Factors that Determine Digital Financial Inclusion in Banking industry. The case of sample selected Commercial Banks in Ethiopia.

Thesis submitted to Addis Ababa University College of Business and Economics in Partial fulfillment of requirements for master`s program, MSc in Management.

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Declaration

I hereby declare that the research work entitled **"Factors that Determine Digital Financial Inclusion"** the case of sample Commercial Banks in Ethiopia, under the advisory of Meskerem Mitiku (Ph.D) member of the University, and submitted in partial fulfillment of MSc in Management, this research work report has not been submitted any Universities or Institutions for award of degree.

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January 25, 2024 G.C

Statement of Certificate

This is to certify that **Thomas Kassa** has carried out his thesis work on the topic entitled **"Factors that Determine Digital Financial Inclusion in Commercial Banking Sector of Ethiopia"** under my guidance and supervision. I here assure that his work is appropriate to be submitted for examination with my approval as a thesis.

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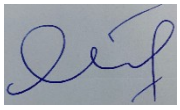
Abera Legesse (Ph.D)		29/02/2024 G.C
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Acronyms

DFI---------- Digital financial Inclusion

DFS----------Digital financial services

DPS----------Digital payment system

DF----------Digital finance

FS----------Financial services

FI----------Financial Inclusion

NBE---------- National bank of Ethiopia

AB ----------Awash Bank

BOA ----------Bank of Abyssinia

CBE----------Commercial Bank of Ethiopia

CBO----------Cooperative Bank of Oromia

DB----------Dashen Bank

WB ----------Wegagen Bank

WB ----------World Bank

MFI ----------Micro finance institution

MNO ----------Mobile Network Operator

MMS----------Mobile Money Services

GSMA----------Global system for Mobile association

ATM ----------Automatic teller machine

CGAP ---------- Consul. Grou. Ass. Po, (World Bank Group)

CSIS----------Center for strategic and international studies

ICF----------International Finance Corporation

IMF ----------International Monetary Fund

Abstract

Digital financial inclusion makes formal financial services digitally accessible and accessible to marginalized and underserved populations. Such services should be tailored to the needs of consumers and delivered responsibly. Costs are affordable for consumers and fair for providers. For both individuals and businesses, digitizing finance will reduce costs, open up new markets and livelihood opportunities. The study uses quantitative methods in a Descriptive and explanatory research Design, The study analyzes and measures the level of financial literacy, regulatory framework and digital infrastructures influencing to digital financial inclusion in commercial Banking sectors. Financial literacy, digital financial infrastructure and regulatory framework is significantly affecting digital financial inclusion in Commercial Banking sectors, and there is a positive correlation between dependent variable and independent variables. The survey result shows that digital financial infrastructure has highly correlated than regulatory framework next to financial literacy; this is reviled that low digital infrastructure is affect the expansion of digital financial inclusion next to financial literacy of the society. The overall finding of this study suggests that digital financial inclusion significantly affected by financial literacy level of the society, digital financial infrastructure and regulatory frameworks respectively. This study mentions that commerial Banks should be invest on these major determinanant factors, to get high return in profit and helping the economic development..

Keywords: DFI, Financial Literacy, Digital Financial infrastructure, Regulatory framework

CHAPTER ONE
INTRODUCTION

This chapter presents the introductory part of the study by describing the background of the study, statement of the problem, research question, objectives of the study, research hypothesis, Significance of study, limitation of study and scope of the studies.

1. Background of the study

Digital financial inclusion is the process of offering long-term, affordably priced digital financial services to underserved populations so they can engage with the formal financial sector of the economy. DFI is the use of and entry to formal financial services by marginalized and impoverished communities via digital means. In order to help the providers while still being accessible to the former, these services must be provided in a professional manner, personalized based on the Customer needs, and reasonably priced. (CGAP World Bank Group)

As stated by Ozili (2022) Digital financial inclusion will present many issues to regulators, particularly the bank regulator and telecoms regulator. They will face new challenges when promoting digital financial inclusion. Multiple regulators will need to communicate and collaborate with one another to find solutions to the regulatory issues, Some regulatory issues include the following: Regulatory loopholes in the regulation of e-money and digital currencies, Consumer protection issues, Weak payment system regulation and The presence of rogue and unregulated digital players in the market for digital financial services. There are digital technology-related risks arising from unexplained loss of Internet connectivity, breakdown of telecommunications infrastructure, privacy or security breach which can a major disruption in the use of digital technology.

According to CGD Policy paper 220 July (2021) ; “find that there is a digital infrastructure competition problems in Ethiopia, competition in DFI is important in the countries DF system, however Financial sector are responsible for the inadequate provision of digital Product and services in Ethiopia. The root cause of inadequate competition, & low FI through DPS, is there is not institution engaged in this sector. Inability of regulatory and supervisory bodies and the central government reluctance to support and encourage competition are the two main institutional weaknesses.

According to Ozili (2020) Financial literacy theory of financial inclusion states that financial literacy will increase people's willingness to join the formal financial sector. It argues that financial inclusion can be achieved through education that increases the financial literacy of citizens. When people become financially literate, they will seek formal financial services wherever they can find it. financial literacy can also help people become self-sufficient and help them have some stability in their personal finance. Financial literacy can help people to distinguish between needs and wants, helping them to create and manage a budget, teaching them to save so that they can pay bills when due, and to plan for retirement. Finally, governments that have limited public funds, or limited tax revenue, to fund financial inclusion programs may prefer to use financial literacy as a national strategy for financial inclusion because it is relatively cheaper to educate the population about financial management and the benefits of using formal financial services.

As stated by Ozili (2020) Some demerits of private money theory of financial inclusion include the following. One, the cost of raising private funds to fund financial inclusion projects may be too high. Secondly, funding financial inclusion programs using private money can increase private interests in financial inclusion outcomes to the detriment of poor people and the excluded population. Thirdly, there may be loss of government control over the financial inclusion infrastructure created by private investors due to partial or full private ownership by private investors.

Ibor, Offiong, and Mendie (2017) contend that all authorized parties involved should work hard to expand the number of financial access to more remote areas and create infrastructure services that support financial inclusivity. In order to address the proliferation of business enterprises, the administrator should also create suitable laws for the extension of financial Services to those who live in remote or rural areas those excluded from formal Financial services.

Current research on digital financial inclusion often fails to sufficiently prioritize the key factors influencing its success. This lack of prioritization creates several potential gaps in my understanding, including: Limited identification of essential components: Many studies simply list various factors without analyzing their relative importance or contribution to digital financial inclusion. This makes it difficult to identify the most critical areas for focus and improvement. Inconsistency in ranking factors: Existing research presents conflicting results

about the relative influence of different factors. This inconsistency makes it challenging to draw clear conclusions and hinders the development of effective strategies.

The study addressing the research gaps through Conducting in-depth studies Focus on specific determinant factors, By addressing these research gaps and implementing actionable strategies, Ethiopia can accelerate progress towards achieving greater digital financial inclusion and unlocking the economic potential of its population. The Study focused on key determinants, coupled with actionable strategies informed by research findings, hold the key for Ethiopia to unlock the transformative power of digital financial inclusion and empower its citizens economically.

This study prioritizing key determinants in this research can unlock significant advancement in Ethiopian digital financial inclusion with the potential for broader impact. It offers actionable insights while filling research gaps, paving the way for a more inclusive financial system.

Although the infrastructure supporting financial services is expanding quickly, Ethiopia's penetration rate is still lower than that of the rest of sub-Saharan Africa. thirty banks, eighteen insurance companies, and forty-three microfinance organizations.Banks added 1600 new locations in 2021–2022, bringing the number of branches to 8,944 from 7,344 total in the previous year branches. In the (NBE Annual report of 2021/2022)[1], the following banks listed as having opened more than 100 branches in a single year: Dashen Bank (252 branches), Awash International Bank (140 branches), Commercial Bank of Ethiopia (137 branches), Siinqee Bank (134 branches), Abyssinia Bank (128 branches), Oromia Cooperative Bank (121 branches), Abay Bank (112 branches), and Amhara Bank (101 branches).

1.1. Statement of the problem

All banking & financial services are now conveniently accessible to customers, the conventional idea of branch banking is nearing extinction. The vulnerable group faces a number of issues, including inadequate internet access, ATM, POS, and agent banking in remote areas; difficulty providing financial services to the unbanked population specially in developing countries like

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Ethiopia, high costs associated with accessing the devices needed for cashless transactions; and lack of digital credit access.

Until recent time Formal secondary market for financial institution shares and instruments are not started in Ethiopia, Nonetheless, NBE created a capital market and presented it to the Council of Ministers for approval in 2021 G.C. Therefore of encouraging monetary policy operations, there isn't an active interbank money market operation policies following approval of NBE directive, and there isn't a single platform for all activities. Every bank deals with other banks in order to lend money or borrow money.

The International Telecommunication Union (ITU) in Ethiopia (2022) states that one of the main issues that determine digital financial inclusion in Ethiopia is digital financial literacy. The majority of Ethiopians still visit conventional bank branches to deposit money or withdraw cash, therefore consumer acceptance of mobile banking has not significantly altered. Due to their low level of digital Literacy, a sizable portion of the populace solely uses mobile banking for a select few services. Currently, cash remains the most widely used mode of payment. Women make up only 30% of DFS users and 16% of mobile banking users (nearly 8 million) in Ethiopia. The banking sector's restrictive practices, such as transaction amount caps, combined with the absence of suitable cyber security, online governance, and consumer protection laws, impede the broader adoption of DFS.

The other factor that determines DFI in Ethiopia is absence of a digital ID and the incompatibility of DFS providers are two more restrictions on DFI. Inadequate electricity, transportation, and mobile infrastructure make it difficult to manage liquidity and have an impact on the availability of cash and electronic payments. In spite of the noticeable increase in DFS channels, particularly ATM and POS facilities, agency banking is still relatively limited. Insufficient products pose a hindrance to the uptake of mobile banking services in Ethiopia.

Researched by Wuddasie D. in (2022) "Kenya has higher than Ethiopia when compared the countries level of FI. The main difference of the two countries has Kenya have higher Financial liberalization Policy than Ethiopia, other factors of the difference are GDP, percentage people lived in rural area, these are at macro level differences, but some of the micro level differences between the two countries can be described by differences in financial literacy rates and methods of receiving payments, such as government transfers. additionally lack of documentation is another factor.

Similar study of Focusing on Ethiopia's banking industry, Debebe A. (2020) explores the reasons behind low adoption of digital financial products and services. The study uncovers limitations like: Limited financial capability: Unemployment, inflation, and varying income sources restrict access. Inflexible regulations: Government regulations hinder banks' technology adoption. Sociocultural diversity: Differences in cultural norms and educational backgrounds create barriers. To overcome these challenges, the author suggests: Government intervention: Governments should adopt policies that simplify regulations for bank technology adoption. Enhanced consumer education: Banks need to actively inform their customers about DFPS through targeted marketing campaigns.

According to CGD Policy paper 220 July (2021) ; “find that there is a digital infrastructure competition problems in Ethiopia, competition in DFI is important in the countries DF system, however Financial sector are responsible for the inadequate provision of digital Product and services in Ethiopia. The root cause of inadequate competition, & low FI through DPS, is there is not institution engaged in this sector. Inability of regulatory and supervisory bodies and the central government reluctance to support and encourage competition are the two main institutional weaknesses. Dominance of government owned companies; such as Ethio telecom and CBE, has kept digital payment service costs high, especially for low-income groups. This is because low-value transactions are subject to extremely high fees, and the cost of digital infrastructure such as mobile phones and plans is also high.”

