



**ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE
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**“THE EFFECT OF FINANCIAL TECHNOLOGY (FINTECH) ON
FINANCIAL INCLUSION: A CASE STUDY OF ETHIOTELECOM’S
TELEBIRR”**

By: Beza Mekonnen

Advisor: D.r Tenkir Seifu

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Addis Ababa, Ethiopia

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INCLUSION: A CASE STUDY OF ETHIOTELECOM'S TELEBIRR**

BY: BEZA MEKONNEN (GSR5960/16)

ADVISOR: D.r TENKIR SEIFU

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ACRONYMS/ABBREVIATIONS

AI	Artificial Intelligence
AML	Anti-Money Laundering
BC	Blockchain
CFT	Counter-Terrorism Financing
CS	Cybersecurity
DFL	Digital Financial Literacy
FA	FinTech Accessibility
FI	Financial Inclusion
Fintech	Financial Technology
FSD	Financial Sector Deepening
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan
KYC	Know Your Customer
ML	Machine Learning
MSMEs	Micro, Small, and Medium Enterprises
NBE	National Bank of Ethiopia
P2P	Peer-to-Peer
P2M	Person-to-Merchant
PoS	Point of Sale
SD	Service Diversity
SPSS	Statistical Package for the Social Sciences
Telebirr	A mobile money service developed by EthioTelecom
UNDP	United Nations Development Program
USD	United States Dollar

DECLARATION

I, Beza Mekonnen declare that the study entitled “The effect of Financial Technology (Fintech) on financial Inclusion: A case study of Ethiotelecom's Telebirr” is my original work that is done under the guidance and input of my advisor, Dr. Tenkir Seifu.

This study will be done in partial fulfillment for Master of Corporate Finance.

Declared by:

Name _____

Signature_____

Date_____

CERTIFICATION

This is to certify that the thesis entitled “The effect of Financial Technology (Fintech) on financial Inclusion: A case study of Ethiotelecom's Telebirr” has been carried out by Mrs. Beza Mekonnen under my supervision. This thesis is submitted for the fulfillment of the requirements for the **Master of Science in Corporate Finance (With Specialty in Investment Management)** program at Addis Ababa University. I confirm that the candidate has met the necessary academic requirements and recommend the thesis for submission and defense.

Name of Advisor: D.r Tenkir Seifu

Signature:



Date: 6/4/2025

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ABSTRACT

The study, titled “The Effect of Financial Technology (FinTech) on Financial Inclusion: A Case Study of EthioTelecom’s Telebirr,” by Beza Mekonnen, investigates the effect of financial technology, Telebirr on financial inclusion in Addis Ababa Ethiopia. It highlights although mobile money platforms have expanded rapidly, limited empirical evidence exists regarding their long-term contribution to financial well-being, including savings, investment, and economic empowerment. The study examines how FinTech dimensions accessibility, service diversity, and cost & reliability impact financial inclusion outcomes, with digital financial literacy assessed as a mediating factor. An explanatory research design was employed using a structured, close-ended and a five-point Likert scale questionnaire. Primary data were collected from 385 Telebirr users in Addis Ababa through purposive sampling, based on Cochran’s formula. Secondary sources, including policy reports and academic and scholarly studies, were used to contextualize findings. Thematic interpretation was applied to selected indicators to enrich quantitative insights. Instrument validity was ensured through content, construct, and criterion validity techniques. Data were analyzed using STATA/IC 15.1 employing descriptive statistics, correlation, and multiple linear regression analysis. Findings show that Telebirr has improved access to basic financial services such as digital transfers and bill payments but remains limited in supporting deeper financial engagement like savings and credit usage. Major challenges include low digital financial literacy, insufficient user awareness, and inconsistent platform reliability. The study provides empirical evidence relevant to digital finance adoption in low-income settings and informs future FinTech strategies and inclusive finance policies.

Keywords: Digital Financial Literacy, Financial Inclusion, FinTech, Telebirr

CHAPTER 1: INTRODUCTION

1.Introduction

In recent years, the advancement of digital technology has significantly reshaped the financial landscape, especially in developing countries. Financial Technology (FinTech) has emerged as a key tool for improving access to financial services by offering convenient, affordable, and secure digital platforms. In Ethiopia, the introduction of Telebirr by EthioTelecom in 2021 represents a major step toward promoting financial inclusion through mobile money services. While digital finance has expanded access, questions remain about how effectively such platforms contribute to long-term financial empowerment. This chapter introduces the background, problem statement, research questions, objectives, and significance of the study, focusing on the effect of Telebirr on financial inclusion after adoption in Addis Ababa.

