commercial Bank of Ethiopia, the Bank of Ethiopia served as both a commercial and a central bank until 1963. Following this time, a flood of new banks arose, many of which had been in operation prior to the Great Depression.

Following the fall of the imperial government in 1974, the Commercial Bank of Ethiopia (CBE) took over all private commercial banks. Ethiopian financial sector reforms did not allow private sector participation in existing government banks or the entry of foreign banks until 1994 Geda (2006). After 1994, a new chapter in the history of banking was written, allowing local private banks to operate in the country. As a result, Awash international bank s.c, Ethiopia's first indigenous private commercial bank, was founded by 486 initial shareholders with a paid-up capital of Birr 24.2 million. It received its banking license on November 10, 1994, and began operations on February 13, 1995.

With a recently joined four private commercial banks, the Current banking industry comprises one state-owned development bank and 21 commercial including the state owned dominant Commercial Bank of Ethiopia (NBE annual report, 2021)

According to Keatinge (2014) the financial sector in Ethiopia is dominated by the state owned Commercial bank and also the sector is on its infancy stage. CBE dominate the sector and it accounts with a total of 70 percent of the industry's asset holdings. This monopoly has a negative influence on the country's economic growth and financial intermediation. In comparison, banking businesses in regional and international peer countries have a substantially higher level of private sector and foreign participation. Literatures revel, compared to most countries, for so many purposes and intent, Ethiopia has refrained from opening up its banking industry. This generally resulted in less development than its regional peers (Keatinge, 2014).

The banking sector dominates Ethiopia's financial sector. The strength of any economy is determined by the efficiency and competitiveness of its financial system. Ethiopian banks, like those in other developing countries, play a critical part in the country's economic growth and development. Banks are a necessary component of every financial system. They serve a crucial role in moving surplus sector savings to deficit sectors.

Since the financial liberalization in Ethiopia, the numbers of financial institutions come to operation increase rapidly. However, Cash remains the most widely used medium of exchange (Garedachew, W. 2010).

2.1.6. Digital Banking practice in Ethiopia

Ethiopia's main state-owned bank, Commercial Bank of Ethiopia, began e-banking in 2001. With eight ATMs in Addis Ababa, CBE was a pioneer in establishing ATM service for local users. Furthermore, CBE had been a Visa member since November 14, 2005. However, due to lack of adequate infrastructure, the membership was not successful.

Dashen bank began offering ATM and POS services to Visa cardholders in 2004. In 2008, the bank received a membership license from MasterCard and began taking MasterCard in addition to Visa cards. Customers might withdraw a maximum of 3,000 birr in a single transaction. The bank has worked hard to maintain its position as the market leader in electronic payment systems (Garedachew, W. 2010). Dashen Bank is the first bank in Ethiopia to provide a full-fledged payment card service as a primary plus member of AMEX, VISA, MasterCard, and Union Pay, as well as the first African bank to sign such an

arrangement. Dashen Bank has placed 389 ATMs and 1,283 plus Point-of-Sale (POS) terminals across the country. Through its Omni channel banking services, the bank provides digital payment capabilities as well as access to aggregated digital products and services. One of a kind in Ethiopia is the launch of an international commerce gateway that accepts international cards such as Amex, Visa, and MasterCard (Dashen bank annual report, 2021).

On December 30, 2008, Wegagen Bank inked an agreement with Technology Associates (TA), a Kenyan information technology (IT) business, for the construction of an ATM network and a payment system solution. Currently the bank offers different digital banking products to its customers (Wegagen bank).

Zemen Bank launched a full-fledged version of its internet banking services in 2010, allowing users to conduct online bank transfers to other banks, examine balances, and track loan progress, among other things. Zemen bank's services are still available through a variety of banking channels, all of which are adapted to the needs and tastes of its customers and are all incorporated into Omni channel banking (Zemenbank, 2021).

On July 5, 2012, three private commercial banks agreed to launch Premium Switch Solutions S.C. (PSS) with a capital of 165 million birr. Awash International Bank, Nib International Bank, and United Bank have created a consortium to provide electronic banking services. Berhan Bank joins the consortium on June 27, 2013. The arrangement is Ethiopia's first significant cooperation between competing banks, setting a precedent for other banks to follow in their footsteps, as no single bank in Ethiopia can afford to provide vast regional coverage (Wondimu, M. 2013).

Electronic banking facilities provided by most Ethiopian Banks are very basic. Next to other private commercial banks, Bank of Abyssinia (BOA) introduced its electronic banking service in 2014 with the support of core banking system which was implemented two years ahead. The Bank has started out card banking (ATM and POS) with 50ATM machines installed in various location and Mobile Banking. On the same year, The Bank has been also in the process of introducing other types of electronic banking channels such as mobile and internet banking and Agent banking which enable to increase its effort and proximity to the existing and prospective customers. As a result of the enhancement work which has been

made on mobile and internet banking, more secured, reliable and faster online banking products including newly virtual and e-commerce service has roll out to retail and corporate customers (BOA Annual report, 2020).

Ethiopia's banking sector appears to be underdeveloped, demanding rapid capacity building and financial system modernization using cutting-edge technologies available elsewhere in the world. Ethiopia's current banking system falls short of offering effective and dependable services, given the expanding number of import-export enterprises, greater international trade, and increased international ties. As a result, all commercial banks in Ethiopia should understand the necessity to implement an electronic banking system in order to meet the needs and requirements of their consumers. (Garedachew,W. 2010).

Although the adoption of digital mechanisms for financial transactions is still low in Ethiopia, it has a substantial room to expand. The number of debit card holder's increase from time to time. However, only 12% of Ethiopians made or received digital payments during the last year, compared to the 4% of population that hold a debit card. Credit cards are not issued in Ethiopia and are used only by foreigners and diaspora (0.3% of population). However, while peer countries such as Kenya and Rwanda evidenced an increasing usage of mobile money as a solution for financial inclusion (73% and 31% of population), in Ethiopia it is less than 1% due to regulation restrictions (Digital Ethiopia 2025).

2.1.7. Digital Banking Forms

2.1.7.1. Automated Teller Machines (ATM)

ATM has been around for quite some time now. ATMs are convenient since they are open 24 hours a day, seven days a week, so clients do not have to wait until bank hours to get their money. An automated teller machine (ATM) is an electronic computerized telecommunications device that allows customers of a financial institution to access their bank accounts, order or make cash withdrawals (or cash advances using a credit card), and check account balances without the need for a human bank teller. First, as compared to other e-channels, ATMs are the most well-known and accepted. Bishnoi, S. (2013) ATMs play a major role in enhancing the firm's competitive position; since they were first introduced in an attempt to lower bank costs and increase efficiency (AbdEl.Aziz, El Badrawy and Ismail

Hussien, 2014). Banks have been positioning ATMs to increase their accessibility. As clients value their time, they would appreciate a reliable ATM that would help them save their time in conducting routine banking activities at their convenience to withdraw and deposit money. ATMs added another benefits regarding their location, because many shopping places, Malls, Hotels, Supermarkets and market places include a point nearby or inside their location to give customers the opportunity to have access to their money for shopping. Unlike cash it has also a secured feature in case of misplaced or stolen. If the person who gets the ATM card doesn't know the pin security code, your money cannot be accessed.

2.1.7.2. Point of Sale (POS)

A real or virtual location where commercial transactions take place. A customer can buy things and pay for them using POS. The transactions could take place at a cash register in a retail store or through virtual shopping on Booking.com or Ebay.com. Commercial banks set up point-of-sale systems to allow merchants to take payments using local and international VISA, MasterCard, UnionPay, and American Express cards from all over the world. POS terminals have steadily gained a reputation for being at the heart of business operations, particularly for merchants. Unlike the early POS terminals, which were only used to accept card payments, more modern POS terminals have been upgraded to include additional payment methods of contactless payments like mobile wallets. This technological advancement led to e-POS, which accepts a limited number of digital payments without the presence of card swiping (Nambisan, B., 2021)

2.1.7.3. Internet Banking (IB)

Financial institutions provides service through internet banking which can be accessed via web browsers and mobile apps, Customers can use mobile apps to access banking services from anywhere with an internet connection. The service can be served to both individual customers and corporate businesses based on the customers need and capacity of the company. Customers may be more satisfied with Internet Banking than with a manual banking system, which requires more time and costs (Hasan, 2015). It provides several advantages to banks, including cost reduction, market differentiation, streamlining of work processes, improve consumer banking service, increased sales, increased reach, increased

loyalty and opportunity to attract new customers. It is a self-service model which can be offered anytime and anywhere accessing to a broad range of banking products and services.

2.1.7.4. Mobile Banking (MB)

Mobile banking refers to the use of electronic mobile devices such as cell phones and PDAs to access banking services and facilities. The use of a mobile phone or another mobile device to conduct financial transactions tied to a customer account is known as mobile banking (m-banking) Saleem & Rashid, (2011). In his study on the association between mobile banking and commercial bank financial performance in Kenya, Kingoo, N. (2011) noted that m-banking refers to the provision and use of banking and financial services via a mobile communications device.

Mobile Banking enables financial transactions to be carried out on mobile devices such as smartphones and tablets. This service is provided by financial institutions, particularly banks. Unlike the internet banking, it makes use of software, commonly referred to as an app that is offered by the financial institution. Mobile banking has revolutionized the way people in underdeveloped countries transfer money, and it is now set to offer more complex banking services that might have a substantial impact on people's lives
(Mabwai, F. 2016). Mobile banking allows users to monitor account balances, make electronic bill payments, receive short notifications on their phones telling them of instant transactions in their bank accounts, and make cash transfers between one customer's and another's accounts, depending on the institution.

2.1.7.5. Mobile Wallet (MW)

Mobile wallets allow users to use the funds in the wallet to make payments for transactions with multiple merchants, as long as there is an existing contract between the merchant and the mobile wallet company. It allows users to withdraw the funds into a bank account and in cash.

2.1.7.6. Virtual Banking (ITM)

The hybrid experience of utilizing an Automated Teller Machine (ATM) and engaging with a live teller is created via virtual banking conducted through the use of an Interactive Teller

Machine (ITM). ITMs, sometimes known as virtual teller machines, are automated machines that handle currency, receive checks, scan identity, and produce receipts. They also give the transaction a human touch by using digital communication capabilities to communicate with a distant, live person within the bank. ITMs provide voice communication (through a speaker or a private handset), video conferencing, and chat, similar to how Skype works on a PC (Portal.BankofAbyssinia.com).

2.1.7.7. Credit/Debit Cards

With a certain amount of digit card numbers, expiration dates, and magnetic strips, credit and debit cards look remarkably identical. Both can make purchasing in stores or online simple and convenient. Debit cards are used to make purchases by withdrawing monies from a customer's bank account. Credit cards allow customers to borrow money from the card issuer for purchases or cash withdrawals up to a certain limit. Credit cards are issued by financial entities, most commonly banks, and allow cardholders to borrow funds that must be repaid with interest. When it comes to fraud protection, credit cards outperform debit cards (Cussen, P.M. 2021).

2.1.8. Determinants of Financial Performance

Banks' Financial performance is a measure of a company's ability to earn revenue from its primary way of operation. This term can also be used to describe a broad indicator of a company's overall financial health over time, and it can be used to compare similar companies in the same industry or to compare industries or sectors in aggregate (Sime et al., 2020).

The ultimate goal of a given firm performance is measured through profit. Banks' profitability determinants are normally consisting of factors that are within the control of commercial banks. These factors which affect the revenue and the cost of the banks are classified into two categories namely the financial statement variables and non-financial variables. Bank’s balance sheet and income statement have a direct relationship with the financial statement variables. Whereas, the non-financial statement variables include factors like management quality, efficiency, and productivity, the number of branches of a particular bank location, size of the bank, and technology. Banks have deployed different

ratios to measure profit of which Return on the asset, return of equity, and net interest margin are the major ones (Devinaga Rasiah, 2010).

According to Aburime (2008), there are two common ways of classifying bank performance determinant which are classified as internal (bank specific) and external (macro-economic) factors. Internal factors are specific to individual banks which can affect the performance of the bank. Internal (bank specific) and external (macro-economic) factors are the two most popular approaches of identifying bank performance determinants. Internal factors are unique to each bank and might have an impact on the bank's success. Operating environment and technology, human capital, management efficiency, business risk, loan performance, earning quality, liquidity, net-worth, asset quality, asset size, and capital adequacy are some of the most common internal determinants of a bank's performance. Bank concentration and regulation, inflation rate, actual economic activities (GDP), and tax rate are examples of external influences.