Digital financial inclusion is becoming more and more important for both economic growth and the fight against poverty, particularly in developing nations like Ethiopia. Ethiopia has made great progress lately but it is still far from realizing widespread digital financial inclusion, pointing the most impactful factors in the Ethiopian context.

The study address main determinant factors of DFI, Filling Knowledge Gaps: Existing research often provides broad overviews of various factors influencing digital financial inclusion without adequately prioritizing their relative importance and the research specifically addresses the unique challenges and opportunities within the Ethiopian Banking sector.

The main objective of this paper is to identify which factors currently have the greatest impact on Digital Financial Inclusion in country. It seeks to learn about the current status of DFI in Ethiopia and how Sample selected commercial banks may best contribute to its advancement.

emphasis on the specified commercial banks that have played role in the advancement of DFI in Ethiopia, this paper presents the analysis of which determinant factors more influence currently DFI in Ethiopia.

Sample of commercial banks was selected according to certain study related criteria such: bank's size (as determined by deposits, loans, or assets), digital banking capabilities (bank size of digital infrastructure), number & locations of bank branches form make up the branch network. The three components of Commercial Banks financial performance are efficiency, liquidity, and profitability. Convenience (take into account the bank's branches, ATM locations, and internet banking choices).

1.2. Research question

Studies by the World Bank, IMF, GSMA, CGD, ITU, Debebe A, Wuddase D, and Workineh A have consistently highlighted financial literacy, regulatory frameworks, and digital infrastructure as key factors influencing digital financial inclusion in Ethiopia.

Ozili in his research, argues that financial literacy and regulatory frameworks are the main factors influencing the use of digital financial services, details of the study described under theoretical literature review.

- To what extent does digital financial literacy contribute to the advancement of DFI?
- What will be the impact of regulatory framework design and implementation on adoption and utilization of DFS?
- How much does the type and level of DFI depend on the availability and quality of digital infrastructure?

1.3. Research Objectives

1.3.1. General Objectives

To ascertain the main factors influencing the adoption and application of DFS by firms and customers in Ethiopia's banking sector.

1.3.2. Specific objectives

- To evaluate the impact of digital financial literacy on DFI in Ethiopian commercial banks.

- To analyze the impact of regulatory frameworks on competition in DFS market,digital innovation, and cooperation with Fintech companies.
- To measure the association between different types of digital infrastructure and levels of DFI offered by Commercial Banks.

1.4. Significance of the Study

This study is significant for a number of reasons. It will first provide a thorough overview of the issues influencing DFI in Ethiopia. Highlighting the need to measure which variables have the greatest influence on DFI in the nation and to justify those variables derived from Commercial Banks. Additionally, the study will offer recommendations for tactics to advance DFI in Ethiopia. Policymakers, regulators, financial institutions, and other stakeholders interested in advancing DFI in Ethiopia will find this data valuable.

1.5. Limitation of study

Generalization: This study focus solely on Ethiopia excludes the contributions of micro finance institutions, insurance companies and Ethio-telecom from recent years their geographic reach, including mobile network carrier and microfinance companies. Therefore, applying the results to other Commercial Bank countries or areas is not feasible. Despite these limitations, the research can add value to the body of information already in existence in this field and provide perceptive evaluation of the banking sector.

1.6. Scope the study

The main purpose of the study has to determine the potential and hindrance related to with advancing Digital financial Inclusion through with Commercial Banking sector in Country. Additionally to developing recommendations to the key factors and analyze the main factors influencing customers & businesses adoption and use of digital financial services.

CHAPTER TWO

Literature review

2. Introduction

This study uses the basic concepts: Digital Financial inclusion and determinant factors of DFI. The issues on these concepts have been the concepts in the literature concerning DFI and different variable factors determine DFI. This chapter deals with the arguments emphasized in the literature on DFI and determinant factors of DFI. It begins with benefits of DFI and varied definitions of DFI and factors determine DFI, and empirical review on the relation between the determinant factors and DFI, at the end different related studies on DFI and FI are summarized in table.

2.1. Theoretical Literature Review

A group of African Development Funds (2019) has stated that the African Development Fund DFI is an advanced financing facility created to rapid Digital Financial Inclusion all over the continent or Africa. The plan is to make sure that 332 million additional Africans of whom, 60% are women have access to the formal economy. Emerging as a potent engine for inclusive economic growth, gender equality, and financial inclusion are digital financial services. Digital financial instruments, including mobile payment systems, open doors to increased economic security, empowerment, and opportunity for customers in low- and middle-income nations. Even though the number of mobile phone owners in Africa is rising, the advantages of DFI are still being underutilized.

DFI refers to digital access and use of formal financial services by excluded and underserved part (Lauer & Lyman, 2015) In other words, it is a method of positively access to financial products & services such as bank accounts, incoming and payment services, financial recommended services etc, adequate credit where required by powerless groups like weaker sections and low-income earners at affordable cost (Durai & Stella, 2019). According to Atkinson and McKay (2007) digital economy represents pervasive use of IT (hardware, software, applications, & telecommunications) in all feature of the economy, including internal

operations of business, government & non profit organization, transaction acting as consumers & citizens, & organizations (Malecki & Moriset, 2008).

According to Alt, Beck and Smits (2018), fintech is a collection of application domain of financial & technology. According to Bouwman et al. (2005), as cited in Alt, Beck and Smits (2018), a technology is a manner of coordinating things & processes, and performing tasks more efficiently. Durai and Stella, (2019) posit that though digital finance provide many advantage to customers those who uses this services, but the threat of cyber is a red alert which co-exists with evolution of economy. Security problems lack of literacy, expansive transaction cost and trust on this services are retaining some customers to adopt this service.

According to International finance corporation, (2017) also states most of the time subject to cash transaction is when there is low formal financial services in the region, the reason is less technology usage, low literacy level of society specially when there weak digital infrastructure in country. Shofawati (2019) identified the role of Digital service to support financial inclusion & development of enterprises, in indonesia summarizes that, accessibility of digital finance can create FI so access for financing is more ease especially for the SME. Bett & Bogonko (2017) ascertain that Digital Finance machines have been executed & diffused quicker than any technology in the history changing the way people contact with each other & the way banks deportment business with their customers devices. The study also concluded that digital finance technologies had supported an development in financial returns. Karlan et al., (2016) also resolved that Digital finance could significantly improve customer well-beings both right as well as through allowing a wide-ranging network. But, in Kenya, Michelle, (2016) found that digital financial services (agent banking, mobile banking and internet banking) adversely & not meaningfully impact on FI in kenya banking industry. This is because of banks adopted DF to reduce operational cost and not as a tool to nurture financial inclusion. Onwe (2013) specifically observed the role of information technology (IT) in the banking sector in Nigeria & found that IT simplifies financial intermediation through price discount & appropriate transfer of financial services. In another study, Jaksic and Marinc (2015) examined the role of IT on the future of banking and speculate radical changes are imminent in banking due to the initiation of Fintech startups & participation of information technology companies in traditional banking businesses.With this competition, though the economics of banking have not changed but there

is a need for banks to modify its products and services to digitally motivated customers preferences and requirements.

According to Durai & Stella (2019) assert that digital money is indispensable aspect of peoples daily lives. Consequently, can be conclude that digital finance, including online & mobile banking as well as mobile wallets is significantly influences financial inclusion. Asian Development Bank (2016) stated that digital finance has globally regarded as sufficient means of providing opportunities to promote financial inclusion through the decrease of costs of providing these services. Villasenor, Darrell & Lewis (2015); described Progressive account administrations are turning into an essential part of the nexus amongst improvement and money related considerations. The utilization of computerized money related management has become important as of late among large numbers of individuals who have practically zero past involvement with formal monetary administrations. According to report ITU; 2019, In Kenya DFS such as M-Pesa boosted percentage of the people using formal financial services from 27% in 2006 to 75% by 2015 (International Telecommunication Union Media Center 2019).

According to World Bank (2020d), report DFS are essential to increase financial inclusion in economy, between 2011 and 2017 the share of adults with financial accounts in Africa raised from 23% to 43%, focused largely to growth in mobile money. Widespread uptake of DFS enables deep-rooted economic development by allowing all people to connect with the formal economy, thus increasing financial strength and reducing poverty. Digital payments is gives opportunity to people with a low income in a system of automatic deposits, text reminders, & positive default options that can help them overwhelmed psychological barriers to saving (World Bank Group 2020f; International Monetary Fund 2020; Massi et al. 2019).

According to Ozili (2020) Financial literacy theory of financial inclusion states that financial literacy will increase people’s willingness to join the formal financial sector. It argues that financial inclusion can be achieved through education that increases the financial literacy of citizens. When people become financially literate, they will seek formal financial services wherever they can find it. financial literacy can also help people become self-sufficient and help them have some stability in their personal finance. Financial literacy can help people to distinguish between needs and wants, helping them to create and manage a budget, teaching them to save so that they can pay bills when due, and to plan for retirement. Finally, governments that have limited public funds, or limited tax revenue, to fund financial inclusion

programs may prefer to use financial literacy as a national strategy for financial inclusion because it is relatively cheaper to educate the population about financial management and the benefits of using formal financial services.

The term "DFI" describes the use of modern digital technologies to provide the underserved people with engaged to formal FS at reasonable prices. Ozili (2021b). Issues related to regulatory framework Ozili stated in (2022) that Digital financial inclusion will present many issues to regulators, particularly the bank regulator and telecoms regulator. They will face new challenges when promoting digital financial inclusion. Multiple regulators will need to communicate and collaborate with one another to find solutions to the regulatory issues, Some regulatory issues include the following: Regulatory loopholes in the regulation of e-money and digital currencies, Consumer protection issues, Weak payment system regulation and The presence of rogue and unregulated digital players in the market for digital financial services. There are digital technology-related risks arising from unexplained loss of Internet connectivity, breakdown of telecommunications infrastructure, privacy or security breach which can a major disruption in the use of digital technology. By providing financial services to unbanked adults via digitally interfaced devices, including smartphones or other digital gadgets, digital financial inclusion aims to integrate unbanked adults into the formal financial system. DFI, according to Peterson K. Ozili (2018), is giving underprivileged and financially excluded people entrance to DFS while also utilizing mobile phones and other Digital Devices to increase these services' accessibility. Retail agents are vendors or agents that have a digital device that is connected to a communications infrastructure. The retail agents are able to transmit and receive financial transaction details which enables customers to convert cash into electronically stored value and to transform stored electronic value back into cash. As stated by Ozili (2022)

Ozili, (2022) state that some financial institutions, due to their small size, may be slow in adopting digital technology and the cost of upgrading digital technology infrastructure may be very high. This can put small financial institutions at a competitive disadvantage, and make them vulnerable and attractive for hostile acquisition by rivals. In (2020) Ozili stated the demerits of private money theory of financial inclusion include the following. One, the cost of raising private funds to fund financial inclusion projects may be too high. Secondly, funding financial inclusion programs using private money can increase private interests in financial inclusion outcomes to the detriment of poor people and the excluded population. Thirdly, there

may be loss of government control over the financial inclusion infrastructure created by private investors due to partial or full private ownership by private investors.