1.1 Background of the study

In recent years, the global push toward financial inclusion has accelerated, driven by advancements in financial technology (FinTech). Emerging digital tools such as mobile money platforms, cloud computing, blockchain, and AI-based financial systems are helping overcome long-standing barriers to formal financial services. These innovations offer cost-effective, secure, and scalable solutions, particularly beneficial in regions where access to traditional banking is limited (Demirgüç-Kunt et al., 2022; World Bank, 2023). The COVID-19 pandemic further underscored the importance of digital finance, as contactless services became essential for financial continuity in underserved communities (FSD Ethiopia, 2024).

Recognizing this potential, several developing nations have adopted digital-first financial inclusion strategies. Ethiopia has followed suit by updating its National Financial Inclusion Strategy to achieve 70% account ownership by 2025 an essential target given that micro, small, and medium enterprises (MSMEs) contribute to over 70% of urban employment (FSD Ethiopia, 2024). One of the country's most significant developments in this regard is the launch of Telebirr by EthioTelecom in

2021, designed to provide widespread access to mobile-based financial services and encourage digital economic participation (Capital Newspaper, 2021).

Despite increasing access, many challenges remain. In low-income economies, digital financial inclusion is still constrained by inadequate financial literacy, limited infrastructure, lack of formal identification, and regulatory inefficiencies (World Bank, 2021; 2022). Though the number of financially excluded adults has declined significantly from 2.5 billion in 2011 to 1.4 billion in 2021 this progress is uneven, particularly in Sub-Saharan Africa where meaningful financial engagement beyond basic transactions is often lacking (World Bank, 2021).

Global organizations such as the United Nations Development Program(UNDP), the G20, and the World Bank continue to advocate for FinTech as a means of promoting inclusive economic development, emphasizing its potential to empower marginalized populations and reduce poverty (UNDP, 2024; World Bank Blogs, 2022; United Nations, 2015). While studies in countries like Kenya and India have shown FinTech can significantly reduce financial barriers and enable financial growth, the long-term behavioral impact post-adoption especially in saving, credit access, and economic planning has not been fully assessed in many emerging markets (Arner and Zetsche, 2018).

In Ethiopia's case, although Telebirr has gained widespread user adoption, little is known about whether it supports more comprehensive financial inclusion, such as increased saving & credit use, and digital financial decision-making.

Accordingly, this study examined the effect of financial technology (FinTech), specifically Telebirr, on financial inclusion in Addis Ababa. It focused on evaluating how key characteristics of FinTech services—namely accessibility, service diversity, and cost and reliability—contributed to financial inclusion outcomes. Furthermore, the study assessed the mediating role of digital financial literacy in shaping these outcomes. By doing so, the research offered timely, evidence-based insights to inform the development of more inclusive digital financial strategies and FinTech policies in Ethiopia and other comparable low-income urban contexts.

1.2 Statement of the problem

Financial inclusion is widely acknowledged as a critical lever for achieving equitable economic growth, poverty alleviation, and social empowerment, particularly in developing economies where traditional financial institutions often fail to reach large segments of the population (Demirgüç-Kunt et al., 2018; UNDP, 2024). Despite global advances, a significant proportion of Ethiopia's population particularly low-income, unbanked, and underbanked groups remains excluded from formal financial services due to infrastructural, educational, economic, and regulatory barriers (World Bank, 2021; Santosdiaz, 2022). These include limited banking infrastructure, high transaction costs, lack of identification, low financial literacy, and poor digital connectivity.

In response to these challenges, the introduction of Financial Technology (FinTech) is widely seen as a transformative force capable of bridging these gaps by offering scalable, low-cost, and easily accessible digital financial services. For instance, in Ethiopia, the launch of Telebirr by Ethio Telecom in 2021 marked a significant milestone in the country's digital finance landscape. Telebirr has rapidly grown to serve over 51 million users (Ethio Telecom, 2024), offering services such as mobile money transfers, utility bill payments, and recently, credit and micro-savings. It was designed to catalyze financial inclusion by delivering financial services through mobile platforms, even in regions underserved by traditional banks (Aragaw, 2023).