2.1.9. Digital Banking and Financial Performance

Prior to the emergence of information technology, the cash-based transaction was the only channel of conducting banking transactions which were characterized with risk, inefficiency and inconvenience to both the banks and the customers (Boateng, 2020). With the advancement of technology over the past two decades, the banking sector has embraced and offered a variety of electronic banking channels with the goal of increasing efficiency, convenience, and financial inclusion.

In previous decades, a bank's large branch network might have been leveraged to gain a competitive advantage over rival banks. In today's banking world, however, this is not the best method for banks to service their customers and urge them to stay with them. Instead, by using the e-banking platform to consistently generate novel products and services at a cheaper cost, future consumers will be attracted to the bank and existing customers' loyalty will be increased, causing them to stay with the bank (OBENG-OSEI, 2019). Banks that want to gain a competitive advantage use the internet and other communication technologies like mobile banking to maintain a smooth flow of information with their consumers (Shah, 2009).

Increases in new customer acquisition, customer retention, resource mobilization, and cross-selling opportunities have all been identified as possible drivers of the revenue rise brought about by e-banking channels. There is still a debate about whether the increase in revenue is sufficient to provide banks with a satisfactory return on investment (Shah, 2009). One of the main economic arguments for e-banking has been the lowering of overhead costs, as it eliminates the need for more bank branches and their accompanying operational costs. According to Young (2007), the implementation of e-banking entails a significant financial expenditure. System integration, internet security, and labor costs all have a tendency to undermine profits.

Despite the high investment of ICT, digital banking has a huge impact on Nigerian's deposit banks profitability. Electronic banking plays a major role in the financial performance of commercial banks in Kenya. A study by Simiyu (2018) noted that electronic banking has been found to increase profitability, improve bank management quality, raise bank assets, and stimulate growth and expansion. Due to its time savings, convenient access to cash, and ease of use of the goods, ATMs have been considered to be a more appealing digital banking channel than internet banking. In addition, customers believe that ATM is safer and much secure than internet banking (Mawutor, J.K.M., 2014).

Due to its 24/7 convenience service to clients, the introduction of mobile banking into the digital banking channel has resulted in a significant growth in banking users. Commercial banks' profitability has improved as a result of a growth in the number of users and transactions on mobile banking. The greater the number of mobile banking transactions, the higher the capital adequacy ratio, the larger the market share, and the greater the number of mobile banking users, the better financial performance (Mabwai's, 2016). Banks' profitability improved as a result of their use of e-banking, resulting in increased income. The driving reason behind digital banking is operating cost minimization and operating profit maximization (Simpson, 2002).

2.1.10. Banks performance measurement

Bank performance measure can be classified into internal and external factors. Variables that can be controlled by the bank from the internal factors and they differ from one bank to the

other. Variables beyond the control of the bank from the external factors such as; gross domestic product, inflation, interest rate and political instability among others. Ngango et al (2015) claimed that profitability is one of the most important indicators of financial performance in their study. The level of profitability is reflected in the return on assets (ROA). Return on equity (ROE), which compares the amount of profit made to the amount invested by shareholders, are two other ratios that are utilized. Indicators of profitability were used to assess a bank's financial performance to see if electronic banking leads to enhanced efficiency, effectiveness in terms of cost reduction, and time savings, according to (Mwangi, 2014). Profitability ratios, such as return on assets, were employed to demonstrate management efficiency. This ratio illustrates how successfully a company utilizes its net income in relation to its total assets. The major indicators of profitability are returns on assets, return on equity, net interest margin and earning spread ratio.

The researcher used ROE as a measure of profitability for commercial banks in this study. As far as net interest margin is concerned, there are two primary drawbacks. Because most banks receive fees and other non-interest income through service and net interest margin, it was unable to determine the bank's entire profitability. Furthermore, banks cannot be compared because they are poles dissimilar in terms of the nature of their activities and client base makeup. (https://www.readyratios.com)

Although ROA is important measure to in profitability but it has also shortcomings that we should consider while using for performance measurement. Its limitation is that, it does not consider for outstanding liabilities and may indicate a higher profit level than the actual. ROA is a measure of firm’s success in using assets to generate profit without looking at how the assets were financed.

2.2. Empirical Review

Banks are considered to be highly technology-intensive firms that invest large sums in digital technologies. Therefore, one would expect to find ample literature on the impact of the digital transformation on bank performance. However, empirical analyses of the link between digital transformation and bank performance are quite sparse (Kriebel et al., 2019).

In the following paragraphs the most related studies are analyzed and identified knowledge gaps are documented.

2.2.1. Related Empirical Studies

Giudice, M. D., Campanell a, F & Dezi, L (2016) made a study to determine the impact of e-banking products on banks' profitability. 3692 banks located in 28 European countries used as a sample and classification analysis method adopted to determine the impact of independent variables over the dependent variable of ROE. The researchers concluded that high return on equity (ROE) for banks is achieved by offering retail and corporate internet services and home banking services to customers.

A study made by Kimani, N. (2015) on mobile banking and operational efficiency of Kenyan commercial banks. The researcher conducted a census survey of the 43 Kenyan commercial banks. For the period 2011 to 2014, the study analyzed secondary data on the number of registered mobile banking clients, the quantity of money moved through mobile banking, bank earnings, and operational costs. Data has been analyzed using Pearson correlation analysis deployed between dependent and independent variables. The result of the study shows that Mobile banking positively and significantly impacts the operational efficiency of commercial banks in Kenya and the research recommended policy makers to constantly look at adopting mobile banking technologies.

Mbama, C (2018) surveyed on UK bank customer's perceptions of digital banking. The study applied independent variables of Customer experience, loyalty, satisfaction and dependent variable of financial performance. Structural Equation Modeling, ANOVA and Multivariate Factor Analysis used to determine customer experience in digital banking are service quality, perceived value, employee-client engagement, perceived risk and usability. The study revealed a significant connection among customer loyalty, experience and satisfaction which enhances financial performance.

Vekya, J. M. (2017) studied on the impact of ATM transactions, Point of sale (POS) transactions on profitability of commercial banks (ROE), the study adopted a descriptive design. A census survey was undertaken on population which consists of 43 Kenyan commercial banks in operations as at 2014. SPSS was used to analyze secondary data

obtained from various Kenya' central bank publications. The study revealed that a rise in ATM and POS transactions leads to a rise in bank profitability (ROE).

Morufu, O. (2016) studied e-payment adoption and profitability of banks in Nigeria. Internet Banking Transactions has been used as independent variable and ROA as a dependent variable. The study used secondary data for the period 2005 to 2012 and applied Panel Regression. From the study the researcher concluded that Internet banking transaction was found to have a negative effect on banks' profitability. Another study made by Mulwa, F. N. (2017) on variables ROA, Online bank transactions, online transaction fees, online customer deposits. Descriptive design was used. Data were collected through questionnaires on 40 commercial banks in Kenya. Pearson correlation coefficient and inferential test multiple regression analysis was used for analysis. The study concluded that online banking transaction significantly and positively predicts ROA and which resulted in an increase in ROA.

Agboola et al. (2019) use the purposive technique and simple random sample to study how digitalization improves the performance of commercial banks in Nigeria. They chose 370 non-managerial staff from a commercial bank. The main data collection instrument was a self-structured questionnaire, which was processed using SPSS version 25. According to the findings, there was a minor significant and positive association between digitization and commercial bank performance (r = 0.114*; p.05). In addition, there is a significant positive link between product innovation and commercial bank performance in Nigeria (r = 0.186; p 0.001). According to the findings, if digitization processes are properly implemented, they will have a considerable positive impact on commercial bank performance in Nigeria.

According to Boateng and Nagarju (2020), Ghana's banking system has adopted and introduced numerous channels of electronic banking during the last two decades with the primary goal of improving efficiency, convenience, and financial inclusion. Boateng and Nagarju studied on the impact of digital banking on the profitability Ghanaian deposit. Secondary source date from annual report of the central bank of Ghana has employed. Data is analyzed using the Partial Least Square (PLS) regression model. Result from the PLS revealed that out of the six independent variables only two variables are significantly impact on the profitability of the bank. Positive relation with the profitability of

the bank has been seen with regard to the independent variables of cheque code line clearing; Ghana automated clearing house, Ghana interbank settlement and GH-Link. And unexpected result has been exhibited on mobile money and E-zwich negatively related with the dependent variable of profitability of the banks. This is due to double charge policy on mobile money which resulted in customer dissatisfaction and shortage of E-zwich machines.

In Kenya, Ogare (2013) researched the impact of e-banking on commercial banks' financial performance. The study sought to see if there is a link between the dependent variable, such as profit after tax, and the independent variables, such as the number of ATMs, debit and credit cards issued to customers, point of sale terminals, and mobile banking usage levels. The analysis relied on secondary data gathered from commercial banks' annual reports and the Kenyan Central Bank. Descriptive and inferential statistical analysis used to analyze the data. According to the study's findings, e-banking has a considerable and positive impact on the profitability of commercial banks in Kenya's banking industry. As a result, e-banking and bank performance have a positive association. The impact of bank innovations on bank profitability was statistically significant, indicating that the aggregate effect of bank innovations in this study was statistically significant in explaining the commercial banks profit in Kenya.

Mawutor, J.K.M. (2014) conducted research on the influence of electronic banking on a bank's profitability in Ghana. It also investigates how ATM and internet banking has impacted on Agricultural Development banking services and profitability. Structured questionnaires were used to collect data from selected branches of the bank’s customers. SPSS has been deployed to analyze the data and it was discovered that the net profit margin of the bank in the year 2011 and 2013 has increased. Therefore, the study concludes that E-banking has a positive impact on the profitability of the Agricultural Development bank.

A study by Taiwo, J.N., Agwu, E. (2017) on the role of e-banking on organizational performance tried to determine the impact of operational efficiency of banks: bank revenue and base, customer loyalty. The study used Primary data obtained by administering questionnaires to the staff of four purposively selected commercial banks in Nigeria. The data was analyzed using Statistical Package for Social Sciences (SPSS). According to the

research, banks' operational efficiency improves as a result of e-banking adoption, as seen by increased revenue and capital bases and increased client loyalty.

Referring on the above researches which were made in the context of the African commercial banking industries where a cashless policy has been declared and practiced since 2012. In addition, most of the banks have introduced various channels of electronic banking since the past two decades ago. On the other hand, the current researcher is proposing to make a similar study on the Ethiopian society where the National Digital Payment Strategy is only a new release, in 2021, and the practice and adoption of digital financial services by the public is at its infant stages. The current Ethiopian commercial banks are not yet fully digitalized; so that digital banking is more or less a choice to the customer.

2.2.2. Related Empirical Studies in Ethiopia

Girma (2016) used secondary data to conduct a research ICT impact on the performance of the Ethiopian banking industry from 2010 to 2014. The data is analyzed in a panel environment. The researchers used a purposive selection strategy to choose six samples from Ethiopia's 18 commercial banks. The study used ROA as dependent variable and six independent variables (ICT investment, ATM, POS, INFLATION, BRANCH and GDP) and deployed co-integration regression analysis to affirm the result and impact of ROA analyzed using ordinary least square technique. According to the regression results, ICT, ATMs, and POS have no statistically significant impact on commercial banks' return on assets. Based on the study's findings and conclusions, the researcher advised Ethiopian commercial banks to enhance their return on assets by improving their ICT.

Dawit (2017) made a study to identify the relationship between IT investment and profitability of commercial banks in Ethiopia. In order to achieve this, Dawit used a multivariate regression model using ROA as a dependent variable for measuring financial performance whereas he used six independent explanatory variables, three of which are IT related (Hardware, Software and IT Service). The researcher has concluded that there is a negative significant relation between IT investment and financial performance.

Kassa (2017) found that E-banking services have a favorable impact on the profitability of CBE by minimizing transaction processing mistakes, saving time, lowering the risk of losing cashes, and enhancing the bank's operational reliability. While the study finds that attracting new clients to the bank, reducing the firm's human resource requirements, and improving customer loyalty to the bank are all of lesser value. Electronic banking and its five components (i.e., automated teller machines, bank cards, online banking, telephone banking, and point of sale) have a favorable link with bank profitability, according to the empirical investigation.