Abraham Augustin's (2023) depicted that Digital financial services are starting to be associated with financial inclusion in the common narrative of the international development sector. Still, 1.9 billion and more people worldwide lacks bank accounts, making them a poor baseline for assessing formal financial inclusion. Governments, development and relief agencies & members of the private sector have all resorted to technology to speed up access to financial services in an effort to bridge the gap in formal financial inclusion. Financial services must be made available to customers in a responsible, secure, and sustainably managed setting (Demirguc Kunt, Klapper, Singer, & Oudheusden, 2015). Policymakers at the national and international levels are recognizing Financial Inclusion as critical development agenda item and giving it the attention it requires. For instance, the G20 made financial inclusion the primary pillar (Cull, Ehrbeck, & Holle, 2014).

Access as well as quality, utilization, and welfare are four elements of financial inclusion (Aguera, 2015). Macroeconomically speak, financial inclusion can lead to a diverse base of deposits strengthening the financial system and promoting financial stability (Garcia, 2016). According to the IMF, restrictions resulting from various macroeconomic outcomes, such as political stability of the country, economic equality the society, and economic growth, have a significant Impact on financial inclusion within a nation (Sahay et al., 2015).

DF has significantly improved through the use of information and communication technology. The government, different development partners, and Financial Product and service providers themselves are emphasizing more that supplying financial services digitally is an encourage move toward inclusivity in finance (Gabor & Brooks, 2017). Financially excluded individuals now have simple access to electronic transfer payments through services like mobile banking, which can lower the chance of loss and decrease financial robbery and other financial thefts involving cash transactions. For people who are socially and financially marginalized, digital finance seems to be a superior option (GSMA, 2017). To promote financial clarity, the barriers to financing that may hinder the expansion of Businesses will be addressed.

According to Financial Inclusion Alliance (2018), access to safe and less priced financial services like credit and savings, money transfers, and international and domestic payments

depends on the accessiblity of smartphones and broadband Internet. Alaxandre and Eisenhart (2013), mobile technologies are bringing about a genuine flaw in the financial parts. Financial services would be delivered more quickly if partnerships were formed to create and adopt digital innovations for financial inclusion. Dorfleitner and Roble (2018) increased financial inclusion is essential for encouraging savings, quick access to payments, mobile and ATM use and credit availability. Higher investment levels, more job opportunities, higher income levels, and lower rates of poverty are all linked to the significant increase in FI. According to Umar (2013), economic progress cannot be sustained until a sizable portion of the population has availabilty to formal FS.

Financial service providers especially those serving residents from rural regions, should reduce the cost of managing accounts, and however enhance financial inclusivity for the large part of the people (Eton, Mwosi, Ogwel, et al., 2018). Transaction is coasty in sparsely populated areas combined with strict and intricate methods of determining a client's risk profile in remote or far from major cities areas have made it difficult for formal financial institutions to provide adequate and efficient financial product & services to people lived in remote area in a sustainable manner (FAO, 2016a). The growth of business Enterprises will undoubtedly depend heavily on addressing issues with information and communication technologies, particularly those related to financial currency transfer, price of capital, consumption, and access to financing.

Evidence from across the nation indicates that, macro level financial institutions have expanded the **extensive** and depth of the products and services they offer, and which can minimize societal inequality and spur economic growth and development (Sarma & Pais, 2011). Martinez (2011) demonstrates, in a similar vein, that financial inclusion accelerates comprehensive development and progress, which must be sustainable and include efficient and effective systems for allocating limited resources for the good of society.

Financial services, according to CBN (2012), increase household savings, combine money for investments, and expand the pool of potential entrepreneurs. These financial services might cover credit cards, loans, pension plans, insurance, and payment methods. FI, According to Damodaran (2013), enables easy access to money for both wealthy individuals and those who are poor by directing the flow of money within the economy. Household financial inclusion may more successfully support macroeconomic policy frameworks. International Monetary

Fund, (2018) has established a correlate between household financial inclusion and increased GDP revenue and expenditure. The relationship the three factors would be increase the size of the fiscal multiplier, implying that countries with higher household financial inclusion will have higher output bounce to interest rates. Therefore, Financial Inclusion provides significant and reasonable priced financial Services to those with low income and those who have difficulty accessing Financial services; majority of these population reside in rural areas. Ibor, Offiong, and Mendie (2017) contend that all authorized parties involved should work hard to expand the number of financial access to more remote areas and create infrastructure services that support financial inclusivity. In order to address the proliferation of business enterprises, the administrator should also create suitable laws for the extension of financial Services to those who live in remote or rural areas those excluded from formal Financial services.

Digital finance

Digital finance its way of financial inclusion this means when formal services are inclusive to the majority through digital way, the government, economy and customers are more benefited from this services. Since 2010, the G-20 and the World Bank have led the initiative for increased financial inclusion in developing countries to help reduce poverty levels in developing and emerging economies (Peterson K Ozili, 2018)Financial inclusion, according to Dr. Tabitha Durai (2019), is process of safeguarding the weak groups, such as lower-income and weaker sections, have cheap access to FS and appropriate credit when needed. Access to financial products and services, such as bank accounts, insurance, remittance and payment services, financial advising services, etc., is a component of financial inclusion. It gives people the chance to prepare for financial security in the future; a high bank deposit level would allow a stable deposit base in economy; and it gives them the chance to save money, invest, and get credit.

According to Shofawati, (2019) depicted that Financial services offered through mobile phones, mobile wallets computers, active Internet, or Debit and credit Cards connected to a dependable digital payment system are together referred to as digital finance, includes services, infrastructure, and technology that make it possible to people & businesses to use internet for payments, savings accounts, and credit facilities without having go to bank branches or communicate with financial service providers directly.

According to Asian Development Bank, (2016) a comprehensive range of providers can now offer Financial services to a sizable recipient class thanks to the advanced technology (e-money, mobile money, card payments, and electronic funds transfers) that are available. Digital financial services is defined by Organization for Economic Cooperation and Development [OECD] (2018), financial trading operations that make use of digital innovation, including services provided by banks and non-banking institutions, mobile and online financial Services, and electronic money.

According to Evan G, Federico L and Ross P. (2015) limited access of traditional bank branch leave out over a billion of people from get into financial services. Modern financial services given by agent banking is the best way of expanding financial services to all through partner with commercial banks, its also better for commercial banks because reduce the cost of opening conventional branches in remote area. However DFS through agents requires a legal framework to regulate liability.

study conducted by Jaksic and Marinc (2015) observed information technology (IT) improves service providing decision making & communication in banking industry, Likewise digital finance service provides convenience & secure financial services to customers.

According the study of Abbasi & Weigand, (2017) noted DFS has prosper the delivery of conventional banking services to customers through advanced technologies like internet banking, mobile phone enabled solutions, electronic money models and digital payment programs. ATM and phone Banking is the first modern banking examples, still, the internet and mobile banking offer fast and effective delivery channels not only for traditional banking products but also made-up the way for new products as well being. The reach of 3G and 4G internet technology, along with the expanded uses of smart phones and tablets, has increased demand for digital services. The demand digitization is increased day to day this demand This market demand inspire Banks, Microfinance and fintech institutions, to develop software houses and other service providers to offer advanced digital banking services together with the advent of new different financial products and this kind of service applications helps to retain the existing clients and access the unbanked population.

According to World Bank Development Report, (2016) the four main introduce in digital payments identified are mobile money systems,Wrappers ,credit and local digital medium of

exchange. Wrappers refer to an innovation that creates a digital interface with conventional payment systems like bank accounts or credit cards. Many wrappers are offered by nontraditional providers and internet mediators such as Google Wallet and Apple Pay. Mobile money systems store money in the national currency as a credit on smart cards or a system provider's books and enable payments online or via mobile phones.

Ethiopia had just one state-owned mobile operator, Ethio Telecom, up until September 2022. Nonetheless, the industry's liberalization has made it possible for private telecom startup Safaricom to join the market and offer services. The Ethiopian government intends to sell a forty-five percent stake in Ethio Telecom as part of market liberalization. In the meantime, the Ethiopian Communications Authority (ECA) declared in May 2023 that it had completed the necessary arrangements to launch a global tender to welcome a new mobile network operator (MNO) to the market.

Financial inclusion is the measures included in the second Ethiopia Growth and Transformation Plan (GTP II), which aims to achieve full employment, decent jobs & sustainable livelihoods. Priorities set by NFIS include progressively expanding the number of underprivileged individuals with access banking services and reducing costs due to a combination of competitive pressures and other infrastructure expenditures. The results of the limited research on the subject conducted in Ethiopia indicate that both supply side and demand side factors have an impact on financial inclusion.

In addition to promoting growth, DFI in a well-managed, sustainable setting facilitates quicker advancement of the 2030 Sustainable Development Goals (National Digital Payment Strategy, 2021–2024). Ethiopia's attainment of the SDGs will be greatly aided by the effective execution of the National Digital Payments Strategy (NDPS). In order to achieve the 13 SDGs, inclusive digital financial services have an impact on them both directly and indirectly, according to the Better Than Cash Alliance. (Better Than Cash Alliance 2020)[2], this 13 SDGs are No poverty (Helps families save money, allows government transfers to those who need them most, and fuels business models that expand access to low-cost financial services), Good health and well-being(Helps households prepare for unexpected health care expenses, makes micro-health

2

insurance aordable, and can deliver larger and more reliable income), Gender equality(Allows women more control of finances, allows better understanding of women business owner needs, and helps policymakers develop female-friendly policies and better digital products for women), affordable and clean energy(Shifts toward low-cost prepaid or Pay-as-you go solutions, expanding access to energy), industry and infrastructure(Helps small and medium sized enterprises build payment histories and credit scores; leads to efficiency gains; avoids disparities in wage payments; ensures compliance with labor laws; and reduces frau),peace, justice and strong institution(Creates transparent auditable records, reduces operational costs of government transfers, and formalizes economies),zero hunger(Enables farmers to access credit and financial solutions faster, more safely and lowers the cost of sending and receiving social transfers),Quality education(Allows parents to manage education expenses through flexible products; provides safer, faster, and more reliable wages for teachers; and allows governments more visibility for educational cash flows to design more sustainable business models),clean water and sanitation(Lowers operating expenses and secures cash flows for safe water, and allows for sustainable water practices), decent work economic growth (Allows employers to offer direct channel to financial inclusion for employees and reduces the cost of handling cash),Reduced in equalities(Increases productivity and income for rural households, cuts remittance costs, and helps households better manage costs),climate action(Encourages consumers to lower carbon footprint, helps poor households mitigate risk of climate-related disasters, and encourages environmentally friendly investments)(Ethiopia National Digital Payment Strategy 2021-2024).

World Bank report (2020) states that both economic progress and the elimination of poverty depend on having access to reasonably priced financial services. Higher economic growth and more significant declines in poverty and income inequality are found in nations with more intricate and advanced financial systems. Access to and utilization of the main financial services can boost incomes, build resilience, and enhance the good life for the impoverished. Particularly women gain. majority of people or 65% of adults in developing nations lack access to even the most basic transaction account, which would enable them to send and receive money securely and conveniently far too many people lack access to savings, insurance, and credit services, which would enable them to grow their businesses and reduce risks. Fintech-driven digital financial services have the ability to enhance the rapidity, Security, and clearness of

transactions; reduce costs by using economies of scale; and enable more specialized financial services that benefit those in need. The instruments of digital finance, as well as effective business models and regulations to support their expansion, are all covered in this paper. It examines the dangers and difficulties associated with novel service models in addition the legal and regulatory structures required to address them. Lastly, it covers national experiences in encouraging the growth of DFS and the challenges encountered.

