SCHOOL OF GRADUATE STUDIES

EFFECTS OF DIGITAL BANKING SYSTEM ON BANKS PERFORMANCE: A COMPARATIVE STUDY ON PUBLIC & PRIVATE COMMERCIAL BANKS

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MAY, 2025

WOLKITE, ETHIOPIA

WOLKITE UNIVERSITY

SCHOOL OF GRADUATE STUDIES

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A THESIS SUBMITED TO SCHOOL OF GRADUATE STUDIES, IN PARTIAL FULFILMENT OF THE REQURMENTS FOR THE DEGREE OF MASTER OF ARTS IN BUSINSS ADMINISTRATION (MBA)

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MAY, 2025

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Declaration

I, Abebe Fekede, hereby declare that this MBA thesis entitled "effects of digital banking system on banks performance: a comparative study on public & private commercial banks' 'is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis have been properly acknowledged. This thesis has been carried out by me under the guidance and supervision of Abas Mohammed (Ph.D.).

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Abebe Fekede Signature ……. Date ……..

Advisors Approval Sheet

This is to certify that the thesis entitled "effects of digital banking system on banks performance: a comparative study on public & private commercial banks." submitted in partial fulfillment of the requirements for the degree of Master of art in Business Administration (MBA), the Graduate Program of the school of graduate study, and has been carried out by Abebe Fekede Id. No 001/15 under my supervision. Therefore, I recommend that he has fulfilled the requirements and hence hereby can submit the thesis to the Management.

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EXAMINERS APPROVAL SHEET

We, the undersigned, members of the Board of Examiners of the final open defense by Abebe Fekede have read and evaluated her thesis entitled “Effects of Digital Banking System on Banks Performance: A Comparative Study on Public & Private Commercial Banks”, and examined the candidate. This is, therefore, to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree Master of art in Business Administration (MBA).

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SGS Approval	Signature	Date

Final Approval and acceptance of the thesis is contingent upon the submission of the final copy of the thesis to the School of Graduate Studies (SGS) through the School Graduate Committee (DGC/SGC) of the candidate’s department.

Acknowledgement

Above all, my deepest Gratitude goes to the Almighty God for giving me the ability and all those exertions to complete this study. Next, I would like to extend my deepest indebtedness to my advisor Abas Mohammed (Ph.D.) for his heartfelt support from the very beginning up to the final writing of report. He sacrificed his precious time, forwarded positive criticism, suggestions, valuable guidance and comments, my debts are innumerable.

List of acronyms

ATM:- Automated teller machine

CBE:- Commercial bank of Ethiopia

IB:- Internet banking

MB:- Mobile banking

Posm:- Pos machine

ROA:- Return on asset

ROE:- Return on equity

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ABSTRACT

The banking industry in Ethiopia is now booming due to the allowed free competition, a total of thirty two banks are now licensed to give financial services in Ethiopia and the competition is becoming intensive so that banks are now trying to achieve competitive advantage by differentiating their service quality like digitalization. In this study, an attempt was made to assess and compare the similarities and differences of private and public banks by using primary data comparative performance as perceived by head office employee of each selected banks in terms ATM, pos machine, mobile banking money transfer and internet banking of digital was used to meet the objective of the study. The data were collected using close ended questionnaires with a sample of 178 respondents were taken using simple random sampling technique from head office employee of selected bank. The secondary data was collected in central bank. The collected data from the employee was analyzed using descriptive and inferential statistical tools like mean, T-tes and panel regression of the year from 2016-2023. The results of the study revealed that the individual private bank study with Public bank, public bank has significant difference compare to Private banks except Dashen in the case of internet banking. In group study, the result of ATM, internet banking and pos machine has insignificant difference indicates that the number of customer use digital is similar. But in the case of mobile banking public bank has significant difference compare to private bank. The private banks are more profitable compare to public bank. The regression result indicates that internet banking and Posm have positive and significant effect on ROA and ATM and Mobile banking have negative and insignificant effect on ROA. ATM and internet banking have positive and significant effect on ROE and mobile bank has significant and negative effect on ROE. Finally as a whole, individually observed that public bank on the digital bank performed better than private bank and in the group both banks have similar capacity on digital bank utilization performance. Digital bank has significant effect on the performance of bank.

Key words: Public bank, Private bank, digitalization, comparative

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

The great advancement in technology has changed the pace of events in the financial industry, bringing about many transformations, and a key innovation in the reshaping of banking service into the current form of digital banking systems worldwide.The digital banking relates to the digital channels that facilitate the provision of banking services integrated through the internet and mobile platforms: collaborative convenience, effectiveness, and a wider reach of clients (Omarini, 2022; Hakizimana et al., 2023). This change is not only changing the customer expectations but also giving a new dimension to the performance metrics of banks. In addition, the systems of digital banking have also brought important changes in operational processes, customer interactions, and overall bank performance (Omarini, 2018; Lumpkin, S., & Schich, 2020). In other words, it was evident that such systems could streamline operations, reduce operational costs, and practically strengthen service efficiency (Dubey e al., 2020; Kumar & Shukla, 2022).Yet,the integration of digital technologies requires huge infrastructure and cyber security investments that are difficult to make for banks, more so for those whose resources are bound are some of the issues that limit the extent of digitization of the banks.

Digital banking provides services in recent days activity have become the important issue of the financial industry (Machkour & Abriane, 2020). The provision of digital Banking services as definite by Chikoko & Munongo (2015) is the use of the mobile phones, internet and other electronic transfer as a delivery channel for banking services, which contains all the back way service services include statement printing, balance enquiry, transfer of funds, bills payments and new banking services such as bill presentment of electronic and out of payment necessarily visiting a bank (Wadesango& Magaya, 2021) Yao et al. (2020), struggles that although digitization and digital transactions are essential for the future, little is known about their financial and economic effect. The banking

sector is regarded as the primary driver of economic growth. At the end , branches of each bank are suitable less and less integrated with the banking area (Sanusi, 2010; Babajide et al., 2015).

Among the many metrics we may rely on to assess banks' profitability is one of the primary performance indicators. Prior to India's banking sector reform, banks' performance was assessed using Return on Assets (ROA) (Jagdish R, 2020).

Currently, business management in the age of globalization is very strict, which is expressed as the progress of the world economy, which can stimulate the business growth of the service sector (Berger, 2005). Banks are one of the services that can stimulate Indonesia's economic growth. This is because the bank has become a service industry that contributes to national income and operates as an intermediary of the state fund and sends it to production economy (Pratiwi, 2016; Wulandari & Indristuti, 2023).Bank digitalization has become the main trend of Ethiopia's banking industry. This digital innovation caused significant changes in the way banks work and interact with customers (Sonono & Orrtstad, 2017). Providing digital banking services simply means placing banking services and product placement (eg, new bank account opening, inspection and savings account, transfer, etc. 2021).

The transformation of traditional banking services to the latest preferences for mobile banking applications or digital formats was gradual. At first, both banks and customers paid attention to this transition (Gomber et al., 2018; Anand & Mantrala, 2019). Nevertheless, the demand for service supply to digital platforms is strong because people recognize the potential of digital banks' platforms, as people can improve their relationships with customers, improve the image of brands and increase the efficiency of online banks (Tanda & Schena, 2019; Filotto et al., 21). The main preference of banks' digital innovation is to significantly reduce operating costs. Automated applications and processes have reduced the probability of error, providing effective results, lowering all these costs and reducing costs (Ameme, B., & Wireko, 2016; Murinde et al., 2022). In addition, technologies such as AI maintain the loyalty of the indicated process, thinking of automation function.

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

The present study attempts to investigate the effect of digital banking systems on bank performance in comparison with the public and private commercial banks. The existence of government support and regulation within the public banks elevates the responsible factor for the trust placed upon it and the extent of competitive pressure from other operating and managing public money banks. It may help stakeholders understand these differences in a crucial way in making effective use of digital banking technologies while trying to tackle the different challenges that various types of banks are exposed to.

1.2. Statement of the Problem

Financial service is a wide range of financial services provided in digital channels, including payment, loan, savings, money transfer, insurance and financial information. The term "digital channel" belongs to the Internet, mobile phones (smartphones and digital features), ATM, POS, electronic cards, biometric devices, tablets and other digital systems. Digital financial system uses innovative technologies such as solutions that receive mobile phone support, electronic money and digital payment platforms, and have a significant potential to expand basic financial services through cheap, convenient and safe environment for the whole (especially poor). Digital Revolution provides a new way to expand selective and global finance by adding new classes to the material culture of financial inclusion. A new form of poor households in financial asset generators(Gabor and Brooks, 2016).

In the banking industry, the use of electronic banks has become very common as a distribution channel for financial products and services thanks to the rapid development

and strict competition of information technology. Financial institutions invest billions of dollars, hoping that the new technology system increase profitability and market share. However, if the buyer does not accept it and does not use it, the expected return may be small. In addition, the anxiety that the electronic bank does not provide the desired results is increasing(Nyangena and Muturi, 2015).

Despite the growing adoption of digital banking systems globally, there remains a critical gap in understanding how these systems differentially impact the performance of public versus private commercial banks. While digital banking is hailed for its potential to enhance operational efficiency, reduce costs, and improve customer service, the extent to which these benefits translate into actual performance improvements can vary significantly between public and private institutions (Shaikh et al., 2027; Omarini, 2018). Public banks often face bureaucratic inertia and budgetary constraints that may hinder their ability to fully leverage digital technologies, potentially limiting their performance gains (Ashok et al., 2021; Kaganer et al., 2023). In contrast, private banks, with their competitive drive and greater flexibility, might achieve faster and more pronounced improvements in performance metrics through digital innovations (Cheng et al., 2023; Verma &Chakarwarty, 2024). However, empirical evidence comparing these effects is sparse, particularly in the Ethiopian context. Most existing studies provide general insights into digital banking adoption without addressing how the type of bank influences the outcomes of such adoption (Scott et al., 2017; Alkhowaiter, 2020).

Several attempts have been made to investigate the impact of electronic banking on bank performance, yielding mixed results. Previous research by (Singh et al 2019; Hada 2019; Chandna, 2016; Ramya, 2021; Dhandayuthapani and Manivannan, 2020; Kumar and Gupta, 2020) presents findings on in different way as explained in literature review of this research. This study aims to address the existing gap by providing a comprehensive comparative analysis of how digital banking systems affect the performance of public versus private commercial banks in Ethiopia, a focus that has not been extensively explored in the current literature.

In Ethiopia, the effect of digitalization bank comparative study of private and public bank have done by using the financial performance but on digital bank not done on the technology usage comparison. This research tries to use both financial profitability and also the used technology like ATM, pos machine, mobile banking etc. This research also try to use beyond secondary data that is primary or qualitative data at the head office of each selected bank to know the challenge and decision making of digitalization in the bank of Ethiopia between public and private bank. Therefore, this research seeks to fill those listed critical gap of the research. Insights gained from this study provide valuable information for bank management, policymakers, and industry stakeholders seeking to optimize the implementation of digital banking technologies.

1.3. Research Question

To achieve these broad objectives, a central research questions are developed. The study address the question:-

- What is the comparative effect of ATM between public and private bank performance?
- What is the effect of Posm on the public and private banks performance comparatively?
- What is the comparative effect of mobile banking on the public and private banks performance?
- What is the effect of internet banking on the public and private banks performance?
- What is the mean difference between public and private bank**?**

1.4. Objective of the Study

1.4.1. General Objective

The general objective of the study is to investigate the effects of digital banking systems on the performance of public and private commercial banks in Ethiopia, and to compare the impact of these systems between the two types of banks.

1.4.2. Specific Objectives

More specifically, the study attempted to achieve the following objectives:

- To study the comparative effects of ATM on bank performance between public and private bank.
- To know the comparative effect of Posm on the performance of public and private bank.
- To investigate the comparative effect of mobile banking on the bank performance.
- To study the effect of internet banking on the public and private bank performance comparatively.
- To assess the mean difference between public and private bank.

1.5 Significance of the Study

This can, therefore, add meaning to any information concerning the effects of the digital banking system on the performance of public and private commercial banks in Ethiopia. With its evolution and reformation, it becomes very important for policymakers and bank managers to know how these different digital innovations, including ATM, pos machine, mobile, and internet banking. The research would contribute the identification of which digital banking innovations are most beneficial and point out the challenges and barriers faced during implementation. The findings may, therefore, inform banks on strategic decisions, aid in optimizing their digital banking strategies, and enhance their competitive advantage. Again, the study has added to the existing literature and bridged gaps that exist therein, mainly in the Ethiopian context, where such comparative analyses have not been done. Overall, the research offers support for the development of more effective policies and practices pertaining to digital banking, with the view to building a more solid and vibrant banking sector.