Solomon (2016) looked at the impact of e-banking on return on assets, one of the most important indicators of profitability, in his study on the Roles of E-banking on Financial Commercial Banks in Ethiopia. Secondary data from 10 commercial banks operating in Ethiopia was selected using a purposeful sampling strategy for the years 2013 to 2015. Solomon used the E-view 8 application to perform a Random effect panel least square regression with ROA as the dependent variable, and six independent explanatory variables and other control variables, including the value or price of an ATM transaction, the value or price of a POS transaction, a debit card, the number of automated teller machine terminals, the number of point of sale terminals, and the market share. The researcher came to the conclusion that having more ATMs, POS, and market share had a positive impact on commercial banks' financial performance, with many banking institutions stating that having more market share allowed them to achieve greater scale in their operations, which improved their profitability. Finally, the study concluded that, in order to improve return on assets, commercial banks should focus more on raising knowledge about e-banking services and providing fast support to consumers.

Girma, E. (2019) conducted a research on the role of e-banking on the financial performance of commercial banks in Ethiopia on secondary data collected from ten commercial banks in Ethiopia for the year covering 2015 to 2018. Number of ATM terminals, number of debit cards, number of mobile banking users, value of ATM transactions, value of mobile banking transactions, bank size and inflation rate were independent variables used for the study with ROE as a dependent variable to study the banks performance on the role of bank specific variables. STATA 13 was used to analyze the data and the result shows that number of

mobile banking users and value of ATM transactions had positive and significant roles on bank's profitability measured by return on equity. Whereas, bank size had negative and significant role while inflation had a positive significant role from macroeconomic variable on bank's profitability.

2.2.3. Research Gaps

In general, there are a large number of researches made in this area, especially in the African commercial banking industry. When it comes to the Ethiopian context, however, only a few studies have been made to see the relationship between digitalization and profitability of commercial banks. Even if there are a few previous works, most of them are focused on e-banking adoption, barriers and benefits, challenges and prospect, customer satisfaction and behavior towards e-banking, identifying the relationship between bank performance and IT infrastructure investments and automation costs.

From the review of the relevant literature relating to the impact of electronic banking on financial performance of commercial banks, it's possible to see the existence of knowledge gap. As it can be seen, Girma's and Dawit's studies focused on the impact of investment on IT automation and basic ICT infrastructural components than digitalizing the banking service which is the use of IT and other digital technologies as a strategic focus to derive the Banking business. As it can be seen, Kassa's study is focused on the benefits adopting e-banking services by CBE to bring operational cost reduction in the Bank (e.g., reducing transaction processing errors, saving time, reducing risk of caring cashes, and improving operational reliability of the bank), which highly relates to operational excellence. The study made by Girma, E. was dealing with the role of e-banking on selected commercial banks in Ethiopia with the intention of determining ROE on bank specific variables such as number of mobile banking and ATM user and their value of transactions and bank size and macroeconomic variable of inflation rate which is more or less focused on bank's performance variables instead of e-channel products. On the contrary, the current researcher is proposing to explore not only how profitability of the commercial banks in Ethiopia would be impacted through digital banking products but also the impact on service quality and operational excellence of the banks as a result of adopting digitalization strategy.

In addition, most local studies have been performed before the introduction of the National Digital Payment Strategy. However, the current researcher is proposing to make the research after the introduction of the National Digital Payment Strategy which could add a new knowledge because the introduction of the strategy is generally expected to bring a change in the behavior of local financial ecosystem.

2.2.4. Conceptual Framework

2.2.4.1. Digital Banking and Service Quality

In a competitive environment, service quality is important for the success of any organization. It is one aspect that affects the organization's competitiveness of business. In such environment Banks should increase the quality of service constantly since there is no assurance that the current outstanding service is also suitable for future. In addition, banks should "develop new strategy" to fulfill their customer's need and should provide quality service to distinguish themselves from competitors (Siddiqi; 2011). High-quality banking services give banks a competitive advantage in terms of revenue, customer loyalty, and retention Kumar et al. (2010).

In this regard, digital banking would be one aspect that has a big role to distinguish the service quality of one bank over the other. The adaptation and fulfillment of customer needs are important to the understanding of service quality, while setting the standards and later evaluating up to which point the expectations are met. Digital banking service quality can be perceived into five dimensions namely: reliability, tangibles, responsiveness, assurance, empathy (Nahusenay, 2016).

Reliability: refers to the ability to provide a service as expected by customers in terms of speed, accuracy and efficiency. How fast that one transaction can be done without error and in a 24 operation mode. This ability to perform the promised service dependably and accurately is what we call reliability.

Tangibles: refers to the physical appearance of e-banking which relates to facilities, equipment and communication materials. The surrounding should draw favorable attention of the customers.

Responsiveness: Employees readiness to provide prompt service and willing to support customer in case of and disputes arise from the customer's side regarding the use of digital banking services.

Assurance: refers to the knowledge and skill of employees pass on trust and confidence on the customer in case of any default arise while using digital banking services. A 24/7 good working condition of the digital banking service may also generate confidence on the customers.

Empathy: giving extra care or individual attention to customers at times when they demand extra help to fulfill their personal need with regard to the digital banking service provision.

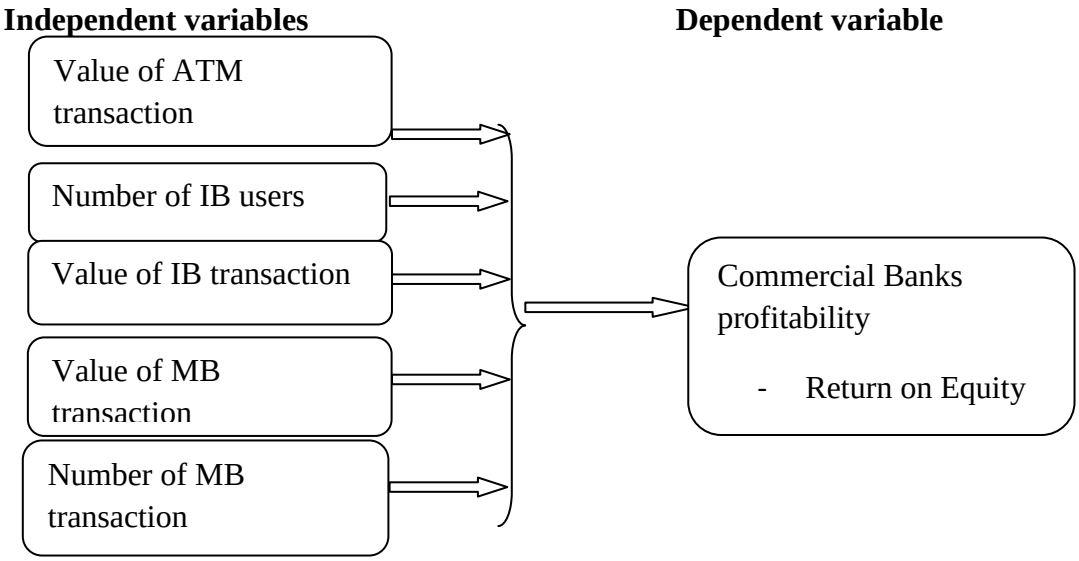
2.2.4.2. Digital Banking and Operational Excellency

To achieve different customer experience with speed and simplicity requires new business models that focus on back-office efficiency and operational excellence. One positive impact of digitalization for banks as well as for the public is improving back-office efficiency to provide new avenues for business efficiency and customer experience improvement. Banks are focusing on standardization, optimization, convenience, effectiveness and efficiency to bring operational excellence through cost minimization, wastage reduction, and efficient resource utilization work process transformation by leveraging on digital technology and deterring of fraud and corruption. It vastly elaborates the positive impacts of digital payments for the service user as well as for the bank, using mobile money, for example. Digital payments can bring operational excellence and transform developing countries like Ethiopia by offering convenience and cost savings. The multi-faceted advantages of digitalization include: cost-savings, minimizing inefficiency and inconvenience of traditional banking, wastage of time and other resources (e.g. passbook printing costs and costs associated with transportation in search of branch offices of the banks), eases of accessibility of funds, traceability of funds and security of transactions. In this way, digital payments also deter fraud and corruption. Moreover, Olanrewaju (2014) found that the trail of digitalization in commercial banking and financial sector in Africa is heavily impacting towards cost-saving potential and also creating fresh revenue sources.

The recent trend of digitalization has also unlocked huge potential for organizations pursuing operational excellence value through leveraging not only on better price on but also automation and digitization. Organizations find it rewarding to leverage on digital solutions, hence they are working on integrating digital solutions to their operational excellence framework (BCG, 2018).

2.2.4.3. Dependent and Independent variables on bank profitability

Figure 2.1. Conceptual framework



Source: Researcher

CHAPTER THREE

RESEARCH DESIGN & METHODOLOGY

This section deals with the research design and methodology applied to carry out this particular research. Research is a logical and systematic search for new and useful information on a particular topic. A systematic approach to problem-solving is known as the research methodology. It is the specific procedures or techniques used to identify the way the research can be carried out. In research, the methodology section allows the reader to critically evaluate a study's overall validity and reliability. The research contributes new ideas to the existing knowledge. It can be done with the help of study, experiment, observation, analysis, comparison, and reasoning. Most importantly research seeks predictions of events and explanations, relationships, and theories for them (Goundar, 2012). The chapter is organized into five parts; begins with research design, the study population and sampling techniques, data type and data collection method, data analysis, and model specification.

3.1. Research Design

The study aimed to examine the impact of digitalization on profitability of commercial banks in Ethiopia. To achieve this objective quantitative research method used. Descriptive and explanatory types of research design have been employed. Explanatory research design helps to identify and evaluate the causal relationships between the different variables under the study (Marczyk et al., 2005). Explanatory research design is important to show how one variable affects, or is “responsible for,” changes in another variable. And it also helps to understand, explain, predict, and control relationships between variables Cooper and Emory (2006). Whereas, descriptive survey research design is suitable since the research is designed to construct a picture for the readers about observed effects of digitalization and trends in performance of the banks in relation to profitability, service quality and operational excellence due implementation of the digital banking service.

3.2. Population of the study and Sampling Technique

3.2.1. Target Population

The study's target population is all Ethiopian commercial banks that have adopted digital banking services. However, due to the lack of available organized digital banking data and no complete data on internet banking the researcher considers those banks with the required data on hand. Accordingly, nine banks from the nineteen commercial banks registered in Ethiopia were selected. Based on the stated criteria the selected banks are Commercial bank of Ethiopia, Awash Bank, Dashen bank, Bank of Abyssinia, Wegagen bank, Lion bank, Zemen bank, Bunna bank, and Birhan bank. The researcher also considered the total number of 1636 selected bank branches located in Addis Ababa as the target population for this specific study.

3.2.2. Sample Size Determination

Sample size determination is the most frequently asked question considering sampling in every research. It is influenced by a number of factors, including the purpose of the study, population size, the risk of selecting a "bad" sample, and the allowable sampling error. In addition, the level of precision, the level of confidence or risk, and the degree of variability in the attributes being measured are the three important criteria that usually will need to be specified to determine the appropriate sample size (Glenn D. Israel).

Therefore, a representative sample of the selected commercial bank branches was calculated based on the formula for sample size determination and for finite population.

According to Kothari (2004) the sample size for this study was computed by using the formula below.

$$n = \frac{Z^2.p.q.N}{e^2.(N-1) + Z^2.p.q}$$

Where, **n** = the desired sample size

z = the value of the standard variation at a given confidence level (to be read from the table

giving the areas under normal curve)

p = the proportion of target population estimated (50%)

q = 1-p

e = acceptable error (the precision)

N = population size

Therefore, representative sample of population was determined at 95% degree of confidence.

Hence at 95% degree of confidence;

Z=1.96 p=0.5 q=1-p e=5% (0.05); by substituting;

$$n = \frac{(1.96)^2(0.5)(0.5)(1636)}{(0.05)^2(1636-1)+(1.96)} = 311.18$$ which is approximately equal to 311

Therefore, from the population size of 1636 a total sample of 311branhes was used as a representative for the study.

3.2.3. Sampling Techniques

Data collection is critical in research since the data is intended to aid in the comprehension of a theoretical framework. It is then critical that the method of obtaining data and from whom the data will be obtained be chosen with prudence, especially since no amount of analysis will substitute for inaccurately collected data. Purposive sampling, also known as judgment sampling, is the deliberate selection of a participant who is willing to contribute information because of their expertise or experience.

Purposive or judgmental sampling is used when the researcher's prior knowledge and judgment indicate that it will best suit the study's goals and gives the best information (Etikan, 2016). To recruit participants for this study, the researcher used a purposive sampling strategy. Moreover, in this study the researcher also applied stratified sampling techniques to select sample branches from the selected bank branches which are located in Addis Ababa. In stratified random sample, the population is divided into groups or strata. A random sample is selected from each stratum based upon the percentage that each strata represents in the population. The basis of stratification was geographical area location of the bank's branches due to the fact that they are located in geographical areas that span the state.