2.2. Empirical Literature

Center for Global Development Policy Paper 220 (July 2021) states that Ethiopia has a low demographic penetration of ATMs (and bank offices) in compared to countries like Bangladesh, Pakistan, Ghana, and Kenya. Moreover, Ethiopia has continued to have a very low geographic ATM penetration rate less than 5 machines per 1,000 square kilometers. Discussions with stakeholders indicate that the cost of investing in ATMs is far higher than that of branch expansion, which makes the promotion of digital financial inclusion even more challenging. This suggests that addressing FI through digital systems like mobile money will be necessary to improve access to banks and the country's financial system. Because of this, it is essential to look at how telecoms offer digital infrastructure while thinking about Ethiopia. Internet and digital device access: DFI requires internet and digital device access. However, Ethiopians have restricted access to these resources, particularly in remote areas far apart from major cities of the country. (World Bank, 2021)

According to the Global Findex Data Base 2021, account ownership is a crucial sign of FI and the first step toward using financial services in a way that supports development. Holders of formal accounts have ability to send, receive, and save money, which they can use to fund businesses, healthcare, and education. Credit unions, microfinance companies, banks, and mobile Banking service providers are examples of regulated institutions where these holders can open official accounts. Adults without bank accounts commonly cite poor documentation, lack of finances, and remoteness to the nearest financial Institution as the main causes of their accountlessness. A common excuse given by 35% of people in Sub-Saharan Africa for not having a Mobile banking account is that they do not own a cell phone. Ethiopian government aims to increase the country's financial inclusion rate from 22% in 2014 to 66% by 2020, as stated in NBE (2014 - 2020).

According to (World Bank, 2021b) data The key governance indicator for Ethiopia is regulatory quality, which captures “the ability of government to formulate and implement sound policies and regulations that permit and promote private sector development”. Concretely, the weak capacity of the NBE has been a drag on the Development of Ethiopia’s financial sector in general and DPS in particular. Regulatory reform is key to tap the full potential of digital payments and allow the ecosystem to expand, Ethiopia’s regulatory framework for DFS was a bank-led model; only banks and MFIs had exclusive rights to hold deposits, be licensed as payment service providers, and manage agent networks. Banks offer financial services electronically and through the bank agents. This did not allow MNOs or Fintechs to offer DFS independently. This model presents not only advantages, including allowing for greater control and regulation over mobile money services, but also disadvantages, including lower scale and reach, hindering the potential for inclusion and increased job creation. (National digital payment strategy, 2020) Collaboration between regulatory bodies and financial institutions plays a crucial role in promoting digital financial inclusion, as highlighted by the (World economic Forum, 2020). Regulatory bodies, such as the National Bank of Ethiopia, have the responsibility of creating an enabling environment for DFS. Additionally, financial institutions, such as commercial banks, need to actively collaborate with these regulatory bodies in order to adhere to regulations and implement digital Financial solutions effectively (World Economic Forum 2020).

According to (GSMA, 2023) Formal FI is a key contributor to Economic development and poverty reduction. It allows people to save for economic shocks and their long-term well-being, enables access to credit to establish and expand businesses or pay for education, and to obtain essential protection such as crop and health insurance. While the Percentage of adult population in Ethiopia who have an account at a financial institution has steadily increased, from 22% in 2014 to more than 46% in 2022, formal financial inclusion remains significantly lower than in other East African countries. There is a large gap in FI between urban and rural areas, where more than three quarters of the population resides, as well as regional disparities in account ownership. Poorer and less literate Ethiopians, who are more likely to live in rural areas, also tend to be unbanked.

The integration of Commercial banks and fintech companies plays a major role in increasing DFI in banking sectors, it allows for the innovative technologies and digital platforms to expand

access to FS, especially in rural area and underserved areas by (Fintech association of Ethiopia, 2020).

Investigated why consumers are not using Internet banking. Lacking knowledge is an important factor that affect the adoption of Internet banking by (Gerrard, Cunningham & Devlin, 2006). In addition, that financial knowledge is significantly positively related with the probability to the usage of DFS, being financially literate is linked to being able to use DFS in a way that is helpful and useful. (Königsheim, Lukas & Nöth, 2017).

Financial literacy is described as "a combination of awareness, knowledge, skill, attitude and behavior necessary to make sound financial decisions and ultimately achieve individual financial wellbeing" by the Organization for Economic Co-operation and Development, or OECD, in 2019; Given its critical role in empowering people with their finances and serving as the cornerstone for establishing financial stability at the household level, financial literacy has been given top priority in the global policy agenda. Digital literacy is linked to improved employment prospects, is contingent upon educational attainment, and is influenced by the socioeconomic background of the individual.

DFI in Ethiopia banking is determined by several factors. Firstly, the level of digital literacy among the population plays a crucial role according to National Digital Transformation Strategy, Government of Ethiopia.

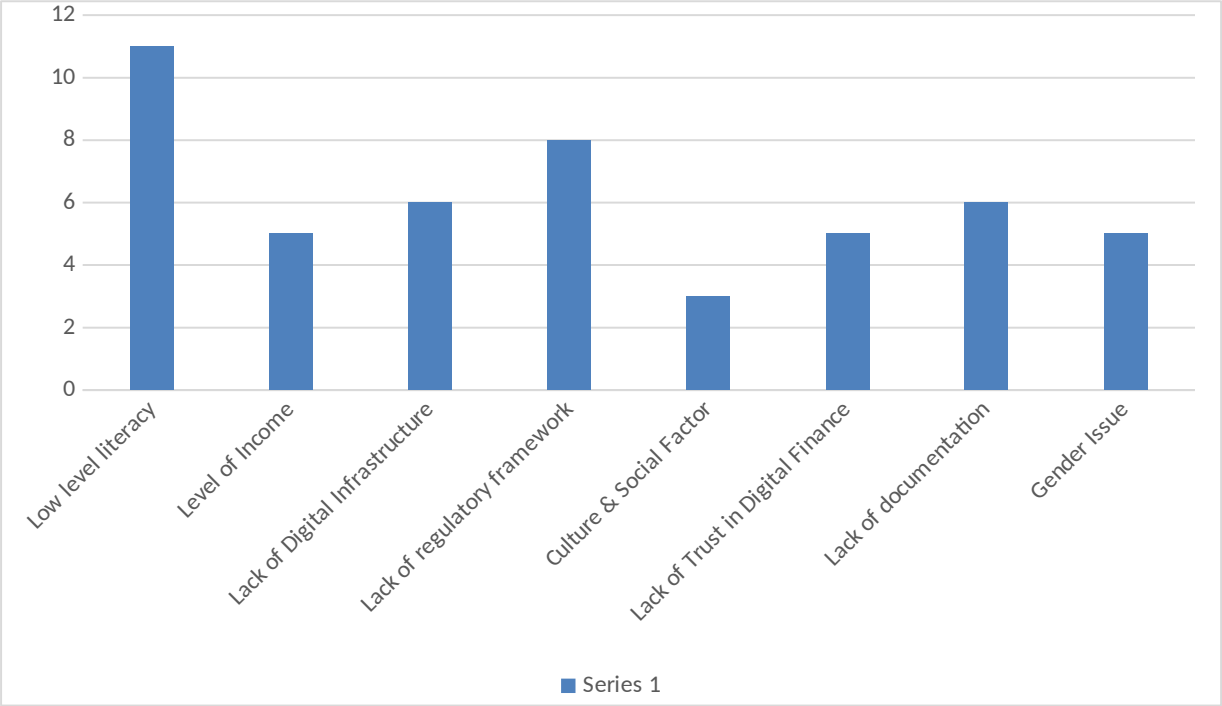
Ethiopians would trust mobile banking slightest, this is described by low bank account owners and mobile perception in Ethiopia. But in Benin, Burkina Faso, Mozambique and Nigeria, respondents indicated that trust mobile banking more if sponsored by a mobile Operator. However, individuals` attitudes on mobile banking in Botswana point the opportunity for mobile Operators and banks to Cooperate (Tchouassi, G.,2012).

2.3. Summary of different related articles and journals

The following table presents key factors influencing digital financial inclusion (DFI) identified by various studies. Among the eight identified factors, four consistently emerged: financial literacy, regulatory frameworks, digital infrastructure, and documentation. However, documentation was excluded from further analysis due to its stronger association with general financial inclusion, rather than specifically impacting DFI.

Research title	In case of	Identified Determinants by different studies							
		level of Customer	Low level of	Lack Digital	Lack of	Cultu re and	Lack of	Lack of	Gender

		awareness	customers income	infrastructure	regulatory frame	social factors	trust	documentation	
DF Products And Services In Ethiopian Banking Industry: An Enquiry On Its Hindrances Of Adoption And Usage	Ethiopia (Debebe Alemu-2020)	X	X	X	X	X	-	-	-
Determinants of FI: A Comparative Study of Kenya and Ethiopia	Ethiopia & Kenya (Wuddasie Dereje -2023)	X	-	X	X	-	-	X	-
Identifying Binding Constraints on DPS in Ethiopia	Ethiopia (Getnet A, Tadele F, & Alejandro F- 2021)	X	-	X	X	-	-	X	-
Country assessment to facilitate DFI in Ethiopia	Ethiopia (ITU-2022)	X	X	X	X	-	X	X	X
Understanding FI in Ethiopia	Ethiopia (Workineh Ayenewu -2022)	X	X	-	X	-	-	X	X
Determinants of DFI in India	India (Prabhakar N, Madhavaiah C. -2021)	X	-	-	-	-	-	-	X
Factors Effecting The Adoption of Mobile Financial Services in Myanmar	MYANMAR (Aye Aye Sint 2019)	X	-	-	-	X	X	-	X
DFS	World Bank (April-2021)	X	X	X	X	-	X	X	-
DFI: next frontiers—challenges and opportunities	India (Chandra M, Rupesh K, Sanjay S.- 2021)	X	-	X	X	-	-	-	-
DFS: Prospects and Challenges	South Africa (MG van Niekerk)	X	-	-	-	-	X	-	-



2.4. Current body knowledge lacks

Most the literature focused on describe and identify different key determinant factors of digital financial inclusion but which individual factor or combination of factors has the greatest influence remains unclear and there is lack of research exploring the role of suppliers (financial service provider). Although a lot of Research has been done on digital financial inclusion or the factors that affect financial inclusion in general not much of it has been explicitly done on the banking sector in Ethiopia and the obstacles it presents for DFI in Banking sector. The quantification and analysis of the determinant factor could close this research gap and offer insightful information to financial institutions, policymakers and other stakeholders in Ethiopia's banking industry.