1.6. Scope of the Study

This study investigates the effects of digital banking systems on the performance of commercial banks in Ethiopia, with a specific focus on comparing public and private

sector banks. The research includes a total of 8 banks, comprising one public commercial bank and 7 private commercial banks, to facilitate a detailed comparison. The data used both primary and secondary data. The secondary data spans an eight year period from 2016-2023 providing a comprehensive view of how digital banking innovations have influenced bank performance over time. The primary data was collected through key personnel at the head offices of the selected banks in Addis Ababa. Secondary data was obtained from central bank of Ethiopia and other relevant documents.

1.7. Limitation of the Study

The study acknowledges several limitations that may affect the interpretation and applicability of its findings. One significant limitation is that the research focuses inclusively on 8 commercial banks in Ethiopia that have adopted digital banking systems data, the bank which have not quantified data are not included in the research. Additionally, the analysis is also confined to the head offices of these banks in Addis Ababa, potentially overlooking variations in digital banking practices and performance metrics across branch offices and other regions. These limitations should be considered when interpreting the results, as they may influence the generalizability and relevance of the findings to the broader banking sector or other contexts.

1.8. Organization of the Paper

The paper is organized into key sections to systematically address the research objectives and provide a comprehensive analysis of the effects of digital banking systems on bank performance. The introduction sets the stage by outlining the research problem, objectives, and significance of the study. This is followed by a literature review that explores existing research and theoretical frameworks related to digital banking and its impact on bank performance. The methodology section details the research design, data collection methods, and analytical approaches used in the study. The results section presents the findings from both primary and secondary data, including a comparative analysis of public and private commercial banks. Following this, the discussion interprets the results in the context of existing literature, highlighting key insights and implications. The paper concludes with a summary of findings, recommendations for practice, and

suggestions for future research. This structured approach ensures a clear, logical flow of information and facilitates a thorough understanding of the effect of digital banking systems on bank performance.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Theoretical Review of Related Literature

2.1.1 Digitalization

Digitalization is a process of organizational change connected with the adoption of digital technologies in different areas to enhance the operation, service, and general efficiency of any organization (Vasilev et al., 2020). It is basically the adoption of digital tools and platforms that take the place of or complement conventionally practiced ways of getting things done. This includes cloud computing, artificial intelligence, big data analytics, and digital communications, all these helps make processes faster and assist better decision-making. Digitalization of analog processes gives way to increased speed, accuracy, and flexibility certainly some of the ingredients needed to keep pace with the fast-changing digital world (Lang & Lang, 2021).

It is the swath of innovations changing the way financial services are offered and consumed in the banking industry. This is all that digital banking systems, such as online banking, mobile banking applications, and automated teller machines, have in store. These technologies facilitate financial transactions, access to account information, and management of finances from anywhere and at any time (Alkhowaiter, 2020). Digital banking limits the number of physical visits to branches and enhances efficiency in transactional processes and real-time access to banking services. On this basis, it enables banks to provide a much more frictionless and personalized experience, catering to rising demands for instant and accessible financial solutions (Francesca & Claeys, 2010).

Further, digitization of banking does not only involve customer service but also reaches out to optimize internal operations and strategic management (Ameme & Wireko, 2016). For instance, the use of data analytics will help banks understand better their customers' behavior, preferences, and trends. Armed with such information, banks are capable of making informed decisions on personalization of services in serving specific needs and

identifying opportunities for further growth. In addition, there is immense scope for reduction of operational costs, reducing human errors, and increasing overall efficiency by way of automation of processes and workflows through digitization. It can, therefore, be said that through digitalization, banks would be able to optimize their operational performance and drive innovation and agility amid an increasingly digital world (Ashok et al., 2021).

2.1.2. Digital banking

Digital banking is simply defined as the delivery of such services and management of financial transactions through electronic channels using digital technologies. It is a paradigm shift from the traditional modes of banking, where visits to bank branches in person were common and paper was very much used in transactions. Digital banking involves various technologies and multiple-channel platforms that provide easy access, convenience, and more efficiency in banking services. These include internet banking, mobile banking applications, ATMs, and e-payment systems, all of which allow customers to do most of their banking without entering a bank branch (Al Nuaimi, 2019).

Online banking also is known as internet banking, conducting banking business on the Internet. Customers can log in to a secure Web site to manage accounts, transfer money, pay bills, and conduct other financial transactions. In the next generation, mobile banking continued to expand this functionality into native mobile applications on both smartphones and tablets, providing members with the ability to conduct transactions and manage their finances from wherever they may be (Pooja & Singh, 2009). Even automated teller machines have been enhanced to do a great deal more than just cash withdrawals, such as balance inquiries and bill payments, all accomplished electronically. These digital platforms are always available to customers, thereby reducing the necessity of opening and closing hours and a physical structure for banking (Uvaneswaran et al., 2017).

Digital banking, among many other advantages, enhances convenience, accelerates transactions, and improves customer service. It allows for real-time access to account information and transaction history, fastens payment and transfer processing, and

provides a more personalized form of banking by using data insights (Rukiya, 2018). It can also aid in operational efficiencies of the banks by reducing the number of physical branches, thereby allowing processes to be streamlined and having very minimal manual interventions. Ensuring cybersecurity, managing digital fraud, and addressing the concerns of those customers who are not comfortable or have access to digital technologies are the major challenges (DeYoung, 2005). Overall, digital banking represents a transformative advancement in the financial industry, reshaping how banking services are delivered and experienced.

2.1.3. Advantages of Digital banking

Digital banking has revolutionized the financial industry by offering numerous advantages that enhance both customer experience and operational efficiency. These benefits encompass a range of factors from increased convenience to cost savings and improved financial management.

Enhanced Convenience and Accessibility: One of the primary advantages of digital banking is the enhanced convenience it offers. Customers can access their accounts, perform transactions, and manage their finances anytime and anywhere, without the need to visit a physical bank branch. This 24/7 accessibility is particularly beneficial for individuals with busy schedules or those living in remote areas. Online and mobile banking platforms provide a seamless experience for everyday banking tasks such as transferring funds, paying bills, and checking account balances (Buchak et al., 2018). This round-the-clock access to banking services significantly reduces the time and effort required to conduct financial transactions.

Faster Transactions and Efficiency: Digital banking systems streamline and expedite financial transactions. Online and mobile platforms enable instantaneous processing of payments and transfers, which minimizes delays and increases operational efficiency. For example, electronic fund transfers and bill payments are completed in real time, which is a considerable improvement over traditional methods that may involve waiting periods (Kumar et al., 2016). The automation of routine tasks, such as account management and

transaction recording, further enhances the efficiency of banking operations, reducing manual errors and speeding up service delivery.

Cost Savings for Banks and Customers: Digital banking also contributes to cost savings for both banks and their customers. For financial institutions, digital platforms reduce the need for physical branch infrastructure and staffing, leading to lower operational costs (Burgess & Pande, 2005). This reduction in overhead can result in lower fees and charges for customers. Additionally, the automation of processes and the use of digital tools can reduce the time and resources required for routine banking operations, further lowering costs (Gomber et al., 2018). For customers, the elimination of travel and waiting times, as well as reduced transaction fees, translates into direct financial savings.

Improved Financial Management and Personalization: Digital banking platforms offer advanced tools and features that enhance financial management and personalization. Through data analytics and artificial intelligence, banks can provide personalized financial advice, budgeting tools, and spending insights tailored to individual customer needs (Gomber et al., 2018). These features help customers better manage their finances, track expenses, and make informed financial decisions. Additionally, digital banking allows for seamless integration with other financial services, such as investment accounts and insurance, providing a comprehensive view of an individual's financial portfolio.

2.1.4. Challenges of digital banking

Digital banking holds numerous advantages but equally comes with several challenges to the financial institution and their customers. These range from issues of cybersecurity and digital inclusion to compliance and issues related to keeping up with technological changes. The ability to deal with such challenges define successful implementation and sustainability for any digital banking service.

Cybersecurity Risitcs and Fraud: The most critical challenge in regard to digital banking today has to do with cybersecurity. The more banks and their customers are dependent on digital platforms, the more they become vulnerable to cyber threats such as

data breaches, phishing scams, and malware infections. Hackers are continuously inventing innovative ways to exploit flaws in digital banking systems that may lead to potential financial losses and personal information compromise. Banks need to invest heavily in security measures that can include strong encryption, multi-factor authentication, and constant monitoring to protect sensitive data and maintain customer trust. As much as all this is done, banks should be more vigilant and continue reviewing and changing their safety strategies according to the emerging cyber threats.

Digital Divide and Inclusion: Digital banking has the potential to exacerbate digital divide and related problems of financial inclusion. While digital platforms bring convenience to tech-savvy people, they may have the effect of alienating other members of society who either have no access to technology or are digitally challenged. It affects older adults, the low-income earning population, and those dwelling in rural areas who may not have reliable internet or modern devices to access such facilities, thus creating some digital divide that describes the equality issue around access to banking services, hence it will only be enjoyed by a few segments in society. Banks should, therefore, develop and establish ways of addressing these gaps by providing alternative access, digital literacy programs, and making their services accessible to all (Klapper & Singer, 2014).

Regulatory Compliance and Data Privacy: One of the main challenges that exist in the area of digital banking relates to regulatory compliance and data privacy. In most cases, banks have to operate in highly regulated environments, which require conformance to a myriad of laws and standards in regard to the protection of data, processing of financial transactions, protection of consumer rights, and others. Regulations like the General Data Protection Regulation within the European Union and other places globally put strict requirements on personal data handling by banks. Compliance with such regulations is related to huge investments in legal and technological resources, many times with updates to the policies and practices that need to be continued further. Non-compliance can result in legal penalties, reputational damage, and loss of customer trust.

Technological Adaptation and Integration: One more challenge that digital banking has to face is the rapidity at which technology is changing. Banks have to continuously adopt new technologies and integrate them into existing systems, something that has always been expensive and rather complex. It involves investment in the updating of legacy systems to have them be compatible with new technologies and to undertake the transition toward digital solutions (Hitt et al., 2002). More importantly, how blockchain and artificial intelligence are to be integrated needs careful consideration in the way they could potentially interfere with banking operations and the customer experience. Banks are supposed to balance the act between innovation and stability, where such technological changes must ensure that innovations in services enhance rather than disrupt.

2.1.5. Types of digital banking

There are many electronic banking delivery channels to provide banking service to customers. The most widely used electronic banking includes ATM, POS, Mobile banking, internet banking/Amole banking and agency banking. Here some of the digital banking services are discussed.

Automated Teller Machines (ATM) is a machine that can make cash withdrawal by ATM out of bank. It used cards and means of transfer. You can access it 24 hours/7 days by requesting an account balance(Fenuga, 2010).

ATM also known as an automated financial machine (ABM) or a currency machine, is a computerized communication device that provides financial institutions in public places without the need for a cashier, human clerk or bank cashier. In most latest ATMs, the client is identified by inserting a plastic smart card that contains some security information, such as an ATM plastic card with magnet strips or a chip with a unique card number and a valid date expiration date. According to Thompson (1997), Certification is provided by clients entering a personal identification number (pin code). Using ATM, customers can access the bank account to develop into cash withdrawal and credit cards, check the account balance and receive a mobile phone purchase loan.

ATM banks allow you to access your bank account to make money and check your account balance. In addition, the ATM continues when people stop, so there is a continuous performance for the bank after the bank time (Yosef, 2017). The main advantage of ATM is that it can save customers' time in providing services, which is an economical way to increase the performance of the times than people.

Point-of-Sale Transfer Terminals (POS):

Point of sale (POS) is sometimes called a location design where a purchase point (pop) or transaction occurs. "Design" indicates that the hardware and software used in the order in POS -Terminal or more common plans is equivalent to the electronic monetary registration. The POS terminal controls the sales process using a cheap seller interface. The same system allows you to create a receipt. Due to the cost associated with the POS system, Ebay Management recommends that investment in the POS system will be advantageous if the annual income exceeds the $ 700,000 threshold. SOS systems record sales for business and tax purposes. The illegal software called "Zappers" is used to forge these records to avoid tax payments.

Point of sale (POS) is sometimes mentioned as a point of purchase (POP) or checkout is the location where a purchase occurs. A "checkout" refers to a POS terminal allowr generally to the hardware- software used for check, the equivalent of an electronic cash register. The system were allowed for the creation and printing of the receipt. The expense involved with a POS system, the e Bay guide recommends that if annual revenue exceeds the threshold, investment in a POS system will be advantageous. POS systems record sales for business and tax purposes. The software which are Illegal softwa dubbed "zappers" is increasingly used on them to falsify these records with a view to evading the payment of taxes (Shittu, 2010).

