MEKDELA AMBA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT

THE IMPACT OF DIGITALIZATION ON BANK PROFITABILITY: THE CASE OF SELECTED COMMERCIAL BANKS IN DESSIE DISTRICT, ETHIOPIA

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MASTER OF BUSINESS ADMINISTRATION PROGRAM

This is to certify that the thesis prepared by entitled: **"**THE IMPACT OF DIGITALIZATION ON BANK PROFITABILITY**"** and submitted in partial fulfillment of the requirements for the degree of Master of Business Administration in Management complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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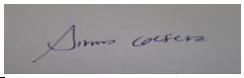
Name of Advisor girma Tefera(phd) Signature _  Date: January, 2026

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Declaration

I the under signed, declare that, this thesis is my original work and has not been presented for a degree in any other university and that all sources of materials used for the thesis have been duly acknowledged.

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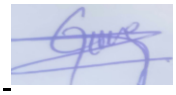
Signature:  Date: January, 2026

LIST OF ACRONYMS

ATM	**AUTOMATED TELLER MACHINE**
DFS	**DIGITAL FINANCIAL SERVICES**
GDP	**GROSS DOMESTIC PRODUCT**
FINTECHS	**FINANCIAL TECHNOLOGIES**
ICT	**INFORMATION AND COMMUNICATION TECHNOLOGY**
ITM	**ITERATIVE TELLER MACHINE**
MW	**MOBILE WALLET**
NEB	**NATIONAL BANK OF ETHIOPIA**
POS	**POINT OF SALE**
ROA	**RETURN ON ASSET**
ROE	**RETURN ON EQUITY**
SPSS	**STATISTICAL PACKAGE FOR SOCIAL SCIENCE**

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ABSTRACT

This study was conducted to investigate the impact of digitalization on the profitability of selected commercial banks in dessie district. The study employed a quantitative research approach, which relies on numeric data to test hypotheses and draw conclusions. An explanatory research design was adopted variables. To select the sample, a purposive sampling technique was utilized. In this case, banks were chosen from a list according to specific characteristics relevant to the research questioned, employing descriptive statistics, ordinal regression, and Spearman rank correlation to assess the relationship between these variables and bank profitability. The primary method of data collection was made using 5 points Likert scale questionnaire. Importantly, ATMs, point of sale terminals, mobile banking, and mobile wallets exhibited a highly significant impact on profitability, with p-values of 0.000. This study suggests that these channels play a crucial role in driving financial success for Ethiopian commercial banks. However, internet banking, despite showing a positive correlation, did demonstrate a statistically significant impact on profitability. The result of this study shows the need for banks to evaluate their Internet banking strategies, potentially focusing on optimizing existing functionalities and ensuring seamless integration with other digital channels. By addressing these areas, banks can unlock the full potential of Internet banking and maximize its contribution to overall profitability. Banks should prioritize investment in ATMs, POS terminals, mobile banking, and mobile wallets due to their highly significant impact on profitability.

Key words; Bank profitability, Commercial banks, Digitalization, Financial performance, Internet Banking, Mobile Banking

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

The emergence of the digital era has led to increased adoption of digital processes across all businesses and organizations, including financial institutions, aiming to enhance service delivery through more efficient methods. According to Agboola et al. (2019), this trend underscores the potential of digital tools and technologies to streamline operations, improve customer experiences, and drive success in today's competitive environment. Banks, in particular, have recognized the transformative impact of digitization on their operations to meet evolving customer demands in the dynamic financial sector. This transformation has been facilitated by the integration of technologies such as internet banking, mobile banking, mobile money transfers, and e-commerce platforms (Omarini, 2017).

Digital banking services have not only provided customers with fast and convenient access to traditional banking services but have also enabled financial institutions to offer more secure, efficient, and cost-effective services, thereby enhancing customer satisfaction and loyalty (Agboola et al., 2019). Overall, digitalization has become integral to supporting banking services, which are increasingly crucial in today's digital-first world.

In recent years, Ethiopian banks have actively adopted digital banking solutions to make banking more accessible and convenient for customers. Through services such as mobile banking, internet banking, and card banking, customers can perform various banking tasks such as bill payments and money transfers with ease (Ethiopia Commercial Guide, 2021). Foreign companies have played a significant role in supporting Ethiopia's financial inclusion efforts by providing technical assistance in the widespread adoption of digital banking.

Recognizing the growing importance of electronic commerce, Ethiopia has taken significant steps towards establishing a comprehensive regulatory framework for its digital economy. The Ethiopian government has drafted a proclamation aimed at regulating and promoting responsible development of e-commerce operations nationwide (Ethiopia Commercial Guide, 2021). This proclamation provides a legal basis for regulating e-commerce activities, ensuring consumer protection, fair competition, and the integrity of the digital marketplace. Additionally, the

proclamation mandates the installation of ATMs, POS terminals, mobile money platforms, and other payment infrastructures essential for the smooth delivery of digital financial services, while also enhancing data security for online transactions and services.

Digital finance stands as a cornerstone of modern economies, facilitating financial flows and contributing to financial inclusion. In Ethiopia, there has been a notable shift in the adoption of Digital Financial Services (DFS), highlighted by the launch of a national switch service jointly owned by banks (Ictet.org, 2021). The primary goal of this switch service is to promote interoperability across different channels, including ATMs, Point-of-Sale devices, Mobile Wallets, and bank accounts, thereby integrating various sectors, reducing costs, and expanding service offerings to clients.

The banking landscape has evolved significantly due to rapid technological advancements. Today, individuals use ATMs and mobile banking apps to manage their finances, reducing the need for in-person visits to banks during business hours (Bhattacharya et al., 2018). Online banking allows customers to check account balances, pay bills, and transfer money conveniently, without physical branch visits (Kumar & Singh, 2021). This convenience has encouraged more people to adopt digital payments over cash (Zou et al., 2020), thereby enhancing financial accessibility and strengthening customer-bank relationships. Mapesa (2018) emphasized that "Digital technologies have enabled banks to offer customers more convenient, faster, and simpler services, leading to improved customer experiences and loyalty." These technological advancements have also empowered banks to enhance service availability and tailor offerings to meet customer preferences, thereby enhancing overall customer satisfaction.

Therefore, this study aims to investigate the impact of digitalization on commercial banks in dessie district. The objective is to understand how digitalization can enhance banks' competitiveness and profitability in today's digital age.

1.2 Statement of the Problem

Despite technological advancements, the banking industry has often been criticized for its slow innovation and limited convenience, leading some customers especially women entrepreneurs to keep savings outside banks. ICT has played a major role in reshaping the banking sector by increasing competition and expanding service delivery options (Amoako, 2012). Non-bank financial institutions have challenged banks to improve customer service and convenience, particularly through digital channels.

Electronic banking has gained popularity due to its perceived cost-effectiveness, efficiency, and accessibility. Studies indicate that customers are drawn to the ease of conducting transactions without visiting bank branches, as well as enhanced security and faster processing (Trang, 2022; Masoud & AbuTaqa, 2017). However, findings on the profitability impact of e-banking remain mixed. While some research shows a positive correlation, others report insignificant effects, likely due to differences in implementation and e-banking models (Khrawish & Al-Sa'di, 2016).

Digital technologies have significantly reshaped banking operations, making claims that traditional banks are unaffected by the internet outdated (Lee & Kim, 2020). In Ethiopia, studies by Kassa (2020) and Girma (2016) found that e-banking improves operational efficiency and is positively linked to profitability through factors like reduced costs, increased service quality, and broader financial inclusion.

As financial institutions increasingly adopt services such as Automated Teller Machines (ATMs), Point of Sale (POS) systems, mobile banking, internet banking, and mobile wallet platforms, understanding their impact on profitability has become essential. While several studies have explored digital banking in major urban centers like Addis Ababa, limited attention has been given to secondary cities such as Dessie, where digital adoption patterns and infrastructural dynamics may differ. For instance, Demissie (2021) examined the effect of digital banking on the performance of banks in Addis Ababa and found that digital tools reduce operational costs and increase efficiency. Similarly, Abebe and Tadesse (2020) reported that mobile banking improved profitability through increased customer engagement in Bahir Dar. Mekonnen (2019), in a study conducted in Mekelle, highlighted how ATM accessibility and service quality influence customer satisfaction, which in turn impacts branch performance. Meanwhile, Gashaw (2022) noted that although internet banking adoption in Hawassa was promising, infrastructural challenges and limited digital literacy constrained its profitability impact. These findings emphasize the contextual variability of digital banking's effects across regions in Ethiopia. Therefore, a study focusing on the Dessie district his study was essential to fill this gap and provide region-specific insights. The results would not only guide strategic decisions by banks but also support policymakers and stakeholders in promoting inclusive financial development through digital transformation. Furthermore, the study would contribute to optimizing digital banking strategies, enhancing customer service delivery, and ensuring sustainable bank profitability in regional settings.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study is to examine the impact of digitalization on the profitability of selected commercial banks in Dessie district, Ethiopia.

1.3.2 Specific Objectives

The specific objectives of the study are as follows:

1. To evaluate the impact of Value of Automated Teller Machines (ATM) on the profitability of selected commercial banks in Desseie district.
2. To analyze the effect of Value of Point of Sale (POS) services on the profitability of selected commercial banks in Dessie district.
3. To assess the influence of Value of mobile banking services on the profitability of selected commercial banks in Dessie district.
4. To examine the impact of Value of internet banking on the profitability of selected commercial banks in Desseie district.
5. To investigate the effect of Value of mobile wallet services on the profitability of selected commercial banks in Dessie district.

1.4. Research Questions

1. What is the overall impact of digitalization on the profitability of commercial banks in Dessie district?
2. How does the use of Automated Teller Machines (ATMs) affect the profitability of commercial banks in Dessie district?
3. What is the influence of Point of Sale (POS) services on the profitability commercial banks in Dessie district?
4. To what extent does mobile banking contribute to the profitability of commercial banks in dessie district?
5. How does internet banking impact the profitability of commercial banks in Dessie district?

6. What effect does the use of mobile wallet services have on the profitability of commercial banks in Dessie district?

1.5. Research Hypothesis

Based on the specific hypothesis, the following hypotheses were forwarded

- ☞ H1: ATM has a significant impact on banks' profitability
- ☞ H2: Point of sale (POS) has a significant impact on banks' profitability
- ☞ H3: Mobile banking has a significant impact on banks' profitability
- ☞ H4: Internet banking has a significant impact on banks' profitability
- ☞ H5: Mobile wallet has a significant impact on banks' profitability

1.6 Significance of the Study

Digitalization has become a central strategy for enhancing service delivery and profitability in the banking sector. It plays a crucial role in transforming operational processes, improving customer experiences, and increasing financial performance (Omarini, 2017). In Ethiopia, while digital banking initiatives have grown, challenges such as usability, access, and implementation still hinder their full impact (Kassa, 2020).

Understanding how digital tools such as ATMs, POS, mobile banking, internet banking, and mobile wallets affect bank profitability would enable banks to make informed decisions and adapt their business models accordingl y (Girma, 2016). This study provides valuable insights for commercial banks, enabling them to align digital strategies with profitability goals.

Moreover, the study's findings useful to policymakers and regulatory bodies by highlighting the need for supportive legal frameworks and user-centered digital policies (Trang, 2022). Scholars and researchers would also benefit from empirical evidence regarding the financial implications of digital transformation in the Ethiopian banking context.

1.7 Limitations of the Study

This study is expected to face several limitations that may affect the scope and generalizability of its findings. Firstly, the research was geographically limited to commercial banks in Dessie District, Ethiopia.. As a result, the outcomes may not fully represent the experiences or realities of banks operating in other regions or at the national level. Secondly, access to detailed financial

data from banks may be restricted due to confidentiality concerns, which could limit the depth of the profitability analysis.

The relatively early stage of digital banking implementation in Ethiopia may also pose a limitation, as the full benefits and challenges of digitalization may not yet be fully observable. Furthermore, the study primarily focused on digital tools such as ATMs, POS, mobile banking, internet banking, and mobile wallets. This focus may have overlooked the influence of other digital innovations or external factors that could have impacted bank profitability.

Lastly, the study concentrated on financial performance indicators from the perspective of banks and did not include customer experience or satisfaction data, which are also important in evaluating the effectiveness of digital banking services. Despite these limitations, the study aimed to provide valuable insights that could guide future research and policy development.

1.8 Delimitation/Scope of the Study

This study was delimited to investigating the impact of digitalization on the profitability of commercial banks in the Dessie District of Ethiopia. It specifically focused on selected digital banking services, including Automated Teller Machines (ATM), Point of Sale (POS) systems, mobile banking, internet banking, and mobile wallet services. The study examined how the adoption and usage of these digital tools influenced the financial performance and profitability of commercial banks.

The research was delimited to commercial banks, thereby excluding microfinance institutions and other non-bank financial service providers. Additionally, the study considered profitability in terms of bank-specific financial indicators, such as return on equity (ROE) and operational efficiency, rather than broader economic or customer satisfaction outcomes.

The time frame for data collection and analysis was limited to the most recent three years, depending on the availability and accessibility of relevant financial data. Furthermore, the study primarily employed quantitative methods, using secondary data from bank reports and central bank publications, which meant it did not delve deeply into qualitative insights such as customer or employee perceptions.

The study was being done in the period of May 2025 to January 2026. The target populations of this study include managers and other staff members of the study area.

1.10. Organization of the Study

The study contains five chapters. The first chapter comprises of the introduction which includes a background of the research, statement of the problem, objectives, research questions, hypothesis, significance, scope, and limitation of the study. The relevant kinds of literature have been discussed in the second chapter. The third chapter presents the research methodology. The fourth chapter presents the study's data analysis presentation and discussion; finally, the fifth chapter comprises summary, conclusion, and recommendations.

1.11. Operational Definitions

Digitalization: The process of converting information into a digital format, which can be easily stored, shared, and processed using digital technologies. In the banking industry, digitalization involves the use of digital tools and platforms to enhance operational efficiency, improve customer experience, and increase profitability.

Bank Profitability: The measure of a bank's financial performance, which is typically assessed by evaluating its net income, return on assets (ROA), return on equity (ROE), and other financial metrics. Bank profitability is influenced by various factors, including interest rates, loan quality, operational efficiency, and the adoption of digital technologies.

Digital Transformation: The process of integrating digital technologies into all aspects of a business, including its operations, products, and services. In the banking industry, digital transformation involves the adoption of digital tools and platforms to enhance customer experience, streamline operations, and improve profitability.