2.5. Measurement of DFI (Dependent variable)

- **E-Money Accounts**: is a digital currency represented on an electronic device and used for transactions. The device may be a piece of hardware, such as a smartphone, or it may be software, such as a prepaid card or a payment service provider like PayPal, these refer to electronic wallets—or e-wallets—that store electronic money in every situations. Peterson K. Ozili, (2022)

- **Debit Cards:** Debit Cards: is a card you can used to pay through POS and withdraw cash from ATM, this card is small and rectangular plastic piece, have a unique number and security code for each printed cards. before making any payment through card make sure that the card have enough balance. Peterson K. Ozili, (2022)
- **Credit Cards**: is similar with debit card, except to authorizing customers to borrow money, to pay money for purchsed products and services from businesses that accept credit cards. Customers receive credit cards with specific terms attached, including an interest rate applies and an obligation to repay the borrowed funds plus any additional fees that may have been agreed upon. Master card and Visa cards are credit cards examples. Peterson K. Ozili, (2022)
- **Mobile money** is users can send, receive, and store money directly from their phone. It`s like fintech applications and modern form of financial service without required bank account opening. To offer their customers mobile money, for people without bank accounts in these situations, mobile money serves as a banking. Peterson K. Ozili, (2022)
- **Internet Banking**: is an electronic Financial System that is also referred to as web banking or online banking. It is a financial tool that enables bank clients to conduct business online and through bank's website. Can regard it as a branch of the bank because it extends the bank and the services it offers; the only difference is that is not a physical location. A customer can use the internet for anything through this bank's virtual branch. You might be given money, have transactions paid for, get a loan, etc. The online banking services offered by different banks are different. Range of FS your bank provides will determine your access to them. Peterson K. Ozili, (2022)
- **Retail point of Sale** (POS): is a terminal for retail establishments are hardware-based systems used to process credit and Debit card payments. The hardware has software built in to read credit and debit card magnetic strips. The next generation of point-of-sale (POS) systems consists of portable (i.e., not counter-anchored terminals), either proprietary or third-party, with contactless capabilities for new mobile payment methods.
- **Agent Networks**: is Banking ecosystem. (Peterson K. Ozili, 2022).

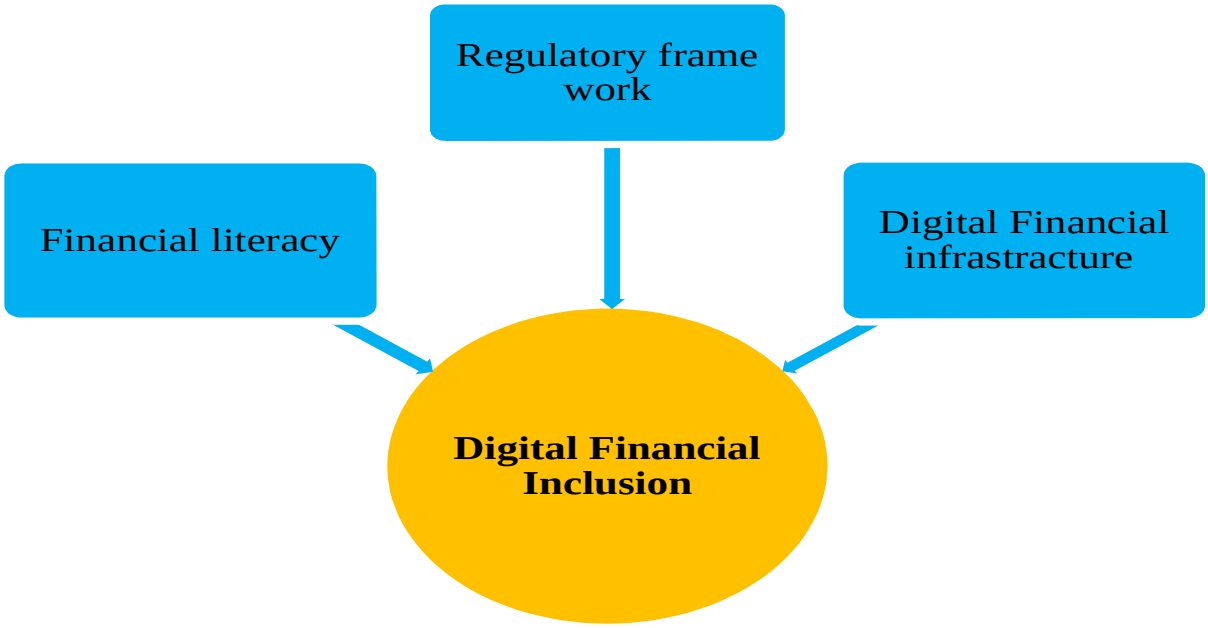
2.6. Research Hypothesis

- Higher digital financial literacy level among Bank customers will have positive impact on DFI.

- Availability and quality of Digital infrastructure has positive impact on DFI.
- Building and application of regulatory framework is positively influence implementation and adoption of DFS.

2.7. Conceptual framework

The framework has developed bases on CSIS (2021) and review of different related literatures, published journals & articles. It`s important to help a deep understanding on the dependent & independent variables in study.



CHAPTER THREE

RESEARCH METHODOLOGY

3. INTRODUCTION

This chapter focuses on the methodology used to answer research questions in study. Research approach and design, sample size and sampling technique, target population, data gathering methods and data analysis are all explained. This section also examines the reliability and validity of data, as well as ethical considerations

3.1. Research methodology

Research methodology is how of a research study in practice, to be more precise, it concerns the methodical ways in which a researcher plans a study to guarantee accurate and trustworthy outcomes that answer the goals, objectives, and research questions. more especially, the manner in which the researcher arrived at. (Goundar, 2012). Research methodology is an outline of a given piece of research is carried out and it define the techniques or procedures that are used to identify and analyze the data regarding a specific research topic (Goundar, 2012).

3.2. Research Approach

Research can be done essentially using three different methods or approaches such as mixed method, Qualitative method and Quantitative method (Creswell, 2009; Creswell & Plano, 2007). quantitative techniques to accurately measure the determinant factors of DFI in commercial banks. The study uses quantitative methods to evaluate and analyze the factors affecting DFI in Ethiopia Commercial Banking sector.

3.3. Research Design

The plan for gathering, measuring, & analyzing data is called research design, which also refers to the general approach adopted to combine the many study components in a logical & cogent manner, guaranteeing the study will successfully solve the research problem. In this study, a quantitative technique was employed in a Descriptive research Design. Descriptive study design is according to (Lavrakas, 2008) are non experimental research designs used in a variety of fields to gather a sizable amount of survey data from a representative sample that is sampled from the study.

Descriptive research plans also ensure a thorough portrayal of the circumstances, minimizing bias in the data collection process from the study population (Cooper & Schindler, 2008). It is a non-experimental research method in which events or actions are observed and recorded in their natural state, free from the researcher's manipulation. Explanatory research can also be explained as a “cause and effect” model, investigating patterns and trends in existing data that haven’t been previously investigated. Specifically in this study descriptive and explanatory design was employed.

3.4. Target Population, Sample Size

According to (NBE annual report, 2022) there are 28 private Commercial Banks and 2 Gov`t commercial banks operated in the country. It`s was unable to cover all Banks, instead, sample of commercial banks has chosen, based on Bank size (as determined by deposits, loans, or assets), digital banking capabilities (the online and mobile digital banking services Offered by banks), Branch network (where and how many bank branches there are), Financial performance, which encompasses efficiency, liquidity, and profitability Offerings of goods and services (the scope and diversity of goods and Services provided by banks), Convenience (Take into account the locations of the bank's ATMs and branches, as well as the services they offer for online banking). The target population will be included Government and private Commercial banks operating in Ethiopia (Managers, and senior officers of Awash Bank, Bank of Abyssinia, Commercial Banks of Ethiopia, Cooperative Bank of Oromia, Dashen Bank, and Wegagen Banks), the total population of Directors, managers and senior staff under Digital Banking department related to marketing is 210 (AB=31,BOA=29,CBE=78,CBO=19,DB=27, & WB=26). As stated by Miaoulis and Michener (1976) and cited by Israel (1992), the proper sample size is usually determined by three criteria: the Level of precision or sampling error=5%, the level of Confidence or risk 95%, and degree of variability= 0.5 in the Attributes being Measured, there are numerous methods for calculating sample size. For small populations, these include conducting a census, copying the sample size of similar research, using available Tables, and applying Formulas to calculate a sample size. This study will be used applying formulas to determine the sample size. Formula to calculate sample sizes was used from (Yamane, 1967).

n=N/1+Ne 2
Where:
n = is sample Size

N= s population Size and
e = is the level of Precision or acceptable sample error
n= $210/1+210(.05)^2$
n=138

3.5. Data source and collection techniques

The study used primary and secondary data, structured questionnaire, with a five-point Likert scale, was used to gather the data. Respondents were provided with a self-administered questionnaire to complete. The constructs in questionnaire were developed from the literature review. English survey form was used since English is the language of transaction in the banks. The questionnaire is adopted from different published journals and articles modified to address the specific research objective of this study. The questionnaire consisted of two sections. The first has demographic data of the respondents. The second has used for each of the three predetermined independent variables and one dependent variable. The data obtained from the questionnaires were coded, captured and edited. The Statistical Package for Social Sciences (SPSS version 29.0) has used to Analyze the results. Survey descriptive research is a quantitative method that focuses on describing the characteristics of a phenomenon rather than asking why it occurs. Doing this provides a better understanding of the nature of the subject at hand and creates a good foundation for further research. In this study Survey- is used to collect data from 138 participants through questionnaires

3.6. Time horizon

In quantitative research design, the time horizon refers to the timeframe for data collection and analysis. It's a crucial element that influences the type of research that conduct. In this study cross sectional data were used

3.7. Sampling method

Sampling strategy used in this study has simple random sampling which entails choosing a sample based on prearranged standards that related to the research question. Using this approach researchers specifically choose the units they think will provide the most insights into the research.

3.8. Measurement of Variables

When it comes to measuring the variables in study such as digital infrastructure, digital financial regulatory framework and digital financial literacy was independent variables of study, while digital financial inclusion has dependent variable in this study. Both of independent &

dependent variables of the study has been measured by using a five-point Likert scale, mean, & standard deviations.

3.9. Data Analysis Technique

The data collected through questionnaire has analyzed by descriptive statistics, correlation & regression analysis by using SPSS software version 29.0 to assess the effect as well as answer the research questions.

3.10. Reliability

Consistency means a primary concern of reliability, it speaks of which methods used for data collection & analysis have produced reliable results (Bryman & Bell, 2015). The internal Consistency of a scale`s items are measured by Cronbach Alpha, that shows how closely related a questionnaire`s items are to one another (Hair et al., 2003).

It also indicates that whether a scale is one-dimensional or multidimensional. The normal range of Cronbach‟s coefficient alpha value ranges between 0-1 and the higher values reflects a higher degree of Internal consistency. Different authors accept different values of this test in order to achieve internal reliability. Cronbach alpha value of at least 0.7 can be regarded as an acceptable level of reliability. For the purpose this study 82 instruments were distributed and the Cronbach‟s coefficient alpha was calculated for each items of the questionnaire and to over all items (Pallant ,2010).

Table – 2 Reliability results

Variables	Cronbach's Alpha	No of items
Digital financial inclusion	.829	7
Financial literacy	.729	5
Financial Regulatory framework	.762	5
Digital infrastructure	.818	5

Source: survey results

The reliability statistics for this study are reflected in the above table, which indicates that for each construct values of Cronbach's Alpha ranged from 0.729 to 0.829. This range is considered acceptable as the result ensures the reliability of each field of the questionnaire.