This is a system that allows you to use a computer terminal located at the time of sales transactions to immediately capture data by your computer system. It is also a retail system that replaces electronic transfer of electronic funds for cash, checks or projects when purchasing retail products and services(Gerlach, 2000). As of Gerlach (2000),

Information on POS banking systems, sales and payment is stored in electronic format, including sales, dates and places and consumer account numbers. If the transaction is carried out with a bank credit or debit card, the payment information is sent to a financial institution or a payment processor, and the sales data will be sent to the seller's information management system to update the sales record.

Internet Banking: Internet banking is a system where bank customers can access general information about bank products and services by using bank websites(Witman &poust, 2008).

Internet banking allows customers of a financial institution to conduct financial transactions on a secure website operated by the institution, which can be a retail or virtual bank, credit union or society. It may include of any transactions related to online usage. Banks increasingly operate websites through which customers are able not only to inquire about account balances, interest and exchange rates but also to conduct a range of transactions. Unfortunately, data on Internet banking are scarce, and differences in definitions make cross-country comparisons difficult(Alabar, 2010).

Mobile Banking: is a system that allows bank customers to carry out various financial transactions through mobile devices, the latest service of electronic banks. Mobile banking depends on WAP technology (wireless application protocol). This is because the mobile device requires the installed WAP browser to access information(Driga& Isac, 2014).

In developing countries where modern communication infrastructure is not very advanced, mobile technology changes the accessibility of services on the Internet(Driga& Isac, 2014). Currently almost all commercial banks in Ethiopia are making significant investments in mobile banking systems to deliver a wide range of banking service, to reach on increased efficiency, cost reduction, improved operational effectiveness and improved customer service and to achieve the aim of financial inclusion (NBE, 2015).

Recently in addition to the electronic banking products in Ethiopia mobile banking is adapted widely. Literally this is getting banking service on the mobile phone. Based on, Clottey (2008)

Mobile banking is a system or platform where customers automatically update their accounts. These changes can occur in debit and loan form, taking into account the fees of accounts or accounts. What you need for mobile banking is a mobile phone with a well - working text message exchange system. SMS banking belongs to this category. This system uses a short text message exchange system to inform customers about accounts (Clottey and Collier, 2008).

Mobile banking refers to the provision and benefits of banks and financial services using mobile communication devices. The scope of the possibility of the service provided may include access to banks and transactions in the stock market, account management and individual information. According to Meute (2010),mobile Banking consists of three inter-related concepts: mobile accounting, mobile brokerage and mobile financial information services. With mobile technology banks can offer a variety of services to their customers such as doing funds transfer while traveling, receiving online updates of stock price or even performing stock trading while being stuck in traffic. Smart phones and 3G connectivity provide some capabilities that older text message-only phones do not (Shan, 2006).

2.1.6. Bank performance

Bank performance refers to the ability of a financial institution to achieve its objectives efficiently and effectively while maintaining financial health and stability. It is a multifaceted concept that encompasses various dimensions of a bank's operations, financial results, and overall impact on stakeholders (Al Nuaimi, 2019). Evaluating bank performance involves analyzing both quantitative and qualitative factors that reflect the bank's profitability, efficiency, risk management, and customer satisfaction. Bank performance is defined as the measure of how well a bank meets its financial and operational goals. This assessment typically includes analyzing financial statements, operational metrics, and other indicators that reflect the bank’s ability to generate profit,

manage costs, and provide value to shareholders, customers, and employees. Performance metrics are used to gauge the effectiveness of the bank's strategies, its competitive position in the market, and its resilience against economic fluctuations and operational risks (Buchak et al., 2018). Components of bank performance includes:

Profitability: is the ability of the bank to earn money in regard to its expenses and other related costs which it has incurred over some time. It is one of the major parameters that describe the financial health and operational efficiency of the institution. Some of the important parameters describing profitability include Return on Assets, Return on Equity, and Net Interest Margin (Rukiya, 2018). ROA is arrived at by dividing net income by total assets. Hence, ROA indicates the efficiency with which a bank used its assets in its pool to make profits. Good asset management and better profitability are referred to under a higher ROA. ROE is about how efficiently a bank could use its equity to generate earnings. A high ROE will mean good management of its equity capital. NIM represents a bank's spread in interest income received from loans and interest paid on deposits as a percentage of average earning assets. Higher NIM indicates better management in interest income against funding costs.

Efficiency: shows how well a bank manages its resources to generate income and keeps the cost at the lowest possible level. This metric, in fact, shows the operational performance, cost management, and at times the strategy employed. It simply indicates the level of operating expenses as a percentage of operating income, showing how much of the revenues a bank is expending to earn (Lerner, 2006). The efficiency ratio indicates that the lower the ratio, the more operationally efficient the bank is, since it generates more income for every unit of expense. On the other hand, the cost-to-income ratio measures the proportion of operating expenses in relation to operating income. A low cost-to-income ratio would connote good cost management, with provisions for ensuring increased revenues and hence higher profitability (Malhotra & Singh, 2009).

Asset quality: is a description of a bank's health and performance through its loan portfolio and investment assets, particularly from a credit risk management perspective. The nonperforming loans are the percentage of overdue loans that are unlikely to be

repaid. High NPL ratios could be indicative of problems in the loan quality or increased credit risk, which is very negative from the point of view of financial stability. Provision for loan losses refers to the money set aside against the likelihood of loss incurred on the loan portfolio. This is the level of preparedness of the banking company in the event of default. Adequate provisions would indicate a priori that there is effective risk management in the bank, which has a proactive policy concerning impairments that may be incurred in its assets (Berger & DeYoung, 1997).

Capital adequacy: This is a measure that infers the financial strength and ability of the bank to absorb shocks and remain stable while staying with the regulatory requirements. The capital adequacy ratio is a measure that refers to the bank's capital against its risk exposure, more specifically, total capital divided by risk-weighted assets (Dew, 2007). Basel III has stipulated a minimum CAR for financial stability in the interest of all stakeholders. Basically, Tier 1 Capital Ratio expresses the adequacy of its core capital against risk-weighted assets, and thus the capacity of a bank to absorb and withstand financial stress assures long-term stability for a banking institution. The liquidity of the bank refers to the ability to meet all short-run obligations, and through proper cash flow management, achieve operational stability (Eyob, 2010).

The LCR measures the proportion of high-quality liquid assets to total net cash outflows during a 30-day period, to ensure that banks have enough liquidity to meet their short-term liabilities and prevent crises in liquidity. The NSFR is a metric of funding stability for a bank in the long run by comparing available stable funding with required stable funding. It encourages better stability and resistance to funding market pressure over longer periods of time. Basel Committee on Banking Supervision, 2010. Customer Satisfaction is the level of service and overall experience that bank customers receive, which has a bearing on customer retention and customer loyalty (Scott et al., 2017).

Financial performance

ROA reflects the ability of bank management to benefit from banking assets, but can be biased by something. Return on equity indicates the return to the shareholders of their equity.

As highlighted by (Athanasoglou*et al.,* 2013) and (Sufian, 2011), Many scholars suggest that ROA is a key calculated result for evaluating bank profitability, given that ROA is not distorted with high inventory content, but ROE ignores risks related to high leverage and financial leverage. In this regard, we rarely find that this article uses ROE as a single profitability measurement(Rumler &wasshiczek, 2010). ROE, other papers utilize for checking the consistency with ROA, e.g. (Ben Naceur, SB and Omran M, 2011) and (Sufian, 2011). While a bulk of studies employ ROA as profitability measure, e.g. (Pasiouras F and Kosmidou K, 2012), (Athanasoglou et al, 2013) and (Olweny&Shipho, 2011). ROA is measured as net profit before tax divided by total assets similar to (Olweny&Shipho, 2011).

According to Malesav et al. (2021). Financial indicators can also be expressed as a result from various activities made in the framework of existing financial resources. You can see financial indicators using financial statements or financial relations analysis results. Pollak et al. (2021) When analyzing financial indicators, the analysis requires a concept or side to explain the company's financial data. Financial indicators are achieved by the company for a certain period of time when explaining the company's excellence. According to Peter et al. (2020) and Pollak et al. (2021) this can be the basis for assessing the condition of financial performance based on financial statement analysis.

Digital technology is developing very fast, so it is almost widely accepted worldwide. The main goal of digitalization is to ensure the greatest results in the customer satisfaction process. According to Peter et al. (2020) and Pollak et al. (2021), digital marketing has the possibility of tracking that business people can calculate the profitability of investment (investment returns).

According to Syazali et al. (2019) and Wanasida et al. (2021), the difference between this study and the previous study is to analyze the use of digital payments by the existence of digitalization and financial indicators. The results of this study are expected to ensure the advantages of both and management. For this theoretical advantage, this study is expected to provide an academic understanding of all researchers as an additional knowledge and contribution to studies related to digital payments in order to pay

attention to digitalization and increase business efficiency. The profits of the assets measure how efficiently the bank works, and the stock's profit for capital measures how well the owner deals with the investment income of the asset, that is, the net profit after the tax on the asset dollar.

2.2. Empirical review

According to Singh et al.(2019), the conceptual analysis of Internet banking users' perceptions, the perception of India. The study explained the quality of the online banking services of the state and private banks for each service aid and found that customers in the private sector of the Internet bank are more advantageous than the public sector. This study showed that the maintenance of the Internet banking provided by the two sectors is effective and satisfactory. Online banking customers expressed positive opinions. Online banking maintenance quality of the state and private banks was similar in this field.

According to Jihen Bousrih (2023) on the title the impact of digitalization on the banking sector: Evidence from fintech countries. The study take a sample of 24 nations, including leading fintech nations. The taken data was from 2012-2019from the World Development Indicators and the Bank for International Settlements (BIS) databases. The researcher finds that mobile subscriptions used for mobile transactions has a negative impact on the bank's performance. This result indicates that consumers are ready to replace existing(traditional) bank operations with mobile transactions.

Abenezer abera (2024) empirical study on the effect of digital banking services on bank financial performance in Ethiopia by using the data from 2018-2024.The analysis found that the value of ATM transactions has a positive and significant impact on profitability. the study revealed that the number of internet banking users and mobile banking transaction value had a negative and insignificant effect on profitability.

According to Chandna, (2016) the review of literature on services in the state and private sectors provides more information about the scope of electronic banking services that can be used to private banks and uses these services most actively. In principle, it indicates

that customers in the private sector are more satisfied compared to the public sector. Public banks are behind the private sector banks in terms of product and service. The use of technical services such as ATM, debit cards, credit cards, UPS and customer support is higher among private banks compared to banks in the public sector. Customers in the two sectors express satisfaction with products and services, but customers who maintain savings accounts at private banks report the highest level of satisfaction. Banks must make additional efforts to increase customer satisfaction. In particular, public banks should focus on more efficient promotion of products and technology services.

Wondowessen (2016) study on the ownership and organizational performance a comparative analysis of private and state banks. The used data was available secondary data from 2005 to 2010 published balance sheets. The finding of the study was state owned banks are better in performance than privately owned banks. But NBE-Bill is only valid for private banks, all state offices and sectors must work with CBE, and resources for condominium housing are mobilized only by state CBEs, so the injustice of private and national banks was negative.

2.3 Conceptual Framework

The conceptual framework of this study delineates the relationship between digital banking systems and bank performance, integrating various theoretical and empirical insights to form a coherent structure for analysis. Central to this framework is digital banking encompassing technologies such as mobile banking, ATM services, internet banking and POS systems affects multiple dimensions of bank performance comparatively. The conceptual framework graph can shows for both public and private bank separately. No need of two conceptual framework graph.

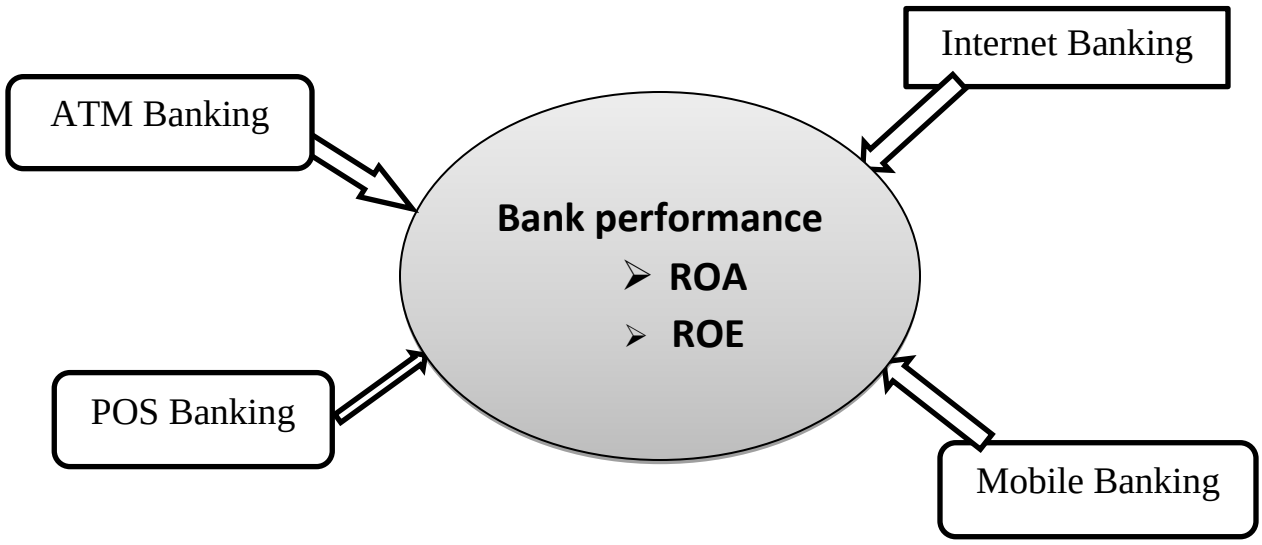


Figure 1:- ***Conceptual framework of the study; adopted from Abera (2024)***

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Research Design

The research design describes the information collected for evaluation including data collection, method identification, tools, tool control methods, information formation and analysis methods(Assumptah & Muhari, 2017).