Stratified sampling primary interest is in the representativeness of the sample for purposes of commenting on the population. Stratified proportionate random sampling technique produce the overall population parameters with greater precision and ensures a more representative sample is derived from a relatively heterogonous population.

Table 3.1. Sample Frame

Selected commercial banks	No. of branches located in Addis Ababa	Sample Size	Percentage (%)
Commercial bank of Ethiopia	436	83	26.7%
Awash bank	229	44	14%
Dashen bank	167	31	10%
Bank of Abyssinia	252	48	15.4%
Wegagen bank	148	28	9%
Lion bank	86	17	5.4%
Zemen bank	42	8	2.6%
Bunna bank	137	26	8.4%
Birhan bank	139	26	8.5%
Total	1636	311	100%

3.3. Source and Types of Data

The study employed quantitative research approach by involving secondary data collected from bank's head office and published and unpublished documents of the banks. In addition, financial statements and Annual reports of the banks were the main sources of secondary data while primary data collected from formal survey using self-structured questionnaire and

out of 311 copies of the questionnaires which were distributed to the selected 311 bank branches employees, only 250 (80%) copies were responded. The data for this study was analyzed using descriptive statistics such as frequency counts and inferential statistics. Four years of secondary data starting from 2018 to 2021 where most of the commercial banks started their internet banking services and taken most initiatives to boost digitalization, were used to study the impact of digitalization on profitability of the commercial banks in Ethiopia.

3.4. Methods of Data Collection

In this study, the researcher collected primary data through structured questionnaire which contained general questions and specifies questions and were administered through a drop and pick later method. Secondary data collected from the banks' head office, annual report and other published and unpublished documents of the banks for four years, between 2018 and 2021 were used. The secondary data sources collected enough and reliable data for the study that was used to enrich the analysis from primary data.

3.5. Methods of Data Analysis

Once collected, the data analyzed using descriptive and inferential statistics procedures. Descriptive statistics enables the researcher to analyze the impact of digitalization on profitability using both the quantitative and qualitative approaches. In this study, the primary data was analyzed by using descriptive statistics which include mean, standard deviation, percentages, and frequency of occurrence. In order to test the relationship between variables on secondary data, the inferential test particularly the Pearson product-moment correlation and multiple regression analysis were used. Data entry was the next step and then the analysis done using Statistical Package for Social Sciences to get the desired output and trends of the secondary data from 2018 to 2021.

3.6. Model Specification

When a researcher wants to quantitatively define the link between independent variables and the dependent variable, he or she uses model specification. It is the process of deciding which independent variables to include in a regression equation and which to leave out. It primarily necessitates a review of the literature in order to gain a theoretical grasp of the key

independent variables, their interactions with the dependent variable, and the expected coefficient signs and effect magnitudes. Despite the fact that statistical measures are an important part of model definition, the foundation for model selection should be based on theoretical issues. In general, rather than empirical or methodological factors, the specification of a regression model should be based primarily on theoretical considerations.

In this study the researcher adopted multiple regression analysis method to establish the correlation of profitability which is taken as the dependent variable and regressed against the chosen independent variables.

Therefore, the general multivariate regression model with K independent variables is defined as follows:

$$Yi = \beta 0 + \beta 1x1 + \beta 2x2 + \beta 3x3 + \beta 4x4 + \ldots\ldots + \beta kxi + \varepsilon i \ (i=1,2,3,4,\ldots n)$$

Where Yi is the ith observation of the dependent variable, X1,…, Xi are the ith observation of the independent variables, β0,…,βk are the regression coefficients, εi is the ith observation of the stochastic error term, and n is the number of observations. Hence, empirical model to be used to test the impact of digital banking on the profitability of commercial banks can represent as:-

$$ROE = \beta 0 + \beta 1VATMTi,t + \beta 2VIBTi, t + \beta 3NIBUi, t + \beta 4VMBTi, t + B5NMBTi, t + \varepsilon i,t$$

Where;
ROE = Net Income/ Shareholder's equity
NIBU= Number of internet banking users
VATMT = Value of transactions executed by ATM = (Natural logarithm of the value of ATM transactions)
VIBT=Value of transactions executed by Internet banking = (Natural logarithm of the value of Internet banking transactions)

NMBT= Number of mobile banking transaction count

VMBT= Value of mobile banking transaction executed

βo = Constant term

β1, 2, 3…5 are parameters to be estimated

ε = is the error component for Bank i at time t assumed to have mean zero E [Є it] =0

i = commercial banks i = 1. . . 9; and

t = the index of time periods and t = 1 to 4

The significance of the regression model will be determined at 95% confidence interval and 5% level of significance.

3.7. Variable Definition

As Nwankwo and Emunemu (2014) mentioned in their study, variables are the names that are given to the variance we wish to explain and it is very critical to the research process as the researcher uses them to find out the nature and direction of the research. It also varies or changes in value according to situations or how treated. In a research variables are main focus of the subject which is going to change due to circumstances.

3.7.1. Dependent Variable

Anbar and Alper (2011) in their study mentioned that bank performance is divided into internal and external factors. Internal factors are factors that are under the control and influence of the bank management and the board. However, an external factor is independent of the management control and depends on the external environment. Among the internal factors, ROA and ROE are those of the traditional accounting measures of analysis mostly used by researchers and scholars to determine a bank's profitability (Fisseha, 2015)

The return on assets measures the capability of a bank‘s management to make profits from its assets. It is a good indicator of how well a bank‘s management is managing the assets of the bank. Return on Asset is a basic measure of bank profitability that corrects for the size of the bank, which divides the net income of the bank by the number of its assets. ROA is a useful measure of how well a bank is doing on the job because it indicates how well a bank's assets are being used to generate profits (Sarwar & Mustafa, 2018).

ROE is one of the most important ratios to measure bank profitability which tells us how much stake holders are earning on the funds they invest to the firm. ROE generally increase the stock price. When it is high the stock price will be high. Even though ROA is not distorted by high equity multipliers, its relationship with ROE is explained by equity multiplier which is the result of assets divided by equity tells ROE's effect when a bank holds a smaller amount of capital. With the critics that ROE has on risk associated with financial leverages, it is also the most popular measure of performance which considers the effect of borrowed capital in financing the assets to generate profit and suggests a direct assessment of the financial return of a shareholders investment.

$$ROE = \frac{\text{Net Income}}{\text{Shareholder's equity}}$$

3.7.2. Independent Variables

3.7.2.1. Value of Automated Teller Machine Transaction

Automated Teller Machines (ATMs) is one of existing replacements of the bricks and mortar, labor intensive transaction system and paper based payment instruments. An automatic teller machine allows a bank customer to conduct banking transactions from almost every other ATM machine in the world. The ATM, therefore, performs the traditional functions of bank cashiers and other counter staff (Ogbuji, C. N. et al., 2012).

The combined services of automated and human tellers mean that the bank will be more productive during banking hours. Customers can also invest the time saved in other productive activities because it saves them time in service delivery as opposed to queuing in bank halls. ATMs are a cost-effective technique to increase productivity because they produce more transactions per hour than human tellers (an average of 6,400 transactions per month for ATMs vs. 4,300 for human tellers (Rose, 1999). Furthermore, because ATMs continue to operate even when human tellers are unavailable, banks maintain a high level of productivity even after normal business hours (C.A., 2014). "Effects of Automated Teller Machines on the Performance of Nigerian Banks," according to the report, because of the rising rate of ATM fraud, the data show that the deployment of ATM terminals has

enhanced the performance of Nigerian banks on average. Similarly, the security and privacy of customers and suppliers have less of an impact on ATM service quality.

According to a study made by Madugba et al. (2021) on "Effect of electronic banking on financial performance of deposit money banks in Nigeria" ATM has a positive and significant association with ROA; POS and National Electronic Fund Transfer significantly affect ROA only, while Web Banking has an insignificant impact on ROA. It is concluded that electronic banking significantly affects financial performance of deposit money banks in Nigeria.

Evidence from other empirical study on Automated Teller Machines and Profitability of Commercial Banks in Rwanda reveal that there is a significant relationship between automated teller machines and profitability of Bank of Kigali with an increase of ROE from year 2013 to 2014. The correlations between ATM and ROA, ROE and net margin are found to be positively correlated. The finding also shows that Bank of Kigali ATM user's satisfaction level is determined by lower cost, differentiation and accessibility. Other factors such as competitive market, advertisement and increase ATM services are strategies to optimize the usage of ATM at Bank of Kigali (Bosco Harelimana, 2018).

3.7.2.2. Number of Internet Banking Subscribers/Users

With the introduction of internet banking, bank customers now have access to their accounts as well as general information on bank products and services via the bank's website, without the need for intervention or the inconvenience of sending letters, faxes, original signatures, or phone confirmations. Banks have made significant expenditures in telecommunications and electronic systems, and users have been validated in their acceptance of electronic banking as beneficial and simple to use. Many banks have been compelled to focus on information technology initiatives in order to keep ahead of the competition as a result of the development of Internet Banking. In terms of cost, customer service, and profit, Internet Banking has become an important part of the bank (Manoranjan, Bhusan, Kanta, & Suryakanta, 2012).

Over the last few decades, Internet Banking has become more widely used to assist and improve the banking industry's operational and managerial performance. According to Gogl

et al. (2015), a study on the influence of online banking on bank performance found that internet banking had a favorable and significant impact on bank revenue. Internet banking has been a crucial driver of cost management in banks due to its ease of use, convenience, and quick transactions for customers.

In his study on E-Banking and Kenyan's commercial banks financial performance, Mueni (2019) discovered that all of the independent variables in the study (internet banking, mobile banking, automated teller machine banking, and debit/credit banking) were positively and significantly related to the Return on Assets. Mobile banking and internet banking, rather than ROA and ROE, were found to be positively and significantly related to Net Profit.

In this study, Internet Banking is measured in terms of the total number of users/subscribers and the value of transactions completed via Internet Banking during the indicated years.

3.7.2.3. Number of Mobile Banking Transactions

Kingoo, (2011) defines mobile banking as the provision and use of banking and financial services via a mobile phone device. Financial services can be accessible by minimizing the time and distance to the nearest retail bank branches with the help of mobile banking. It also reduces the bank's overhead and transaction related costs. With the extension of mobile banking service to their customer's financial service can create a great deal of opportunity which in turn can increase their market share (Mabwai, F., 2016). A study made by Simpson (2002) suggests that e-banking is driven largely by the prospects of operating costs minimization and operating revenues maximization. Banks which have conventionally depended on physically setting up branches to offer banking services are now moving towards the taking up of mobile banking services as a structure of branchless banking which in effect has reduces banking costs, and thus improving the profitability ratios. Mabwai, F. (2016) sought to determine the effects of mobile banking on the financial performance of commercial banks. The results reveal that the number of mobile banking transactions (MBT) had a positive influence on the ROE of commercial banks in Kenya.

According to Wadhwa (2016) a study on the "Impact of Mobile Banking on Profitability of Scheduled Commercial Banks in India." In this study volume of transactions and value of transactions performed through mobile banking considered as the factors of mobile banking

and Profitability considered in terms of Return on Assets (ROA) and Return on Equity (ROE). The result of the study showed that although the usage of mobile banking has increased extremely during the period of study, it has not played any significant role towards the improvement of the profitability of these banks. The study that if all the banks concluded that if the banks follow proper proceed to the path of mobile banking, the overall profitability due to mobile banking will improve in coming years.

In the current study Mobile Banking is considered in terms of total number of Mobile Banking transaction count and value of transaction executed through Mobile Banking on the years specified.

3.8. Instrument validation and reliability

3.8.1. Validity

Validity has been defined by Bolarinwa (2015) as the degree to which an instrument measures what it`s intended to measure. To strengthen the questionnaire's validity, the researcher engaged specialists in the field, particularly the supervisor, who assessed the content's relevance and assisted in the review and modification of the questionnaire.

3.8.2. Reliability

The consistency with which a method measures something and achieves the same result over time is referred to as reliability. According to Heale and Twycross (2015), reliability refers to the degree to which a research instrument consistently produces the same results. Cronbach's Alpha can be used to determine internal consistency. Pre-testing the questionnaire with five commercial bank e-banking staffs ensured its reliability. The information gathered aided in determining the need for any changes, ensuring that the research instrument measured what it was designed to assess and therefore enhancing the questionnaire's reliability.