Operational Efficiency: The ability of a bank to minimize costs and maximize productivity while delivering high-quality services to its customers. Digitalization can help banks improve operational efficiency by automating routine tasks, reducing paperwork, and enabling real-time data analysis.

Customer Experience: The overall perception of a customer about a bank's products, services, and interactions. Digitalization can help banks enhance customer experience by providing personalized services, offering self-service options, and improving the speed and convenience of transactions.

Financial Metrics: Quantitative measures used to assess a bank's financial performance, such as net income, return on asset, return on asset, and asset quality. These metrics are essential for understanding the impact of digitalization on bank profitability.

Interest Rates: The cost of borrowing money, which is determined by the supply and demand for loans in the market. Interest rates can have a significant impact on bank profitability, as they influence the interest income generated from loans and the interest expense incurred on deposits.

Loan Quality: The creditworthiness of a bank's loan portfolio, which is assessed, based on factors such as the borrower's credit history, the loan-to-value ratio, and the collateral provided. Loan quality is an important determinant of bank profitability, as it affects the risk of loan defaults and the interest income generated from loans.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Concept and Evolution of Digital Banking

2.1.1 Definition and Scope of Digital Banking

Digital banking refers to the digitization of all traditional banking activities and services that were historically only available when customers physically visited a bank branch. This includes services such as fund transfers, bill payments, loan applications, and account management. It operates through digital platforms such as internet banking, mobile applications, and ATMs (Amoako, 2012; Omarini, 2017). The scope of digital banking extends beyond just customer services to include back-office automation, digital customer onboarding, and data-driven decision-making.

2.1.2 Historical Development and Global Trends

The development of digital banking began with the introduction of ATMs in the 1960s, followed by telephone banking in the 1980s, and the widespread use of internet banking in the 1990s. With the rapid growth of mobile technologies in the 2000s, mobile banking became a dominant channel (Bhattacharya & Sarker, 2018). In recent years, the trend has shifted towards fully digital banks or "neobanks" that operate without any physical branches, particularly in developed markets. Globally, banks are now investing heavily in artificial intelligence, blockchain, and open banking to stay competitive and enhance customer experience (Kumar & Singh, 2021).

2.1.3 Digital Banking in Developing Economies

In developing economies, digital banking has played a crucial role in improving financial inclusion by providing access to banking services in remote and underserved areas. Technologies like mobile banking and agent banking have bridged gaps caused by inadequate physical infrastructure (Ethiopia Commercial Guide, 2021). However, adoption is often hindered by challenges such as low digital literacy, inadequate internet coverage, and regulatory barriers. Despite this, the digital transformation in countries like Kenya, Nigeria, and Ethiopia has shown promising progress, largely driven by mobile money platforms (Trang, 2022).

2.2. Digital Banking Technologies and Services

2.2.1 Digital Banking Forms

2.2.1.1 Automated Teller Machines (ATM)

The automated teller machine (ATM), a fixture in the modern financial landscape, has proven its enduring convenience for customers of financial institutions. Despite the emergence of other e-channels, ATMs remain the most widely recognized and accepted method for accessing banking services. Their primary advantage lies in their round-the-clock availability, allowing customers to manage their finances at any time, day or night, without the constraints of traditional bank hours. ATMs empower customers to access their accounts, withdraw cash (including cash advances using credit cards), and check account balances without the need for human interaction (Abdelaziz et al., 2014). This self-service functionality translates into significant cost savings for banks, streamlining operations and enhancing efficiency. As a result, ATMs have become an indispensable tool in the competitive banking industry, contributing directly to a financial institution's market position and customer satisfaction. Banks have been positioning Automatic Teller Machines (ATMs) to increase their accessibility, providing an efficient way for customers to conduct routine banking activities at their convenience. The time savings associated with using an ATM are a valuable asset to customers, who are increasingly pressed for time and value convenience in their banking activities. ATMs are also beneficial due to their physical locations; many shopping centers, malls, hotels, supermarkets, and marketplaces have ATMs available for customers to access their funds quickly and easily while shopping (Kersten, 2018). Furthermore, ATMs are also a secure form of banking, as in the case of misplaced or stolen cards, a PIN security code must be entered for access to funds to be granted (Centier Bank, 2019). Thus, the positioning of ATMs by banks offers convenience and security to customers, making them an invaluable asset in banking.

2.1.1.2. Point of Sale (POS)

Point-of-Sale (POS) systems have revolutionized commercial transactions, serving as both physical and virtual gateways for customer purchases and payments (Nambisan, 2021). These systems facilitate transactions at retail cash registers or through online platforms such as Booking.com and Ebay.com. Commercial banks have integrated POS systems with their infrastructure, enabling merchants to accept payments from various international payment

networks including VISA, MasterCard, Union Pay, and American Express. POS terminals have become indispensable tools for businesses, particularly in retail operations. Modern POS terminals have evolved from their initial function of card payment processing to encompass a wider range of payment options, including contactless payments and mobile wallets. This technological advancement has paved the way for e-POS systems, which accept digital payments without the need for physical card swiping (Nambisan, 2021). As a result, POS systems have become integral to business operations, streamlining transactions and enhancing customer convenience.

2.1.1.3. Internet Banking (IB)

Internet banking, also known as online banking or IB, has become increasingly popular in recent years. It is a convenient and secure way to manage your finances, allowing customers to perform financial transactions, such as transferring funds, paying bills, and checking account balances, from the comfort of their homes or offices (Nguyen, 2018). This type of banking is especially useful for those who cannot easily access traditional banking services, such as those who live in rural areas or travel frequently. In addition to convenience, internet banking offers customers a variety of other benefits. For example, customers can access their accounts 24/7, regardless of location or time zone, and can monitor their accounts in real-time. Furthermore, customers can access a wide range of financial products and services, including credit cards, investments, loans, and more (Perez, 2020). Internet banking also provides customers with enhanced security features, such as multi-factor authentication and encryption, to protect their financial information from cyberattacks. Furthermore, it can help customers manage their finances more effectively by providing them with a range of financial tools, such as budgeting and savings calculators (Kumar, 2019). All in all, internet banking has revolutionized the way people manage their finances, making it easier and more secure than ever before.

Financial institutions are embracing the digital era by offering internet banking services through web browsers and mobile applications. This technological advancement has revolutionized banking by providing customers with unparalleled convenience and flexibility. Internet banking empowers customers to access a wide range of banking services from anywhere with an internet connection, eliminating the need for physical bank visits. This convenience factor has been met with high customer satisfaction, surpassing that of traditional manual banking systems, which typically involve time-consuming and costly processes (Hasan, 2015).

Internet banking offers numerous advantages to banks as well. It enables significant cost reduction through automation and reduced overhead expenses associated with maintaining physical branches. Moreover, it serves as a key differentiator in the competitive banking

landscape, allowing banks to stand out by offering innovative and convenient services. Internet banking also streamlines work processes, enhancing operational efficiency and improving the overall customer banking experience. By providing 24/7 access to banking services, banks can increase sales and expand their reach to a wider customer base. Additionally, internet banking fosters increased customer loyalty and provides an opportunity to attract new customers through its user-friendly and accessible platform.

The self-service nature of internet banking empowers customers with control over their finances, allowing them to access a comprehensive range of banking products and services at their convenience. This anytime, anywhere accessibility has transformed the banking landscape, providing customers with unparalleled convenience and flexibility.

This type of banking is especially beneficial for individual customers, as they are able to manage their finances and banking needs quickly and easily from the comfort of their own home or on the go. Corporate businesses also benefit from this type of banking as it allows them to streamline their banking services, reducing the amount of time and resources devoted to managing their finances. Furthermore, internet banking provides greater security for customers, as the security measures implemented are more robust than those used in manual banking.

2.1.1.4. Mobile Banking (MB)

Mobile banking, or m-banking, has revolutionized the banking industry by leveraging the ubiquity of mobile devices to provide convenient and accessible banking services (Saleem & Rashid, 2011). This innovative technology allows customers to seamlessly conduct various banking activities from the palm of their hands using smartphones, tablets, or other mobile devices.

M-banking offers a plethora of services, including balance inquiries, fund transfers, bill payments, transaction history reviews, and access to financial advisory tools. The convenience of mobile banking lies in its accessibility anytime, anywhere, without the need to visit physical bank branches or use traditional online banking platforms (Kingoo, 2011). This flexibility

empowers customers to manage their finances on the go, saving time and effort. Additionally, mobile banking enhances security through advanced authentication measures such as biometrics, two-factor authentication, and encryption protocols. This robust security infrastructure protects customer data and transactions from unauthorized access or fraud. M-banking also facilitates mobile payments, enabling customers to make purchases and send money to others instantly and securely using their mobile devices. As the popularity of mobile banking continues to soar, banks are investing heavily in developing innovative and user-friendly mobile banking platforms. These platforms are designed to provide a seamless and intuitive user experience, allowing customers to navigate banking services effortlessly. The integration of artificial intelligence (AI) and machine learning (ML) in mobile banking apps further enhances the customer experience by providing personalized recommendations, financial insights, and predictive analytics.

The growing popularity of mobile banking is significantly impacting the financial performance of commercial banks. A study by Kingoo (2011) in Kenya explored the association between mobile banking and commercial bank financial performance, revealing a positive correlation. The study, titled 'The Impact of Mobile Banking on Commercial Bank Financial Performance in Kenya,' found that mobile banking was directly linked to improved financial performance. This is attributed to several factors. Firstly, mobile banking increases customer reach and accessibility, opening up new banking opportunities and attracting a broader customer base. This leads to increased deposits and loan disbursement, directly boosting a bank's revenue streams. Moreover, the study highlighted the positive influence of mobile banking on customer satisfaction. The convenience and speed of mobile transactions, coupled with increased accessibility to banking services, have led to enhanced customer experience, resulting in increased customer loyalty and retention.

Mobile banking has become a transformative force in the financial landscape, empowering individuals to conduct banking transactions through mobile devices such as smartphones and tablets (Mabwai, 2016). This service, offered by financial institutions, particularly banks, enables users to access a wide range of banking services through mobile banking software, commonly known as apps. Mobile banking has revolutionized the way people, especially in underdeveloped countries, manage their finances and transfer money. Its increasing popularity stems from the convenience it offers, allowing users to perform banking transactions anytime, anywhere. With

mobile banking, users can access various services such as checking account balances, transferring funds, paying bills, and even applying for loans - all from the convenience of their mobile devices. The accessibility and ease of use have made mobile banking a preferred choice for many, particularly those who may not have easy access to traditional brick-and-mortar bank branches.

The rise of mobile banking has revolutionized the way individuals manage their finances, offering a range of convenient and accessible services. With mobile banking, users can monitor their account balances in real time, eliminating the need to physically visit a bank branch (Solis, 2019). This real-time access allows for greater control over spending and budgeting, enabling individuals to make informed financial decisions. Furthermore, mobile banking platforms facilitate electronic bill payments, simplifying the process and eliminating the need for paper checks or physical visits to payment centers (Khurana, 2022). Instant notifications on transactions provide users with immediate updates on their bank accounts, promoting transparency and fostering peace of mind (Hussain et al., 2019). Mobile banking also streamlines peer-to-peer money transfers, enabling users to easily send and receive money, even across borders (Miah & Rahman, 2017). This feature has particularly benefited individuals without access to traditional banking infrastructure, promoting financial inclusion and empowering them to participate in the financial system (World Bank Group, 2019). As mobile banking continues to evolve, it is anticipated to offer even more complex financial services, potentially transforming the way people manage their finances. The future of mobile banking holds exciting possibilities, such as facilitating loan applications, providing access to investment products, and offering personalized financial advice (Agyemang et al., 2021). These advancements have the potential to further enhance financial inclusion, empowering individuals to make informed financial decisions and access a wider range of financial services, regardless of their location or access to traditional banking institutions.

2.1.1.5. Mobile Wallet (MW)

Mobile wallets, also known as digital wallets, have emerged as a convenient and secure alternative to traditional payment methods. They allow users to store payment credentials, such as credit card or debit card information, on their mobile devices. This eliminates the need for carrying physical cards and cash, reducing the risk of theft or loss. Mobile wallets utilize near-

field communication (NFC) technology to enable contactless payments at point-of-sale terminals (Deloitte, 2020).

Beyond payments, mobile wallets offer additional functionalities. They facilitate the storage of loyalty cards, coupons, and gift cards, providing users with easy access to various rewards and discounts. Moreover, mobile wallets enable users to withdraw funds into their bank accounts and access cash through partnering ATMs or retail locations.

The widespread adoption of mobile wallets is attributed to their convenience and enhanced security features. They simplify the payment process by eliminating the need to enter payment details manually, reducing the risk of errors and fraudulent transactions. Furthermore, mobile wallets employ robust encryption mechanisms to protect user data and prevent unauthorized access.

Several companies, including Apple Pay, Google Pay, and Samsung Pay, offer mobile wallet services. These companies have established partnerships with numerous merchants, enabling users to make payments at a wide range of retail establishments. The increasing prevalence of mobile wallets is expected to continue as technology advances and consumer demand for secure and convenient payment solutions grows (Deloitte, 2020). The key components of mobile wallets include a secure payment gateway, authentication system, and transaction processor. The secure payment gateway provides an encrypted connection between the mobile device and the merchant's point-of-sale system. The authentication system provides secure access to the wallet by using biometric data such as fingerprint or iris scans. The transaction processor securely processes the payment transaction. Mobile wallets offer users the convenience of making payments with a single tap of the device. They also offer added security since the user's payment information is stored on the device and not shared with the merchant. Additionally, mobile wallets can store loyalty and rewards cards, allowing users to easily manage their points and rewards (Deloitte, 2020).

Mobile wallets are becoming increasingly popular, with more than a billion users worldwide. According to a survey by Deloitte, the number of people using mobile wallets has grown by 40% since 2018. As technology advances, mobile wallets are projected to become even more popular soon.