Research designs are thought with planning, structure and research strategy to get answers to research questions and problems. The plan is the entire system or research program. This includes a description of the contents created by the researcher and the final analysis of the data(Kumar, 2011).

As explained by Kothari, (2004) the explanatory research design explores the causes and results between the dependent and independent variables. This study is intended to study the comparison between public and private banks. Therefore, this study uses descriptive and explanatory research design.

3.2 Research approach

As per Creswell (2003) there are three approaches used in this study. This is a quantitative, qualitative and mixed research approach. The quantitative research approach is mainly focused on the configuration of quantitative data, and the quantitative data is a systematic record, consisting of numbers built by a researcher using a measurement process(Kent, 2007). The quantitative research approach employ measurement that can be quantifiable while the qualitative approach cannot be measured (Bryman & Bell, 2007). In the mixed research approach, serious and quantitative assumptions for qualitative and quantitative assumptions(Creswell, 2009).

The quantitative design of the research is specific and well organized, has been tested for validity and reliability, clearly defined and recognized. In a quantitative study, the requirements for measuring and classifying the collected information must be more

systematic, firm, fixed and predetermined in order for the research project to ensure the accuracy of measurement and classification. Quantitative research projects are clearer and have differences in projects and data collection methods(Kumar, 2011).

Therefore, as shown in the previous section, the quantitative and qualitative research approach is preferable and suitable for this study.

3.3 Data Type, Source and Method of Collection

3.3.1 Data type

The study used both primary and secondary data. Primary sources of data include interview and questionnaire, whereas secondary sources of data are generated through a review of relevant documents on national bank of Ethiopia from 2016 up to 2023.

3.3.2 Data source and method of collection

In this study, the researchers gathered primary data from the selected 8 banks head office employee of both public and private bank as respondents. Furthermore, face-to-face interviews with selected key informants, which were from each, selected bank officer. A secondary data were collected from national bank of Ethiopia except the number of customer of each bank. The number of all customers of each bank data was collected in the annual report of each bank.

Questionnaire

The elements of the questionnaire closed formats were used to generate qualitative and quantitative data as expected. In addition to other advantages, the comparison of the response in the relevant consensus increases, so the reaction category of the contract type is desirable depending on the size. To collect data according to the population statistics data and digital banking participation of the respondents

Interview

Interview guide open - ended questions, we used to gather in-depth qualitative data from managers and experts officers working in the sampled banks. The researcher conducts the

interview in the highest manager of selected bank. The researcher prepared an interview protocol in advance and used it to take notes during the interview. Interviews are important sources of data as participants can be asked key questions about the study.

3.4 Target population

Population:- The target population is all 32 banks registered in Ethiopia and found in operation. Currently, as the data gained in the national Bank, there are 8 banks in the Ethiopian. The selected 8 Banks are appropriate for the study since they are operating under the strict government regulations, making their financial and accounting disclosures largely reliable the rest bank did not have data of digitalization.

3.4.1 Sample size and sampling design

This study used sample of 8 banks from the total population of 32 banks in Ethiopia based on availability of data. Therefore, out of the 32 banks with purposive sampling technique the researcher selected 8 banks as sample size since the data obtained from Central bank of Ethiopia. Then after selecting the eight banks, the selection of respondent of each bank were selected randomly in the head officier. The bank purposively selected were CBE, Dashen Bank, Bank of Abyssinia, Wegagen Bank, United Bank, Nib Bank, Zemen Bank and Abay Bank

The need for sampling in this study result from the desire to obtain validity and also to eliminate problems associated with most researches such as population size, cost in terms of finance, time greater speed and accuracy as well as accessibility to the population. Each respondent are provided equal chance of being chosen and this are because it allows us easy to assemble the sample. Besides, in order to select the representatives of the sample and determine the size, we used sample size determination with confidence level 95% and tolerable errors ± 5% i.e. Yamane's (1967) developed a formula to calculate a representative sample for proportions as: - the sample size of public bank were

$$\boldsymbol{n} = \frac{\boldsymbol{N}}{(\mathbf{1}+\boldsymbol{N}\,(\boldsymbol{e})^{\mathbf{2}})}$$

$$n = \frac{319}{(1 + 319(0.05 * 0.05))} = 178$$

n = Sample size

N= Total Population from in the selected bank

ni= sample size from each bank

The area under the normal curve for 95% level of confidence suppose we want to calculate a sample size of employee population whose degree of variability was known. Assuming the maximum variability and taking 95% confidence level with ± 5% precision, the calculation for required sample size was as follows;

Table 1 Selected bank with their prospective bank

No	Name of Bank	Total pop	In %	Ni=(in%/178)*100
	CBE	77	24.1	43
	Dashen Bank	32	10	18
	Bank of Abyssinia	36	11.3	20
	Wegagen Bank	41	12.9	22
	United Bank	33	10.4	19
	Nib Bank	39	12.2	22
	Zemen Bank	30	9.4	17
	Abay Bank	31	9.7	17
	Total	319	100	178

Source: Own Survey 2025

Therefore the total population of 319 (100%), 178 sample representatives were randomly selected from the total member of employee

3.5 Data Analysis

The collected data is summarized, edited, coded and data entry is done. And then with the help of SPSS the following descriptive and inferential statistical tools are applied to analyze the data:

3.5.1 Comparative data analysis by using t-test

- T-tests is executed to test for the significant difference and similarities that may exist between the mean of government and private banks digitalization.
- In this study, it is declared to use a critical alpha level of 0.05. The probability of 0.05 or less is considered to be a significant difference between the mean of government bank (Commercial Bank of Ethiopia) and private banks digitalization (ATM, POS machine, mobile banking and internet banking).

3.5.2 Econometric Model specification

The study assessed the relationship between independent and dependent variables explained by using multiple linear regression analysis has been used to explain the effect whether the group of independent variables together predicts the effect of digital banking system on banks performance. For public bank used ROA and ROE are the dependent variables similarly for private bank ROA and ROE are the dependent bank, i is a symbol representative of the cross-section and t represents the time.

Modeling is based on data panels using stata. Panel data includes both the element of the cross section and the elements of the time series; The cross -sectional element is reflected in the selected bank and the elements of the time series are reflected in the study period(2016-2023). The study used a panel regression technique to analyze the effects of digital banking system on performance. The following model of the linear regression has been used:

$$ROA_{it} = \beta_0 + \beta_1 ATM_{it} + \beta_2 Posm_{it} + \beta_3 MB_{it} + \beta_4 IB_{it} + \mu_{it}$$
$$ROE_{it} = \beta_0 + \beta_1 ATM_{it} + \beta_2 Posm_{it} + \beta_3 MB_{it} + \beta_4 IB_{it} + \mu_{it}$$

Where

- ROA_{it}:- Return on asset ratio of banks i at time t
- ROE_{it}:- Return on equity ratio of banks i at time t
- β_0:- is a constant term
- β_{1-n} :- measures the partial effect of explanatory variables 1-n for period t.
- ATM_{it}:- Automated teller machine of bank i at time t.
- $Posm_{it}$:- Pos machine of bank i at time t.
- MB_{it}:- Mobile banking of bank i at time t.
- IB_{it}:- Internet banking of bank i at time t.
- μ:- error term

3.6 Description of variables

Automated Teller Machine(ATM) automated teller machine (ATM) is an electronic bank exit that allows customers to perform basic transactions without the help of a representative or cashier using a credit card or debit card. You can access most ATMs. The measurement of ATM is the number of ATM terminals founded by Ethiopia Bank.

Mobile Banking

Mobile banking refers to the provision of ailmen of banks and financial services using mobile communication devices. The variable measurement is the number of mobile banking service users in Ethiopia.

A point of sale terminal (POS terminal)

POS is an electronic device used to handle card payment at a retail store. The POS terminal usually performs: Read the information on the client's credit or debit card. Check that the fund is enough in the customer bank account. The measurement of POS Mashins is the number of terminal banking services in Ethiopia.

Internet banking

Online banking is an electronic payment system that allows customers from online banks or other financial institutions, also known as Internet banking, web banking, or housing banking, can perform multiple financial transactions through the website of financial institutions. The measurement of variable is Ethiopia's number of Internet banking users.

Table 2:- Variable measurement

variable	**Measurement for the number of customer**	**Measurement for their used customer compare to total**	Symbol	Expected cingn
Mobile Banking	Natural log of Number of mobile banking users	The ratio of MB user to total customer	MB	+
Automated Teller Machine	Number of ATM terminals installed by the banks		ATM	+
A point of sale terminal (POS terminal)	Number of A point of sale terminal banking		POSM	+
Internet banking	Number of Internet banking users	The ratio of IB user to total customer	IB	+
Return on asset	$ROA = \frac{Net\ income}{\left(\frac{TA\ pr+TA\ cu}{2}\right)}$*100	TA pe total asset of previus year and TA cu total asset of current year	ROA	Dependent variable
Return on equity	$ROE = \frac{Net\ income}{\left(\frac{Cap\ pr+cap\ cu}{2}\right)}$*100	Cap pe total capital of previus year and Cap cu total capital of current year	ROE	Dependent variable

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter analysis the effects of digital banking system on banks performance: a comparative study on public & private commercial banks, using primary data on the head office employee of both public and private banks and also secondary data of eight year annual balanced data used. The study has a time series segment spanning from the period 2016 up to 2023 considered eight Ethiopian banks. Prior to conducting the regression of the effects of digital banking system on banks performance: a comparative study on public & private commercial banks, it is essential to test the appropriateness of the t test comparison method. For primary data 178 questionnaires were distributed to selected respondents from both private and public owned bank head office employer, of which 42 questionnaires from public bank and 122 from private bank totally 164 questioner were returned, yielding an approximately 92 percent response rate.

The previous three chapters decided on the problem, formalized their goals, and investigated the literature related to this topic. In addition, the research design used for the research was discussed to achieve the research and test goals of the research hypothesis. In this chapter, the collected data is presented and analyzed. It has first analyzed the demographic characteristics are presented followed by correlation analysis and then presents the test for the classical linear regression model/CLRM and Then, the results of the t test analysis were presented finally.

4.2 Demographic Characteristics of the Respondent

The demographic backgrounds of the sample respondents in six parameters are presented in Table 3 to understand the respondent profiles i.e. Sex, age, marital status, educational status, Experience and Salary.

Table 3: Demographic Characteristics of Respondents

		Public Bank(CBE)			Private Bank		
		Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
Sex	Female	21	50.0	50.0	54	44.3	44.3
	Male	21	50.0	100.0	68	55.7	100.0
	Total	42	100.0		122	100.0	
Age	less than 30 years	27	64.3	64.3	73	59.8	59.8
	31-40 years	10	23.8	88.1	35	28.7	88.5
	41-50 years	5	11.9	100.0	14	11.5	100.0
	Total	42	100.0		122	100.0	
marital status	Single	19	45.2	45.2	73	59.8	59.8
	Married	23	54.8	100.0	49	40.2	100.0
	Total	42	100.0		122	100.0	
education status	PhD	6	14.3	14.3	7	5.7	5.7
	MSC/MBA	16	38.1	52.4	62	50.8	56.6
	BSC/BA	20	47.6	100.0	53	43.4	100.0
	Total	42	100.0		122	100.0	
Experience	less than 4 years	21	50.0	50.0	73	59.8	59.8
	5-7 years	8	19.0	69.0	21	17.2	77.0
	8-10 years	5	11.9	81.0	14	11.5	88.5
	above 10 years	8	19.0	100.0	14	11.5	100.0
	Total	42	100.0		122	100.0	
sallary	Less than 20000 Birr	17	40.5	40.5	33	27.0	27.0
	20001-30000 Birr	6	14.3	54.8	54	44.3	71.3
	30001-40000 Birr	9	21.4	76.2	21	17.2	88.5
	Above 40000 Birr	10	23.8	100.0	14	11.5	100.0
	Total	42	100.0		122	100.0	

Source: survey result,SPSS(2025)

The sex of respondent as explained in the table 3 are participated equally both gender in public bank of head office employee. In private bank the participation rate of male was 55.7% indicates more are male. This result shows that in public bank participation of

female are equal with male but in private bank employee use more male. This result indicates that the participation of women in private bank slightly less compare with male.