While the initial uptake of Telebirr has been substantial, existing studies and reports predominantly focus on access and adoption metrics, without a comprehensive understanding of post-adoption behavior and financial empowerment outcomes (Addis Insight, 2024; Mururu, 2024). This has created a critical empirical gap. It remains unclear whether users are engaging with the platform in a way that meaningfully enhances their financial well-being through services such as digital savings, access to credit, insurance, and long-term financial planning—or whether usage remains confined to basic functions such as airtime top-ups and peer-to-peer transfers (Mahir, 2024; Tiony, 2024).

Furthermore, much of the existing literature relies on quantitative approaches that fail to capture nuanced user experiences, especially challenges faced post-adoption such as digital illiteracy, limited service awareness, usability concerns, and trust issues (Ozili, 2020; Philippon, 2019). Given Ethiopia's socio-economic disparities spanning gender, education level, and employment status there is an urgent need to disaggregate usage patterns and financial outcomes across demographic lines (World Bank, 2024; Tidjani and Madouri, 2024).

Theoretical frameworks such as Financial Inclusion Theory (Ozil, 2020), Financial Intermediation Theory (Gurley and Shaw, 1960), and Payment System Theory (Rossi, 2007) suggest that beyond access, meaningful financial inclusion requires regular usage, high service quality, and integration into broader economic activity. Yet, Telebirr's actual effectiveness along these dimensions has not been sufficiently evaluated in the Ethiopian context. This lack of longitudinal, behavior-focused, and user-segmented analysis presents a serious limitation for academics, policymakers, and FinTech practitioners aiming to design inclusive financial ecosystems.

Therefore, this study seeks to address these gaps by conducting a post-adoption analysis of Telebirr's impact on financial inclusion in Addis Ababa. The research extends beyond descriptive access metrics to examine user engagement, service diversity, digital financial literacy, and barriers to deeper financial integration. It aims to generate both quantitative insights and qualitative data that reflect the experiences of users, thereby providing a more holistic assessment of whether FinTech solutions such as Telebirr effectively contribute to sustainable and inclusive financial empowerment in low-income urban environments.

1.3 Research Questions

1. How has Telebirr influenced financial inclusion among its users in Addis Ababa post-adoption?
2. To what extent has Telebirr facilitated access to financial services such as payments, savings, and credit?
3. What are the major challenges faced by Telebirr users in achieving meaningful financial inclusion?

4. Has Telebirr contributed to sustained economic participation and financial empowerment beyond transactions?

1.4 Objectives of the Study

General Objective:

The primary objective of this study is to examine the effect of financial technology, specifically EthioTelecom's Telebirr, on enhancing financial inclusion in Addis Ababa, Ethiopia.

Specific Objectives:

1. To evaluate how Telebirr has improved financial accessibility beyond basic transactions.
2. To analyze whether Telebirr enhances long-term financial inclusion by facilitating savings, credit access, and investment opportunities.
3. To identify the key barriers that hinder Telebirr users from fully utilizing digital financial services.
4. To assess whether Telebirr has contributed to economic empowerment and sustainable financial inclusion.

By addressing these objectives, this study will contribute valuable empirical evidence to the discourse on FinTech-driven financial inclusion and provide recommendations for enhancing the long-term impact of digital financial services in Ethiopia.

1.5 Significance of the Study

For policymakers, the findings illuminate specific barriers such as low digital financial literacy and uneven service utilization that can inform the development of targeted regulatory frameworks and national digital finance strategies. These insights are particularly relevant for refining Ethiopia's Financial Inclusion Strategy and guiding future interventions aimed at low-income urban populations.

For EthioTelecom and other FinTech service providers, the study presents a user-driven analysis of service strengths and limitations, including access disparities,

limited awareness of advanced functionalities, and patterns of usage behavior. Such findings can inform product development by enhancing platform functionality, improving service reliability, and encouraging user engagement beyond basic transactions such as airtime purchases.