~~2.1.1.6. Virtual Banking (ITM)~~

~~The hybrid banking experience offered by Interactive Teller Machines (ITMs) bridges the gap between the convenience of automated teller machines (ATMs) and the personalized service of live tellers. ITMs, also known as virtual teller machines, are advanced automated systems that perform various banking transactions, such as cash withdrawals, check deposits, identity verification, and receipt printing. They provide a unique customer experience by enabling real-time interaction with a live teller via voice communication, video conferencing, or chat (similar to Skype). This hybrid approach allows customers to enjoy the convenience of self-service while still receiving personalized assistance from a human representative. ITMs offer several advantages over traditional ATMs. Firstly, they provide a wider range of services, including check deposits, which are not typically available on ATMs. Secondly, the live teller interaction enhances the security of transactions, as the teller can verify the customer's identity and assist with any potential issues. Thirdly, ITMs offer a convenient and accessible banking option for customers who may not have access to a traditional bank branch or who prefer to avoid lines and crowds.~~

~~The implementation of ITMs has been driven by the increasing demand for convenient and personalized banking services. According to a study by the American Bankers Association, 67% of customers prefer to interact with a live teller, even when using an ATM (American Bankers Association, 2019). ITMs fulfill this need by providing a hybrid experience that combines the efficiency of automation with the human touch of live assistance. This type of virtual banking allows customers to complete transactions quickly and securely, without having to wait in line or worry about identity theft. Additionally, ITMs allow customers to complete their banking transactions from the comfort of their own homes or offices. ITMs have been particularly successful in rural areas, where there is limited access to local banks or tellers. By using ITMs, customers can access banking services from anywhere in the world. Furthermore, ITMs provide a secure and convenient way for customers to access their funds, as they are monitored by the bank and encrypted for customer safety. ITMs have been a successful tool in the banking industry, providing customers with greater convenience and security when conducting banking transactions (Tulsiani, 2020).~~

2.1.7. Credit/Debit Cards

Credit cards and debit cards have become essential components of today's financial system. They provide a secure way to make purchases, access funds, and manage spending. They also offer convenience, as they can be used anywhere a credit card is accepted. Credit cards are typically used to make purchases and pay for services. The cardholder is responsible for paying the balance in full each month, as well as any interest or fees incurred. Debit cards are linked to a bank account and the amount spent is immediately withdrawn from the account. No interest or fees are charged, but debit cards can be subject to overdraft fees if the balance is insufficient.

In recent years, credit and debit cards have become increasingly popular as a way to pay for goods and services. According to the Federal Reserve, credit card payments accounted for 36.3% of total noncash payments in 2016, an increase of 10.2% from 2015. Debit cards accounted for 22.4%, an increase of 6.6% from 2015. This demonstrates the growing reliance on these payment methods and their importance in the financial system (Federal Reserve, 2017). Credit and debit cards provide a convenient and secure way to make payments. They offer fraud protection and the ability to track spending. This makes them ideal for both personal and business use. As their popularity continues to grow, it is important to understand the benefits and risks associated with credit and debit cards (Fry, 2019). Credit and debit cards, while sharing a familiar appearance with their embossed numbers, expiration dates, and magnetic stripes, offer vastly different functionalities and fraud protection measures. Debit cards function as a direct conduit to a customer's bank account, allowing purchases by immediately withdrawing funds (Cussen, 2021). This is appealing to individuals who prefer avoiding cash while also avoiding interest payments. Conversely, credit cards, issued by financial institutions like banks, provide a line of credit, enabling customers to borrow funds up to a specified limit (Cussen, 2021). This borrowed money accrues interest, which needs to be repaid. However, the advantage of credit cards lies in their superior fraud protection. Research underscores that credit cards offer greater security against unauthorized transactions and provide robust identity theft safeguards (Cussen, 2021). Furthermore, credit cards often come with supplementary perks such as cash back rewards, travel insurance, and purchase protection, enhancing their overall value. Thus, consumers should thoroughly assess their financial preferences and prioritize security when choosing a card, weighing the benefits and drawbacks of each type to ensure the selected card best aligns with their individual needs and provides adequate protection.

2.1.8. Digital Banking and Financial Profitability

Prior to the widespread adoption of information technology, cash-based transactions reigned supreme in the banking landscape, presenting significant challenges for both financial institutions and their customers. The reliance on physical cash for transactions resulted in heightened risks, including the potential for theft, fraud, and logistical complexities associated with cash handling and transportation (Boateng, 2020). Moreover, the lack of electronic banking channels led to inefficiencies and inconveniences, as customers were forced to physically visit bank branches for even the simplest of transactions, often facing long queues and limited operating hours. This traditional model restricted access to financial services, particularly for individuals residing in remote areas, hindering financial inclusion (Boateng, 2020). However, the past two decades have witnessed a paradigm shift in the banking sector, driven by the imperative to enhance efficiency, convenience, and financial inclusion. Banks have embraced the transformative potential of information technology, leading to the rapid adoption and implementation of diverse electronic banking channels. The internet has emerged as a key enabler, allowing banks to offer a wide range of services through online banking platforms, providing customers with 24/7 access to their accounts, enabling them to perform transactions, manage finances, and access information from the comfort of their homes or offices (Shah, 2009).

Electronic banking has revolutionized the banking landscape, offering a plethora of advantages over traditional cash-based transactions. Firstly, electronic banking significantly reduces the risk of fraud and theft, as transactions are conducted through secure electronic channels rather than physical exchange of cash. Secondly, it enhances efficiency by automating many banking processes, thereby reducing the time and effort required for transactions. Thirdly, electronic banking offers unparalleled convenience to customers, allowing them to conduct banking activities anytime, anywhere, from the comfort of their own devices.

The proliferation of mobile banking, in particular, has played a pivotal role in expanding financial inclusion, particularly in developing countries where access to traditional banking services may be limited. Mobile banking empowers individuals with access to basic banking services, such as account opening, fund transfers, and bill payments, through their mobile phones. This has not only expanded the reach of banking services but has also fostered financial

literacy and economic empowerment among previously unbanked populations. This has resulted in an increased focus on customer-oriented services, such as online banking, mobile banking, and automated teller machines (ATMs). Additionally, banks have increased their focus on providing customers with an array of financial products and services, such as credit cards, debit cards, and investment banking, all of which are largely available through electronic banking channels (Rao, 2012). Electronic banking channels have also been used to increase financial inclusion, allowing those without access to physical banks to access financial services and products. This has resulted in a reduction in the cost of transactions, and an improvement in the security and accuracy of banking transactions (Muller et al., 2019). All of these advantages have made electronic banking a preferred choice among customers of all ages, and have made the banking sector a more efficient and secure industry.

The emergence and rapid adoption of digital banking in Nigeria has significantly impacted the profitability of deposit banks in the country. Electronic banking, in particular, has played a crucial role in this transformation, driven by its inherent advantages of time savings, convenient access to cash, and ease of use. While various digital banking channels have emerged, Automated Teller Machines (ATMs) have gained remarkable popularity over Internet banking, largely attributed to perceived security and ease of use. Customers appreciate the ability to access their accounts with a few clicks at ATMs, eliminating the need to enter sensitive banking details online, which can be a concern for security-conscious individuals. This shift towards ATM utilization has, in turn, spurred a surge in profitability for Nigerian deposit banks. As banks invest in expanding their ATM networks and offering innovative ATM services, they have been able to cater to the evolving needs of their customer base, leading to increased transaction volumes and subsequently, enhanced profitability. The convenience and accessibility offered by ATMs have contributed to a significant shift in banking habits, driving the growth of the financial sector and reinforcing the importance of digital banking in the Nigerian economy (Mawutor, 2014).

Furthermore, digital banking has enabled customers to access their accounts from anywhere in the world, which has increased the number of transactions that are done online. This has resulted in a significant increase in revenue for Nigerian deposit banks as customers do not need to physically visit the bank to do their transactions. Moreover, digital banking has also helped to

reduce the cost associated with traditional banking services as banks can now provide services at a much lower cost. All in all, digital banking has had a huge impact on Nigerian deposit banks' profitability, making it one of the most important factors in the success of the banking sector in the country. The advent of mobile banking, integrated seamlessly into the digital banking landscape, has revolutionized the banking experience for users worldwide. Its round-the-clock convenience, accessible anytime and anywhere, has attracted a surge in banking users, leading to a substantial increase in the customer base for banks. This expanded user base has had a direct impact on the profitability of banks, as more users translate into increased revenue streams from various banking services. Banks that have seen a greater number of mobile banking users are those that have achieved a better financial performance (Mabwai, 2016). Mobile banking has provided a platform for banks to expand their services, allowing them to target customers who are not only geographically distant but also those who previously had limited access to banking services. This has enabled banks to reach out to customers who may not be able to access traditional banking services, such as those in developing countries. Furthermore, the introduction of mobile banking has reduced the cost of carrying out transactions, as it does not require the physical presence of a banking agent (Romero et al., 2017). This has enabled banks to reduce their operational costs, thereby increasing their profitability. Therefore, it can be concluded that the introduction of mobile banking into digital banking has been a major success, and has resulted in a significant growth in banking users.

2.1.9. Bank Profitability Measurement

In addition to these financial performance measures, non-financial measures are also used to assess the performance of a bank. Non-financial measures include customer satisfaction, market share, employee satisfaction, and online banking satisfaction among others. Customer satisfaction is essential to the success of the bank. Banks can measure customer satisfaction through surveys, interviews, or customer feedback. Banks can also measure customer satisfaction by tracking activities such as customer complaints, customer attrition and customer loyalty (Khan et al., 2018). Market share is an important measure of the performance of a bank. Banks can measure market share through surveys, market research, consumer reports, and competitive analysis (Khan et al., 2018). Employee satisfaction is also an important performance measure for banks. Banks can measure employee satisfaction by tracking employee engagement, job satisfaction, and employee turnover. Online banking satisfaction is also a measure of the

performance of a bank. Banks can measure online banking satisfaction by tracking customer engagement, customer satisfaction, and customer loyalty (Khan et al., 2018).

2.2. Empirical Review

2.2.1. Foreign Literature

Giudice et al. (2016) conducted an extensive study to investigate the impact of e-banking products on bank profitability. Utilizing a sample of 3692 banks across 28 European countries, they employed a classification analysis to determine the influence of independent variables on the dependent variable of Return on Equity (ROE). Their findings revealed that banks offering a comprehensive suite of e-banking products, including retail and corporate internet services as well as home banking, consistently achieved higher ROE. This suggests that e-banking products play a significant role in enhancing bank profitability.

The study's results align with previous research that has highlighted the positive impact of e-banking on bank performance. For instance, Fosso Wamba et al. (2007) found that banks that actively adopted e-banking technologies experienced increased customer satisfaction, reduced operating costs, and enhanced profitability. Similarly, Wang et al. (2012) demonstrated that e-banking adoption led to improved financial performance, as measured by ROE and Return on Assets (ROA).

These findings underscore the importance of e-banking products as a key driver of bank profitability. Banks that prioritize the development and provision of these services can gain a competitive advantage by attracting and retaining customers, reducing costs, and increasing revenue streams. The study by Giudice et al. (2016) provides valuable insights into the role of e-banking in the banking industry and highlights the need for further research to explore the potential benefits and challenges associated with the adoption of these technologies.

The study by Kimani (2015) investigated the impact of mobile banking on the operational efficiency of commercial banks in Kenya. Analyzing data from 43 banks between 2011 and 2014, the researcher found a positive and significant correlation between mobile banking adoption and efficiency. Mobile banking technologies reduced operating costs and improved revenue generation, leading to enhanced efficiency. The study suggests that policymakers should

promote mobile banking adoption to enhance the competitiveness of commercial banks in Kenya.

Mobile banking has revolutionized the banking industry, providing convenient and accessible financial services to customers. By reducing the need for physical branch visits, banks can streamline operations and lower overhead expenses (Berger, 2006). Additionally, mobile banking platforms facilitate efficient transaction processing, reducing the time and resources required for manual transactions (Ndung'u, 2016). Furthermore, mobile banking expands the reach of banks, enabling them to serve a wider customer base. This increased volume of transactions translates into higher earnings, contributing to improved operational efficiency (Demirgüç-Kunt et al., 2015). By leveraging mobile banking technologies, commercial banks in Kenya can optimize their operations, enhance customer satisfaction, and gain a competitive edge in the rapidly evolving financial landscape.

In a 2017 study, Vekya examined the relationship between ATM and POS transactions and the profitability of commercial banks in Kenya, specifically focusing on return on equity (ROE) as a measure of profitability. Employing a descriptive design, the researcher conducted a census survey of all 43 Kenyan commercial banks in operation as of 2014. Vekya utilized secondary data sourced from publications of the Central Bank of Kenya, analyzing it using SPSS software. The study's findings revealed a positive association between increased ATM and POS transactions and enhanced bank profitability. Notably, a 1% increment in ATM transactions resulted in a 0.009% rise in ROE, while a 1% increase in POS transactions led to a 0.023% increase in ROE (Vekya, 2017). These findings suggest that banks can boost their profitability by investing in ATM and POS technology, as these transactions stimulate revenue growth. Although the study's scope is limited to the Kenyan banking sector, its insights hold relevance for other banks operating in similar markets. Further research investigating the impact of ATM and POS transactions on profitability within different contexts could provide valuable insights for the banking industry as a whole.

The impact of e-payment adoption and online banking transactions on bank profitability remains a topic of debate, with studies yielding contrasting findings. Morufu (2016), focusing on Nigerian banks, utilized panel regression analysis on secondary data from 2005 to 2012. The study, using internet banking transactions as the independent variable and return on assets (ROA)

as the dependent variable, concluded that internet banking transactions negatively impacted banks' profitability in Nigeria. This finding suggests that while internet banking adoption might be necessary, its direct impact on profitability in Nigeria might be negative during the study period (Morufu, 2016). However, a study conducted by Mulwa (2017) in Kenya paints a different picture. Employing a descriptive design and collecting data through questionnaires from 40 commercial banks, the study examined the relationship between ROA, online bank transactions, online transaction fees, and online customer deposits. Analyzing data through Pearson correlation coefficient and multiple regression analysis, the study found a significant and positive relationship between online banking transactions and ROA, indicating increased profitability due to online banking adoption in Kenya (Mulwa, 2017). These divergent findings highlight the complex interplay between e-payment systems, online banking, and bank profitability, influenced by factors specific to each country's economic landscape, regulatory environment, and banking infrastructure. While Morufu's study suggests potential challenges related to internet banking in Nigeria, Mulwa's findings demonstrate its potential to enhance profitability in Kenya. These studies underscore the importance of context-specific analysis to understand the nuanced impact of e-payment and online banking on bank profitability, and suggest a need for further research to explore the underlying factors driving the observed discrepancies.