The other variable is age, by which the majority of the respondents are under the age of 30 years in public and private bank of head office employee which accounts 64.3% and 59.8% respectively followed by the age of 31-40 years for both bank. But numerically public bank use younger employer as compare to private bank head office employee. The interview response says most customers are between the age 20 and 40 years typically use digital banking more frequently. This is because they are more technology user have access to smartphones, and are more comfortable using technology in their daily lives.

The marital status of respondent in public bank head office employee majority 23(54.8%) participant were married the rest 19(45.2%) were single. In private bank head office employee 73(59.8%) participant were single and the rest 49 (40.2%) participants were married. When we come to comparison more public bank employer were married contrast to private bank more employee were single. The interview response tecknology usage the marital status may have a minimal effect. Married individuals might use digital banking more for household financial management, such as paying utility bills and school fees. However, the difference is not significant compared to unmarried individuals.

The education status of the head office employee in public bank were the majority employee were BSC/BA holder account 20(47.6%) followed by MSC/MBA and in the private bank most participants were MSC/MBA holder followed by BSC/BA(43.4%). The interview responses about digital banking usage higher-educated individuals are more likely to understand and trust the system.

The other variable is experience, which the majority of the respondent have the experience less than 4 years in both public and private bank. The experience less than 4 years in public bank account 21(50%) and in private bank 73(59.8%). Both private and public bank majority employee in head office have less than 4 years.

The last demographic factor is salary, the majority of the public bank respondents are paid less than 20000 account 17(40.5%) followed by paid above 40000 birr and in private

bank majority employee paid between 20000 and 30000 birr accounts 54(44.3%) followed by less than 20000 birr. Therefore the result revel that the private bank paid better as compared to public bank.

4.3 Analysis of Independent Sample T-Test for primary data

Table 4:- The level of usage of digitalization

Variables		N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Differenc
The bank use more technology	CBE	42	4.10	.958	.148	-1.483	51.773	.144	-.233	.157
	Private	122	4.33	.581	.053					
The bank used ATM	CBE	42	4.55	.633	.098	1.367	162	.174	.146	.107
	Private	122	4.40	.584	.053					
The bank used mobile banking well	CBE	42	4.79	.682	.105	3.491	75.379	.001	.433	.124
	Private	122	4.35	.726	.066					
The bank used pos machine well	CBE	42	3.90	.932	.144	-.298	54.362	.767	-.046	.155
	Private	122	3.95	.628	.057					
The bank used internet banking well	CBE	42	4.31	.563	.087	1.941	60.590	.057	.187	.096
	Private	122	4.12	.456	.041					
The banks providing innovating products and service	CBE	42	3.88	.916	.141	-.504	162	.615	-.086	.171
	Private	122	3.97	.970	.088					
The bank is less labor intensive bank	CBE	42	2.14	.814	.126	-3.420	86.735	.001	-.529	.155
	Private	122	2.67	1.000	.090					

Source:- Own computation SPSS (2025)

The analysis of question, the bank use more technology comparative study between in the public and private bank using the independent samples t-test was used to explore the differences in the mean value. As shown in table 4 indicates that the value of p is 0.14 is greater than significance level $\alpha = 0.05$, we can accept the null hypothesis and reject the alternative. Based on the results, we can state that there was not a significant difference in mean between public and private bank($t_{51.773} = -1.483$, $p > .05$). There are not difference on using technology in public and private bank that means we can conclude that both private and public bank have similar use of technology. The interview response indicates that the usage of digital banking, the level of profit has increased due to reduced operational costs (e.g., fewer in-branch transactions) and enhanced customer satisfaction through quick and efficient services, which attract more customers.

As shown in table 4 indicates that the ATM value of p is 0.174 is greater than significance level $\alpha = 0.05$, we can accept the null hypothesis and reject the alternative. Based on the results, we can state that there was not a significant difference in mean ATM between public and private bank ($t_{162} = 1.367$, $p > 0.05$). The mean ATM for public bank was slightly 0.146 greater than the mean of private bank as described above indicates public bank has better but not significantly different. Generally can be conclude that both private and public bank have similar use of ATM technology.

The mobile banking independent t test result as shown in table 4 indicates that the value of p is 0.001 is less than significance level $\alpha = 0.05$, we can reject the null hypothesis, and accept the alternative. Based on the results, we can state that there was a significant difference in mean mobile banking between public and private bank ($t_{75.379} = 3.495$, $p < .05$). The mean mobile banking for public bank was 0.433 greater than the average mobile banking for private bank as described above indicates public bank has better use of mobile banking.

.The pos machine independent samples t-test was used to explore the differences in the mean values of digital banking performance of public and private banks. The pos machine independent t test result as shown in table 4 indicates that the value of p is 0.767 is greater than significance level $\alpha = 0.05$, we can accept the null hypothesis, and reject the alternative. Based on the results, we can state that there was not a significant difference in mean Pos machine between public and private bank ($t_{54.362} = 0.298$, $p > .05$). The average Pos machine for public bank was 0.046 less than the average Pos machine for private bank as described above indicates private bank has better but not significantly different. Generally can be conclude that both private and public bank have similar use pos machine.

.The internet banking independent t test result as shown in table 4 indicates that the value of p is 0.057 is greater than the significance level $\alpha = 0.05$, we can accept the null hypothesis and reject the alternative Based on the results, we can state that there was not a significant difference in mean internet banking between public and private bank ($t_{60.69} = 1.941$, $p > .05$). The average internet banking for public bank was 0.187greater than the

average internet banking for private bank as described above. The similarity comes from the failure of connection, public bank convert the service to mobile banking and the private bank use advanced internet banking because of this public bank has not given on this as expected.

The bank is less labor intensive independent t test result as shown in table 4 indicates that the value of p is 0.001 is less than significance level $\alpha = 0.05$, we can reject the null hypothesis and accept the alternative. Based on the results, we can state that there was a significant difference in mean the bank is less labor intensive bank between public and private bank ($t_{83.735} = 3.42$, $p < .05$). The average the bank is less labor intensive bank for public bank was -0.529 less than the private bank as described above. The result indicates that private bank use more less labor intensive than public bank. The interview response indicates that even though private bank more less labor intensive, the number of employees may not have significantly increased, but their roles have shifted. With digital banking, there is less need for clerical staff and more demand for IT professionals and customer support teams to manage digital services.

Table 5:- Number of complaints

Variable		N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
The bank has more Problem regarding use of online banking.	CBE	42	2.19	.671	.104	-5.430	93.437	.000	-.711	.131
	Private	122	2.90	.885	.080					
The bank has lack of attention or improving behavior of bank employee.	CBE	42	2.00	.698	.108	-4.063	91.273	.000	-.549	.135
	Private	122	2.55	.901	.082					

Source:- Own computation SPSS (2025)

The bank has more Problem regarding use of online banking, the independent samples t-test was used to explore the differences in the mean values of digital banking performance of public and private banks. As shown in table 5 indicates that the value of p is 0.00 is less than significance level $\alpha = 0.05$, we can reject the null hypothesis and accept the alternative. Based on the results, we can state that the bank has more Problem regarding use of online banking have significant difference in mean between public and

private bank ($t_{93.437}$ = -5.430, p < .05). The average of public bank was 0.711 less than the average of private bank. This result indicates private bank use online bank especially advanced technology. The interview response explains problem like cyber security threats, lack of digital literacy among customers, technical issues such as downtime, trust faild, and resistance from customers who prefer traditional banking methods.

4.4 Secondary data T-test digital bank comparison study

The secondary data of comparative study divided in two methods. The first way was the digital data as a country equally the data as it was and secondly the available mobile banking, and internet banking were divided by the total number of each customer. The available data as received indicates the performance of competition in the country. The ratio result indicates the comparative performance of the used technology based on their customer.

4.4.1 The comparison based on the amount of customer

Table 6:- t test result of CBE and Dashion bank

ID		N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
LogATM	CBE	8	2.976	0.068	0.024	2.499	7.22	0.04	0.476	0.19
	Dashen	8	2.5	0.535	0.189					
LogPOS	CBE	8	3.909	0.256	0.091	10.04	7	0	0.909	0.091
	Dashen	8	3	0	0					
LogMB	CBE	8	6.333	0.564	0.2	2.852	9.97	0.017	1.333	0.467
	Dashen	8	5	1.195	0.423					
LogIB	CBE	8	4.725	0.511	0.181	-0.656	10.1	0.527	-0.275	0.419
	Dashen	8	5	1.069	0.378					

Source:- Own computation SPSS (2025)

The output in table 6 Present the basic descriptive stastics for each group: the n of cases, ATM Mean, standard deviation and standard error of the mean for each of the two groups(CBE and Dashen bank) are presented here. The difference between the mean, M_1-M_2, 2.976-2.5=.476. This result comes after the transformation of logarithm of ATM of CBE is greater than Dashen bank. This result shows that public bank differs highly as

compare to Dashen bank. Similarly the amount of pos machine in commercial bank of Ethiopia is greater than Dashen bank (i.e 3.909-3.00=0.909). This result shows that the variation was very high that means public bank has high capacity the utilization of pos machine compare to private Dashion bank.

The capacity of public bank on the utilization of mobile banking have more ability than the Dashen bank(private bank) in Ethiopia. The mean difference of logarithm MB M_1-M_2, 6.333-5.000= 0.333. This result indicates in MB by commercial bank of Ethiopia has great difference with compare to Dashen bank. On the side of internet banking, private bank of Dashen bank has great difference compared to public bank(M_1-M_2, 5.000-4.725= 0.275). This result shows that Dashen bank involve in internet bank indicate unbelievable result as compare to other.

The result of all variables listed above indicates that public bank has great difference compared to private bank in Ethiopia except internet banking. The utilization of digital banking in public bank was near to utilization of technology compare to private bank.

Analysis of independent samples t-test was used to explore the differences in the mean values of digital banking performance of public and private banks. The testing of the hypotheses is based on the assumption that the confidence level is 0.05, which is generally accepted by social science researchers. As shown in table 6 indicates that the value of p is 0.04 is less than significance level α = 0.05, we can reject the null hypothesis and accept the alternative. Based on the results, we can state that there was a significant difference in mean ATM between CBE and Dashen bank ($t_{7.224}$ = 2.499, p < .04). The average ATM for CBE was 0.476 greater than the average ATM for Dashen bank as described above.

The pos machine independent samples t-test was used to explore the differences in the mean values of digital banking performance of public and private banks. The pos machine independent t test result as shown in table 6 indicates that the value of p is 0.00 is less than significance level α = 0.05, we can reject the null hypothesis and accept the alternative. Based on the results, we can state that there was a significant difference in

mean Pos machine between CBE and Dashen bank ($t_{7.000} = 10.043$, $p < .05$). The average Pos machine for CBE was 0.909 greater than the average Pos machine for Dashen bank as described above.

The mobile banking independent t test result as shown in table 6 indicates that the value of p is 0.017 is less than significance level $\alpha = 0.05$, we can reject the null hypothesis and accept the alternative. Based on the results, we can state that there was a significant difference in mean mobile banking between CBE and Dashen bank ($t_{9.973} = 2.852$, $p < .05$). The average mobile banking for CBE was 1.333 greater than the average mobile banking for Dashen bank as described above.

The internet banking independent t test result as shown in table 6 indicates that the value of p is 0.523 is greater than the significance level $\alpha = 0.05$, we can accept the null hypothesis and reject the alternative. Based on the results, we can state that there was not a significant difference in mean internet banking between CBE and Dashen bank ($t_{10.05} = -0.656$, $p > .05$). The average internet banking for CBE was -0.275 less than the average internet banking for Dashen bank as described above. This result happens by the reason that public bank on internet banking not functional because on public bank network connection was weak. By this reason, the customer changes their service in to mobile banking.

The rest six private bank results were similar in all perspective compare to public bank as shown in table 7. In all perspective, public bank has significant difference compare to private bank. The table described in table 7 all 6 bank namely bank of Abyssinia, United bank, Zemen bank, Abay bank, Nib bank and wegagen bank result listed there. The finding indicates similar that means the variable ATM, mobile banking, internet banking, and posm have significantly different between public and private bank. Public bank have huge difference with compare to private bank, the capacity of private bank on the utilization of digital bank not that match with public bank. This difference may be different reason like lack of unification of different private bank.