3.11. Ethical Considerations

In order to guarantee that the study's participants suffer no harm, the research must abide by ethical standards and guidelines. This entails getting their permission after being informed, keeping information private, and safeguarding their privacy. Preserve participant privacy and identity. The goal, dangers, and advantages of the study should be properly disclosed to

participants, who should also be free to decline participation at any time. In order to safeguard participants' privacy, confidentiality and anonymity should be upheld throughout the entire study. These ethical guidelines will help ensure that the study is carried out in a way that promotes participant welfare and upholds the fundamentals of research ethics.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4. Introduction

Chapter includes the presentation; analysis and Interpretation of the data on the findings under presentation, aimed at achieving research objective. In this Regard, the unit discusses the data cleaning process; reliability analysis scores of the instrument employed in this research; the result of tests of assumptions; descriptive statistics on the demographic information of the respondents, inferential analysis which is performed for investigating relationship of variables and influence of independent variable (Digital infrastructure, Financial Literacy and Regulatory framework) over dependent variable (DFI) and summary of proposed hypotheses.

4.1. Data Cleaning

Based on the methodologies specified in the previous unit, 138 questionnaires were distributed and all questionnaires are returned for analysis, Meanwhile, when the data was checked for its completeness and practical response pattern, all 135 questionnaires were valid or workable responses. Therefore, 3 responses were rejected and cancelled from this study, because of incomplete responses. Accordingly: those 135 workable responses obtained from respondents

were used for data analysis with Statistical Package for Social Science (SPSS) Version 29, which is licensed statistical software, for Descriptive analysis.

No.	Company name	Number of distributed questi.	Number of collected questi.	Number of valid questi.	Percent of valid questi.
1	Awash Bank	20	20	20	100%
2	Bank of Abyssinia	19	19	19	100%
3	CBE	52	52	49	94%
4	Oromia Cooperative Bank	12	12	12	100%
5	Dashen Bank	18	18	18	100%
6	Wegagen Bank	17	17	17	100%

4.2. Reliability Analysis

According to (Kothari, 2004) noted that sound measurement is essential to conduct a good research & test of reliability is important test to sound measurement. Thus, to maintain reliability of instrument and to make sure that data collection tool provides consistent results, reliability analysis was conducted on all instruments employed in this research after full scale data collection, & the Cronbach‟s coefficient alpha score is presented as follows.

Table 2: Reliability statistics of independent variables

Independent Variables	Cronbach's Alpha	Number of Items
Financial Literacy (FL)	.729	5
Digital Financial Infrastructure (DFI)	.818	5
Regulatory framework (RF)	.762	5

Source own survey computed by SPSS, Version.29

As illustrated in table 2, independent variables that determine digital financial inclusion, were tested for their reliability in measuring the result of DFI in Commercial Banks in Ethiopia. Accordingly, they are found reliable with Cronbach‟s coefficient alpha score of 0.729 for FL, 0.818 for DFI and 0.762 for RF.

Table 3: Reliability statistics of DFI

Cronbach's Alpha	Number of Items
.829	7

Source own survey computed by SPSS, Version.29

As indicated in table 3, the 7 item scale was tested for its reliability in measuring the digital Financial inclusion in Commercial Banks Ethiopia, and found reliable with Cronbach‟s coefficient alpha score of 0.829.

4.3. Descriptive Analysis

Demographic data questions are set in part I of the questionnaire. Personal and demographic information such as gender, age group, years of work experience and educational qualification are presented as follows.

1.1. Table 4 Demography of the respondents

Variables	Categories	Freq.	Perc.	Valid per.	Cum. per.
Sex of respondent	Male	89	65.9%	65.9%	65.9%
	Female	46	34.1%	34.1%	100%
	Total	135	100%	100%	
Educational qualification of respondents	First Degree	88	65.2%	65.2%	65.2%
	Masters Degree	47	34.8%	34.8%	100%
	Total	135	100%	100%	
Age of respondents	20-30	10	7.4%	7.4%	7.4%
	31-40	93	68.9%	68.9%	76.3%
	41-50	32	23.7%	23.7%	100%
	Total	100%	100%	100%	
Job position of respondents	Management	12	8.9%	8.9%	8.9%
	Lower level Mgmt.	38	28.1%	28.1%	37%
	Non Mgmt.	86	63%	63%	100%
	Total	135	100%	100%	
Work Experience respondents	<4 years	5	3.7%	3.7%	3.7%
	4-8 years	47	34.8%	34.8%	38.5
	9-13 years	53	39.3%	39.3%	77.8%
	14-18 years	22	16.6%	16.3%	94.1%
	19-25 years	8	5.9%	5.9%	100%
	Total	135	100%	100%	

Source: Own survey, computed in SPSS Version 29

As shown in table 4, in the sample of Commercial Banks in Ethiopia, the majority of the employees, 65.9% were male and 34.1%were female. With regard to educational qualification, the highest number of the employees 65.2% were first Degree holder and 34.8% were Master degree holder. With regard to Job position of respondents 8.9% were Managers, 28.1% were lower level management and 63% non-Management. Regarding to respondent work experience 3.7% were <4 years, 34.8% were 4-8 years, 39.3% were 9-13 years, 16.6% were 14-18 years and 5.9% were 19-25 years.

4.4. Determinant factors of DFI

Descriptive Statistics			
	Mean	Std. Deviation	N
Digital Financial Inclusion	4.6053	0.49524	135
Digital Finance infrastructure	4.4296	0.58871	135
Financial Literacy	4.4637	0.51581	135
Regulatory Framework	4.3096	0.50592	135

Source: own survey result of SPSS Version 29

The above table shows that the corresponding mean and standard deviation of all construct totals 4.4637 and SD of .51581 which makes it the highest score from the other DFI determinant factors. Hence, the above result implies that the main factor to Commercial Banks to expand and to address digital financial services with in country, Digital Financial infrastructure is next to the financial literacy with a mean score of 4.4296 and SD .49524 the second main challenges of commercial banks to expand DFS. The third determinant factor is Regulatory framework with mean scores of 4.3096 and SD of .50592. Which implies the commercial banks have lack of convenient regulatory framework of digital finances to make DFS accessible to majority of the people.

4.5. Assumptions of Multiple Linear Regression Analysis

Multiple linear regression studies the relationship between a dependent variable and two or more independent variables.

Multiple linear regression equation writes as follows:

- $Y=b_0+b_1x_1+b_2x_2+\ldots b_kx_k+E$

Where Y is the dependent variable, the X are the independent variables, the b is are the regression coefficients, and b_0 is the constant.

4.6. Normality

According to Field (2009), the assumption of normality is important in research using regression (or general linear models) and helpful to generalize the results of the analysis beyond the sample collected. Among several ways to check for the normality assumptions for multiple linear regression analysis, it is advisable to inspect to see if a distribution is normal through a

Q–Q plot. Therefore, to establish the validity of these assumptions, the researcher also checks for the normality through Q-Q plot of sample commercial Banks as follows.

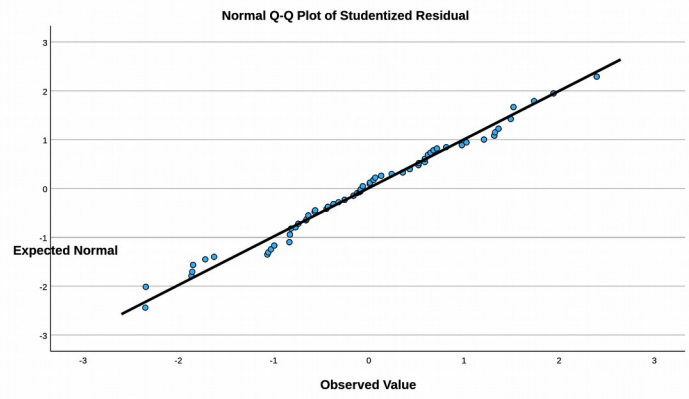
- ***Ho: Normally distributed errors***
- ***Ha: Non-Normal Distribution error***

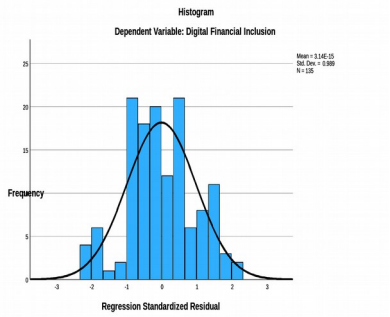
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	0.08	135	0.033	0.981	135	0.057

a. Lilliefors Significance Correction

Source: Own survey, computed in SPSS Version 29





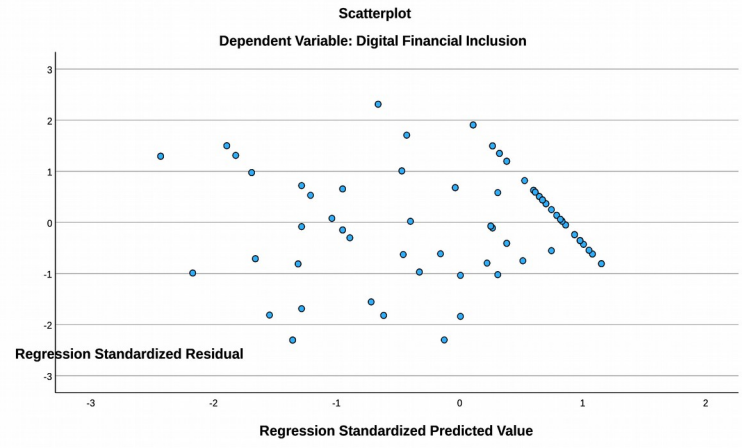
Source: Own survey, computed in SPSS Version 29

Result obtained from Shapiro-wilke test indicate that all the variables had P-value greater than (>0.05), meaning that the variables involved in this study follow normal distribution, therefore, it can be concluded that the residual value is normally distributed so that the regression analysis producers have been fulfilled.

4.7. Test of Homoscedasticity

This assumption assumed that variance of the errors is constant. Assumptions can be checked by scatter plot diagram. The result plots the values the model would predict, against the

residuals obtained. As the predicted values increase, the variation in the residuals should be roughly similar. The graph looks like random array of dots. So, the model is homoscedasticity.



Source: Own survey, computed in SPSS Version 29

4.8. Test of Autocorrelations

Multiple linear regression model assume residuals are independent of one another, the Durbin-Watson statistic is used to test for the presence of serial correlation among the residuals. If the Durbin-Watson statistics within the range of 1.50 - 2.50, it is an acceptable range. From the result Durbin-Watson was 1.886 & it was within the range of 1.50-2.50, as a result assumption of independence of residuals was satisfied.