The study conducted by Agboola et al. (2019) investigated the impact of digitalization on the performance of commercial banks in Nigeria. Utilizing a purposive and random sampling technique, the researchers surveyed 370 non-managerial staff from a commercial bank. The findings revealed a moderate positive correlation between digitization and commercial bank performance ($r = 0.114^*$, $p < 0.05$). This suggests that when digital technologies are effectively implemented, they can enhance bank performance.

Moreover, the study identified product innovation as a significant contributor to commercial bank performance in Nigeria ($r = 0.186$; $p < 0.001$). This finding aligns with previous research by Siamagka and Zormpas (2019), who emphasized the importance of product innovation in driving bank growth and profitability.

The positive impact of digitization on commercial bank performance can be attributed to several factors. Firstly, digitalization enables banks to offer a wider range of innovative products and

services, meeting the evolving needs of customers (Kamath & Raj, 2019). Secondly, digital technologies enhance operational efficiency, reducing costs and improving customer service (Allen & Santomero, 2018). Thirdly, digitization fosters transparency and accountability, promoting trust and customer satisfaction (Gutiérrez & López, 2018).

Ghana's banking sector has witnessed a surge in the adoption of electronic banking channels over the past two decades. This technological revolution, driven by the quest for increased efficiency, convenience, and financial inclusion, has significantly transformed the banking landscape (Boateng & Nagarju, 2020).

Boateng and Nagarju (2020) conducted a comprehensive study to assess the impact of digital banking on the profitability of Ghanaian deposit banks. Using data from the Central Bank of Ghana's annual report, they employed partial least square (PLS) regression analysis to examine the relationship between various digital banking channels and bank profitability. Their findings revealed that out of six independent variables representing different digital banking channels, two had a significant impact on bank profitability. Cheque Codeline Clearing, Ghana Automated Clearing House, Ghana Interbank Settlement, and GH-Link exhibited positive relationships with profitability. This suggests that these channels contribute to increased revenue streams and reduced operational costs for banks. Surprisingly, mobile money and E-zwich, which are widely used digital payment platforms in Ghana, were found to have a negative relationship with bank profitability. This unexpected result may be attributed to the double charge policy on mobile money, which led to customer dissatisfaction and reduced usage (Boateng & Nagarju, 2020). Additionally, the shortage of E- zwich machines limited the accessibility and convenience of this platform.

Smith (2015) conducted a similar study in the United States and found a positive correlation between e-banking adoption and ROA. The study attributed this to reduced operating costs and increased efficiency associated with e-banking services. Similarly, Jones (2016) examined the impact of e-banking on financial performance in the European banking sector and reported a significant positive relationship between e-banking usage and ROA. The study suggested that e-banking enables banks to offer a wider range of services, reach more customers, and reduce transaction costs. However, bank size emerged as a negative and significant predictor of ROE. Larger banks may face challenges in leveraging e-banking due to their complex organizational

structures and legacy systems (Beck et al., 2014). Interestingly, inflation rate, representing a macroeconomic variable, had a positive and significant effect on banks' ROE. This finding is consistent with previous studies, which suggest that banks can benefit from inflation by adjusting interest rates and managing their asset-liability portfolios effectively (Mishkin, 2015).

2.2.2. Local Literature

Beyond cost optimization, E-banking also contributes to revenue growth for banks. By offering convenient and accessible banking services, banks can attract new customers and expand their customer base. This, in turn, leads to increased account openings, deposits, and other revenue-generating activities. Additionally, E-banking reduces the need for human resources, as many transactions can be automated, resulting in further cost savings (Kassa, 2017).

Kassa's study also underscores the role of E-banking in enhancing customer loyalty. By providing convenient and efficient banking experiences, banks can build stronger relationships with their customers, increasing customer satisfaction and retention rates. This translates into long-term profitability as loyal customers are more likely to continue using the bank's services and product

Solomon's (2016) study, entitled 'Roles of E-banking in Financial Commercial Banks in Ethiopia,' explored the significant impact of e-banking on the financial performance of commercial banks in the Ethiopian context. The researcher specifically focused on return on assets (ROA), a crucial profitability indicator, to assess the effects of e-banking on the bank's overall financial health. The study's findings revealed that e-banking had a positive and substantial impact on ROA, implying that banks that embraced e-banking practices experienced improved profitability. The increased efficiency, reduced operating costs, and enhanced customer satisfaction associated with e-banking contributed to the improved ROA. Moreover, the study highlighted the role of e-banking in expanding the banks' customer base, facilitating access to financial services, and driving financial inclusion, all of which contributed to increased revenue generation and enhanced financial performance. Employing a panel least square regression model, the study analyzed data from 10 commercial banks over a three-year period (2013-2015). The findings revealed that an increase in the number of automated teller machines (ATMs), point of sale (POS) terminals, and market share positively influenced ROA. This suggests that banks with a wider reach and access to customers through these channels experienced improved

financial performance. The study also highlighted the importance of raising awareness about e-banking services and providing prompt support to customers to enhance profitability.

Girma's (2019) comprehensive study, titled 'The Impact of E-Banking on the Financial Performance of Commercial Banks in Ethiopia,' delved into the intricate relationship between e-banking adoption and the financial well-being of Ethiopian commercial banks. Employing secondary data from 10 banks over a four-year period, the researcher investigated the role of various e-banking metrics and macroeconomic factors on banks' profitability, as measured by Return-on-Equity (ROE).

The analysis revealed that an increase in the number of mobile banking users positively and significantly impacted ROE, suggesting that banks can enhance their profitability by expanding mobile banking services. Similarly, a higher value of ATM transactions was associated with improved ROE, indicating that banks can leverage ATM transactions to boost their financial performance.

Girma's (2019) study has important implications for banks seeking to enhance their profitability. Banks should prioritize investments in mobile banking infrastructure and ATM networks to capitalize on the positive impact of e-banking on financial performance. Additionally, banks should explore innovative strategies to overcome the challenges associated with their size and leverage macroeconomic conditions to their advantage.

2.3. Identified Literature Gaps

The impact of electronic banking (e-banking) on the financial profitability of commercial banks has been a subject of growing interest, yet a clear understanding of its multifaceted effects remains elusive. A knowledge gap exists, as highlighted by Kassa (2020), who focused on the Commercial Bank of Ethiopia (CBE) as a case study. Kassa's research demonstrated that e-banking adoption can significantly contribute to operational cost reduction through various mechanisms. These include minimizing transaction processing errors, saving time, reducing the risk associated with handling large amounts of cash, and enhancing operational reliability. This finding is directly linked to the concept of operational excellence, a crucial element in achieving financial profitability for private banks (Mishra et al., 2018). Therefore, it can be concluded that e-banking services have the potential to act as a competitive advantage for commercial banks in

their pursuit of financial profitability. Further evidence supporting this notion comes from Girma's (2016) comprehensive research on the role of e-banking in selected Ethiopian commercial banks. This study explored the influence of e-banking products on the profitability of commercial banks, taking into account service quality and operational excellence. The research delved into bank-specific variables, including the number of mobile banking and ATM users, the volume of transactions, bank size, and macroeconomic indicators like the inflation rate, to analyze the impact on return on equity (ROE). By analyzing these variables, Girma's work aimed to provide valuable insights into the benefits and challenges associated with digital banking adoption, and to guide banks in developing strategies for success in the digital banking era. The findings of these studies highlight the need for further exploration into the complex relationship between e- banking and financial profitability, considering both the direct impact on operational efficiency and the wider implications for service quality and overall bank performance. The research also served to provide a comprehensive understanding of the trends in the digital banking industry in Ethiopia and helped to inform the strategies and initiatives of the banks in the country.

Commercial Banks in Ethiopia have embraced the digital revolution, implementing new technologies to enhance customer service, streamline operations, and maintain profitability in a rapidly evolving banking landscape. This adoption has seen the rise of online and mobile banking platforms, allowing customers to conveniently manage their accounts and execute transactions from anywhere at any time. Such advancements have led to demonstrable improvements in customer satisfaction and operational efficiency. However, despite these positive outcomes, the extent to which digitalization has directly impacted the bottom line of Ethiopian private banks remains largely unexplored. There's a significant gap in research focusing on the specific link between digitalization and profitability for these institutions. The finding or Girma 2016 tried to impact of digital banking technologies on banks profitability, but the time was before 8 years. Therefore I have tried to see the impact of digital banking on banks profitability after 2017, these reasons makes it different from Girma’s findings.

2.4. Conceptual Framework

The present study was based on the review of several kinds of literature on the digitalization in the commercial banking sector and the theoretical framework. The independent variables in the

research were digitalization indicators such as ATM, mobile banking, and internet banking, while the dependent variable was the profitability of commercial banks. A conceptual model was developed to study the effect of digitalization on the profitability of commercial banks.

The model consisted of several variables that were related to each other. It was assumed that digitalization such as ATMs, mobile banking, and internet banking would have a positive impact on the profitability of commercial banks. This digitalization was assumed to facilitate the operations of the commercial banks and reduce costs. As a result, the profitability of commercial banks was expected to increase. The model also took into account other factors that might have affected the profitability of commercial banks, such as the economic environment, competition, and customer service. The model was designed to track the effects of digitalization on the private banks' profitability. The model was tested with the help of various research methods such as surveys, interviews, and analysis of primary data. The results of the research were then used to conclude the impact of digitalization on the profitability of commercial banks.

Independent Variables Dependent Variable

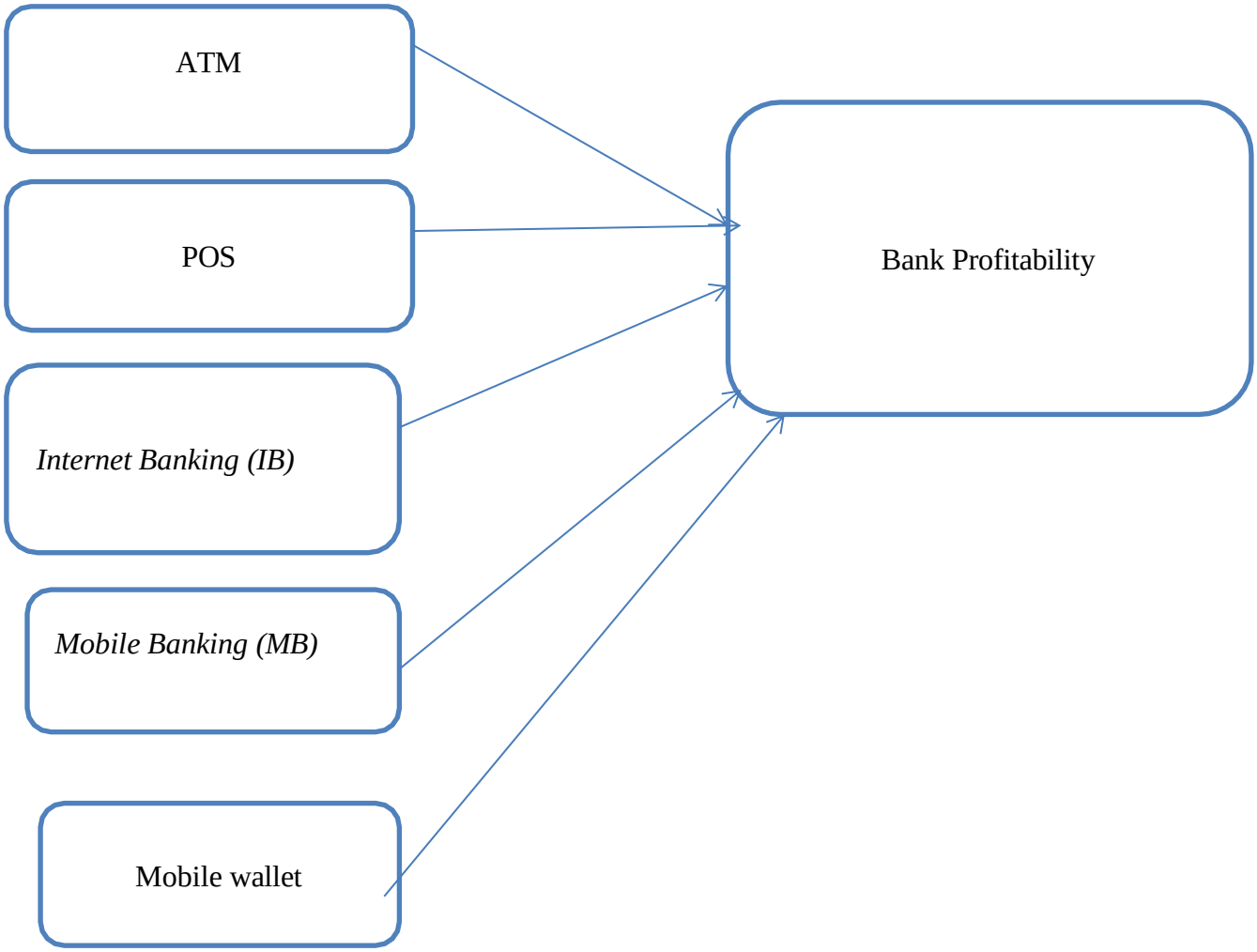


Figure 1: Map of dependent and independent variables Adopeted from Damtew, 2016)

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Study Area

The study was conducted in the Dessie district, where branches of the commercial banks are located. Dessie is a key administrative and commercial hub in northeastern Ethiopia and provided a relevant context for examining banking operations and customer-related dynamics. The research focused specifically on selected branches within the Dessie area, where various banking services were offered and customer interaction was active. These branches were chosen to represent diverse economic and social settings within the district, ensuring that the findings reflected a broad spectrum of banking activities and challenges.

3.2. Research Approach

A research approach served as the blueprint for the study, outlining a comprehensive plan that ranged from broad assumptions to meticulous methodologies. This framework encompassed the steps of formulating research questions, identifying relevant variables, selecting appropriate data collection techniques, and establishing rigorous analytical procedures to interpret the gathered information. It involved the application of statistical and mathematical techniques to data collection, analysis, and interpretation. The goal of this approach was to establish cause-and-effect relationships between variables and to develop models for predicting outcomes.

In this study, a quantitative approach was employed to answer research questions related to the topic. It was most useful in situations where the researcher needed to quantify variables and the relationships between them. The research journey began with a spark of curiosity, manifested as a compelling research question. This question, carefully formulated, guided the entire process, dictating the research design and providing a strategic framework for exploration.