For academics and researchers, this study addresses a critical gap in empirical evidence concerning the behavioral outcomes of digital finance adoption in the Ethiopian context. It provides a localized case study that can serve as a comparative reference for research in other emerging economies and contribute to theoretical advancement in areas such as post-adoption behavior, financial empowerment, and technology-mediated financial services.

For development organizations and community leaders, the research identifies concrete challenges such as deficits in digital literacy and low trust in digital platforms that can be mitigated through tailored financial education and awareness programs. These insights can support the design and implementation of inclusion initiatives aligned with the specific needs and realities of urban digital finance users.

1.6 Scope and Delimitation

This study focused exclusively on users of Telebirr in Ethiopia, with a specific emphasis on urban populations within Addis Ababa. It examined the impact of Telebirr on financial inclusion across various demographic segments, including small and medium-sized business owners, household users, and young adults, particularly in areas with differing levels of mobile network accessibility.

Primary data were collected through structured questionnaires, supplemented by relevant secondary sources. The study covered the period from Telebirr's official launch in 2021 up to 2025, thereby enabling an assessment of its post-adoption effects over time. The scope of the research was limited to Telebirr as the case subject and did not extend to other FinTech platforms or mobile money services operating in Ethiopia.

Geographically, the study was confined to the city of Addis Ababa and did not include rural areas or other regional administrations. Moreover, the study did not address the broader macroeconomic implications of financial inclusion at the national level. Instead, it aimed to generate a context-specific understanding of Telebirr's contribution to financial inclusion within an urban Ethiopian setting.

1.7 limitation of the study

This study was subject to several limitations. First, the relatively recent implementation of Telebirr—launched in 2021—meant that long-term trends and sustained behavioral changes could not be fully assessed. As such, the findings primarily reflect short- to medium-term impacts on financial inclusion.

Second, the research focused exclusively on the urban context of Addis Ababa and on a single FinTech platform, Telebirr. This geographical and institutional specificity limits the generalizability of the findings to rural areas, other regions of Ethiopia, or to users of alternative digital financial services. Consequently, caution should be exercised when applying the results to broader national or international contexts.

1.9 Organization of the paper

This thesis is organized as follows the first chapter deals with the introductory part of the study, the second chapter examines and discusses existing literatures and researches related to the study. The third chapter includes the details of the research design and methodology of the study. The fourth chapter deals with the data Analysis and discussion to presents and discusses the findings related to the research questions. The last chapter is about a summary of major findings, conclusions and recommendations.

CHAPTER 2: LITRETURE REVIEW

2. Literature Review

The rapid advancement of Financial Technology (Fintech) has significantly transformed the landscape of financial services worldwide, particularly in facilitating financial inclusion for marginalized populations. Financial inclusion encompasses the ability of individuals and businesses, especially those in underserved communities, to access and utilize a diverse range of financial products, such as savings accounts, loans, insurance, and payment systems (Demirgüç-Kunt et al., 2018). Traditional banking infrastructures often pose accessibility challenges due to their rigid requirements and limited reach, leaving many without essential financial services. However, Fintech innovations have emerged as pivotal tools in addressing these barriers. Fintech or financial technology encompasses the integration of technology with financial service to enhance the efficiency and security of transactions. By utilizing cutting-edge technologies like mobile applications and digital platforms they enable easier access to financial services, thus empowering individuals and enhancing economic participation (Zetlin, 2020).

In Addis Ababa, where digital literacy and access to technology are likely higher than in rural areas, the simple 'adoption' question is less critical. Instead, the focus shifts to how Telebirr integrates into existing financial practices and how it benefits users in financial inclusion given their network connections thus, the study focused on Telebirr users specifically in Addis Ababa to assess the effect/impact of Telebirr (Fintech solution) on financial inclusion, so the theoretical framework is tailored to the unique characteristics of an urban, relatively more digitally-savvy population. The framework took into consideration the interplay between individual-level factors, network effects, and contextual influences.

The literature review synthesized existing theoretical and empirical literatures which were relevant to the study. The theoretical review focused on related and relevant theories to the study where as the empirical review discussed prior studies and their major findings and gaps with literature analysis, and the conceptual framework showed the relation in the components of the study.