3.9. Ethical Consideration

Ethical considerations have been put into practice during and after the research process. Some of the information that was required for this study was considered by the commercial banks to be private and confidential. In this regard, any private information that was given

by the respondents for this study was treated with the desired confidentiality and was purposely meant for the academic work and was not disclosed to the public. The respondents to the study were coded to protect their anonymity.

3.10. Operationalized and Measurement of Variables

Table 3.2. Operationalized of Dependent and Independent variables

Type of variables	**Name of the variable**	**Indicator**	**Measurement**
Dependent Variable	Profitability	ROE	Net income after tax / Average shareholder's equity
Independent Variables	ATM	Value of ATM transaction	Total amount transacted on ATM
	Mobile Banking	Number of MB transaction	Total number of MB transaction count
		Value of MB transaction	Total money transacted by mobile banking
	Internet Banking	Number of IB transaction	Total number of IB transaction count
		Value of IB transaction	Total money transacted by internet banking

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND INTERPRETATION

This chapter presents the data findings to determine the impact of digital banking on profitability of Commercial banks in Ethiopia. The data were analyzed by using SPSS software version 20. The descriptive statistics analysis was done and the findings were presented in form of figures and tables. The result of tests of assumptions; inferential analysis which is performed to examine relationship of variables, influence of independent variable over dependent variable was examined and hypothesis analysis was tested.

A total of 311 questionnaires were distributed out of which 250 (80.4%) were responded, while 61 (19.6%) questionnaires were not returned from respondents. Therefore, 250 questionnaires served as a source of data for analysis, findings presentation and drawing conclusions.

4.1. Profile of Respondents

This part examines a descriptive study of the respondents' personal profiles as commercial bank workers. The educational qualifications, years of experience in the respective bank, and current professional position assumed are all included in the personal profile.

Table 4.1. Respondents Profile

	ITEM	**FREQUENCY**	**PERCENT**	**CUMULATIVE PERCENT**
Educational Qualification	Diploma	3	1.2	1.2
	Degree	199	79.6	80.8
	Masters and above	48	19.2	100
	Total	**250**	**100**	
Current Professional Position	Officer	162	64.8	65.1
	Senior Officer	44	17.6	82.7
	Manager	42	16.8	99.6
	Director	1	.4	100
	Total	249	99.6	
	Missed system	1	.4	
	Total	**250**	**100**	
Working	Less than 2 years	94	37.6	37.6

Experience	2-5 years	98	39.2	76.8
	6-10 years	39	15.6	92.4
	More than 10 years	19	7.6	100
	Total	**250**	**100**	

Source; Research Findings, 2022

From the data findings on respondents profile with regard to educational level of the respondents, the largest portions 199 (79.6%) were university graduates with Bachelor's degree, 3 (1.2%) of them were College graduates with Diploma and the remaining 48 (19.2%) of them were Second Degree or Master's Degree holders. This reveals that the majority of the employees of the banks are first degree holders.

In terms of work experience or service years 98 (39.2%) of the respondents served between 2 to 5 years, 94 (37.6%) of the respondents served less than 2 years, 39 (15.6%) of the respondents served between 6 years to 10 years and the rest 19 (7.6%) of the respondents served for more than 10 Years. In general, majority of the respondents have 5 years and less experience in the bank. Whereas, as far as the current professional position of employees is concerned, 206 (82.4%) of respondent of employees assumes a current position of Officer and Senior Officer. Only 42 (16.8%) of the respondents are currently in the Managerial position.

4.1.1. Descriptive analysis on Operational Excellence and Service Quality

In order to see the general perception of the respondents regarding the Impact of Digital Banking on operational efficiency, the researcher has analyzed the variable using frequency, percentage, mean and standard deviation. Thus, the mean indicates to what extent the sample group on average agrees or disagrees with the different statements. Weighted averages were calculated for the Likert scales, from Strongly Agree=1 to Strongly Disagree=5.

Thus, the bench mark standard for the descriptive analysis of this study was a weighted average score between 1and 1.79 indicates Strong Agreement, between 1.80 and 2.59 indicates Agreement, between 2.60 and 3.39 indicates Neutral or Not Known, between 3.40 and 4.19 indicates Disagreement and finally between 4.20 and 5 indicates Strong Disagreement (Alonazi, Beloff and White, 2019).

Table 4.2. Descriptive statistical analysis result on Operational Excellence

Description	**Responses**					**Mean**	**SD**
	1=SA	2=A	3=N	4=DIS.	5=SDIS.		
The uniform digital banking service such as ATM attendants gives the feeling of standard communication to the customer.	75 30%	123 49.2%	46 18.4%	-	3 1.2%	1.92	0.771
Adoption of digital banking service enables the banks to deliver retail services 24 by 7 to customers.	129 51.6%	103 41.2%	12 4.8%	4 1.6%	2 0.8%	1.588	0.729
The 24-by-7-by-365 availability of the digital banking service makes customers be loyal to bank.	105 42%	117 46.8%	18 7.2%	7 2.8%	2 0.8%	1.811	1.502
The availability of digital banking as an option to a branch office saves time to customers and minimizes the need for physical engagements with the Bank branch.	153 61.2%	81 32.4%	14 5.6%	2 0.8%	- -	1.46	0.640
Availability of digital banking reduce the need and the cost to establish and operationalize a branch office	102 40.8%	113 45.2%	25 10%	5 2%	3 1.2%	1.766	0.805
Availability of digital banking reduce the need and the cost to hire, train, onboard and engage banking officers	70 28.0%	117 46.8%	44 17.6%	16 6.4%	3 1.2%	2.06	0.905
Adoption of digital banking enables the bank to reduce stationary cost by making the transaction ideally paperless.	128 51.2%	97 38.8%	19 7.6%	3 1.2%	2 0.8%	1.61	0.749
Adoption of digital banking products and services reduces the cost of handling transactions by reducing customer visit to bank branch.	119 47.6%	114 45.6	13 5.2%	4 1.6%	-	1.608	0.663
Adoption of online banking reduces the cost of handling cash and the risk of carrying cash.	143 57.2%	87 34.8%	15 6%	2 0.8%	2 0.8%	1.526	0.718
Adoption of digital banking has reduces error committed by employees and customers while transaction has been made manually.	71 28.4%	121 48.4%	45 18%	10 4%	2 0.8%	2.04	1.048
Digital banking has contributed a significant role in mobilizing local currency deposit to the Bank.	87 34.8%	102 40.8%	50 20%	11 4.4%	-	1.94	0.85
Availability of Digital banking products and service such as ATM, ITM (in the case of BOA) and POS has special advantage to the inflow of foreign currency to the Bank.	112 44.8%	98 39.2%	30 12%	6 2.4%	3 1.2%	1.755	0.847
Total Mean and Standard Deviation						1.757	

Source; Research Findings

SA= Strongly Agree, A= Agree, N=Neutral, DIS= Disagree, SDIS= Strongly Disagree

The result in (Table 4.2.) above shows that 198 (79.2%) of the respondents with the mean score of 1.92 agree that the introduction of ATM (Automated Teller Machine) on the digital banking service has created the feeling of standard communication to customers. The mean score of 1.588 also infers that 232(92.8%) of the sample group respondents strongly agree that adoption of digital banking service enables the bank to deliver retail services 24 by 7 to customers. Thus, growth as one of the Bank's strategic theme can be achieved through convenient and inexpensive accessibility option to customers. By the same token 222 (88.8%) of respondents has strongly agreed that the 24 by 7 digital banking service availability contributed to have loyal customer to the bank. The most important factors encouraging customers to use digital banking are reducing paper work and human error, which subsequently minimize disputes Kiang *et al.* (2000). The results obtained in table 4.2 above also revealed that 192(76.8%) of the respondents agreed and above did state that digital banking does reduce transaction errors while only 12(4.8%) of the respondents were of the opposite view when compare and contrast the transaction done manually. According to Chakava (2015) digital banking service adoption has an impact on cost reduction associated with transaction and stationary by making it ideally paperless. With this regard, 224(97.6%) of the sample groups of respondents with mean score of 1.2 responded with neutral and above that digital banking adoption has contributed huge amount to the cost of handling transactions and stationary costs by minimizing customer's visit to the branch. With the mean score of 1.755 and 1.94 respondents also reviled that digital banking availability has contributed a significant role to mobilized local and foreign currency resources to the bank.

In general, the researcher finds out that most of the respondents agree that digital banking adoption has a significant contribution to increase operational excellence of the commercial banks.

Table 4.3. Descriptive statistical analysis result on Service Quality

Questions	**Responses**					**Mean**	**SD**
	1=SA	2=A	3=N	4=DIS.	5=SDIS.		
Digital banking services such as ATM, POS, ITM(in case of BOA), Mobile banking, Internet banking and Mobile Wallet are operational in a 24/7 mode without interruption in delivering service to customers.	47 18.8%	119 47.6%	40 16%	36 14.4%	7 2.8%	2.34	1.03
Digital banking services are technically easy to access and load quickly.	47 18.8%	122 48.8%	38 15.2%	38 15.2%	4 1.6%	2.31	0.99
Digital banking offered by banks is applicable for customers in any level of literacy.	28 11.2	74 29.6%	60 24.0%	68 27.2%	18 7.2%	2.89	1.14
Employees who have direct access to deliver the digital banking service have sufficient knowledge of the products/services.	57 22.8%	123 49.2%	40 16.0%	24 9.6%	5 2.0%	2.18	0.96
The number of steps required to process digital banking services such as Mobile banking, Internet banking and Mobile Wallet is short and precise.	43 17.2%	99 39.6%	42 16.8%	54 21.6%	11 4.4%	2.56	1.13
System response time of digital banking services is reasonably short.	35 14.0%	121 48.4%	57 22.8%	33 13.2%	3 1.2%	2.38	0.92
Digital banking service offered by banks is secured and reduces transaction frauds made by employees and customers.	70 28.0%	113 45.2%	35 14.0%	27 10.8%	4 1.6%	2.12	0.99
The banks has availed a secured set of digital services.	79 31.6%	118 47.2%	37 14.8%	11 4.4%	4 1.6%	1.96	0.88
Total grand Mean and Standard Deviation						2.34	

SA= Strongly Agree, A= Agree, N=Neutral, DIS= Disagree, SDIS= Strongly Disagree

Source: The Researcher

As shown in the above table 4.3, the mean score of 2.34 implies that respondents agreed on the banks digital banking services are operational in a 24/7 mode without interruption in delivering service to its customers. On the other hand, 169(67.6%) of the respondents are agreed and strongly agreed that digital banking services are technically easy to access to

customers. On the contrast, 38(15.2%) respondents are neutral and the other 38(15.2%) of respondents are disagreed. 180 (72 percent) respondents agreed or strongly agreed that personnel with direct access to supply digital banking services are knowledgeable. However, 29(11.2%) of the respondents reveal their disagreement and above, the remaining 16% respondents do not have any idea. Digital banking services have to be easy and convenient for customers to choose over the traditional baking services. The study revealed that only 56.8% of the respondents agree and 26% of them disagree with a mean score of 2.56 which implies respondents agree on that the banks provide short and precise digital banking service to customers. Security is a critical aspect of digital banking. It has to be transformed with innovative capabilities to provide consumers with a secure banking experience, where they can access their financial data without fear and conduct transactions with ease. The study finds out that 197 (78.8%) of the respondents with mean score of 1.96 strongly agreed that the banks has availed a secured set of digital services.

In general the researcher summarizes that the grand mean score of 2.34 indicates that majority of the respondents agreed on digital banking adoption has improves the service quality of the banks.

4.1.2. Reliability Test

A reliability test is done to test internal consistency of items in variables. The total number of complete feedback received was 250 sample populations. In order to confirm the reliability of the data, Cronbach's Alpha was calculated for each variable. As below table indicate, all variables Cronbach's alpha test result shows to be larger than 0.7 which is known to be satisfactory.

Table 4.4.Scale: Reliability Statistics on Operational Excellence

Reliability Statistics

Cronbach's Alpha	N of Items
.792	12

Table 4.5. Scale: Reliability Statistics on Service Quality

Reliability Statistics

Cronbach's Alpha	N of Items
.862	8

4.2. Correlation Analysis

Gujarati (2004) defines correlation as a statistical measure that reflects how closely two variables are associated linearly, or how they change at a steady pace. The Pearson product-movement coefficient, sometimes known as the Pearson correlation, is the most generally used bi-variant correlation statistic. It's crucial to evaluate the correlation between the variables used in the regression before looking at the results. The Pearson correlation analysis is utilized in this study to look at the correlations between the secondary data variables. The correlation coefficient, abbreviated as r, can be anywhere between -1 and 1. The most powerful potential positive correlation is +1, and the most powerful possible negative correlation is -1, where the value of one variable increases while the value of the other variable decreases. As a result, the closer the coefficient is to one of these figures, the higher the data connection it represents. The value of 0 in the correlation coefficient suggests a weaker linear relationship. Correlation coefficients of 0.80 to 1.00 are considered extremely strong, 0.60 to 0.79 are considered strong, 0.40 to 0.59 are considered moderate, 0.20 to 0.39 are considered weak, and 0.00 to 0.19 are considered very weak, according to (Meghanathan, N. 2016).