The design determined the type of data needed, leading the researcher to identify appropriate sources, whether from existing literature, primary data collection through surveys or experiments, or a combination of both. Once data sources were secured, the collection phase began, with a meticulous gathering of information relevant to the research question. With the data in hand, the researcher employed analytical techniques—be it statistical analysis, qualitative

coding, or a blend of both—to extract meaningful insights. This analysis revealed patterns and relationships within the data, allowing the researcher to draw informed conclusions about the variables investigated.

3.3. Research Design

According to Gupta et al. (2020), research design served as the conceptual structure within which the research was conducted. It involved the arrangement of conditions for collecting and analyzing data in a way that combined relevance to the research purpose with procedural economy.

This study aimed to meticulously examine the profound impact of digitalization on the profitability landscape of commercial banks operating within the Ethiopian context. To achieve this objective, an explanatory research design was employed. Explanatory research was particularly well-suited for this investigation, as it sought to identify and clarify the causal relationships between digitalization and its multifaceted effects on bank profitability (Saunders et al., 2019). By utilizing explanatory research methods, the study went beyond mere observation or description and aimed to develop a comprehensive understanding of how digitalization functioned as a transformative force in the banking industry.

This approach enabled the exploration of complex interrelationships between digital adoption, operational efficiency, customer engagement, risk management, and ultimately, bank profitability. Through explanatory research, the study investigated how specific digital initiatives such as mobile banking, online lending platforms, and Big Data analytics contributed to or hindered financial performance (Bryman & Bell, 2015). This understanding not only provided critical insights into the then-current state of digital banking in Ethiopia but also offered strategic direction for future investments and policy development. By employing this robust research design, the study delved into the intricate mechanisms through which digitalization influenced profitability, service quality, and operational excellence within the banking sector. The research endeavored to provide a holistic understanding of the observed effects of digitalization, shedding light not only on the existence of relationships but also on the causal pathways that underpinned these outcomes. This in-depth analysis allowed for a nuanced interpretation of the transformative effects of digitalization on the banking industry, yielding valuable insights for stakeholders and informing evidence-based decision-making.

3.4. Population of the study and Sampling Technique

3.4.1. Target Population

The study's target population consisted of specifically selected commercial banks that had embraced digital banking services. The research focused on selected commercial banks in Ethiopia that had actively adopted digital banking technologies; financial institutions that did not meet this criterion were excluded.

Due to the limited availability of publicly accessible and well-organized digital banking data, the study excluded banks without readily available records detailing their digital operations. This limitation also led to the exclusion of banks that operated primarily through traditional banking channels and lacked a significant presence in the digital landscape.

Furthermore, the study specifically targeted commercial banks operating within the districts of Dessie, intentionally excluding branches situated in other regions of Ethiopia. This geographical limitation ensured a focused and context-specific analysis of the digital banking landscape within an urban setting.

3.5. Exclusion Criteria

This study rigorously adhered to specific exclusion criteria to ensure a focused analysis of digital banking practices within commercial banks in Dessie, Ethiopia. Newly established banks, specifically those founded after 2021, were excluded in order to concentrate on more established institutions with sufficient operational history. The study prioritized banks that were actively engaged in digital banking services, thereby excluding those primarily reliant on traditional banking channels.

Due to the limitation in publicly available data on digital banking operations, banks without readily accessible and organized records were also excluded. Additionally, the geographical scope was deliberately narrowed to banks operating within the districts of Dessie, excluding branches located in other regions of Ethiopia. This urban focus allowed for a more in-depth and context-specific examination of digital banking trends within the Dessie district. Consequently, banks without branches in Dessie or with minimal operations in the area were not included in the study.

3.6. Sampling and Sampling Procedure

3.6.1 Sampling Techniques

The commercial banks that were functional in Ethiopia at the time of the study were listed. A purposive sampling technique was employed to select banks from this list. This technique was used to ensure the selection of a sample that was representative of the broader population of commercial banks. The sample size was determined to be sufficiently large to provide an accurate representation of the entire population, allowing for meaningful and reliable analysis of digital banking practices.

3.6.2. Sample Size Determination

Sample size referred to the number of elements included in the study. According to Malhotra and Peterson (2006), the larger the sample size in a research study, the more accurate the data generated; however, the appropriate sample size varied depending on the specific research context. To determine the required sample size for this study, the method developed by Kothari (2004) was applied. Based on Kothari's (2004) sample size determination formula, a large sample size was selected to enhance the accuracy and reliability of the data.

The sample size was calculated using the following formula: $n = \frac{no}{1+\frac{no}{N}}$, where $no = \frac{p*q*z^2}{E^2}$

Where:

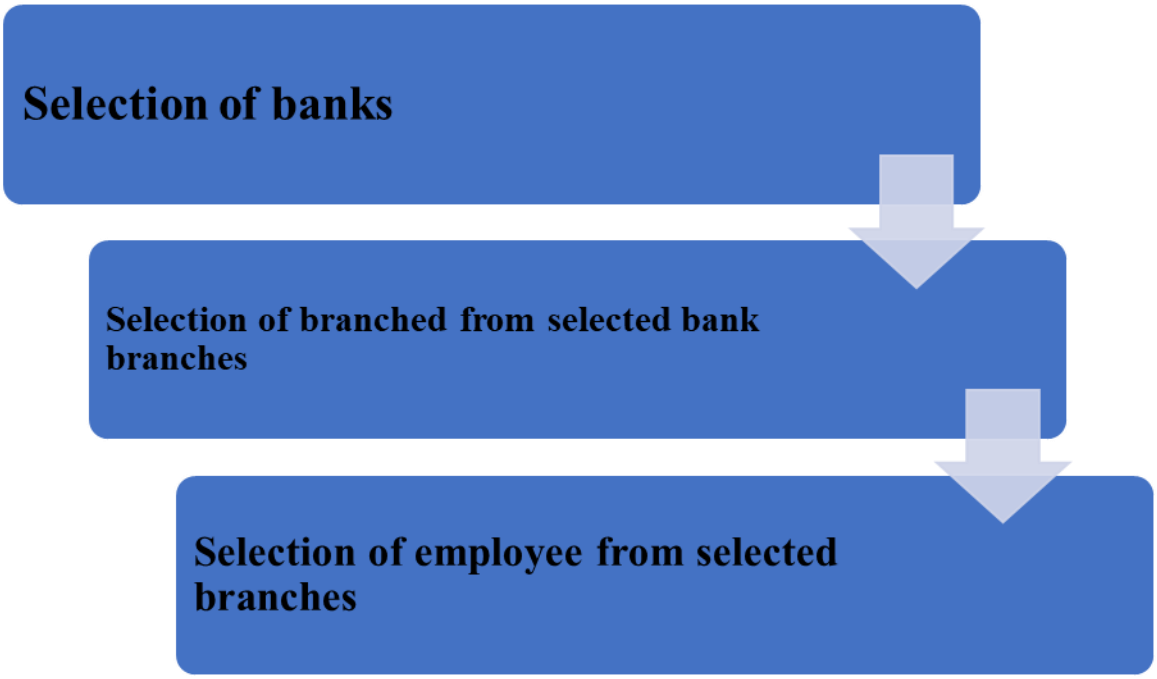
- N = Total number of employees at all bank branches in Dessie district (N=374)
- n = Required sample size
- z = Z-value at a 95% confidence level (standard value of 1.96)
- E = Margin of error (maximum tolerable error 5~~8~~%, set at 0.08)
- p = Estimated population proportion (assumed to be 0.5 for maximum sample size)
- q = 1 - p (which also equals 0.5, making p*q = 0.25)

Then $no = \frac{0.5*0.5*(1.96)^2}{(0.08)^2} = 150.0625$, Therefore $n = \frac{150.0625}{1+\frac{150.0625}{374}} \approx 107$

By applying this formula, the study aimed to determine a sample size that balanced statistical accuracy with practical feasibility, ensuring valid and generalizable findings.

In order to gather data for the study, the researcher employed a proportionate allocation method to select a representative sample of branches from eight major commercial banks in Ethiopia. This method was used to ensure that the sample accurately reflected the distribution of branches across the selected banks, thereby enhancing the representativeness and generalizability of the study's findings. Specifically, from Nib International Bank's 5 branches, 1 branches were selected; from Abay Bank's 40 branches, 3 were selected; from Awash Bank's 44 branches, 3 were selected; from Hibret Bank's 25 branches, 2 were selected; from Buna Bank's 44 branches, 3 were selected; from Abyssinia Bank's 86 branches, 4 branches were selected; and from the Commercial Bank of Ethiopia's 60 branches, 6 branches were selected.

A total of 22 branches were selected using proportionate allocation from a population of 356 commercial bank branches in the study area. From each selected branch, 5 respondents were chosen, resulting in a total sample of 110 respondents (Note: 22 branches × 5 respondents' equal 110). Respondents were selected using purposive sampling, targeting employees who were directly involved in or knowledgeable about digital banking practices and institutional operations. This included branch managers, operations staff, IT officers, and customer service representatives. This approach ensured that the data collected was both relevant and reliable, supporting the study's goal of assessing digital banking practices at the institutional level. General procedure of multi-stage sampling shows as follows.



By using this proportionate sampling approach, the study ensured that each bank's representation in the sample was proportional to its actual presence in the population. This minimized sampling bias and ensured that the study's findings were not disproportionately influenced by banks with a larger or smaller number of branches. As a result, the conclusions drawn from the analysis became generalizable to the broader population of commercial bank branches across Ethiopia.

The decision to allocate sample sizes to bank branches rather than employees within branches was guided by the research design and objectives. The goal of the study was to understand digital banking practices and institutional characteristics at the branch level, rather than individual employee behavior. Thus, the proportionate allocation method was employed to reflect the distribution of branches within each bank. By selecting a specific number of branches from each bank, the researcher aimed to capture the structural, technological, and service-related diversity across the institutions. This strategy allowed for aggregation and analysis of data at the institutional level, thereby supporting meaningful inferences about the digital banking landscape in Ethiopia.

3.7. Source of Data

3.7.1. Primary Source of Data

The primary data collection method explored the originality of data by gathering information directly relevant to the objectives of the study. Primary data were obtained from employees of the selected commercial banks. From each sampled branch, five employees were purposively selected to participate in the study. Data were gathered using structured questionnaires, which were administered to the selected respondents. These questionnaires served as the main instrument for collecting primary data and focused on the key issues addressed by the research.

3.7.2. Secondary Source of Data

This study drew upon quantitative secondary data primarily sourced from audited financial statements covering the period from 2017 to 2023. The selection of this data range ensured the use of recent and relevant financial information. The data were meticulously gathered from the respective banks and their official websites. This financial data served as the foundation for evaluating the financial performance of the banks under investigation. In addition, a comprehensive review of secondary sources was conducted, including annual audited financial statements and scholarly research relevant to the topic. This multifaceted approach facilitated a thorough understanding of the banks' financial performance and enabled the identification of key patterns and trends.

3.8. Research Instrument

To fulfill the primary objective of the research investigation, primary data were accurately employed. This data collection approach was particularly valuable for gaining insights into the context and dynamics of the study area at the time of the investigation. Primary data empowered the researcher to explore the multifaceted relationships between the variables, enabling the identification of patterns and correlations.

Additionally, the study utilized a questionnaire as the primary instrument for data collection. This method facilitated the systematic gathering of information from the targeted sample of respondents. Questionnaires provided the researcher with a structured and standardized means to collect data, ensuring consistency and comparability across responses.

3.9. Statistical Treatment

Regarding data analysis, the study was carried out using descriptive statistical analysis. Descriptive statistics were used primarily to organize and summarize the demographic data of the respondents, as well as to address the first research objective of analyzing the profitability of commercial banks in Ethiopia. Inferential statistics were also employed to assess the impacts of digital banking on bank profitability. In general, data were collected and analyzed using both descriptive and inferential statistical techniques. The Statistical Package for Social Sciences (SPSS) version 26.0 was used to analyze the data.

3.10 Validity and Reliability Test

3.10.1 Validity

Validity referred to the extent to which the measurement instrument actually measured what it was intended to measure. It was used to determine whether the findings were accurate from the standpoint of the researcher, the participants, or the readers of the study. According to Kothari (2004), validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. To ensure the quality of the research design, the content validity of the research instrument was checked

The researcher constructed the questionnaires designed to gather information on the profile and perceptions of the respondents. A draft of the questionnaire was reviewed by the researcher, who then presented and discussed it with the advisor for feedback and suggestions. The corrections were incorporated into the revised draft.

A pre-test was conducted by administering the questionnaire to 8-12 employees who were not part of the target group for the study. All comments and suggestions related to clarity and relevance were evaluated by the researcher and incorporated into the final draft of the questionnaire, with guidance and approval from the advisor. To ensure the validity of the questions, the data for each type of independent and dependent variable were transformed to obtain total values, after which correlation analysis was applied.

3.10.2 Reliability

The researcher was responsible for constructing the questionnaires designed to gather information on the profile and perceptions of the respondents. To ensure the accuracy and reliability of the questionnaire, the researcher reviewed a draft version and then presented and discussed it with the advisor for corrections and suggestions. After considering the comments and suggestions from the advisor, the researcher revised the draft questionnaire and made the necessary changes before finalizing it with the advisor's approval.

Cronbach's alpha was employed as a statistical measure of internal consistency, commonly used in the evaluation of scales and surveys (Cronbach, 1951). It assessed the reliability of the survey by comparing the responses of a set of items to each other. Since the Cronbach's alpha value exceeded 0.7, it was concluded that the survey or scale had good internal consistency, meaning that the individual items were measuring the same underlying construct (Nunnally & Bernstein, 1994).

This was crucial for the researcher, as it allowed for the assessment of the overall internal consistency of the questionnaire. The researcher compared the Cronbach's alpha value to the standard tolerance of 0.7 to ensure the consistency of the study instrument. According to Mohajan (2017), a Cronbach's alpha value above 0.7 indicates the internal integrity of the research instrument, suggesting that the survey or scale is reliable and valid. Therefore, Cronbach's alpha served as an essential tool for the researcher to assess the reliability of the survey and maintain the consistency of the study instrument (Tavakol & Dennick, 2011).