2.1 Theoretical review

The theoretical framework of this study provides the foundation for understanding how FinTech services specifically Telebirr contribute to financial inclusion by enhancing access, usage, and the quality of financial services among users in Ethiopia. The study is grounded in financial inclusion theories and FinTech-related models that explain how digital financial services facilitate broader participation in the formal financial system.

To examine the multifaceted impact of Telebirr, the study employs three key theories: the Theory of Financial Inclusion to assess the depth and breadth of financial access and usage; the Theory of Financial Intermediation to evaluate how Telebirr acts as a bridge between users and financial services; and the Theory of Payment Systems to analyze the platform's role in enhancing digital payment efficiency, security, and accessibility.

Theory of Financial Inclusion

According to Ozili (2020), financial inclusion refers to the availability and ease of access to useful and affordable formal financial services that meet the needs of individuals and businesses in a responsible and sustainable manner. The theory emphasizes three core dimensions of financial inclusion: access (availability of financial services), usage (frequency and consistency of use), and quality (affordability, reliability, and user experience).

This theory is particularly relevant to the study as it provides a framework to assess how Telebirr expands financial service delivery among diverse urban populations. Since the study focuses on Telebirr users in Addis Ababa, the usage dimension is particularly important—highlighting the relevance and convenience of the platform for urban lifestyles. This includes its utility for bill payments, online shopping, remittances, business transactions, and its integration with other financial platforms. Additionally, the reliability of the system—especially in handling high transaction volumes typical of urban settings—is a key consideration.

The theory thus enables the analysis of how Telebirr enhances financial inclusion by improving access, increasing usage, and elevating the quality of financial services post-adoption. It also helps in evaluating whether users are more deeply integrated into the formal financial system.

Theory of Financial Intermediation

The Theory of Financial Intermediation, originally developed by Gurley and Shaw (1960), emphasizes the role of financial intermediaries in linking savers and borrowers, mitigating market imperfections, and managing financial risks. As further elaborated by Allen and Santomero (1996), intermediaries reduce transaction costs and address problems of asymmetric information, thereby facilitating efficient allocation of capital.

While traditional banks have historically played this role, FinTech innovations such as Telebirr are increasingly acting as alternative financial intermediaries. Telebirr enables users to store, send, and receive money digitally, often without relying on traditional banking institutions. This theory is therefore instrumental in assessing whether Telebirr has improved financial efficiency, reduced cash dependency, and promoted alternative saving and credit mechanisms. It also helps explore whether users are shifting away from informal financial practices toward more structured digital alternatives.

Theory of Payment Systems

Although there is no single originator of the Payment Systems Theory, scholars such as Sergio Rossi have significantly contributed to the understanding of how monetary systems and payment infrastructures operate. The theory posits that a secure, efficient, and accessible payment system is fundamental to economic activity and financial inclusion.

In the context of this study, the Theory of Payment Systems provides a lens to evaluate the performance of Telebirr as a digital transaction platform. Key aspects include its ability to facilitate real-time payments, reduce dependence on cash, enhance transaction security, and support economic participation by offering a reliable and inclusive alternative to traditional payment methods. The theory also

highlights how digital platforms can lower transaction costs and improve trust in formal financial systems, particularly in underserved areas.

2.2 Empirical review

Global insights

Ozil (2020), in his influential policy paper “Financial Inclusion and Fintech during COVID-19 Crisis: Policy Solutions”, assessed the role of FinTech platforms in mitigating the financial disruptions caused by the pandemic. Drawing on secondary data and comparative policy analysis, he found that digital tools such as mobile wallets, online banking, and peer-to-peer lending enabled remote financial access, particularly among underserved populations during lockdowns. However, Ozil highlighted digital financial literacy (DFL) as a key limiting factor, noting that many users lacked the necessary skills to effectively navigate these technologies. He also warned that the digital divide driven by infrastructure deficits and low levels of DFL risked exacerbating existing socioeconomic inequalities. To address these gaps, he proposed policy interventions including the integration of DFL into national financial education strategies, expansion of digital infrastructure, and the implementation of supportive regulatory frameworks to foster inclusive FinTech ecosystems.