Table 4.6. Correlation matrix between Dependent and Independent variables

Correlations

		ROE	LVATMT	LVIBT	NIBU	LVMBT	NMBT
ROE	Pearson Correlation	1	.607**	.486**	.079	.454**	.445**
	Sig. (2-tailed)		.000	.003	.645	.006	.007
	N	36	36	36	36	35	36
LVATMT	Pearson Correlation	.607**	1	.647**	.130	.717**	.515**
	Sig. (2-tailed)	.000		.000	.449	.000	.001
	N	36	36	36	36	35	36
LVIBT	Pearson Correlation	.486**	.647**	1	.301	.493**	.343*
	Sig. (2-tailed)	.003	.000		.075	.003	.040
	N	36	36	36	36	35	36
NIBU	Pearson Correlation	.079	.130	.301	1	.254	-.024
	Sig. (2-tailed)	.645	.449	.075		.141	.892
	N	36	36	36	36	35	36
LVMBT	Pearson Correlation	.454**	.717**	.493**	.254	1	.444**
	Sig. (2-tailed)	.006	.000	.003	.141		.008
	N	35	35	35	35	35	35
NMBT	Pearson Correlation	.445**	.515**	.343*	-.024	.444**	1
	Sig. (2-tailed)	.007	.001	.040	.892	.008	
	N	36	36	36	36	35	36

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

*. Correlation is significant at the 0.05 level (2-tailed).
Source: Researcher computed on SPSS

Table 4.6 demonstrates the relationship between the dependent and independent variables, as well as the relationship between the independent variables. According to the findings, the value of ATM transactions has a high positive link and is statistically significant ($r= 0.607$, $p<0.01$) with ROE. The study's correlation matrix also shows that the value of internet banking transactions, the number of mobile banking transactions, and the value of mobile banking transactions all have a positive moderate correlation and significance with ROE, with ($r=0.486$, $p<0.05$), ($r=0.445$, $p<0.05$), and ($r=0.454$, $p<0.05$) respectively. Internet banking customers, on the other hand, have a very weak positive link with ROE. All of the independent variables have a positive correlation with the dependent variable, according to the correlation matrix table.

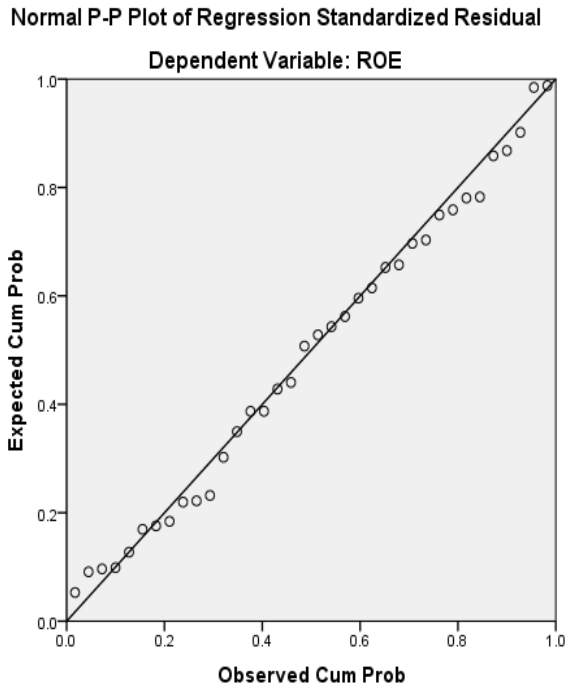
4.3. Multiple Regression Analysis

The relationship between one dependent variable and a number of independent factors is explained using multiple regression analysis (Pallant, 2005). It also indicates how much of the variance in the dependent variable may be accounted for by independent factors. A number of assumptions must be made in order to implement the Multiple Regression Analysis model. If the assumptions are tested and met, inference from the model is valid. The researcher will test the following assumptions.

4.3.1. Linearity Assumption Test

The dependent variable and each of the independent variables must have a linear relationship, according to this assumption. To visually check the linearity of the assumption, a scatterplot is created between the independent and dependent variables. The scatterplot generated by SPSS demonstrates that the dependent and each of the independent variables have a linear relationship, as seen in the figure below.

Figure 4.1. Linearity Assumption Test



Source: Computed by the researcher on SPSS 20

4.3.2. Normality Assumption Test

The cumulative probability plot of residuals (P-P plot) is used to determine whether a variable's distribution is compatible with a given distribution. If the Standardized residuals are normally distributed, the scatters of the residuals basically fall straightly on the normal distribution line indicating a normal distribution of residual. The variance of errors is the same across all levels of the Independent variables, which is known as homoscedasticity. Heteroscedasticity is defined as a difference in the variance of errors at different values of the independent variables. Visual study of a plot of the standardized residuals (errors) by the regression standardized projected value helps confirm this assumption (Matsaany, Bayun & Adinda, Gebri & Amora, Ria & Fauzy, Akhmad. 2016). For this study, the P-P Plot Normality test is examined with the histogram below, which clearly shows that the standardized residuals are normally distributed, and the Test of Normality table for Kolmogorov-Smirnov and Shapiro-Wilk both show that the p-value is greater than 0.05, indicating that the normality assumption test has been met.

Table 4.7. Test for Normality Assumption

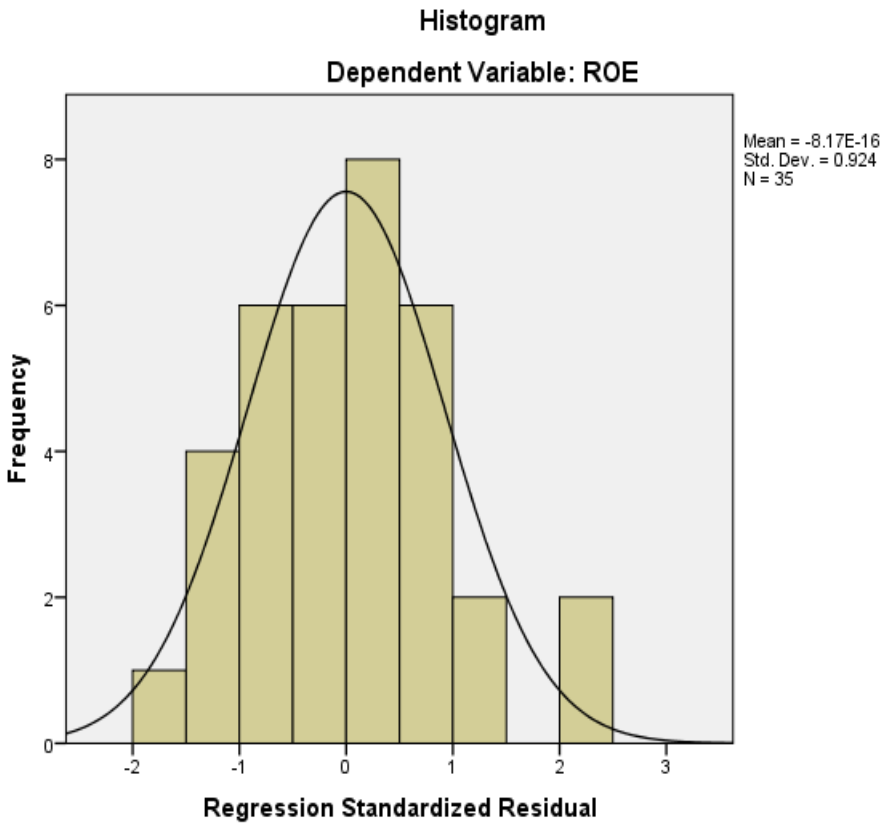
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Standardized Residual	.091	35	.200*	.965	35	.330

*. This is a lower bound of the true significance.

Source: Computed by researcher on SPSS

Figure 4.2. Normality Assumption Test



Source: Computed by the researcher on SPSS 20

4.3.3. Multicollinearity Assumption Test

Simply assessing the correlation coefficient between independent variables is the simplest multicollinearity test. The correlation matrix result (Table 4.3.) in this study reveals that the connection between the explanatory variables is weak, implying that multicollinearity issues are either minor or non-existent. When the correlation between independent variables exceeds 0.80, it becomes a serious issue. According to Tabachnick and Fidell (2001), the presence of multicollinearity in the data is indicated if the Tolerance value is 0.1 and the VIF is >10. Correlation analysis in this scenario does not allow the researcher to draw conclusions about the source and effect of the relationship between variables. According to the findings of this investigation, as indicated in the table 4.8 below all of the independent variables were found to have a tolerance of more than 0.1 and a VIF value of less than 10 which indicates that there doesn't exists the problem of Multicollinearity in this study.

Table 4.8. Multicollinearity Assumption Test

Model	**Collinearity Statistics**	
	Tolerance	**VIF**
(Constant)		
LVATMT	.340	2.938
LVIBT	.554	1.804
NIBU	.837	1.195
NMBT	.699	1.431
LVMBT	.445	2.245
Dependent variable: ROE		

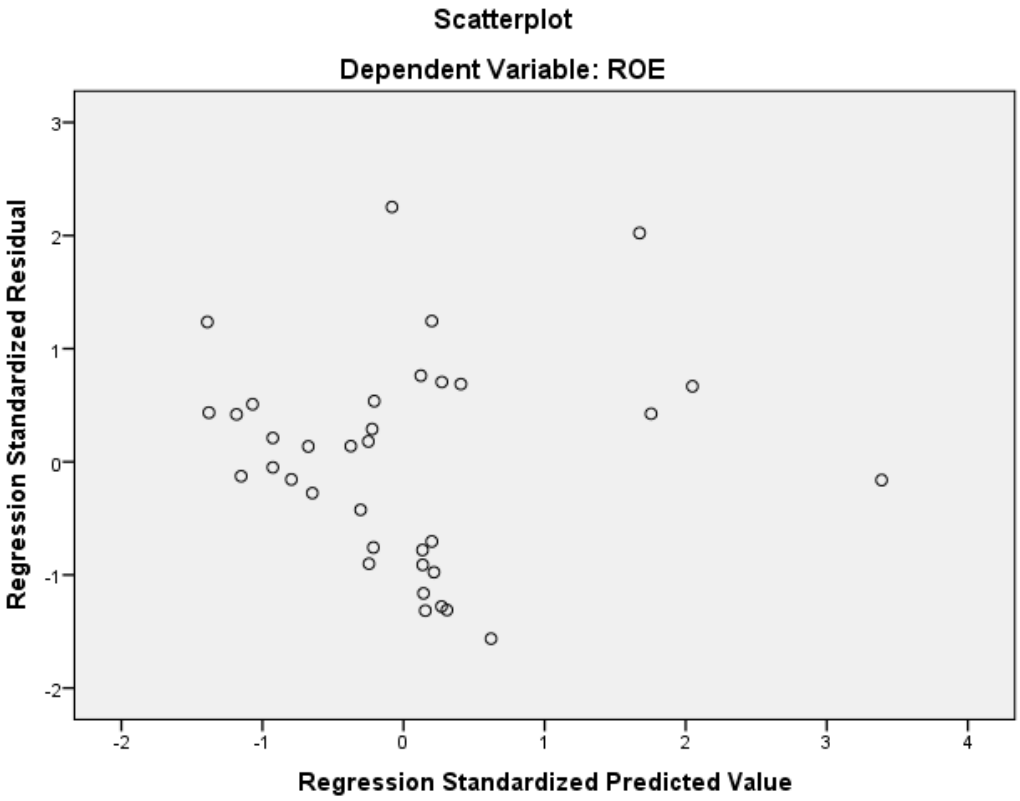
Source: Computed by the researcher on SPSS

4.3.4. Homoscedasticity Assumption Test

The assumption of homoscedasticity is that the variance in the residual (amount of error in the model) is similar throughout the model. To put it another way, the dispersion of the

residuals at each point of the predictor variables should be reasonably constant (or across the linear model). The assumption of homoscedasticity is tested in this study using an SPSS scatter plot for standardized residuals and standardized predicted values of the outcome or dependent variable, as shown below. The scatterplot resembles a rectangle, with no points on the x and y axes outside the -2 point, showing that hetroscedasticity was not a severe concern.