Table 7:- t test result of the rest 6 private bank compare to CBE

Name of variable		Mean	t	df	Sig. (2-tailed)	Name of variable		Mean	t	df	Sig. (2-tailed)
Comparison between CBE and Abysynia bank						Comparison between CBE and Wegagen bank					
LogATM	CBE	3.0	3.3	7.2	0.0	LogATM	CBE	3.0	40.9	7	0.0
	Abyssnia	2.4					Wegagen	2.0			
LogPOS	CBE	3.9	7.5	10.2	0.0	LogPOS	CBE	3.9	8.9	14	0.0
	Abyssnia	2.4					Wegagen	2.3			
LogMB	CBE	6.3	3.4	14.0	0.0	LogMB	CBE	6.3	3.5	14	0.0
	Abyssnia	5.3					Wegagen	5.0			
LogIB	CBE	4.7	4.6	14.0	0.0	LogIB	CBE	4.7	5.2	14	0.0
	Abyssnia	3.0					Wegagen	3.4			
Comparison between CBE and United bank						Comparison between CBE and Nib bank					
LogATM	CBE	3.0	40.9	7.0	0.0	LogATM	CBE	3.0	8.7	14	0.0
	United Bank	2.0					Nib Bank	1.9			
LogPOS	CBE	3.9	8.9	14.0	0.0	LogPOS	CBE	3.9	7.5	10	0.0
	United Bank	2.3					Nib Bank	2.4			
LogMB	CBE	6.3	3.5	14.0	0.0	LogMB	CBE	6.3	6.7	14	0.0
	United Bank	5.4					Nib Bank	4.5			
LogIB	CBE	4.7	4.0	7.0	0.0	LogIB	CBE	4.7	9.5	7	0.0
	United Bank	4.0					Nib Bank	3.0			
Comparison between CBE and Zemen bank						Comparison between CBE and Abay bank					
LogATM	CBE	3.0	40.9	7.0	0.0	LogATM	CBE	3.0	7.3	7.2	0.0
	Zemen Bank	2.0					Abay Bank	1.6			
LogPOS	CBE	3.9	9.1	8.6	0.0	LogPOS	CBE	3.9	13.2	14.0	0.0
	Zemen Bank	1.4					Abay Bank	1.9			
LogMB	CBE	6.3	12.0	14.0	0.0	LogMB	CBE	6.3	4.1	14.0	0.0
	Zemen Bank	3.3					Abay Bank	4.9			
LogIB	CBE	4.7	4.0	14.0	0.0	LogIB	CBE	4.7	4.7	14.0	0.0
	Zemen Bank	3.8					Abay Bank	3.5			

Source:- Own computation SPSS (2025)

4.4.2 The comparison digital utilization among their customer

The analysis of this study was based on the percent of digital user among all customer. For example mobile banking user was calculated by the customer of mobile banking used divided by all customer of bank multiply by 100. The rest internet banking was done similarly.

Table 8:- t test result of CBE and Dashion bank with respect to number of customer

Variable		Mean	t	df	Sig.
The ratio of MB to number of customer	CBE	12.92	-.834	14	.418
	Dashen	20.00			
The ratio of IB to number of customer	CBE	.0075	-2.399	14	.031
	Dashen	19.875			

Source:- Own computation SPSS (2025)

The mobile banking independent t test result as shown in table 8 indicates that the value of p is 0.418 is greater than the significance level $\alpha = 0.05$, we can accept the null hypothesis and reject the alternative. Based on the results, we can state that there was not a significant difference in mean mobile banking between public bank and Dashen bank. The average mobile banking for public bank was 7.08 less than the average for Dashen bank as described above.

The finding of internet banking indicates that there was a significant difference in mean between public bank and Dashen bank. The average internet banking for public bank was 19.87 less than the average for Dashen bank as described above. This result indicates private bank has better performance compared to public bank. The rest six banks are described on the following table and discussed below.

Table 9 The digital bank user to the total customer ratio in percent

Variable	Institution	Mean	t	df	Sig.	Institution	Mean	t	df	Sig.
	The digital bank user to the total customer ratio in percent					The digital bank user to the total customer ratio in percent				
The ratio of MB to number of customer	CBE	12.9	-0.3	13.6	0.8	CBE	12.9	-1.2	14.0	0.2
	Abysinia	13.9				Wegagen	25.0			
The ratio of IB to number of customer(%)	CBE	0.0	1.0	14.0	0.3	CBE	0.0	-1.5	14.0	0.2
	Abysinia	0.0				Wegagen	0.3			
The digital bank user to the total customer ratio in percent						The digital bank user to the total customer ratio in percent				
The ratio of MB to number of customer(%)	CBE	12.9	-3.2	14.0	0.0	CBE	12.9	2.7	12.1	0.0
	United bank	41.6				Nib bank	6.3			
The ratio of IB to number of customer(%)	CBE	0.0	-7.0	14.0	0.0	CBE	0.0	1.0	14.0	0.3
	United bank	2.6				Nib bank	0.0			
	The digital bank user to the total customer ratio in percent					The digital bank user to the total customer ratio in percent				
The ratio of MB to number of customer(%)	CBE	12.9	1.7	13.3	0.1	CBE	12.9	-1.2	14.0	0.3
	Zemen bank	7.4				Abay	19.1			
The ratio of IB to number of customer(%)	CBE	0.0	-8.1	14.0	0.0	CBE	0.0	-2.6	14.0	0.0
	Zemen bank	15.4				Abay	0.5			

Source:- Own computation SPSS (2025)

The rest bank like bank of Abysia, Wegagen bank, United bank, Nib bank, Zemen bank and Abay bank result were displayed on the table 9

Abysinia bank and CBE did not have significant difference on the utilization of digital bank like mobile banking and internet banking . Similarly there is no significant difference between wegagen bank and CBE in the case of mobile and internet banking. The CBE has a better performance compared to wegagen bank.

United bank a significant difference compared to CBE based on their customer. The utilization of digital banking based on the number of customer United bank has better performance. Similarly in the case of internet banking has not a significant difference between CBE and nib bank. But mobile banking has a significant difference between CBE and nib bank. CBE has better performance in the mobile banking case.

Zemen bank has significant difference compare to CBE but in the case of mobile bank, there are no significant difference. The utilization of internet banking, Zemen bank has very high significant difference. Similarly in the case of internet banking, there are a significant difference between CBE and abay bank. In internet bank case abay bank has well performance. In the case of internet bank, Zemen bank has significant difference compared to CBE. Mobile banking has not significant difference between CBE and Abay bank.

4.5 Comparison of Profitability of banks

Table 10:- Description of t-test result of profitability

Variable		Mean	t	df	Sig	Profitability		Mean	t	df	Sig
	ROA comparison						ROA comparison				
ROA	CBE	1.71	-1.6	9.7	0.1	ROA	CBE	1.71	-1.95	10.43	0.079
	Abysinia	2.25					Dashion bank	2.38			
ROE	CBE	35.14	2.0	13.0	0.1	ROE	CBE	35.14	1.78	13	0.098
	Abysinia	19.25					Dashion	21			
	ROA comparison						ROA comparison				
ROA	CBE	1.71	-1.1	13.0	0.3	ROA	CBE	1.71	-2.3	10.7	0.0
	United	2					Nib bank	2.5			
ROE	CBE	35.14	2.2	13.0	0.0	ROE	CBE	35.14	2.2	13.0	0.0
	United	17.75					Nib bank	17.63			
	ROA comparison						ROA comparison				
ROA	CBE	1.71	-4.1	13.0	0.0	ROA	CBE	1.71	-3.8	10.7	0.0
	Zemen	3.5					Abay	3			
ROE	CBE	35.14	1.5	13.0	0.2	ROE	CBE	35.14	1.9	13.0	0.1
	Zemen bank	23.5					Abay	19.75			
	ROA comparison										
ROA	CBE	1.71	-0.8	12.3	0.4						
	Wegagen	2.13									
ROE	CBE	35.14	2.6	13.0	0.0						
	Wegagen	14.25									

Source:- Own computation SPSS (2025)

As described on the table 10 the comparison of profitability between public bank and private bank were explained as follows. The mean result of return on asset of Dashen

bank is greater than CBE indicates that the proportion of their profit of their total asset of Dashen bank is better. In the case of ROE, CBE greater than Dashen bank. This result indicates that CBE has more their own capital.

ROA is a better measure to determine the financial performance of a company. Higher ROE can be misleading with lower ROA and huge debt carried by the company. In this study using independent t test ROA result as shown in table 9 indicates that the value of p is 0.079 is greater than the significance level $\alpha = 0.05$, we can accept the null hypothesis and reject the alternative. Based on the results, we can state that there was not a significant difference between CBE and Dashen bank. The result indicates that the mean difference of Dashen bank is greater shows better performance but not significant. ROE result indicates that there was not a significant difference between CBE and Dashen bank. This better of CBE come because of lower debt compare to private bank.

The ROA of the rest 6 bank indicated that namely Abysinia, Wegagen, United, Nib, Zemen and Abay bank profitability indicates better than commercial bank of Ethiopia because the mean difference of all private bank have greater result and in T-test result also indicates three of them have significant difference namely Zemen, Abay and Nib banks and the rest Abysinia, Wegagen and United bank have not significant different. Similarly ROE result of namely Wegagen, United and Nib bank have a significant difference compared to CBE and the rest Abysinia, Zemen and Abay bank have not significant difference with CBE. In the case of ROE, CBE has better performance.

4.6 Discussion on the comparative study

The head office employee of both public and private bank has similar job experience on the stay. The salary of the employee compare to other governmental organization, it was better and high difference.

The use of technology based on primary data, there were not significantly difference indicates both public and private bank have similarly utilization of technology. Even though t test result indicates not significant difference between public and private bank, the interview result indicates that private bank use more advanced technology and public

bank use more numerically use more technology. The similar comparative relationship also reflected in the study of other scholars Chandna, (2016) finds contradict that the usage of technological services such as ATMs, indicates higher among private sector bank customers compared to those of public sector banks. This happen because of more advanced of indian private bank compare to public bank of Ethiopia.

The finding by utilizing primary data on head office employee, the utilization of ATM has not significantly different but in public bank has slightly better. But the finding in secondary data indicates significantly different that means public bank has better utilization of ATM. The difference come from the number of Dashen bank customer cannot be compare with CBE(public bank) because CBE has huge number of customer. The similar comparative relationship also reflected in the study of other scholars Chandna, (2016) finds contradict that the usage of technological services such as ATM indicates higher among private sector bank customers compared to those of public sector banks. This happen because of more advanced of India private bank compare to public bank of Ethiopia.

By using primary data of head office employer, utilization of mobile banking in public bank has great different compared to private bank. Similarly the finding on the secondary data also shows the same result. This result may cause by the number of customer of internet banking in public bank shift to the mobile banking by the reason of network problem and also more educated employer paid their salary on the public bank caused the difference.

The pos machine using the primary data of the head office employee result indicates that there was not significantly difference between public and private bank. This result indicates the costumer numbers related to total customer number are no different between public and private bank. But in the case of secondary data, there were significant difference between public and private bank. This means that the comparison between CBE and Dashion bank have very high difference on the utilization of pos machine. .

The internet bank study using the primary data result indicates that there was no significant difference between public and private bank. This result indicates the number of internet bank user customer with total customer is proportionally similar, there were no difference between public and private bank on using internet bank. When we come to secondary data, there was no significant difference between public and private bank. This result also can be happen because of the public bank internet bank user shift to mobile banking. The shift to mobile banking reduces the number of customer using internet banking in public bank. The similar comparative relationship also reflected in the study of other scholars Singh et al, (2019) finds private sector internet banking customers experienced more advantages compared to those using public sector services.

The bank utilizes less labor intensive result indicates that there were significant differences between public and private bank. This result indicates that, public bank is more labor intensive than private bank. The private bank use less labor meaning public use more labor based. The other variable, the bank recreating young employee result indicates that there were not significant different between public and private bank. This result indicates that both public and private bank use similar age employee. The interview response result indicates that both public and private bank recreated young employee.

The finding by using the utilization of digital bank on mobile banking and internet banking to the total number of customer of each bank indicates that there was a significant difference in mean between public and Dashen bank. The average internet banking for public bank was 19.87 less than the average for Dashen bank. This result indicates private bank has better performance compared to public bank.

The finding of profitability measured by ROA of three banks namely Zemen, Abay and Nib banks have a significant difference compare to CBE and the rest Abysinia, Dashen, Wegagen and United bank have not a significant different compared to CBE. The mean differences are CBE has greater indicates public bank has better performance. The similar finding of comparative relationship also reflected in the study of other scholars Wondowessen (2016) and Mohan and Ray (2004) finds contradict that public banks are better in performance than privately owned banks. This happen may be because of private

bank use more sophisticated machine and also in public bank servise quality is low because of this most private organization prefer private bank.