4.9. Test of Multicollinearity

The table shows Collinearity statistics

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	0.44	0.145		3.024	0.003	0.152	0.728					
	Digital Finance infrastructure	0.23	0.05	0.278	4.708	<.001	0.136	0.332	0.861	0.38	0.15	0.276	3.623
	Financial Literacy	0.54	0.059	0.561	9.137	<.001	0.422	0.655	0.91	0.624	0.28	0.255	3.915
	Regulatory Framework	0.17	0.041	0.172	4.081	<.001	0.087	0.25	0.72	0.336	0.13	0.541	1.847

Source: Own survey, computed in SPSS Version 29

Summary table collinearity statistics

Model		Collinearity statistics	
1	Constant	Tolerance	VIF
	Digital infrastructure	.276	3.623
	Financial literacy	.255	3.915
	Regulatory framework	.541	1.847

Source: Own survey, computed in SPSS Version 29

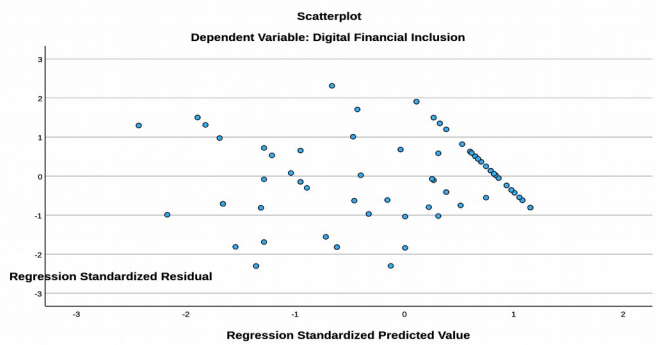
- *H_0: There is a Multicollinearity problem*
- *H_a: There is no Multicollinearity problem*

All the VIF column values are less than 10, and tolerance values are greater than 10% respectively, indicating that there is no multi-collinearity influence between the explanatory variables. As a result, we reject Null Hypotheses.

4.10. Test for Heteroscedasticity

Ho: There is no Heteroskedasticity problem

Ha: There is heteroskedasticity



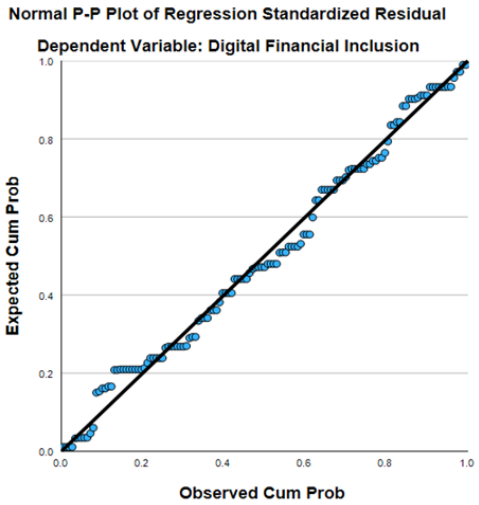
Source: Own survey, computed in SPSS Version 29

Base on the scatterplot output above, it appears that the spots are diffused and do not form a clear pattern, so it can be concluded that the regression model does not occur heteroscedasticity problem.

4.11. Test of Linearity

Multiple linear regression model assumptions assume there is a linear relationship between the independent variables and the dependent variables. The linearity assumption of multiple linear regressions is that the relationship between the independent variable and the dependent variable can be characterized by a straight line. The linearity assumption already linear from the equation

of multiple linear regression models of the independent variables and dependent variable (Gujarat, 2004).



Source: Own survey, computed in SPSS Version 29

4.12. Correlation Analysis

Pearson (r) correlation coefficient was carried out so that the nature of strength and direction of the relationship between the independent variables (financial literacy, regulatory framework and digital infrastructure) and dependent variables (DFI) are identified.

Correlations					
		Digital Financial Inclusion	Digital Finance infrastructure	Financial Literacy	Regulatory Framework
Pearson Correlation	Digital Financial Inclusion	1	0.861	0.91	0.72
	Digital Finance infrastructure	0.861	1	0.846	0.63
	Financial Literacy	0.91	0.846	1	0.665
	Regulatory Framework	0.72	0.63	0.665	1
Sig. (1-tailed)	Digital Financial Inclusion	.	<.001	<.001	<.001
	Digital Finance infrastructure	0	.	0	0
	Financial Literacy	0	0	.	0
	Regulatory Framework	0	0	0	.
N	Digital Financial Inclusion	135	135	135	135
	Digital Finance infrastructure	135	135	135	135
	Financial Literacy	135	135	135	135
	Regulatory Framework	135	135	135	135

Source: Own survey, computed in SPSS Version 29

Summary table of correlation matrix

	DFI	Digital Finance infrastructure	Financial literacy	Regulatory framework
DFI	1			

Digital Finance infrastructure	.861	1		
Financial literacy	.910	.846	1	
Regulatory framework	.720	.630	.665	1

Source: Own survey, computed in SPSS Version 29

The above table shown the correlation between DFI and its determinants such as Digital Financial infrastructure, Finance Literacy and Regulatory framework in commercial banks. The strongest relationship is between DFI and Financial literacy of customers ($r=0.910$, $P<0.01$). this implies that financial literacy is strongly and positively increase DFI in Ethiopia. DFI is empowering the people, their financial management, expenditure and investment decisions as well as growth of economy, hence if commercial Banks are invest in financial literacy. The correlation between DFI and Digital infrastructure are activities of the bank is positive and significant ($r=.861$, $p<0.01$), which means that bank`s with clearly designed strategies to plan the way of digital infrastructure increased throughout country to increase DFI. The relationship between DFI & Regulatory frame has also positive correlation with $r=.720$, $p<0.01$. This reflects that if there is convenient, supportive digital regulatory framework it will be increased the coverage of digital finances services.

4.13. Regression Analysis

The regression analysis is used to determine the degree in which the dependent variable can explained from the independent variables. It's also used to understand how much each independent variables such as Digital infrastructure, financial literacy and Regulatory framework explains the dependent variable.

4.14. Model Significance

The ANOVA table shows result of linear regression analysis to measure the influence of regulatory framework, digital infrastructure and financial literacy on the dependent variable (DFI), if the P-value is <0.001 there is strong correlation between dependent and independent variables. F value shows the correlation of dependent and independent variables, based on the the result from SPSS: $F(3,131)=302.66$ this number is statistically significant indicator of the strong correlation between dependent and independent variables.

If the P-value is less than 0.05 we will reject the null hypotheses, based on the ANOVA table result p-value is <0.001.

- $H_0=b_1,b_2,b_3=0$
- $DFI=b_0+b_1FL+b_2DI+b_3RF$

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.722	3	9.574	302.66	<.001[b]
	Residual	4.144	131	0.032		
	Total	32.866	134			

a. Dependent Variable: Digital Financial Inclusion
b. Predictors: (Constant), Regulatory Framework , Digital Finance infrastructure, Financial Literacy

Source: Own survey, computed in SPSS Version 29

From total sum of square 32.866 the independent variables combined explain 28.722 and rest are error term 4.144 (unexplained variance). Hence, the regression model is good fit of the data. Furthermore, determinant factor has statistically significant impact on the DFI.

4.15. Model summary

The model summary below shows the statistical relationship of the dependent variable (DFI) and independent variables.

Model Summary[b]											
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Change Statistics	PRESS	Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change		
1	.935[a]	0.874	0.871	0.17785	0.874	302.66	3	131	<.001	4.441	1.886

a. Predictors: (Constant), Regulatory Framework , Digital Finance infrastructure, Financial Literacy
b. Dependent Variable: Digital Financial Inclusion

Source: Own survey, computed in SPSS Version 29

The relationship between dependent variable and independent variables are represented by R-value of 0.935 this number indicate significant relationship between the two variable. R Square represents the % of digital financial inclusion can be explained by independent variables, all the three determinant factors are explained 87% of dependent variable the rest 13% are not explained by this study.

4.16. Hypothesis Testing

Coefficients [a]				
Model	**Unstandardized co.**	**Standardized co.**	**T**	**Sig.**

		B	Std. Error	Beta		
1	(Constant)	.440	.145		3.024	.003
	Digital financial infrastructure	.234	.050	.278	4.708	.001
	Financial literacy	.538	.059	.561	9.137	.001
	Regulatory framework	.168	.041	.172	4.081	.001
Dependent variable: DFI						

Source: Own survey, computed in SPSS Version 29

Unstandardized coefficient B 0.44 represents the expected value of dependent variable when independent variables are equal to zero, first 0.234 represents every one unit increase in digital infrastructure the dependent variable is expected to increase by 0.234, second 0.538 represents every one unit increase in Financial literacy the dependent variable is expected to increase by 0.538 and third one is 0.168 represents every one unit increase in regulatory framework the dependent variable is expected to increase by 0.168. The variable with the highest beta value contributes the most to explaining dependent variable variance, which is controlled by all other variables in the model, in beta column beneath standardized coefficients the highest contribution is financial literacy B=0.561,P<0.001, next digital financial infrastructures B= 0.278,P<0.001 and regulatory framework B=0.172, P<0.001.

4.17. Proposed Hypotheses in this study

In this study three hypotheses were formulated. Statistical tests run for these hypotheses were briefly discussed below.

H_1: Higher digital financial literacy level among Bank customers will have a positive impact on DFI

To validate this hypothesis based on the correlation and regression model summary, ANOVA and coefficients results and justifications, customer Financial literacy level strongly correlated or significant influence on DFI with a very high and positive, r=0.910, B=0.561,P<0.001 in Sample selected Commercial Banks in Ethiopia. This could be interpreted financial literacy the most significant influence on DFI in Commercial Banks. Therefore we can`t reject H1 in this study.

H_2: Availability and quality of Digital infrastructure has positive impact on DFI.

To validate the second hypothesis based on the correlation and regression model summary, ANOVA and coefficients results and justifications, availability of quality infrastructure is next

to Financial literacy level correlated or significant influence on DFI with, r=.861,B=0.278,p<0.001. This could be interpreted significantly influence next to financial literacy. Therefore we can`t reject H2 in this study.

H_3: Building and application of regulatory framework is positively influence implementation and adoption of DFS.

To validate the third hypothesis based on the correlation and regression model summary, ANOVA and coefficients results and justifications, availability of building regulatory framework is next to Financial literacy and digital infrastructure correlated or significant influence on DFI with, r =.720,B=0.172, p<0.001. This could be interpreted significantly influence next to financial literacy and digital infrastructure. Therefore we can`t reject H3 in this study.

4.18. Results and discussion

The study is associated With the magnitude of determinants of DFI. the objective of this study is to measure the level of determinant factors of DFI in Commercial Banks specifically sample selected commercial banks in Ethiopia, by analyzing the relationship of every construct in the framework. the framework of the study is adopted from previous researches those mentioned at end of chapter two in this paper and World Bank data Global Findex database. Specifically determinant factors are financial literacy, regulatory framework and digital infrastructure.

The first research question of this study was to what extent digital financial literacy improves Digital financial inclusion. Regard the finding in this study revealed that all the three determining factors are positively influencing DFI in commercial banks. However, the most significant influence of DFI in Commercial Banks were financial literacy of customer (Mean=4.4637), followed by digital infrastructure (4.4296) and regulatory framework (mean 4.3096). customers with understanding of digital financial products and services are more to adopt and utilize. Hence this result shows it suggests need for ongoing financial literacy initiatives by Commercial Banks to bridge the gap on this area. Potential of DFI can only be realized by improving customer financial literacy, from the result as the data highlight. To give people the abilities and information necessary to successfully navigate the digital financial Landscape, financial education initiatives and awareness campaigns must be maintained.

The second question of study was How much does the type and level of DFI depend on the availability and quality of digital infrastructure. The finding in this study revealed that digital

infrastructure has (mean=4.4296) positively influence DFI, the study showed that digital infrastructure had a positive effect on DFI in commercial banks. This indicates that the adoption and utilization of DFI are significantly influenced by the availability and quality of digital infrastructure. In order people to be able to utilize digital financial services, they must have widespread access to reliable mobile networks, internet access, and digital devices. Addressing a broader population as well as rendering infrastructure more affordable are essential for closing the digital divide and serving those who are unbanked.