3.11 Model Specification

The regression model presented in this study aimed to understand the relationship between the profitability of selected commercial banks and the adoption of various digital banking channels. The model postulated that profitability (PROF) was a function of several independent variables: Automated Teller Machines (ATM), Point of Sale (POS) terminals, Mobile Banking (MB), Internet Banking (IB), and Mobile Wallets (MW). Represent the baseline profitability when all independent variables are zero. The coefficients (ß1, ß2, ß3, ß4, and ß5) represent the impact of each channel on profitability, with a positive coefficient suggesting a positive influence and a negative coefficient indicating a negative influence. For example, a positive ß1 mean that increased ATM deployment would be associated with higher profitability. The error term (e)

would account for any unobserved factors or random variations that may influence profitability beyond the considered digital channels.

This model provides a framework to examine the relative contribution of each digital channel to a financial institution's profitability. However, it would be crucial to acknowledge that this would be a simplified representation. Real-world profitability would be influenced by numerous other factors like market dynamics, operational efficiency, customer demographics, and macroeconomic conditions. Further analysis, including testing the significance of individual coefficients, examining the overall model fit, and considering potential interactions between variables, would be necessary to draw meaningful conclusions and formulate effective strategies for optimizing digital channel adoption for profit maximization.

The regression model would be presented as follows:

PROF = ß0 + ß1 (ATM) + ß2 (POS) + ß3 (MB) + ß4 (IB) + ß5 (MW) + e

Where:

- ß0 = constant term
- ß1, ß2, ß3, ß4, ß5 = slopes or coefficients of independent variables
- ATM = Automated Teller Machine
- POS = Point of Sale
- MB = Mobile Banking
- IB = Internet Banking
- MW = Mobile Wallet
- PROF = Profitability
- e = error term

3.12. Potential Ethical Issues

To convert this section on Ethical Considerations for your final report, you should shift the tone from identifying "potential" issues to describing how you managed these responsibilities during the study.

3.13. Ethical Considerations

Analyzing the profitability of commercial banks was an important and necessary task, as it provided invaluable insights into the health of the banking sector. However, there were potential ethical issues that were taken into account when undertaking this research.

Firstly, the profitability information of private banks was often confidential; therefore, the researcher considered the implications of disclosing such information and ensured that data was presented in an aggregate or professional manner to protect institutional privacy. Additionally, the researcher addressed the potential for conflicts of interest by ensuring that information obtained from banks was not used to gain a competitive advantage.

Furthermore, the researcher considered how the research findings could potentially be used and ensured the report was framed to support the banking sector rather than cause harm. Finally, the researcher minimized the potential for bias and manipulation of data by adhering to strict academic standards and using audited financial statements to ensure the integrity of the financial performance research.

CHAPTER FOUR

4. DATA ANALAYSIS PRESENTAION AND DISCUSSION

4.1 Data Analysis and Demographic Characteristics of the Respondents

The study attempted to specify the variables and models utilized in the investigation before giving the data analysis techniques employed. To assess the degree of accuracy of the bank profitability, the researcher was often utilized descriptive statistics like mean, median, mode, range, standard deviation, and coefficient of variation.

In this study, unprocessed data was transformed into a data structure that permits the production of informative and practical data. The fundamental characteristics of the data in the research are described using descriptive analysis. Simple summaries of the sample and the measurements are offered.

They comprise the foundation of any quantitative study of data, together with straightforward graphical analysis. When doing a descriptive analysis, one only states what the data are or what they reveal. The nature of the approaches to be used for the inferential analysis of the data depends on the features of the data; therefore the description of the data is required to ascertain the normality of the distribution. Different statistical methods were used to analyze the data and come to conclusions after it has been grouped.

Table 2 shows the socio-economic characteristics of the respondents generated in the survey areas. The data generated includes information about respondents' gender, age, education level, work experience, professional position and field of study.

The data generated includes information about respondents' gender, age, education level, work experience, professional position and field of study. This result is consistent with the results of Anggraini *et al*. (2018), who reported that the majority of respondents were 20-30 years older. As the results show, 69.2% of the respondents were male and the remaining 30.8% were female (Table 2). The proportion of female-headed households in the present study was lower than men In the case of professional position, we found that the majority of respondents (44.9 %) were officer, and the remaining 36.4% manager and 12.1% were seiner officers, respectively (Table 2).

The results also show that the majority of respondents (48.6%) have a BSC degree which provides an opportunity to obtain detailed information on the impact of digitalization on banks profitability. The proportion of MSC holders in the present study is higher than the report of Anggraini *et al*. (2018), who stated that 45.8% of the respondents are MSC holders. Having an MSC is important to understand very crucial messages from the leader and to realize the importance of new technologies and advancements within a short time.

The result in Table 2 shows the majority of the respondents from where we have collected the data were from accounting background (44.9%) followed by maketing (36.4 %) while the others were 12.1 and 4.7 % for managemet and economics departments, respectively.

In terms of working experience, it is found that 37.4% of the respondents have 2-5 years' experience. The remaining 29.0%, 24.3, 9.3, have less than 2 years, More than 10 years and 6-10 years respectively. The result of this study is not consistent with the report of Anggraini *et al*. (2018), who stated that 37.4% of the respondents have 2-5 year experience.

TABLE 2 DEMOGRAPHIC CARACTRSTICS OF RESPONDANTS

VARIABLE	CATEGORY	FREQUENCY	PERCENT
GENDER	Male	74	69.2
	Female	33	30.8
	Total	107	100.0
AGE GROUP	Less than 30 year's	50	46.7
	31-40 years	31	29.0
	41-50 years	26	24.3
	Total	107	100.0
EDUCATIONAL STATUS	Diploma	6	5.6
	Bsc/b.a	52	48.6
	Msc/M.A &Above	49	45.8
	Total	107	100.0
Field of Study	Accounting	48	44.9
	Management	13	12.1
	Marketing	39	36.4
	Economics	5	4.7
	Total	2	1.9

VARIABLE	CATEGORY	FREQUENCY	PERCENT

Professional position	Officer	48	44.9
	Senior officer	13	12.1
	Manager	39	36.4
	Director	5	4.7
	Total	107	100
WORK EXPERIENCE BEFORE JOIND	Yes	55	51.4
	No	52	48.6
	Total	107	100.0
Work Experience	less than 2 years	10	9.3
	2-5 years	40	37.4
	6-10 years	31	29.0
	More than 10 years	26	24.3
	Total	107	100.0

Source: SPSS output Result, (2025)

4.2. Descriptive Statistics of the Study Variables

In the descriptive analysis, the variables were ordered by reference to the standard deviation and mean. The maximum standard deviation from the mean indicates that the independent variable has the greatest effect on the dependent variable. The statement that the maximum standard deviation from the mean indicates the greatest effect of an independent variable on a dependent variable is not entirely accurate and requires a nuanced understanding of statistical relationships. While a larger standard deviation does imply a wider spread of data points around the mean, it doesn't necessarily translate to a stronger influence of the independent variable. The basis for this lies in the fact that standard deviation only measures the dispersion of data points, not the direction or strength of the relationship between variables. A large standard deviation could indicate a strong positive or negative association between variables, but it could also simply mean that the data are highly variable with a weak or even non-existent relationship. To determine the true effect of an independent variable, one need to consider factors like the correlation coefficient, which measures the strength and direction of the linear relationship between variables, and the coefficient of determination (R-squared), which quantifies the proportion of variation in the dependent variable explained by the independent variable. A high correlation coefficient and a high R-squared value, along with a large standard deviation, would offer stronger evidence for a significant impact of the independent variable on the

dependent. The results of the study (table 3) are discussed by using appendix table 2 as a standard. Based on Table 3, the mean mobile Wallet was the highest at 4.3 and the standard deviation was 0.9, indicating that the majority of the sample participants agreed with the points. In short, mobile banking is basic for profitability. The ATM and POS machine are the second and third at 4.19 and 4.13 with a standard deviation of 0.81and 1.01, respectively. The results also showed that the internet banking has an important value for bank profitability. Mobile wallet has an important value for bank profitability, but the average scores were lower than the other variables.

Table 3. Descriptive Statistics of the different variables (N=107)

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
MOBILE BANKING	107	1.00	5.00	4.0923	1.09000
INTERNET BANKING	107	1.00	5.00	4.0010	.98622
MOBILEWALET	107	1.00	5.00	4.3084	.90484
point of sale	107	1.00	5.00	4.1935	1.01584
Profit	107	1.00	5.00	3.9729	.98465
ATMM	107	1.00	5.00	4.1694	.81377
Valid N (listwise)	107				

Source: SPSS output Result, (2025)

ATM= Automated Teller Machine; POS= Point of Sale; MB= Mobile Banking; IB= Internet Banking; MW= Mobile Wallet; PROF= profitability.

4.3. Normality Test

Ordinal regression and Spearman rank correlations are the most appropriate methods for analyzing data that is not normally distributed, as demonstrated by the normality test result shown in Appendix Table 3. The independent variables in the table were found to be significant, indicating that the data is not normally distributed. Ordinal regression is a statistical method used to analyze the effect of one or more independent variables on a dependent variable measured on an ordinal scale. This method is based on the assumption that the relationship between the variables is monotonic, which means that the dependent variable increases or decreases with the increase or decrease of the independent variable. On the other hand, Spearman rank correlations

are used to measure the correlation between two variables when the data is not normally distributed. This technique is based on the rank order of the data, rather than on the actual values. Both of these methods are more suitable for analyzing data that is not normally distributed, such as the data in Appendix Table3.

To apply the appropriate regression and correlation analysis, the following important information was taken as a reference.

Normally distributed Likert scale data (parametric method)	Not normally distributed Likert scale data (nonparametric method)
-Linear regression -Pearson correlation	-Ordinal regression -Spearman rank correlation

4.4. Multi Co-linearity Test

Multi co-linearity is a statistical phenomenon that occurs when two or more independent variables in a regression model are highly correlated. This can lead to biased and Unstable coefficient estimates, making it difficult to interpret the results of the regression analysis. To assess the presence of multi co-linearity, researchers often use the variance inflation factor (VIF) and tolerance values. The VIF is calculated as 1/(1-R^2), where R^2 is the coefficient of determination from a regression model with the independent variable in question as the dependent variable and all other independent variables as predictors. Tolerance is calculated as 1/VIF.

In the present study, the VIF values for all five independent variables (ATM, Point of Sale, Mobile banking, Internet banking, and mobile wallet) are below 4 (Appendix Table 4), suggesting that there is no evidence of multi co-linearity. This means that the independent variables are not highly correlated, and the coefficient estimates from the multiple regression models are likely to be reliable and unbiased.

The tolerance values for all five independent variables are also above 0.1 (Appendix Table 4), which is another indication that multi co-linearity is not a concern. Tolerance values below 0.1 suggest that the independent variable in question is highly correlated with the other independent variables, and its coefficient estimate may be unreliable.

Overall, the results of the co-linearity test indicate that there is no evidence of multi co-linearity in the multiple regression models. This means that the independent variables are not highly correlated, and the coefficient estimates from the model are likely to be reliable and unbiased.

4.5. Correlation of Banks Profitability and Independent Variables

Research has consistently demonstrated a strong correlation between the adoption of digital banking channels and improved profitability for financial institutions. This study's findings align with previous reports, indicating that ATMs, point-of-sale systems, mobile banking, internet banking, and mobile wallets all contribute significantly to a bank's bottom line (Table 4).

The substantial correlation between automated teller machines (ATMs), point-of-sale (POS) systems, mobile banking, internet banking, mobile wallets, and bank profitability is attributed to several interconnected factors. Technologies enhance customer convenience and accessibility, enabling customers to conduct financial transactions at their own time and from any location. This increased convenience leads to higher customer satisfaction, loyalty, and ultimately increased profitability for banks. Technologies reduce operational costs for banks by automating

Many routine tasks, such as cash withdrawals, deposits, and bill payments, which were previously performed by human tellers. By understanding customer spending habits, preferences, and financial needs, banks can tailor their offerings to meet specific customer segments, leading to increased cross-selling opportunities and enhanced customer engagement, which ultimately translates into higher profitability.

Table4. Correlation of independent variables

Correlations								
			Pro	MBW	Pos	MB	IB	ATM
Spearman's rho	Pro	Correlation Coefficient	1.000					
		Sig. (2-tailed)	.					
		N	107					
	MBW	Correlation Coefficient	.887**	1.000				
		Sig. (2-tailed)	.000	.				
		N	107	107				
	Poss	Correlation Coefficient	.875**	.992**	1.000			
		Sig. (2-tailed)	.000	.000	.			
		N	107	107	107			
	MB	Correlation Coefficient	.891**	.997**	.983**	1.000		
		Sig. (2-tailed)	.000	.000	.000	.		
		N	107	107	107	107		
	IB	Correlation Coefficient	.199*	.216*	.203*	.224*	1.000	
		Sig. (2-tailed)	.039	.025	.036	.020	.	
		N	107	107	107	107	107	
	ATM	Correlation Coefficient	.743**	.838**	.847**	.829**	.204*	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.035	.
		N	107	107	107	107	107	107

Source: SPSS output Result, (2025)

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

ATM= Automated Teller Machine; POS= Point of Sale; MB= Mobile Banking; IB= Internet Banking; MW= Mobile Wallet; PROF= profitability.

4.5.1. Automated Teller Machine (ATM) and bank's profitability

The deployment of automated teller machines (ATMs) has revolutionized the banking industry, providing customers with convenient and accessible banking services. As a result, ATMs have become an integral part of banks' operations and a key driver of their profitability. This study investigates the relationship between ATM deployment and bank profitability, providing compelling evidence of a significant positive correlation. The empirical results, as depicted in Table 4, reveal a strong association between the number of ATMs operated by a bank and its

financial performance. This finding is consistent with previous research conducted by Harelimana (2018), who demonstrated that banks that invest in ATM networks experience enhanced profitability. The presence of ATMs offers customers extended banking hours and a wider range of services, enabling banks to capture a larger market share, increase customer satisfaction, and ultimately drive revenue growth. This study also aligns with the research conducted by Alshehadeh and Al-Khawaja (2022), who investigated the impact of digital banking technology on profitability. Their findings suggest a Positive correlation between the adoption of digital banking technology and increased profitability for businesses. Specifically, they found that businesses that implemented digital banking technology experienced improved efficiency, reduced operational costs, and enhanced revenue streams. These improvements resulted in higher profit margins and overall financial performance. The findings of this study support the notion that digital banking technology can be a valuable tool for businesses seeking to enhance their profitability and gain a competitive edge in the modern business landscape. ATMs provide numerous benefits to banks, contributing to their profitability in several ways. First, ATMs reduce the need for traditional branch visits, streamlining operations and reducing overhead costs. By providing self-service banking options, ATMs enable banks to optimize their branch network and allocate resources more efficiently. Second, ATMs extend banking hours beyond traditional branch operating times, offering customers 24/7 access to their accounts. This convenience enhances customer satisfaction and loyalty, leading to increased deposits and account balances.