The finding of profitability measured by ROE, CBE has a significant difference compered to private bank namely Wegagen, United and Nib bank. The rest also public bank has not a significant difference compared to private bank namely Abysinia, Dashen, Zemen and Abay banks. This finding indicates that the mean difference of CBE has high meaning CBE has high performance. This performance indicates that private bank have more debt than the public bank. This is differ compare to ROA. Therefore, for this study ROA is the best measurement. The similar finding of comparative relationship also reflected in the study of other scholars Wondowessen (2016) and Mohan and Ray (2004) finds that public banks are better in performance than privately owned banks.

4.7 The result of multiple Regression Result

4.7.1 The diagnostic tests

Every estimator of the model should have to meet the panel linear model with fixed effect and random effect model. If the estimators of the model satisfy the OLS assumption, it is possible to say the estimators are blue (best linear unbiased estimator) (Brooks, 2008). The econometric estimation technique that used in this study is linear regression fixed effect and random effect model. The diagnostic test in this research is described as follows:-

The Normality test

The normality distribution of residual was used to check the distribution of normality by applying the Skewness test for normality. Table 3 below presents the value of probability of skiwness test normality is 0.178 which is greater than 0.05 implying significance at a 5% level Consequently, the null hypothesis cannot be rejected. Therefore, according to the Skewness test for normality, residuals show normal distribution.

Table 11:- Test of normality

Test		Adj chi2	pro
Normality	Skewnes test normality	3.45	0.178

Source: Own estimation of research data Stata(2025)

The Multicollinearity test

The term Multicollinearity refers to a linear relationship between explanatory variables, which may cause the regression model, biased (Gujarati, 2004).

In most cases, before moving to the evaluation and analysis of the model, often check whether there is a multicolinearity problem between the description variables. Most economic metrics show that they lead to a high standard error with a high level of multicolinearity which is a very problem. (Gujarati, 2004). If an explanatory variable is an exact linear combination of the other explanatory variable, then we say the model suffers from perfect co linearity and it cannot be estimate by OLS (Brooks 2008).

Perfect multicollinearity is usually observed when the same description variables are used twice in regression without intended. This assumption can care for independent variables, but it does not have to be completely correlated. However, the correlation is not clearly defined as long as it causes multiple public offering. While Hair et al (2006) explained correlation coefficient below 0.9 cause serious multicollinearity problem. Hence,the study correlation four the variables described below in the table was estimated. The explained results correlation matrix show that the highest correlation was 0.4211 which is between internet banking and posm.

Table 12:- Correlation matrix between predictor variables

	LogATM	LogMB	Ib	posm
LogATM	1			
LogMBCU	0.2084	1		
Ibcu	0.0091	0.2084	1	
poscu	-0.0783	-0.0969	0.4211	1

Source: Own computation stata (2025)

The Heteroscedasticity test

Brooks (2008), defined the Heteroscedasticity as the error terms have not a constant variance. If in the study Heteroscedasticity occur, the ordinary least square method are inefficient and hypothesis testing is no longer reliable or valid, as it was underestimate the variances and standard errors. There are several tests to detect the Heteroscedasticity problem, which are Park Test, Glesjer test, Breusch-Pagan-Goldfrey test, White's test and Autoregressive Conditional Heteroscedasticity (ARCH) test. In this study, the Breusch-Pagan employed to test for the presence of Heteroscedasticity.

As shown in the table 13 Evidence showed that there are not present the heteroskedasticity problem in the ROA with significant p-values greater than five percent and in the model ROE, there is a problem of hetrosedasticity problem. To remove the problem of hetrosedasticity, we use robust. Table 13 presents a summary of the test for heteroskedasticity.

Table 13:- Heteroskedasticity Tests

Test		Ethiopian Banks	
		For model ROA	For model ROE
Hetroscedasticity	chi(i)^2	1.19	8.19
	Prob>chi2	0.2748	0.0042

Autocorrelation

To autocorrelation problem of the study, the Durbin and Watson were undertaken and whose value were starts from 0 and ends at 4. The results approaching to 0 indicates positive autocorrelation. In the Kassa (2013) cited in the study by Assfaw (2019b), the autocorrelation problem decided rules explain that there was no positive or negative autocorrelation when the value is $1.765 < d < 2.235$ and there were positive autocorrelation not be an issue when the result varies $1.335 \leq d \leq 1.765$. The test result showed the occurrence of positive autocorrelation in the model. Hence as indicated in table 14 the value of Durbin-Watson statistics model result 1.7 for ROA and 1.81for ROE which has no problem of autocorrelation.

Table 14:- Test of autocorrelation

Test		**ROA**	**ROE**
Autocorrelation	Durbin Watson test	1.698515	1.81
	Border	2	2

Choosing Fixed Effect vs Random Effect Models

The effects of digital banking system on banks performance in Ethiopia are specified and the model is as formulated in chapter three. The organized data are estimated based on the panel model, which includes cross sectional and time series dimensions for 8 Banks of Ethiopia over the period 2016 to 2023. Fixed effects and random effects models are commonly used models for the panel data. In order to choose fixed or random effect model a formal test so called hausman test has used which is based on the null hypothesis states as: Ho: Random effect model is appropriate and H_1:Random effect model is not appropriate or FE model is appropriate. The decision rule is when the prob>chi2 or the P-value is greater than the given level of significant (usually 5%), then we fail to reject the null hypothesis (Ho), thus random effect model is appropriate. On the other hand, if the P- value is less than a given level of significant or 5% we reject the null or the fixed effect model is appropriate (Woodridge, 2006).

The Hausman Test

Ho: Random effect model is appropriate. If P-value>5%, we fail to reject the null

Ha: Fixed effect model is appropriate. If P-value<5%, we reject the null.

Table 15:- Hausman test

Performance	ROA hausman test		ROE hausman test	
	Test	probability	Test	probability
Hausman test	Chi2(5.20)	0.2771	Chi2(0.4)	0.9814

Sowrce:- own estimation Stata(2025)

Table above shows Hausman test, the P-value of the model ROA and ROE are 0.2771 and 0.9814 as shown in the table above which is greater than 5%. Hence, the null hypothesis accept and reject the alternative for both model indicates that random effect model is the appropriate model. This implying that, random effect model is more appropriate equation.

4.7.2 Regression Result and Its Interpretation

This section presents the regression result of random effect model that made to examine the effects of digital banking system on banks performance: a comparative study on public & private commercial banks. Accordingly, the regression result is done by stata software. As stated earlier in model selection that is Hausman test, random effect regression model is an appropriate model in this study.

The coefficients of explanatory variable estimated by the use of linear regression technique, the regression result in Table demonstrates both coefficients of explanatory variables and corresponding p-values.

As described earlier, there were the problems with heteroscedasticity in the second model of ROE. To alleviate these issues estimations on the random effect model were

functional. Then, the estimation results of the linear regression model on effect of dig54italization in bank performance are presented in Table 16.

Table 16:- Summary result of random effect model of private bank

Variable	ROA regresion result				ROE robust regresion result			
ROA	Coef.	Std. Err.	z	P>z	Coef.	Std. Err.	z	P>z
LogATM	-0.26785	0.21043	-1.27	0.203	0.095993	0.034683	2.77	0.006***
LogMB	-0.16195	0.176186	-0.92	0.358	-0.0978065	0.058225	-1.7	0.093*
Ibcu	0.018968	0.009373	2.02	0.043**	0.0049155	0.002414	2.04	0.042**
pos	9.847033	2.455416	4.01	0***	-0.0012044	0.875318	0	0.999
_cons	2.799455	0.46562	6.01	0***	1.147972	0.076526	15	0***
R squar within	0.2286				0.0866			
R squar between	0.6293				0.429			

Note: *** significant at 1% ** significant at 5% * significant at 10%. Source: Researcher's computation with STATA, 2025

Table 16 shows that the internet banking of private bank has positive and significant effect on the ROA of banks at less than 5% level of significance. The result of random effect regression model shows, being other factors held constant, an internet banking user increase by 1 customer leads to profitability of bank(ROA) increased by 0.019 birr. This result indicates that internet banking change dramatically on the performance of private banks in Ethiopia. The utilization of internet banking leads to raise the performance of banks. This result indicates that internet banking has effect on the raising performance of bank. The user of internet banking leads to improve the performance of banks because digitalization reduces the cost of bank to improve profitability. The finding of Abera (2024) was not similar to this study. He finds that internet banking has not significant effect on the performance of banks.

In the case of Posm, it has positive and significant effect on the ROE of banks. The result of random effect regression model shows that, being other factors held constant, a posm banking user increase by 1 unit leads to profitability of bank(ROA) increased by 9.85 birrs.

Persistent with the hypothesis, ATM was found to have a positive and significant effect on the profitability (ROE) of private banks at less than 1% level of significance. The result of robust random effect regression model indicates that an ATM increase by 1 unit, being other factors held constant, 0.096 birr increase on the private bank performance (ROE). This result indicates that ATM has effect on the raising performance of bank. The user of ATM banking leads to improve the performance of banks because those digitalization reduce the cost of bank to improve profitability. The finding of Abera (2024) was similar to this study. He finds that ATM has a significant effect on the performance of banks. Therefore ATM has great effect on the profitability and also reduces the time waiting to get money in the bank.

As explained with the expectation of the study, mobile banking has a significant negative effect on the profitability(ROE) of private bank at less than 10% level of significance. This result of robust random effect regression model indicate that as an increase in mobile banking increase by 1 customer being other factors held constant, results in 0.098 birr decrease in banks' profitability(ROE). This study finding with the finding of Bousrih (2023) were similar meaning mobile banking has negative and significant effect on the performance of bank. This result indicates that most customer may back to the tradition way of transaction in the utilization of mobile banking. In addition to this, The finding of Abera (2024) was not similar to this study. He finds that mobile banking has negative and insignificant effect on the bank performance.this result shows when the profitability increase, the number of customer used mobile banking decrease. This result may be happen by the level of education of customer.

Table 16 shows that the Posm has positive and significant effect on the ROE of private banks at less than 1% level of significance. The result of robust random effect regression model shows, being other factors held constant, a posm increase by 1 customer leads to profitability of private bank(ROE) increased by 0.005 birr. The result indicates that posm change dramatically on the performance of banks in Ethiopia. The utilization of Posm leads to raise the performance of banks.

Table 17:- Summary result of public bank

Variable	ROA regresion result				ROE regresion result			
	Coef.	Std. Err.	t	P>t	Coef.	Std. Err.	t	P>t
LogATM	0.3528992	0.182241	1.94	0.068*	0.112387	0.057243	1.96	0.064*
LogMB	-0.4010134	0.219542	-1.83	0.084*	-0.132302	0.068959	-1.92	0.07*
Ib	0.0250511	0.008455	2.96	0.008***	0.005047	0.002656	1.9	0.073*
posm	7.604419	6.663797	1.14	0.268	4.106008	2.093137	1.96	0.065*
cons	3.564311	0.563401	6.33	0	1.275571	0.176968	7.21	0***
R squar	54.8				52.66			
F stastics	4.7				6.3			
Prob>F	0.008				0.001			

Note: *** significant at 1% ** significant at 5% * significant at 10%. Source: Researcher's computation with STATA, 2025

Table 17 shows that the ATM has positive and significant effect on the ROA on public banks at less than 10% level of significance. The result of regression model shows, being other factors held constant, ATMr increase by 1 leads to profitability of bank(ROA) increased by 0.35 birr. This result indicates that ATM banking change dramatically on the performance of banks in Ethiopia. The utilization of ATM banking leads to raise the performance of banks. Similarly ATM increase by one unit keeping other factor constant ROE increased by 0.11 birr. This result indicates that ATM has effect on the performance of public bank.

In the table 17 shows that the mobile banking has negative and significant effect on the ROA on the public banks at less than 10% level of significance level. The result of regression model shows, being other factors held constant, mobile banking increase by 1 customer leads to the performance of bank(ROA) decreased by 0.40 birr. Similarly mobile banking increased by one unit being other factors held constant performance of public bank(ROE) decrease by 0.13 birr. This result indicates that mobile banking did not change as expected on the performance of banks in Ethiopia. This result indicates that most customers may back to the tradition way of transaction in the utilization of mobile banking. In addition to this, the finding of Jihen Bousrih (2023) was similar to this study but the finding of Abera (2024) was negative and insignificant.

In the case of internet banking, it has significant effect at 1% level of significance. Internet banking has positive and significant effect on the ROA of public bank. The result of regression model shows that, being other factors held constant, an internet banking user increase by 1 unit leads to performance of public bank(ROA) increased by 0.025 birrs. Similarly internet banking increased by one unit other factor keeping constant performance of public bank(ROE) increased by 0.005 birr. This result indicates that internet banking has effect on the improvement of bank performance.