Figure 4.3. Test for Homoscedasticity



Source: Computed by researcher on SPSS

4.3.5. Independent of Residuals Assumption Test

In Multi Linear Regression all observations must not be related or has to be independent. This assumption can be tested using Durbin-Watson statistics which can range between 0-4. The result from the under stated table shows that there is no correlation between observations in the data or the residuals are independent.

Table 4.9. Independency of Residuals Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.660[a]	.436	.338	7.7017	.732

a. Predictors: (Constant), NMBT, NIBU, LVIBT, LVMBT, LVATMT

b. Dependent Variable: ROE

Source: computed by researcher on SPSS

Multiple regression analysis was performed after checking that all the required assumptions have been fulfilled. The researcher uses the result from SPSS to determine how well the regression model fits the data, statistically significance of the explanatory variables over the dependent variable and regression coefficient of the explanatory variables.

4.4. Model Summary

To determine how well the total regression model fits the study hypotheses. This is accomplished by first looking at the adjusted R squared (R2) to determine the percentage of total variance explained by the regression model for the dependent variables. The adjusted number shows us how much variance in the dependent variable would be accounted for if the model had been created from the population from which the sample was obtained, whereas R2 tells us how much variation in the dependent variable is accounted for by the regression model. It expresses the model's goodness of fit to the population while taking into account the sample size and number of predictors utilized. According to researchers, this amount must be equal to or more than 0.19

The following tables indicated that the, R2 value of .436 indicates that 43.6% of the goodness of the model is fairly good. The variation in the dependent variable, ROE can be explained by the predictors, Number of Mobile Banking Transaction (NMBT), Number of Internet Banking Users (NIBU), Value of Internet Banking Transaction (LVIBT), Value of Mobile Banking Transaction (LVMBT) and Value of ATM Transaction (LVATMT). The remaining 56.4 % variation is explained by stochastic error term (e) meaning that 56.4% of changes in ROE are explained by factors that are not explained in the model.

Table 4.10. Model summary for Dependent variable and Predictors

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.660[a]	.436	.338	7.7017

a. Predictors: (Constant), NMBT, NIBU, LVIBT, LVMBT, LVATMT

b. Dependent Variable: ROE

Source: computed by researcher on SPSS

4.5. ANOVA Model Fit

ANOVA analysis is normally used to compare the mean scores of more than two variables. It is also called analysis of variance because it compares the variance between variables and tests whether the R-squared is significantly greater than zero and that the overall regression model is a good fit for the data (Pallant, 2005).

Accordingly (Table 4.11.) of this study shows that the overall regression model was significant, F (5, 29)= 4.48, P-value < 0.05, R2= .436) and it can be said that there is a relationship between ROE of the commercial banks in Ethiopia and the predictors: NMBT, NIBU, VIBT, VMBT and VATMT.

Table 4.11. ANOVA (test using alpha = 0.05)

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1327.080	5	265.416	4.475	.004[b]
	Residual	1720.156	29	59.316		
	Total	3047.235	34			

a. Dependent Variable: ROE

b. Predictors: (Constant), NMBT, NIBU, LVIBT, LVMBT, LVATMT

Source: computed by researcher on SPSS

4.6. Regression Coefficient

4.6.1. Standardized Coefficient

After rescaling variables with a mean of 0 and a standard deviation of 1, standardized coefficients are generated by running a regression model on standardized variables. It's a tool for comparing the influence of various predictors Xi on the outcome Y. As a result, the standardized Beta coefficient may be used to determine the intensity of each independent (predictor) variable's influence on the criteria (dependent) variable. As a result, the regression coefficient explains the average amount of change in the dependent variable produced by a unit of change in the independent variable, such as a change of 1 standard deviation in X is related with a change of Y.

According to the regression coefficient table below (Table 4.12.) out of five explanatory variables only the value of ATM transaction had statistically significant at 5% since the p-value for this variable was 0.05. While assessing coefficients of correlation, the value of ATM transaction, number of mobile banking transaction and value of internet banking transaction had a positive or direct relationship with return on equity (ROE) of commercial banks, which suggested that, an increase in these independent variables would result in an

increase in ROE. Whereas the rest two variables such as: value of mobile banking transaction and the number of internet banking users had a negative coefficient, that means these explanatory variables had an inverse relation with return on equity (ROE) of commercial banks in Ethiopia.

4.6.2. Unstandardized Coefficient

After running a regression model on variables measured in their original scales, unstandardized coefficients are generated. A one-unit change in the independent variable X corresponds to a one-unit change in the result Y. It's utilized to figure out how X affects Y on an individual basis.

As stated in chapter three, the study used the following multiple regression operational model to establish the statistical significance of the independent variables on the dependent variable.

$$ROE = \beta 0 + \beta 1VATMTi,t + \beta 2VIBTi, t + \beta 3NIBUi, t + \beta 4VMBTi, t + B5NMBTi, t + \varepsilon i,t$$

$$ROE= -36.177 + 5.883VATMT + .901VIBT -3.239NIBU - .229VMBT + 1.202NMBT + \varepsilon i,t$$

The constant value (α = -36.177) shows that ROE would be -36.177 if other variables (VATMT, VIBT, NIBT, NIBU AND VMBT) of the model were zero. On the other hand, a beta coefficient of 5.883, .901 and 1.202 indicates that if there is one unit increase in the value of ATM transaction, value of internet banking transaction and number of mobile banking transaction it leads to 5.883 percent, 0.901percent and 1.202 unit increases in ROE of the commercial banks respectively. Whereas, one unit increase in the number of internet banking user and value of mobile banking transaction would lead to 3.239 and .229 decrease in ROE of the commercial banks respectively. Furthermore, the Error term (ϵ) estimate was set to zero.

Table 4.12. Regression coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-36.177	19.937		-1.815	.080
	LVATMT	5.883	2.939	.479	2.002	.055
	LVIBT	.901	1.045	.162	.862	.396
	NIBU	-3.239	.000	-.007	-.043	.966
	LVMBT	-.229	1.350	-.036	-.170	.866
	NMBT	1.202	.000	.153	.918	.366

Source: computed by researcher on SPSS

4.7. Interpretations on Regression Results and Research Hypothesis

Analysis of the results for each explanatory variable and their importance in determining the profitability of the commercial banks discussed in detail in this part. Furthermore, the discussion analyzes the statistical findings of the study in relation to the previous empirical evidences.

4.7.1. Value of ATM Transactions and Return on Equity

The logarithm of the value of ATM transactions is used to measure the value of ATM transactions. When the value or amount of ATM transaction increased by one percent, the return on equity (ROE) of sampled Ethiopian commercial banks increased by 0.05883 units or 5.883 percent on average and statistically significant at the 5% level of significance, according to the regression coefficient model in table 4.12. Because there was insufficient evidence to support the negative hypothesis, the researcher accepted the null hypothesis that the value or volume of ATM transactions had a positive substantial impact on return on equity.

The link between VATMT and ROE was positive, as expected, and this positive relationship may be attributable to the fact that more ATM transactions resulted in a higher return on

equity. This finding was in line with Mueni, M. (2019), Girma, E. (2019), Bosco Harelimana, 2018, Joseph M.V. (2017), Itah, and Emmanuel's (2014) previous research. The value of ATM transactions, according to those experts, had a positive and considerable impact on return on equity.

The reason for the large positive link could be that the more ATM transactions completed the more commission commercial banks generate, particularly when customers transact with banks other than the card issuing bank. Furthermore, as more ATM transactions were performed, banks would benefit from transaction-related cost reductions in ordinary business, with a cost of $1.07 per transaction against 27 cents for ATM banking transactions (Allen and Hamilton, 1996).

4.7.2. Value of Internet Banking Transactions and Return on Equity

The proxy used to measure value of internet banking transactions (VIBT) is natural logarithm of the value of internet banking transaction. The result of regression coefficient model in table 4.12 above shows that the coefficient of value of internet transactions was .901 and its P-value was 0.396, holding other variables constant, when value or amount of transactions of internet banking (VIBT) increased by one percent, return on equity (ROE) of sampled Ethiopian commercial banks would be increased by 0.00901 units or 0.901 percent on average and statistically insignificant at even 10% level of significant. Though the correlation between VIBT and ROE had a positive result as it was expected, but it was not statistically significant. Therefore, the researcher failed to accept the null hypothesis that value or amount of transactions of internet banking had a positive significant impact on return on equity. The result shows that the impact of value of internet banking transaction on the profitability of commercial banks is minimal or negligible.

Similarly, previous researchers have reported the positive impact of internet banking on banks profitability Tunay et.al., (2015), Malhotra, P., & Singh, B. (2009), Hernando, I., & Nieto, M. J. (2007. According to those researchers internet banking transaction reduces the overhead expenses of the banks and the cost reduction result in bank’s profitability. Such findings could be attributed to commission on internet banking which currently most commercial banks in Ethiopia do not collect on internet banking service and moreover the

initial cost allocated for infrastructure development and fail to attract customer to adopt online banking in mass scale.

4.7.3. Number of Internet Banking Users and Return on Equity

The result regression coefficient model in table 4.12 above indicated that the coefficient of the number of internet banking was -3.239 with p-value (0.966). In other words, there was insignificant negative correlation between number of internet banking users (NIBU) and return on equity (ROE) of sampled Ethiopian commercial banks. As a result, the researcher rejected the null hypothesis that there was positive significant relationship between NIBU and ROE. In contrary to the hypothesis of this research, NIBU showed a negative relationship with return on Equity (ROE) of sampled Ethiopian commercial banks. The researcher finding was consistent with the findings of Shah Alam et al. (2007), Khrawish & Al-Sadi (2011), Hosein (2013) and Gutu 's (2014) that number of internet banking users had negative insignificant relationship with return on equity. In contrast, previous studies for instance Hasan (2002), Pigni et al. (2002), Arnaboldi & Claeys'n (2008), and Ciciretti et al. (2009) stated that NIBU had significant positive effect on ROE.

The findings of NIBU negative relation with ROE could be attributed to lack of sufficient number of active customers using internet banking due to level of education of the customer and awareness in relation with the risk of using the service and the bank's website functionality, resulted in the negative relation of NIBU with ROE.

4.7.4. Value of Mobile Banking Transaction and Return on Equity

The logarithm of the value of mobile banking transactions is used to measure the value of mobile banking transactions. The coefficient of the value or volume of transactions conducted via mobile banking was -0.229 with a p-value of 0.866, according to the regression coefficient in table 4.12. In other words, there was no statistically significant negative/inverse association between the value of mobile banking transactions (VMBT) and the commercial banks' return on equity (ROE). As a result, the researcher rejected the null hypothesis that there was a positive significant link between VMBT and ROE, because the results of the investigation found no evidence to support this hypothesis.

VMBT indicated a negative association with Return on Equity (ROE) of tested commercial banks in Ethiopia, contrary to the research premise. The findings were comparable to those of Ene, (2017), who discovered that the value of mobile banking transactions had no meaningful association with return on equity. Many prior studies, such as Kithaka (2014), Momanyi N.D. (2015), Kashif, M., Kamboh, M., and Javaid, M. (2016), and Okon N. and Amaegberi A. (2018), found that VMBT had a beneficial influence on ROE.

The possible reason behind this negative correlation of VMBT and ROE would be that banks have signed up a large number of customers for mobile banking services, despite the fact that few of them are actively transacting on the service due to a lack of awareness about how to use the application and little support from banks on service usage. As a result, many people may have had doubts about the functionality of mobile banking, resulting in an increase in the number of unsuccessful mobile banking transactions.

4.7.5. Number of Mobile Banking Transaction and Return on Equity

Table 4.12 shows the regression coefficient's outcome above indicated that the coefficient of the Number of Mobile Banking Transaction (NMBT) was 1.202 with p-value (0.366). In other words, there was a positive relationship between NMBT and return on equity (ROE) of commercial banks under study. However, the relationship was not statistically significant even with significance level of 10%. Therefore, the researcher rejects the null hypothesis that there was positive significant relationship between NMBT and ROE, as the result from the analysis has no evidence to support the positive relationship between NMBT and ROE.

The result was consistent with the findings Mutua (2011) of that number of mobile banking transaction had positive but no significant relationship with return on equity. However, many previous studies for instance Kithaka (2014), Mabwai, F. (2016), stated that NMBT had significant positive effect on ROE. According to Mutua (2011), this is due to trends that suggest that macro-economic variables such as inflation and foreign exchange rate changes, among other macro-economic variables, have a significant impact on commercial bank financial performance. The reason for this positive negligible relationship of NMBT in the context of commercial banks in Ethiopia is that most commercial banks registered their customers for the goal of growing the number of mobile banking users instead of creating a

profit. In addition, bank's website functionality, system delays, slow processing of transactions and network interruption limits customers' willingness to transact on mobile banking and will impact negatively on the profitability of banks.