The third research question of this study was how does the design and implementation of regulatory frameworks influence the adoption and utilization of DFS, Regard the finding in this study revealed that regulatory framework has at a (mean=4.3096) positively influencing DFI in commercial banks. Regulatory framework plays significant role to create enabling environment for the growth of DFI, specifically regulatory framework has an impact on customer protection, increase competition between Commercial Banks, encourage innovation through collaboration of Commercial Banks and Fintech Companies.

4.19. Research Implication

Based on the research findings that financial literacy has the strongest positive correlation with Digital Financial Inclusion (DFI) in Ethiopia, followed by digital infrastructure and then regulatory framework, here are some potential research implications for Commercial Banks and Policy makers:

- **For Commercial Banks:** *Invest in financial literacy programs*: Offer targeted financial literacy training for customers, particularly focusing on segments with low DFI penetration. Develop programs tailored to different demographics and needs. (e.g., rural communities, small businesses, women). *Prioritize digital infrastructure expansion*: Collaborate with other stakeholders (government, Fintech and telecom companies) to improve internet connectivity and access to mobile devices in underserved areas. Leverage alternative technologies like USSD to reach populations with limited smartphone access. *Encourage supportive regulatory frameworks:* Speak with legislators to support laws that encourage consumer protection and innovation in the field of digital financial services.
- **For Policy makers:** *Include financial education in national initiatives*: Provide funding for the creation and execution of nationwide financial literacy initiatives that serve both adults and children. For a broader reach, collaborate with banks, non-governmental groups, and

neighborhood associations. *Give development of digital infrastructure top priority*: Make investments to increase cell network coverage and internet access, especially in rural areas. Encourage public-private collaborations to quicken the development of infrastructure. *Establish a supportive regulatory framework*: Provide laws in the digital financial services sector that are transparent, flexible, and supportive of responsible innovation while safeguarding consumers. Encourage cooperation between industry stakeholders and regulatory organizations.

CHAPTER FIVE

SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATIONS.

5. Summary of Finding

The study was conducted to measuring and analyzes determinant factors of digital financial inclusion in the case of Commercial Banks in Ethiopia. Therefore the major findings were summarized as follows.

Based on the Results of the descriptive analysis all the three determinant factors are Positively correlated to dependent variable based on the data collected from Bank employees. Based on the

regression result financial literacy is the first most important factors that determine digital financial inclusion.

There is a strong positive correlation between DFI and the determinant factors 87% of the variation on DFI explained by the three determinant factors selected on this study Specifically, all the three factors has a positive relationship with DFI.

The strongest relationship is between DFI and Financial literacy of customers is ($r=0.910$, $P<0.01$). this indicated that financial literacy is strongly affecting the expansion of DFI in Ethiopia. DFI is empowering the people, their financial management, expenditure and investment decisions as well as growth of economy, hence if commercial Banks are invest in financial literacy. The next positive correlation of DFI is Digital infrastructure with the result of ($r=.861$, $p<0.01$), which means that bank`s with clearly designed strategies to plan the way of digital infrastructure increased across the country to address DFI to the majority of population. The relationship between DFI & Regulatory frame has also positive correlation with $r=0.720$, $p<0.01$. This reflects that if there is convenient, supportive digital regulatory framework it will increase digital finances services.

5.1. Conclusion

The study aims to analyze and measure factors that determine digital financial inclusion in the case of Commercial Banks. The study further examines the relationship of each determinant factor DFI on the expansion of this service. Based on the finding of the study the following conclusions were drawn.

- Described determinant factors in this study are highly important to expand digital financial service in the country.
- DFI in Ethiopian Commercial Banking sectors is explained by financial literacy, digital infrastructure and regulatory framework, so according to this study result 87% of DFI is explained by these three factors.
- Based on the result of this study financial literacy has the main factor of determining digital financial inclusion in Commercial Banking sector.
- According to this study next to financial literacy digital infrastructure is also very important to expand DFI in the Ethiopia.
- Results shown from this study the third important factor to determine DFI is regulatory framework.

5.2. Recommendation

All the factors considered in the study plays a significant role in determining digital financial inclusion. Digital financial inclusion is a basic requirement for development of the economy in present scenario. It is necessary to make people understand the importance as well as the risks associated with it. It is also important to enhance digital financial literacy in people as it impacts both the attitude and intention towards usage. Better levels of digital financial literacy will lead to digital financial inclusion.

Based on the conclusion drawn from the study, and research problem, the research required to forward realistic and applicable recommendations. Accordingly, the following recommendations were suggested by the researcher.

- Commercial banks should give more emphasis on society awareness on digital financial literacy because it has a significant impact on DFI as well as financial inclusion in Ethiopia. Commercial banks are creating formal digital financial awareness program partnering with educational institutions and public Media, and proposing other countries best practice to national bank of Ethiopia. Invest in society awareness creation on financial education has high return on the profitability of commercial Banks and contribution of economic growth of country.
- Commercial banks play a major role in the strength and stability of finance sector infrastructure, and contribute to greater financial inclusion. To achieve the goal of DFI in the country Commercial banks should collaborate with fintech companies, Ethio-telecome and Ethiopian electricity to expand their services especially in rural area of the country. Expansion of traditional banking incurs high cost when it compared with the expansion of DFS, commercial banks should be invest in digital infrastructure Instead to expand traditional banking.
- Regulatory framework is a need for an enabling regulatory environment for DFS, and digital infrastructure. Technology-related policies and regulation that support and enable digital financial Services need further development. NBE has the responsibility to develop more technology related policies to enable ease of entry for financial technology, fair competition, and more affordable digital financial products that are relevant and scalable for an inclusive, equitable economy. For mutual benefit Commercial banks are also responsible to propose other country best practices to NBE.

5.3. Suggestion for further studies

In study the major factors that determine DFI in commercial Banks, the researcher addressed the stated objective by employing several statistical methods and strictly following the research methodology. Hence, this study addressed the research problems, draws conclusion and forward practical recommendations. In addition to this, the researcher believed that, there are issues remain uncovered in this study due to the scope limitation and need to be addressed in future studies to add broad insight in to the subject, since it is a new phenomenon. Thus, the following points are taken as limitations of this study and Future research Directions.

- This study only encompasses three determinant factors of DFI, which are widely used in the literature and in actual practice, but to make full picture, future researchers may include additional determinant factors, such as level of customer income, documentation, Gender and trust in their researches.
- The study also limits itself on Commercial Banks in Ethiopia, towards their implementation, adoption and expansion of DFI, and the conclusion and recommendations remains within the companies. In this regard, to make the conclusion and recommendation more wide and applicable for two or more DFS providers, future researches may conduct the research in industry wide or nationwide by increasing the sample size and different institutions.
- This research employed only quantitative research method and considers only Bank employees; accordingly, future researchers may employ mixed approach (qualitative and quantitative) in their data type; by including from demand side or customers.
- Finally, as indicated in the literature, there is lack of theoretical grounds and models in conceptualizing determinant factors of DFI. In this regard, researches should be conducted aiming at model specification and theory development.

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COLLEGE OF BUSINESS AND ECONOMICS

DEPARTEMENT OF MANAGEMENT

RESEARCH SURVEY

Dear Respondents,

Thank you for your willingness to participate in this survey. I know that I am taking your precious time. I am a student pursuing a Master of Science in Management at Addis Ababa University. I am conducting this research as a partial requirement to fulfill my master's degree. The objective of this study is to measure the key factors that determines the adoption and use of digital financial services by individuals and businesses in the Ethiopian banking sector (Sample selected Commercial Banks).

This questionnaire is designed to get the relevant information for the current study to be used for academic purposes. Your participation in this study is entirely voluntary and your survey responses will be kept strictly confidential.

Directions

- You are not required to write your name.
- Put a "√" mark in the column which best describes your response to the statement

If you have any questions about the survey or if there is something you want to clarify, please feel free to contact me via my mobile number: +251-911-702-854.

Thank you in advance for your irreplaceable and valuable time to participate in this study and for your cooperation.

Part I - Demographic Questionnaires

1. Sex

☐ Male ☐ Female

2. Age

☐ 20-30 ☐ 31-40 ☐ 41-50 ☐ 51-60

3. Educational Background

☐ Diploma ☐ First Degree ☐ Master's Degree & above

Other _____

4. Current job Position

☐ Management ☐ Middle Management ☐ Non-Management

5. Year of Experience

☐ Less than 4 Years ☐ 4 - 8 Years ☐ 9 - 13 Years ☐ 14 - 18 Years

☐ 19 – 25 years ☐ above 25 year

Part II. Questionnaires on Digital financial literacy,Regulatory Framework and Digital Infrastructure. This questionnaires were developed bases on IFC (2018), and review of different related published literature & articles of Digital Financial Inclusion and financial inclusion. Please indicate your agreement with the statement below.

Ratings:

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

No	Digital Financial Inclusion (DFI)	1	2	3	4	5
1	When clients needed digital financial services, confident explaining and promoting digital financial product and services.					
2	Digital financial services and products offered by your banks doesn`t design to fulfill the needs and limitations of the unbanked population.					
3	A large number of your customers still prefer personal interactions and rely heavily on traditional banking methods.					
4	Your Bank charges and fees associated to digital finance is not treat low income customers in special way.					
5	Your Bank doesn't have official plan to promote customer awareness on digital financial services.					
6	Your bank provides front line bank staff sufficient tools and assistance to encourage clients to use digital channels instead of traditional Banking.					
7	Internal processes and systems of your Bank effectively adapted to support and manage digital financial products, services and transactions.					

No	Digital financial literacy (FL)	1	2	3	4	5
1	Lack of digital financial literacy among people turns a significant barrier to implementing digital financial services.					

2	Commercial banks do not select digital financial literacy programs targeting to rural and underserved populations.					
3	Financial literacy programs should be personalized to address the specific needs and gender contexts of different communities in Ethiopia					
4	Partnership of commercial banks, government agencies, and NGOs are vital for expand digital financial literacy education in majority of people.					
5	Creating digital financial literacy awareness among child and young adults is essential for continuing digital financial inclusion goals					

No	Regulatory Framework (RF)	1	2	3	4	5
1	Through Increasing regulatory confidence and reducing bureaucratic obstacles can encourage growth of digital financial services sector					
2	NBE collaborates with interested party to develop a progressive and comprehensive digital financial regulatory framework.					
3	Reforming regulatory procedures on license request requirements can encourage more FintechS and financial institutions to offer broad digital products.					
4	Strong data privacy rules are important to build trust and encourage user adoption of digital financial services.					
5	The current National Bank of Ethiopia regulatory frameworks on digital finance services is not open to digital finance innovation.					

No	Digital Infrastructure (DI)	1	2	3	4	5
1	Poor access to consistent internet connectivity and lack of electricity in rural areas delays the adoption of digital financial services.					
2	Lack of affordability of smartphones device by low income group of people is the challenge of expanding Digital finance.					
3	Spending in digital infrastructure expansion project in rural area is critical to driving digital financial inclusion.					
4	Collaboration of Commercial banks with Fintech and Telecom Company is develop affordable and accessible digital financial products.					

5	Government should form a supporting environment to attract fintech companies to investment in digital infrastructure development in the country.					

Thank you for taking time to complete this questionnaire.