Philippon (2019), in his theoretical analysis “On FinTech and Financial Inclusion”, explored how FinTech innovations reduce intermediation costs and enhance access to financial services. His work examined the cost structure of robo-advisors and the use of big data in credit evaluation, arguing that FinTech can democratize financial services by lowering entry barriers and enabling customized credit solutions. However, the benefits of such technologies were shown to be contingent upon users' ability to interpret digital financial information, underscoring the critical role of DFL. Philippon also cautioned that while big data could mitigate traditional biases in lending, it may simultaneously complicate regulatory protections for vulnerable populations. He concluded that a balanced approach—combining innovation with regulation is necessary, with DFL emerging as a behavioral prerequisite for effective adoption and trust in digital systems.

Beck et al. (2018) conducted a cross-country empirical analysis using panel data to investigate the relationship between digital payment systems and financial development. Their econometric findings demonstrated that mobile money services significantly reduced transaction costs and improved financial access in African economies. However, the study largely focused on access and did not delve deeply into usage dimensions such as savings, credit, or investment behaviors—areas where DFL plays a decisive role. Thus, while the research validated the role of FinTech in broadening access, it also indirectly highlighted the need to examine how digital financial literacy influences the depth and quality of usage.

The Global Findex Database 2017 by Demirgüç-Kunt et al. (2018) remains one of the most comprehensive global assessments of financial inclusion trends. Based on nationally representative data from 140 countries, the report revealed that global financial account ownership rose from 62% in 2014 to 69% in 2017, largely driven by digital innovations, particularly mobile money. In Sub-Saharan Africa, 21% of adults had a mobile money account, positioning the region as a leader in mobile-based financial services. Nonetheless, the report highlighted considerable usage gaps: many account holders did not engage with their accounts for functions such as saving, borrowing, or making digital payments. Key barriers included insufficient digital and financial literacy, limited trust in financial institutions, and lack of identification documents. The persistence of a gender gap was also noted. These findings underscore the conclusion that access alone does not ensure financial inclusion without DFL, users are unable to meaningfully utilize financial services.

Ouma, Odongo, and Were (2017) reinforced this argument through their study on mobile financial services and savings behavior in Sub-Saharan Africa. Using household survey data and micro-econometric techniques, they found that although access to mobile money was widespread, actual savings behavior remained limited. The authors attributed this gap to low levels of digital financial literacy, especially in rural areas, which hindered meaningful engagement with available financial tools. Their study provides empirical support for the proposition that DFL is essential for translating technological access into substantive financial empowerment.

One of the foundational studies in this domain is Jack and Suri's (2016) longitudinal panel analysis of M-Pesa in Kenya. Their research demonstrated that mobile money use was associated with poverty reduction and improved financial resilience, particularly in female-headed households. Notably, the study linked these outcomes not merely to access, but to users' ability to effectively utilize services such as saving, transferring, and budgeting through mobile platforms indicative of informal DFL. Although the concept of DFL was not explicitly named, the findings aligned with later studies, affirming that knowledge and trust are fundamental to sustained digital financial engagement.

Regional Insights

Mahir (2024) employed a quantitative methodology, synthesizing multiple case studies and empirical data to examine how FinTech empowers unbanked populations and fosters rural development across Africa. Drawing on platforms such as M-Pesa, the study highlighted that over 350 million Africans have gained access to affordable financial services through mobile money and digital lending solutions. Mahir found that FinTech facilitates cost-effective transactions, enables small and medium-sized enterprises (SMEs) to build credit histories, and contributes to agricultural financing and financial literacy through educational campaigns. Despite its transformative potential, the study identified persistent challenges, including regulatory bottlenecks, cybersecurity vulnerabilities, and infrastructural limitations.

Similarly, Tiony (2024) adopted a mixed-methods approach, combining quantitative analysis of secondary data from the Central Bank of Kenya with qualitative insights from structured interviews conducted with stakeholders. This study investigated how FinTech innovations particularly mobile banking and blockchain technologies have expanded financial access and supported economic growth in Kenya. The findings indicated that FinTech significantly contributes to GDP growth, SME development, and employment creation. However, infrastructural deficits, weak regulatory frameworks, and cybersecurity risks remain significant obstacles. Tiony recommended comprehensive reforms, including regulatory harmonization and strengthened cybersecurity measures.