Comparative effect of public and private bank

Comparatively ATM , internet banking and posm has highly significant effect on the private bank performance. In the case of mobile banking, both public and private bank have negative and weakly significant effect on the bank performance. In the case of public bank, almost all are significant effect at the level of 10% significant level. This result indicates that private bank have more effect on the performance of private bank. this result did not indicate the amount of money. It is the performance of bank based on their available digital banking with respect to profitability performance.

CHAPTER – FIVE

5. Summary, Conclusion and Recommendation

5.1 Summary of findings

The purpose of this study aimed at finding the effects of digital banking system on banks performance a comparative study on public & private commercial banks. In this regard an attempt has been made to compare between public and private bank by using both primary and secondary data. A comparative study on public & private banks, using primary data on the head office employee of both public and private banks has been used. Among 178 distributed questionnaires 42 from public bank and 122 from private bank totally 164 questioner were returned, yielding an approximately 92 percent response rate. The secondary data was used in eight year annual balanced data. The study has a time series segment spanning from the period 2016 up to 2023 considered one public and seven private banks in Ethiopian.

The following are the major findings with regards to the effects of digital banking system on banks performance a comparative study on public & private commercial banks.

The head office employee of both public and private bank has similar job experience on the stay. The salary of the employee compare to other governmental organization, it was better that means there were high difference on the payment.

Individually between public and private bank has significantly different between public and private bank on ATM use. In the case of group there were not significantly different between public and private bank. In the case of mobile banking, In the case of individually and in group, mobile banking has significantly different between public and private bank. Public bank has more capacity on mobile banking.

Pos machine in group both bank has similar capacity but individually public bank has significant different compared to private bank. The use of internet bank has no significant different between public and private bank. This result also can be happen because of the

public bank internet bank user shift to mobile banking. The shift to mobile banking reduces the number of customer using internet banking in public bank.

Comparatively ATM , internet banking and posm has highly significant effect on the private bank performance. In the case of mobile banking, both public and private bank have negative and weakly significant effect on the bank performance. In the case of public bank, almost all are significant effect at the level of 10% significant level. This result indicates that private bank have more effect on the performance of private bank.

The mean of ROA of private banks have higher compared to the public bank. Therefore profitability of private bank has comparatively better performance compare to the public bank.

The digital bank system use ATM, Pos machine, mobile banking and internet banking. When we use dependent variable ROA, the finding was internet banking and posm have positive and significant effect on the performance of bank. The rest two ATM and mobile banking have negative and insignificance effect on bank performance.

Similarly when the dependent variable was ROE, ATM and internet banking have significant and positive effect on the bank performance. Mobile banking has significant and negative effect on the bank performance. The rest variable Posm was not significant effect on bank performance.

5.2 Conclusion

Economic development of any country is mainly influenced by the growth of the banking industry are the main factor. The analysis of eight banks of Ethiopia individually in secondary data and in groups in primary data reveals the following result using t test model. The above analysis provides that the public and private sector bankers accorded importance to various measures of t test model. An overview of all the measures, such as ATM, mobile banking, internet banking and posm brings out that from all sectors considered more important for measuring the performance of the banks. The researcher has taken Public Sector Banks and Private Sector Banks for evaluation and the study

reveals the following results. The individual private bank study with Public bank, public bank has significant difference compare to Private sector banks except Dashen bank in the case of internet banking but based on the percent of digital utilization case private bank has better performance. In group study, the result of ATM, internet banking and pos machine has not significant difference between private and public bank indicates that based on the number of customer use digital bank similarly. But in the case of mobile banking public bank has significant difference compare to private bank. Finally as a whole, individually observed that public Bank on the digital bank performed better than private bank and in the group both banks have similar capacity on digital bank utilization performance. In the case of profitability, private banks have better performance compared to public bank. The regression result indicates that Comparatively ATM , internet banking and posm has highly significant effect on the private bank performance. In the case of mobile banking, both public and private bank have negative and weakly significant effect on the bank performance. In the case of public bank, almost all are significant effect at the level of 10% significant level. This result indicates that private bank have more effect on the performance of private bank. Digitization has an effect on the performance of Ethiopian banks based on the study's findings.

5.3 Recommendation

Based on the finding and conclusions the study recommends the following which will be helpful for the banks.

The private bank individually did not compare with public bank of Ethiopia; therefore we recommend that different private bank may unite to become competitive in the financial market.

Among the customer utilized digital bank in public bank is weak. Therefore we recommended that public bank create awareness for their customer.

The utilization of digitalization changes the financial institution dramatically but on the effective use of the system varies from bank to bank. Therefore we recommend that the utilization of digital banking may use as possible equally in all banks.

Utilization of digital bank reduce the wasting time to get money in bank, therefor we recommend that all bank teach how use the technology in different way.

The use of mobile banking, most customers was registered but not further use the technology on the transaction. Therefore from the bank, the customer may need training how to use mobile banking.

Further research direction

Recommendation for further study: As this study identified are not all variables in digitalization and also can be done with macro variable. The other variable like:- in digitalization debit card and also on macro inflation and exchange rate can be included in further research.

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APPENDIX I:- QUESTIONER

Back ground information of the chilled Respondents

Sex: Male □ Female □

2. Age less than 30 □ 31-40 □ 41-50 □ above 50 □

3. Marital status Single □ Married □ Divorced □ Widowed □

4. Education status: - PhD □ MSc/MBA □ BSC/BA □ Diploma □ Other □

5. Position: - manager □ expert □ others □

6. How long have you been serving this organization? ……. Year.

7. Salary per month ……. Birr.

Questions related to work of government and private bank comparison

This questionnaire is prepared based on a five point Likert scale. Please indicate to what extents do you agree or disagree with the following statements. If the statement strongly matches with your response, choose ***5(Strongly Agree)***, if you discreetly agree on the idea, choose ***4(Agree)***, if you do not have any response on the point, choose ***3 (Neutral)***, if you discreetly disagree with the statement, choose ***2 (Disagree)*** and if you completely differ with the statement, choose ***1 (Strongly Disagree)***.

1. Questions about public bank in Ethiopia

Survey Statement	Strongly Disagree(1)	Disagree(2)	Neutral(3)	Agree(4)	Strongly Agree(5)
The level of usage of technology					
The bank use technology					
The bank used ATM					

The bank used mobile banking well					
The bank used pos machine well					
The bank used internet banking well					
The bank is less labor intensive bank					
The bank has more Problem regarding use of online banking.					
The bank has lack of attention or improving behavior of bank employee.					

Question replied by interview are listed as follows

1. How you describe the using habit of digital banking system in your organization(bank)**?**
   ……
   ……
   ……..
2. Which customer most of the time used digital banking based on the age distribution? why?
   ……
   ……
   ……
   ……
3. Is marital status of the customer has effect on the using of digital banking system? why?
   ……
   ……
   ……
   ……
4. Did the level of education have effect on the use of digital banking system? If the answer is yes what do you think the solution for lowest level educated?……

……
……..

5. Do you thing the level of profit increase or not compare to previous one?……
……
……..
6. Do you think the number of employee increase or not with compare to the previous that means without digital banking? why**?**
……
……
……
7. Do you think which bank is more digital banking user government or private bank? why?
……
……
……
8. What is the problem regarding to digital banking use?
……
……
……..
9. Other if you have**?**
……
……
……
……

APPENDIX II:- SECONDARY DATA

Organization	year	ROA	LogROE	LogATM	posm	Ib	LogMB
Dashen bank	2016	2.7261	1.3645	2.2095	0.0635	0.2591	-1.0966
Dashen bank	2017	2.3927	1.3133	2.2648	0.0664	0.5646	0.0101
Dashen bank	2018	2.3209	1.2752	2.3118	0.0545	0.6677	0.0932
Dashen bank	2019	2.0007	1.2040	2.4843	0.0470	1.2342	0.3757
Dashen bank	2020	2.4697	1.3070	2.5551	0.0606	17.1757	1.2349
Dashen bank	2021	2.1186	1.2724	2.5966	0.0574	32.7505	1.5152
Dashen bank	2022	2.7422	1.3748	2.6064	0.0518	51.5597	1.7123
Dashen bank	2023	3.1535	1.4355	2.6064	0.0455	54.3166	1.7349
Bank of Abysinia	2016	2.3647	1.2631	1.6902	0.0109	0.0100	0.4376
Bank of Abysinia	2017	2.7059	1.3556	1.9031	0.0241	0.0108	0.8260
Bank of Abysinia	2018	1.9641	1.1971	2.0569	0.0260	0.0097	1.1570
Bank of Abysinia	2019	2.1802	1.2279	2.0719	0.0267	0.1428	1.3212
Bank of Abysinia	2020	1.7537	1.2006	2.2355	0.0285	0.3557	1.3852
Bank of Abysinia	2021	1.6697	1.2726	2.7903	0.0100	0.0291	1.0891
Bank of Abysinia	2022	2.5549	1.4518	3.0730	0.0224	0.2805	1.1749
Bank of Abysinia	2023	2.9382	1.5125	3.0973	0.0123	0.2466	1.1694
United bank	2016	2.1436	1.2562	1.9868	0.0344	0.0667	0.1564
United bank	2017	1.9489	1.2211	2.1303	0.0351	0.0609	0.2103
United bank	2018	2.2976	1.3217	2.2967	0.0392	0.0538	0.2396
United bank	2019	1.8402	1.2361	2.2967	0.0279	0.0423	0.8719
United bank	2020	2.2591	1.2857	2.3979	0.0219	0.0370	1.3036
United bank	2021	2.1326	1.2429	2.4728	0.0159	0.4664	1.6656
United bank	2022	1.7961	1.2013	2.4713	0.0168	0.5348	1.7692
United bank	2023	2.0655	1.2620	2.4742	0.0194	0.5558	1.8024
Wegagen bank	2016	2.5124	1.1581	1.8261	0.0277	2.4780	1.1460
Wegagen bank	2017	2.8658	1.2374	1.8388	0.0237	2.8915	1.2525
Wegagen bank	2018	3.2832	1.3443	1.8388	0.0375	3.5611	1.4094
Wegagen bank	2019	2.1727	1.1845	1.8388	0.0458	3.4588	1.4713
Wegagen bank	2020	2.4488	1.2478	2.0719	0.0462	3.8750	1.5617
Wegagen bank	2021	0.3257	0.3986	2.0719	0.0603	0.5698	1.7688
Wegagen bank	2022	1.3322	1.0160	2.1335	0.0381	1.6323	1.8442
Wegagen bank	2023	1.5321	1.0767	2.2122	0.0402	1.8792	1.9048
NIB bank	2016	2.6802	1.2202	1.3010	0.0297	0.1181	0.4118
NIB bank	2017	2.4065	1.2097	1.8388	0.0114	0.1049	0.3846
NIB bank	2018	2.1583	1.2110	2.1614	0.0108	0.1041	0.5652
NIB bank	2019	2.3864	1.2672	2.2253	0.0276	0.1692	0.5836
NIB bank	2020	2.7399	1.3111	2.2304	0.0360	0.1350	0.7017
NIB bank	2021	2.5172	1.2759	2.2304	0.0334	0.1245	1.0055

NIB bank	2022	2.3142	1.2453	2.2945	0.0222	0.1099	1.0241
NIB bank	2023	2.6613	1.3060	2.3997	0.0167	0.0868	1.0384
Zemen bank	2016	3.3109	1.3609	1.6021	0.0121	8.5330	0.5936
Zemen bank	2017	2.9266	1.3331	1.7482	0.0422	6.8179	0.4652
Zemen bank	2018	2.4462	1.2480	1.7709	0.0585	21.2503	0.5991
Zemen bank	2019	3.5600	1.3750	1.7993	0.0547	18.6696	0.5610
Zemen bank	2020	4.4546	1.4330	1.8325	0.0639	14.9593	0.4809
Zemen bank	2021	4.3654	1.3988	1.8976	0.1703	13.2206	0.5021
Zemen bank	2022	4.8988	1.4392	2.0000	0.1508	17.9173	1.2619
Zemen bank	2023	5.6336	1.4998	2.0000	0.2198	20.7128	1.3091
Abay bank	2016	2.7303	1.2440	1.0000	0.0031	0.3718	0.9729
Abay bank	2017	2.3409	1.1864	1.2041	0.0140	0.3586	0.9114
Abay bank	2018	3.0164	1.3092	1.4472	0.0095	0.4387	0.8020
Abay bank	2019	3.6571	1.3719	1.5798	0.0109	0.5177	1.0513
Abay bank	2020	2.8389	1.2570	1.8325	0.0083	0.5101	1.1982
Abay bank	2021	3.3749	1.3647	1.8751	0.0063	0.4904	1.3951
Abay bank	2022	2.6403	1.2674	1.9956	0.0043	0.6594	1.5932
Abay bank	2023	3.0363	1.3281	2.2095	0.0031	0.6437	1.5886