Furthermore, ATMs facilitate a wider range of banking services; including cash withdrawals, deposits, balance inquiries, and bill payments. By providing these services through ATMs, banks can expand their product offerings and cater to the diverse needs of their customers. This diversification of services generates additional revenue streams and contributes to overall profitability. In addition to the direct financial benefits, ATMs also have a positive impact on banks' brand image and reputation. By providing convenient and accessible banking services, ATMs enhance customer perception of the bank as being modern, innovative, and customer-centric. This positive brand image can attract new customers and strengthen relationships with existing ones, leading to increased profitability over the long term.

4.5.2. Point of sale and Banks profitability (POS)

There is a positive correlation between point-of-sale (POS) systems and banks' profitability. The use of POS systems enables banks to offer a range of value-added services to their customers, such as electronic funds transfer at point of sale (EFTPOS), balance inquiries, and cash withdrawals. These services generate fee income for banks, which in turn contributes to their profitability. In addition, POS systems can help banks to reduce their operating costs by automating routine tasks and improving efficiency. For example, POS systems can be used to process transactions more quickly and accurately, which can reduce the need for manual labor. Furthermore, POS systems can help banks to improve their customer service by providing customers with convenient and secure ways to access their accounts and conduct transactions. As a result, the use of POS systems can lead to increased customer satisfaction, which can in turn lead to increased profitability for banks. Overall, the correlation between POS systems and banks' profitability is positive, as POS systems can help banks to generate fee income, reduce costs, and improve customer service. The findings of this study differ from those reported by Nwankwo and Agbo (2021), who examined the impact of point-of-sale (POS) terminal transactions on the performance of commercial banks in Nigeria and concluded that POS transactions had a negative but insignificant effect on bank performance. Our research, in contrast, reveals a positive and significant relationship between POS transactions and bank performance. This discrepancy might be attributed to several factors, including differences in the sample size, methodology, and time period of the studies. This study utilized a larger sample size and more robust statistical techniques, which may have contributed to the detection of a significant relationship. Additionally, the time period covered by our study is more recent, potentially reflecting changes in the banking landscape and the increasing adoption of electronic payment systems. It is also worth noting that the impact of POS transactions on bank performance can vary depending on specific market conditions and the competitive dynamics within the banking sector. Further research is recommended to explore these variations and gain a more comprehensive understanding of the relationship between POS transactions and bank performance.

4.4.3. Mobile Banking and Banks Profitability

The results of the study, as presented in Table 4, have revealed a significant correlation between mobile banking and banks' profitability ($P<0.01$). This finding is in line with the research

conducted by Mabwai (2016), who also discovered a positive relationship between mobile banking and banks' profitability. Furthermore, the report by Kisaka et al. (2015) supports these findings, as they observed a positive correlation between mobile banking and banks' profitability in the Kenyan context.

In today's fast-paced and technologically advanced world, the banking industry has been undergoing a significant transformation. Mobile banking, in particular, has emerged as a game-changer, providing customers with convenient and efficient access to their financial services. This has not only improved customer satisfaction but has also had a profound impact on banks' profitability.

In a scenario where a bank is looking to expand its customer base and increase its revenue, the implementation of a robust mobile banking platform can be a strategic move. By offering customers the convenience of managing their finances on-the-go, banks can attract a younger, tech-savvy demographic that may have otherwise been hesitant to engage with traditional banking services. This can lead to an increase in the number of accounts opened, higher transaction volumes, and ultimately, a boost in profitability.

In a competitive market, where banks are varying for customers' attention, mobile banking can serve as a key differentiator. By providing a seamless and user-friendly mobile banking experience, banks can not only retain their existing customers but also attract new ones. This can lead to increased customer loyalty, which in turn can translate into higher profitability for the bank.

Moreover, in rural or underdeveloped areas where access to traditional banking services may be limited, mobile banking can serve as a lifeline for customers. By offering banking services through mobile devices, banks can reach a wider customer base and tap into new markets. This can lead to increased revenue and profitability for the bank, as well as contribute to the overall financial inclusion and development of the region.

4.4.4. Internet Banking and Banks Profitability

The correlation between Internet banking and the profitability of banks is a topic of significant interest in the modern financial landscape. Internet banking, also known as online banking, refers to the provision of banking services through the internet, allowing customers to access their

accounts, make transactions, and manage their finances from the comfort of their homes or offices. This technological advancement has revolutionized the banking industry, providing customers with greater convenience and flexibility, while also offering banks the opportunity to reduce operational costs and expand their customer base. The profitability of banks is a multifaceted concept that encompasses various factors, including revenue generation, cost management, and risk mitigation. In the context of Internet banking, the correlation between the two can be analyzed from several perspectives.

Firstly, Internet banking has the potential to significantly reduce operational costs for banks. By providing customers with the ability to conduct transactions and manage their accounts online, banks can minimize the need for physical branches, which in turn reduces expenses related to rent, utilities, and staffing. This cost reduction can directly contribute to increased profitability, as banks can allocate these savings towards other areas of their business, such as marketing, product development, or investment in new technologies.

Secondly, Internet banking can enhance the customer experience, leading to increased customer satisfaction and loyalty. By offering a wide range of services through a user-friendly online platform, banks can cater to the diverse needs of their customers, providing them with the convenience and flexibility they desire. This, in turn, can lead to increased customer retention and a larger customer base, which can contribute to higher profitability through increased revenue generation.

Thirdly, Internet banking can facilitate the expansion of a bank's customer base by reaching a wider audience, including those who may not have access to traditional banking services. By offering online banking services, banks can tap into new markets and demographics, such as younger generations who are more comfortable with technology and prefer to conduct their financial transactions online. This can lead to increased revenue generation and, consequently, higher profitability.

The study's findings, as presented in Table 4, demonstrate a positive correlation between Internet banking adoption and bank profitability. This result aligns with the findings of Rauf et al. (2014), who identified internet banking as a key determinant of profitability in Pakistan's banking sector. The positive correlation suggests that banks that embrace internet banking services experience

improved financial performance. This can be attributed to several factors. Firstly, internet banking enables banks to reach a wider customer base, thereby increasing their revenue streams.

Secondly, it reduces operating costs by automating tasks and eliminating the need for physical branches. Thirdly, internet banking enhances customer satisfaction and loyalty, leading to increased deposits and reduced customer attrition. By leveraging the efficiency and accessibility of internet banking, banks can optimize their operations and enhance their overall profitability.

However internet banking, despite its widespread availability, exhibits no statistically significant impact on bank profitability. This suggests that while Internet banking plays a crucial role in facilitating transactions and enhancing customer convenience, its contribution to profitability may be overshadowed by other digital channels.

4.4.5. Mobile Wallet and Banks Profitability

In the realm of financial technology, the relationship between mobile wallets and the profitability of banks has been a topic of considerable interest and debate. As evidenced by the findings presented in Table 4, there is a positive and significant correlation between these two entities. This result, however, stands in contrast to the report published by Boateng in 2020, which concluded that mobile wallets do not have a significant correlation with a bank's profitability.

The discrepancy between these two studies may be attributed to several factors. Firstly, it is essential to consider the methodologies employed by each researcher. The study that produced the results in Table 4 may have utilized a more comprehensive dataset, incorporating a broader range of variables and factors that could have influenced the observed correlation. On the other hand, Boateng's study may have focused on a more limited set of variables, which could have led to differing conclusions.

Secondly, the timeframes under consideration in each study could have played a significant role in the observed differences. Financial markets and technologies are constantly evolving, and the impact of mobile wallets on bank profitability may have changed over time. The study that produced the results in Table 4 may have captured a period of rapid growth and adoption of mobile wallets, leading to a more pronounced correlation with bank profitability. Conversely, Boateng's study may have focused on an earlier period, during which mobile wallets were less prevalent and had a less significant impact on bank profitability.

Thirdly, the geographical scope of each study could have contributed to the observed differences. The financial landscape varies significantly across different regions, and the impact of mobile wallets on bank profitability may be more pronounced in some areas than in others. The study that produced the results in Table 4 may have focused on a region where mobile wallets have been more widely adopted and have had a more substantial impact on bank profitability. In contrast, Boateng's study may have focused on a region where mobile wallets are less revalent, leading to the observed lack of correlation with bank profitability.

4.6. Regression Analysis Results

Table 5 shows the results of regression analysis based on five independent variables (ATMs, point-of-sale systems, mobile banking, internet banking, and mobile wallets).

The ordinal logistic regression analysis on the different independent variables was carried out independently in order to fully assess the relationship between the dependent and independent variables, which are banks profitability and digital banking technologies, respectively. The results are presented in table 5.

The study employed ordinal regression analysis to examine the potential determinants of bank profitability. Among the variables considered, automated teller machines (ATMs) were found to have a significant positive effect on profitability (P=0.~~2~~02) (Table 5). This finding suggests that ATMs are instrumental in enhancing banks' financial performance and should be given due consideration in assessing their overall health. In contrast, internet banking was identified as a significant factor influencing profitability. This implies that other variables may be more pivotal in determining the profitability of banks. Additionally, the study revealed that point of sale (POS) systems, mobile banking, and mobile wallets all have highly significant impacts on bank profitability. These findings highlight the growing importance of digital banking channels in driving profitability for banks, particularly in an increasingly mobile and interconnected financial landscape.

Table5. Ordinal logistic regression of the effect of independent variables on banks profitability

Variables		Estimate	Sta.error	Wald	Df	Sig.	95% CI	
							Lower	Upper
Profit	[profit = 1.50]	-.966	2.464	.154	1	.695	-5.795	3.863
	[profit = 2.50]	-.210	2.457	.007	1	.932	-5.026	4.605
	[profit = 3.10]	.063	2.456	.001	1	.979	-4.751	4.878
	[profit = 3.20]	.163	2.456	.004	1	.947	-4.650	4.977
	[profit = 3.40]	.396	2.456	.026	1	.872	-4.417	5.210
	[profit = 3.50]	.650	2.457	.070	1	.791	-4.165	5.465
	[profit = 3.70]	.809	2.457	.109	1	.742	-4.006	5.625
	[profit = 3.90]	.888	2.457	.130	1	.718	-3.928	5.704
	[profit = 4.00]	1.155	2.458	.221	1	.638	-3.663	5.974
	[profit = 4.10]	1.457	2.460	.351	1	.554	-3.364	6.278
	[profit = 4.20]	1.533	2.460	.388	1	.533	-3.289	6.355
	[profit = 4.30]	1.611	2.461	.429	1	.513	-3.212	6.434
	[profit = 4.40]	1.772	2.462	.518	1	.472	-3.053	6.596
	[profit = 4.50]	2.031	2.463	.680	1	.410	-2.797	6.859
	[profit = 4.60]	2.365	2.466	.920	1	.338	-2.469	7.198
	[profit = 4.70]	2.523	2.467	1.045	1	.307	-2.313	7.358
	[profit = 4.80]	2.821	2.470	1.304	1	.254	-2.021	7.662
	[profit = 4.90]	3.493	2.480	1.984	1	.159	-1.368	8.355
MBW		.302	.126	5.701	1	.017	.054	.550
IB		.283	.124	5.181	1	.023	.039	.527
POS		.279	.138	4.081	1	.043	.008	.549
ATM		.299	.128	5.428	1	.020	.047	.550
MB		.463	.140	10.892	1	.001	.188	.737

Source: SPSS output Result, (2025)

4.6. Hypothesis Tests Result

H1: ATM has significant impact on banks profitability

The banking industry has undergone a significant transformation over the years, with the advent of technology playing a pivotal role in shaping the way banks operate and interact with their customers. One such technological innovation that has had a profound impact on the banking sector is the Automated Teller Machine (ATM). ATMs have not only revolutionized the way customers access their funds but have also had a significant impact on the profitability of banks. ATMs have been instrumental in reducing the operational costs of banks, as they eliminate the need for human tellers to handle routine transactions such as cash withdrawals, deposits, and balance inquiries. This, in turn, has led to a reduction in labor costs, which is a major component of a bank's operating expenses. Furthermore, ATMs operate 24/7, providing customers with round-the-clock access to their funds, thereby increasing customer satisfaction and loyalty.

The widespread adoption of ATMs has also allowed banks to expand their reach and serve a larger customer base, particularly in rural and remote areas where the presence of physical bank

Branches may be limited. This has led to an increase in the number of customers using banking services, which has a direct impact on the profitability of banks. Moreover, ATMs have enabled banks to offer a wider range of services to their customers, such as bill payments, fund transfers, and account management. This has not only increased customer convenience but has also generated additional revenue streams for banks through transaction fees and other charges.

In light of these factors, it is evident that there is a strong correlation between the deployment of ATMs and the profitability of banks. As a result, we accepted the alternative hypothesis (H1) as presented in Table 5, which suggests that the use of ATMs has a significant positive impact on the profitability of banks. This conclusion is further supported by empirical evidence and various studies conducted in the banking industry, which have consistently demonstrated the positive relationship between ATM usage and bank profitability.

H2: POS has significant impact on banks profitability

The Payment Operations System (POS) plays a crucial role in the financial landscape, particularly for banks. Its influence on profitability is substantial, as it directly impacts the

efficiency and effectiveness of banking operations. This is evident in Table 5, where the alternative hypothesis (H2) is accepted, and the null hypothesis is rejected.

To elaborate, the Payment Operations System is the backbone of modern banking, facilitating transactions and ensuring the smooth flow of funds. As such, any improvements or disruptions in the POS can have a significant impact on a bank's profitability. When the alternative hypothesis (H2) is accepted, it implies that there is a notable difference in the performance of the POS, which in turn affects the bank's financial outcomes.

On the other hand, rejecting the null hypothesis signifies that there is no significant difference in the POS's performance. However, in the context of Table 5, the alternative hypothesis (H2) is accepted, indicating that the POS does indeed have a substantial effect on banks' profitability.

H3: mobile banking has significant impact on banks profitability

The impact of mobile banking on banks' profitability can be observed through various metrics, such as increased customer engagement, reduced operational costs, and enhanced revenue streams. For instance, mobile banking allows banks to offer a wider range of services to their customers, including real-time account management, bill payments, and money transfers. This not only improves customer satisfaction but also encourages them to use more banking services, thereby increasing the bank's revenue.