4.7.6. Digitalization and Operational Excellence

The descriptive statistical analysis result of Table 4.2 above shows that digitalization has a significant impact on operational excellence with a mean score of 1.757. Therefore, the researcher accepted the null hypothesis which stated that digitalization has impact on operational excellence of the commercial banks in Ethiopia. The result is consistent with previously made researches that Tornjanski, V., Marinković, S. and Jančić, Z.,(2017), BCG, (2018), Chipwatanga,T.& Kaira, B. (2019) Digitalization has unlocked huge potential for organizations pursuing operational excellence value through leveraging not only on better price but also on automation and digitization. Organizations find it rewarding to leverage on digital solutions, hence they are working on integrating digital solutions to their operational excellence framework. Digital capabilities enable banks to automate processes, boost efficiency, and reduce costs, while also improving the customer experience through different digital channels such as mobile banking, online banking and gaining market share (BCG, 2015).

4.7.7. Digitalization and Service Quality

The descriptive statistical analysis result of Table 4.3 above shows that digitalization has a significant impact on service quality with a mean score of 2.34. Therefore, the researcher accepted the null hypothesis which stated that digitalization has impact on service quality of the commercial banks in Ethiopia. The result is evidenced with previous research Hammoud et al. (2018) which revealed that not only is service quality a significant component in consumer happiness with E-Banking services, but that reliability is the most important attribute of service quality in affecting customer satisfaction. Hammoud et al., (2018) also discovered that the four independent variables associated with E-Banking service quality (efficacy and ease of use, dependability, security and privacy, and responsiveness and communication) had a significant impact on electronic banking with consumer satisfaction. Quality digital banking services allow users to be more cost-effective in their transactions, not just in terms of money but also in terms of time, which could be the explanation for this

attribution. Customers must also be able to rely on regular E-Banking service delivery, as well as timely responsiveness and good communication, which can be crucial when dealing with E-Banking issues. All of these factors appear to have a significant effect on customer satisfaction. In this way, digital banking is one factor that can help differentiate one bank from another in terms of service quality.

Table 4.13. Summary of Variables, Hypothesis Test and Decisions

Explanatory Variables	**Expected Sign**	**Actual Sign**	**Decision**
Value of ATM Transaction	Positive and Significant	Positive and Significant	Accepted
Value of IB Transaction	Positive and Significant	Positive and insignificant	Rejected
Number of IB user	Positive and Significant	Negative and insignificant	Rejected
Value of MB Transaction	Positive and Significant	Negative and insignificant	Rejected
Number of MB Transaction	Positive and Significant	Positive and insignificant	Rejected

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

The chapter discusses the conclusions and drives recommendations based on the data findings analyzed and finally it provides suggestions for further research.

5.1. Conclusion

The overall goal of this study was to estimate the impact of digitalization on commercial banks profitability in Ethiopia from 2018 to 2021. For secondary data analysis, nine purposefully selected commercial banks with 36 observations were employed, while 311 questionnaires were distributed to obtain primary data on stratified randomly selected bank branches. Descriptive statistics and multiple regression models were used to analyze the sample data. Return on equity was the dependent variable employed as a profitability indicator (ROE). The return on equity (ROE) was calculated by dividing net income after taxes by average stockholders' equity, and it was regressed with independent variables such as the value of ATM transactions, the number of mobile banking transactions, the value of internet banking transactions, and the number of internet banking users, and value of mobile banking transaction.

The researcher found that digitization has an effect on the profitability of Ethiopian commercial banks based on the study's findings. The relationship between digital products and their impact on bank profitability, on the other hand, varies. As a result, ATM transaction value has a large beneficial influence on commercial bank profitability in Ethiopia, as measured by return on equity. This suggests that raising the transaction value of ATM transactions has a beneficial influence on commercial bank profits. The underlying causes for this could be related to the bank's own overheads and transaction-related operational costs involved with hosting and servicing customers at a branch counter as a result of providing basic financial services more accessible to the customer which in turn minimizes the service time and increases convenience to the customer who will be willing to pay commissions in return.

On the other hand, the value of internet banking transactions and the number of mobile banking transactions have positive relationship with the profitability of the commercial banks in Ethiopia; however, this relationship is statistically insignificant. The weak association may also suggest that commercial banks subscribe a number of customers on mobile banking services; however only a few of the subscribers actively engage and transact on the service. The underlined reasons for weak mobile transaction engagement of the subscribers may include lack of awareness on how to use the application and little support provided from the banks' on service usage, which in turn leaves the subscribers doubting with regard to the functionality of mobile banking and increased number of unsuccessful mobile banking transactions. On the other hand, the huge infrastructure cost on internet banking and lack of sufficient number of customers may have adversely affected the profitability of commercial banks in Ethiopia.

The rest of the independent variables (i.e. number of internet banking user and value of mobile banking transaction) were not powerful to influence the profitability of commercial banks in Ethiopia. The study also aimed at determining whether digitalization affects, service quality offered by the commercial banks in Ethiopia. Based on the findings, the researcher has established that digitalization has a positive impact on the service quality offered by the banks. This is because customers have been able to consistently transact on various banking services electronically, in a 24/7 mode. On the other hand, by availing the mobile banking service, the banks provided ease of access of their service to customers and therefore saved their valuable time. These would indirectly have a positive impact on the banks profitability by keeping the customers' loyalty to the banks.

The study also examined whether digitalization has an, impact of on operational excellence of the commercial banks in Ethiopia. Based on the result, it was established that digitalization has a positive impact on operational excellence as operational excellence ultimately aims at providing standardized internal communication through different digital channels, optimized and convenient service which minimize customer physical engagement with bank branches, and reduced overhead of transactional costs through efficient and effective integration of front and back offices of the banks. These would have provided for increased profitability of commercial banks.

In general, it can be concluded that digital banking has brought a great opportunity to improve the profitability of commercial banks in Ethiopia. In addition, the existing digitalization efforts of the Ethiopian banks goes with and supported by new national digital strategy of the country and ultimately brings better returns on investment.

5.2. Recommendation

From the research findings it has been revealed that the value of ATM transactions was the significant drivers of profitability of commercial banks in Ethiopia during 2018 to 2021. Special emphasis has to be given to this indicator in order to further enhance profitability of commercial banks in Ethiopia. Even though, value of mobile banking transaction and number of internet banking user have a weak significance over profitability of commercial banks there must be a way to identify the reason and take measure towards improvement on their performance. Based on the study findings the following possible recommendations were forwarded:

Commercial banks should work on awareness creation to their customers with regard to usage of online and mobile banking services and its benefits to time and cost reduction.

Banks should also have to exert maximum effort to increase mobile and internet banking user activation rate targeting to achieve an increased number of internet banking users and value of mobile banking transactions.

Commercial banks should consider commission based mobile and internet banking service transactions as they are currently doing for bill payments and other bank transfers.

Commercial banks should provide proactive and reactive service to customers in a remote location whenever desperations and dropping of services are common. A few examples include the digital customer's complaints on the service, handling of disputed and long outstanding payments and unreleased payments and stacked ATM cards

To deliver quality service to their customers, commercial banks should ensure the ATM service quality and accessibility. One mechanism of doing this better can be fortifying their call centers which serve as direct access points for customer service complaints.

Commercial banks should consider periodic review and continual improvement of the digital channel and associated services by working on the digital customer's specific pain points.

5.3. Limitation and Area for Future Research

This research was done while passing through various limitations including but not limited to the infant stage of digitalization as well as the initial efforts of implementing the digital financial strategy of the country. Even if the entire data is collected and analyzed from nine local commercial banks, it's still too small and talks just the partial truth. Except ATM related services, the commercial banks are just beginning to open up their digital scopes and many of them are not getting return out of the digital services (e.g. mobile banking service hasn't yet been influencing the financial return to the Banks). On the other hand, the research has been done in the down of the new digitalization strategy of the country as well as [partial] privatization of the telecom service, which in turn maximizes the role of banks as central players in fin-tech based services. The most recent examples include ethio-telecom's multi-purpose tele-birr payment service which necessarily demands a B2B integration with commercial banks.

The current research, however, can be a springboard for future new researchers who will be aspiring to see the impacts of digitalization on the return of the local commercial banks, their services and their effort to achieve operational excellence while other digital players like new telecoms with associated fin-tech products, new B2B, B2C and B2G digital-based integrations, and other determinants of the above specified parameters.

Indeed, future researchers may raise the same research questions tested in the current research when a better public awareness on the use of digital banking service is created, cash holding limits are truly enforced, and when other provisions of the financial digitalization strategy in banking services will soon be extended beyond serving the very primitive banking activities like cash withdrawals and making small fund transfers through the banking platform.

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ANNEX

QUESTIONNAIRE ON IMPACT OF DIGITAL BANKING ON PROFITABILITY OF BANK OF ABYSSINIA

Dear respondents,

I would like to express my sincere appreciation for your time, candid and prompt response.

This questionnaire is designed for partial fulfillment for the requirement of Master in Business Administration. This study is conducted to assess the Impact of Digital Banking on Profitability in the banking business in Ethiopia, the case of commercial banks in Ethiopia. It will mainly assess the impact of adopting digital banking with the intent and strategy delivering quality service and maintaining operational excellence. As a strategic theme of the banks, this study is believed to determine the effectiveness of investing on digital banking for the profitability of the Banks and provide information to the bank's stake holders to make further decision whether to invest more on technology or not. The information collected will be kept confidential and used to serve the academic purpose only. So kindly, spare a few minutes of your valuable time to fill up the questionnaire.

Thank You

Mekdes Mekonnen

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General instructions

- Writing your name on the questionnaire is not required
- Please tick (✓) against the appropriate box

I. Background information

1. Educational qualification

   Diploma [ ] Degree [ ] Masters and above [ ]

2. Current professional position

   Officer [ ] Senior-officer [ ] Manager [ ] Director [ ]

3. Working experience in Banks

   Less than 2years [ ] 2-5 years [ ] 6-10 years [ ] More than 10 years [ ]

4. Digital banking services/products provided at your bank/at your respective branch /it is possible to tick more than once)

   ATM [ ]

   POS [ ]

   Mobile banking [ ]

   Internet Banking [ ]

   ITM /Case of BOA/ [ ]

   Mobile Wallet /Money [ ]

I. DIGITAL BANKING AND OPERATIONAL EXCELLENCE	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The uniform customer greetings and closure statements by digital banking service such as ATM attendants gives the feeling of standard communication to the customer.					
Adoption of digital banking service enables the bank to deliver retail services 24 by 7 to customers.					
The 24-by-7-by-365 availability of the digital banking service makes customers be loyal to the bank					
The availability of digital banking as an option to a branch office saves time to customers and minimizes the need for physical engagements with the Bank branch					
Availability of digital banking reduce the need and the cost to establish and operationalize a branch office					
Availability of digital banking reduce the need and the cost to hire, train, onboard and engage banking officers					
Adoption of digital banking enables the bank to reduce stationary cost by making the transaction ideally paperless.					
Adoption of digital banking products and services reduces the cost of handling transactions by reducing customer visit to bank branch.					
Adoption of digital banking reduces the cost of handling cash and the risk of carrying cash.					
Adoption of digital banking has reduces error committed by employees and customers while transaction has been made manually.					
Digital banking has contributed a significant role in mobilizing local currency deposit to the Bank.					
Availability of Digital banking products and service such as ATM, ITM/case of BOA/ and POS has special advantage to the inflow of foreign currency to the Bank.					

III. DIGITAL BANKING AND SERVICE QUALITY	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
BOA's digital banking services such as ATM, ITM /case of BOA/, Mobile banking, Internet banking/Abyssinia Online/ and Mobile Wallet/Wallet are operational in a 24/7 mode without interruption in delivering service to its customers.					
Digital banking services are technically easy to access and load quickly.					
Digital banking is applicable for customers in any level of literacy.					
Employees of the bank who have direct access to deliver the digital banking service have sufficient knowledge of the products/services.					
The number of steps required to process digital banking services such as Mobile banking, Internet banking and Mobile Wallet is short and precise.					
System response time of digital banking services of the bank is reasonably short.					
Digital banking is secured and reduces transaction frauds made by employees and customers.					
The bank has availed a secured set of digital services					