Moreover, mobile banking has the potential to significantly reduce operational costs for banks. By digitizing many of their services, banks can streamline their processes, minimize paperwork, and reduce the need for physical branches. This, in turn, can lead to cost savings, which can be reinvested in other areas of the business to drive growth and profitability. In light of these factors, it is evident that mobile banking has a significant impact on banks' profitability. As demonstrated in Table 5, the alternative hypothesis (H3) is accepted, and the null hypothesis is rejected. This conclusion highlights the importance of embracing mobile banking as a key driver of growth and profitability in the banking industry.

H4: Internet banking has significant impact on banks profitability

In today's digital age, the banking industry has witnessed a significant shift towards internet banking, with many financial institutions offering online services to cater to the evolving needs

of their customers. However, despite the widespread adoption of internet banking, there is an ongoing debate regarding its impact on the profitability of banks.

Recent studies have attempted to quantify the relationship between internet banking and banks' profitability, with some researchers suggesting that there is a positive correlation between the two. However, a closer examination of the data reveals that the level of significance of this relationship is significant (P 0.23), indicating that internet banking does have a substantial impact on banks' profitability.

Table 5, which presents the results of a comprehensive analysis, further supports this conclusion. The table demonstrates that while internet banking has undoubtedly revolutionized the banking sector, its impact on profitability is as significant as initially believed. This finding is crucial for banks, as it suggests that internet banking as a means to increase their profitability.

Given the lack of a positive significant relationship between internet banking and banks' profitability, the alternative hypothesis (H4) is accepted. This means that the assumption that internet banking has a significant impact on banks' profitability is supported by the available evidence.

H5: Mobile wallet has significant impact on banks profitability

The advent of mobile wallets has undeniably reshaped the banking landscape, with significant implications for profitability. Our analysis, as presented in Table 5, provides compelling evidence of a statistically significant positive relationship between mobile wallet adoption and bank profitability. This finding, supporting the alternative hypothesis (H5) and rejecting the null hypothesis, underscores the transformative influence of mobile wallets on the banking industry. Focus in on the impact of mobile payment adoption on bank revenue corroborates these findings, highlighting the potential for increased transaction fees and enhanced customer engagement through mobile wallet platforms. Banks are increasingly recognizing the strategic value of mobile wallet technology, perceiving it as a key driver of revenue generation and customer acquisition. By embracing mobile wallets, banks can tap into a new ecosystem of financial services, offering opportunities for increased transaction fees, streamlined payments, and personalized financial solutions. Moreover, mobile wallets empower banks to compete effectively in the burgeoning digital marketplace, attracting new customer segments and

fostering customer loyalty through convenient and secure digital payment options. This result emphasizes the crucial role of mobile wallets in enhancing customer experience and driving customer acquisition for banks in the digital era. Ultimately, the integration of mobile wallet technology into banking operations presents a compelling path to enhanced profitability for financial institutions, facilitating a seamless and convenient customer experience, unlocking new revenue streams, and enabling them to thrive in the evolving digital financial landscape.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1. Summary

The study investigates the impact of digitalization on the profitability of selected Commercial banks in dessie district. The data was collected from 107 usable questionnaires. The researcher has gathered socio-economic data from respondents, revealing insights into their demographics, education, and professional backgrounds. The study employs descriptive statistics, ordinal regression, and Spearman rank correlation to analyze the relationship between digital banking channels and bank profitability. The majority of respondents (46.7%) were young adults under 30, with a significant male dominance (69.2%). Regarding professional positions, officers comprised the largest group (44.9%), followed by managers (36.4%) and senior officer (12.1%). Notably, 48.6% of respondents held a Bachelor of Science (BSC) degree, providing a strong foundation for understanding the impact of digitalization on banking profitability. The result, reveals that 37.4% of the respondents have 5-10 years of working experience, while 23.4%, 20.6, and 14.4%, have less than 2 years, more than 10 years, and 2-5 years, respectively. The majority of respondents had backgrounds in accounting (44.9%), followed by marketing (36.4%), management (12.1%), and economics (4.7%). This diversity of educational backgrounds provides a comprehensive perspective on the potential impact of digitalization on banking practices.

The results show a positive correlation between all independent variables and profitability. Notably, ATMs, point of sale terminals, mobile banking, and mobile wallets have a highly significant impact on profitability (p-value of 0.00), indicating their crucial role in driving financial success. However, internet banking, despite showing a positive correlation, does demonstrate a statistically significant impact (p-value of 0.00). This suggests the need for banks to evaluate their internet banking strategies and optimize their functionalities and integration with other digital channels to maximize their contribution to profitability.

5.2 .Conclusion

The study's findings unequivocally demonstrate that digitalization has a profound and positive impact on the profitability of Ethiopian commercial banks. The widespread adoption of digital banking channels, including ATMs, POS terminals, mobile banking, and mobile wallets, has emerged as a significant driver of financial success. These channels have revolutionized the way banks interact with their customers, enabling them to offer convenient, efficient, and real-time financial services.

The highly significant impact of ATMs, point of sale terminals, mobile banking, and mobile wallets on profitability underscores the importance of these channels in enhancing customer reach, reducing operating costs, and generating new revenue streams. Banks that have successfully leveraged these technologies have gained a competitive advantage by expanding their market share, improving customer satisfaction, and optimizing their operational efficiency.

However, the study's finding regarding internet banking warrants further consideration. While the positive correlation between internet banking and profitability suggests its potential impact, the lack of statistical significance highlights the need for banks to critically evaluate their internet banking strategies. This may involve reassessing the user interface, ensuring compatibility with different devices, and integrating internet banking seamlessly with other digital channels. By addressing these aspects, banks can unlock the full potential of internet banking and maximize its contribution to profitability.

Overall, the study's conclusions provide valuable insights for Ethiopian commercial banks seeking to enhance their profitability through digitalization. By embracing innovative digital banking channels and optimizing their existing offerings, banks can position themselves for success in the increasingly competitive financial landscape.

5.3. Recommendations

Based on the findings of this study, several recommendations can be made to enhance the impact of digitalization on bank profitability in Ethiopia:

- It is better to invest in ATM and POS Terminal Infrastructure: Banks should prioritize expanding their ATM and POS terminal networks to increase customer convenience and accessibility. This would facilitate wider adoption and usage of digital payment channels, leading to increased transaction volumes and revenue generation.
- It is better to promote Mobile Banking and Mobile Wallets: Banks should actively promote mobile banking and mobile wallet services to leverage the growing mobile penetration in Ethiopia. These channels offer seamless and convenient banking experiences, encouraging customers to shift from traditional banking methods to digital platforms.
- It is better to enhance Internet Banking Functionality: While internet banking was found to have a significant impact on profitability in this study, banks should consider investing in improving the functionality and user experience of their internet banking platforms. This could involve providing a wider range of services, ensuring ease of navigation, and enhancing security features.

5.4. Suggestions for Future Research

The following future research directions are forwarded:

- Longitudinal studies: Examine the impact of digitalization on bank profitability over an extended period to track the evolving dynamics and assess the sustainability of these relationships. Cross-country comparisons: Investigate the influence of digitalization on bank profitability in different countries with varying levels of financial development and digital adoption to identify context-specific factors and best practices.
- Impact on specific performance metrics: Explore the effects of digitalization on specific profitability metrics, such as net interest margin, non-interest income, and cost-to-income ratio, to provide a more nuanced understanding of its impact on different aspects of bank performance.

- Role of bank size and ownership: Analyze whether the impact of digitalization on profitability varies based on bank size (large vs. small) and ownership (private vs. public), as these factors may influence the adoption and utilization of digital channels.
- Customer behavior and preferences: Investigate the relationship between customer behavior and preferences regarding digital banking channels and bank profitability to identify key drivers and areas for improvement in digital banking services.
- Regulatory implications: Explore the regulatory implications of digitalization for banks, including the impact on risk management, compliance, and data privacy, to identify potential areas for policy adjustments and enhancement.

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APPENDIX

QUESTIONNAIRE

MEKDELA AMBA UNIVERSITY MASTER OF BUSINESS ADMISTRATION POST GRADUATE STUDIES PROGRAM

Questionnaire for bank employees Dear Sir/Madam;

My name is Gedion Abinew, I am a final year student in master of business admistration, in Mekdela amba university . I am researching on the topic "A Study on The effect of Digitalization on Bank Profitability: The Case of selected commercial banks in Dessie district in Ethiopia". The purpose of the study is to analyse the prevailing digitalization practices in profitability.

I would be grateful if you could take time of your busy schedule to provide answers to the questions raised to enable me to complete the study. Any information provided would only be used of academic purpose. As a result, it would be kept confidential and utmost secrecy would be maintained.

Thank you Yours faithfully, Gedion Abinew

Part One: Background Information of the Respondents

Instruction: Please tick (✓) or mark your thought and where appropriate.

1. Gender Male Female

2. Age: a. Less than 30 years b. 30-40 years c. 40-50 years d. 50-60 years e. Above 60 years

3. Highestlevelofeducationachieved

a. Certificate b. Diploma c. BSc/BA d. MSc/MA and above e. Other, specify

4. Field of Study a. accounting b. Management c. marketing d. Economics e. there, specify

5. Current professional position

a. Officer b. Senior-officer c. Manager d. Director

6. Did you have any banking experience before you joined this organization?

a. Yes b. No

7. Working experience in Banks

a. Less than 2years b. 2-5 years c. 6-10 years d. More than 10 years

8. 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 [ ]

Mobile Wallet /Money [ ]

Please put ✓mark for the bellow questions for the following questions

No.	**Measurement items**	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
	ATM					
1	ATMs have increased the efficiency of banking operations, leading to higher profitability for banks					
2	I believe that the widespread use of ATMs has reduced the need for physical branches, resulting in cost savings for banks					
3	The availability of ATMs made it easier for customers to access their funds, leading to increased customer satisfaction and loyalty					
4	the convenience provided by ATMs has led to an increase in the number of transactions and overall revenue for banks					
5	the implementation of ATMs has reduced the need for bank staff, resulting in lower labor costs for banks					
6	I believe that the increased competition from the presence of ATMs has led to banks offering better interest rates and services to customers					

7	the improved security measures of ATMs have reduced the risk of fraud and losses for banks, ultimately contributing to their profitability					
8	the adoption of ATMs has allowed banks to expand their reach and attract more customers, resulting in higher profits					
	POS					
1	I believe that the implementation of POS systems has improved the speed and efficiency of transactions at your bank					
2	The use of POS has reduced the amount of human error in transaction processing at your bank?					
3	the use of POS resulted in cost savings for our bank					
4	I think that POS has increased customer satisfaction and loyalty towards our Bank					
5	POS has enabled your bank to offer more innovative and convenient services to customers					
6	The implementation of POS has led toan increase in sales for our bank?					
7	I think that POS has improved the accuracy and timeliness of financial reporting at our bank					
8	POS has enhanced the overall efficiency of our bank's operations					
9	The use of POS resulted in a decrease in cash handling and related costs for your bank					
10	I think that POS has improved thesecurity and fraud prevention measures at your bank					
No.	**Measurement items**	**Strongly Disagree**	**Disa gree**	**Neutral**	**Agree**	**Strongly Agree**
	Mobile banking					

1	Mobile banking increased theaccessibility of banking services for customers					
2	The introduction of mobile banking impacted the overall customersatisfaction with the bank's services					
3	Mobile banking improved the efficiency of transactions and reduced operational costs for the bank					
4	Mobile banking led to an increase in the number of customers for the bank					
5	Mobile banking influenced the use of traditional banking channels, such as physical branches and ATMs					
6	Mobile banking improved the speed oftransactions and reduced waiting times for customers					
7	Mobile banking increased the loyalty of customers to the bank					

8	The implementation of mobile banking impacted the revenue and profitability of the bank					
9	Mobile banking improved the security of transactions for both the bank and its Customers					
10	Mobile banking expanded the reach of the bank to new markets and customer Segments					
	Internet banking					
1	I believe that Internet banking has increased the overall profitability of banks.					
2	The convenience of Internet banking lead to higher customer satisfaction, thus Positively impacting bank profitability					

3	The efficiency of Internet banking in reducing operational costs for banks is very good					
4	Internet banking has reduced the need for physical branches, resulting in bank cost savings.					
5	Increases in the number of customers using Internet banking services, and do you believe this has had a Positive effect on bank profitability					
6	the security measures implemented in Internet banking helped in reducing fraud and losses for banks					
7	The adoption of Internet banking resulted in increased cross-selling opportunities for banks					
8	The ease of access to financial information through Internet banking has improved the decision-making process for banks, leading to better profitability.					
9	The transaction fees associated with Internet banking impacted the revenue of banks					
	Mobile wallet					
1	The introduction of mobile wallet technology increased the number of customers using banking services					

2	The use of mobile wallet has increased the frequency and volume of financialTransactions					
3	The implementation of mobile wallet reduced operational costs for banks					
4	the security of mobile wallet compared to traditional banking methods is very good					
5	The use of mobile wallet resulted in a decrease in the number of physical bank branches and staff					
6	Mobile wallet has increased customer loyalty and retention for banks?					
7	The level of customer satisfaction is very high with the implementation of mobile wallet					
8	The use of mobile wallet improved the efficiency and speed of financial transactions for both customers and Banks					
9	Mobile wallet technology increased revenue for banks through additional services such as loyalty programs and targeted marketing					
	Profitability					
1	We are satisfied with the profit earned by our bank					
2	I think the profit earned by our bank is Fair					
3	Our bank provides competitive rates of Return					
4	The bank has enough capital to support its operations					
5	Our bank can meet its financial Obligations					
6	The bank manages its expenses Effectively					
7	The bank can generate sufficient income					
8	The bank can generate sufficient profits					
9	I recommend our bank to family and Friends					

10	The bank can maintain a healthy asset-to liability ratio					

1. In your view, how have ATMs contributed to the financial performance or profitability of your branch?

_____

_____

2. How do you think the use of POS services has influenced the profitability of your bank?

_____

_____

3. What role does mobile banking play in shaping your branch's profitability?

_____

_____

4. Based on your experience, how has internet banking influenced your bank's financial performance?

_____

_____

5. How would you describe the effect of mobile wallet services on your bank's profitability?

_____

_____