The World Bank (2024), using the Global Findex Database, provided a comprehensive quantitative overview of financial inclusion trends in Sub-Saharan Africa. The report documented a near doubling of account ownership since 2011, largely driven by mobile money adoption. Despite this progress, disparities persist across gender and geographic lines, with women and rural populations continuing to face disproportionate exclusion. The report identified barriers such as lack of disposable income, absence of official identification, and physical distance from financial institutions. While mobile money usage has expanded, the report noted that accounts are infrequently used for savings or investment, highlighting a gap between access and meaningful financial engagement.

Tidjani and Madouri (2024) conducted a panel data econometric analysis across 25 African countries over the period 2011–2019 to explore the relationship between FinTech, financial inclusion, and sustainable development. Their results demonstrated a positive impact of FinTech-driven financial inclusion on sustainable development indicators. However, the study also noted that overlapping financial service offerings could lead to systemic inefficiencies. The authors advocated for coordinated policy approaches, emphasizing the need for investment in financial infrastructure, institutional collaboration, and credit monitoring systems.

Mururu (2024) employed a qualitative methodology based on secondary data from global institutions such as the World Bank and the International Monetary Fund (IMF) to examine how FinTech addresses key financial barriers including high transaction costs, limited credit access, and geographical isolation. The study emphasized the potential of mobile money and digital microloans to improve financial inclusion, stimulate GDP growth, and increase employment. It also noted the role of advanced technologies such as machine learning in enhancing credit allocation. Nonetheless, Mururu cautioned against overgeneralizing findings across Africa due to the continent's diverse economic and regulatory environments.

A synthesis of global and regional studies confirms the pivotal role of Financial Technology (FinTech) in advancing financial access, particularly among underserved populations in Africa and beyond. Mahir (2024), Tiony (2024), and Mururu (2024) consistently demonstrate that mobile money platforms such as M-Pesa and digital

lending solutions significantly enhance economic inclusion by facilitating access to credit for small and medium-sized enterprises (SMEs) and improving financial services in rural areas. Similarly, global scholars such as Ozili (2020) and Philippon (2019) affirm FinTech's capacity to reduce transaction costs, strengthen financial intermediation, and maintain financial continuity during systemic disruptions such as the COVID-19 pandemic.

However, these studies vary in the extent to which they examine the post-adoption phase of FinTech usage. For instance, Jack and Suri (2016) and Ouma, Odongo, and Were (2017) emphasize that while access to mobile financial services has increased, engagement with more advanced financial tools—such as savings, credit, and investment—remains limited. In contrast, Beck et al. (2018) focus primarily on access indicators, offering limited insights into how users engage with these services after adoption.

A notable gap across both global and regional literature is the insufficient exploration of “digital financial literacy (DFL)” as a mediating factor in the relationship between FinTech adoption and sustained financial inclusion. While Ozil (2020) and Demirgüç-Kunt et al. (2018) acknowledge the relevance of DFL, few studies provide empirical evidence on how DFL influences user behavior and financial decision-making, particularly within African contexts. This gap is especially evident in Ethiopia, where no existing study has directly examined the post-adoption behavior or digital financial competencies of **Telebirr** users.

This deficiency underscores the significance of the present study. While existing literature validates FinTech's role in expanding access to financial services, this research aims to move beyond surface-level metrics to investigate how Telebirr contributes to meaningful and sustained financial inclusion. Specifically, it explores the extent to which digital financial literacy mediates the relationship between FinTech usage and long-term financial empowerment in an urban Ethiopian context. By addressing this gap, the study provides a more comprehensive understanding of whether access alone is sufficient, or whether digital competencies are essential for realizing the full benefits of financial technology.

Current FinTech Landscape in Ethiopia

Ethiopia's journey toward FinTech development has been marked by gradual yet significant milestones. The modernization of the financial sector began with the launch of the Ethiopian Automated Transfer System (EATS) in 2011, followed by the establishment of EthSwitch in 2016. These foundational systems aimed to improve interbank transactions and lay the groundwork for digital financial services (Addis Insight, 2024).

In 2016, the Ethiopian government introduced the National Financial Inclusion Strategy, followed by the broader Digital Ethiopia 2025 strategy in 2018. These policies set the tone for digital transformation, aiming to bridge financial gaps and leverage technology for inclusive economic development (NBE, 2017; Law Ethiopia, 2018).

Despite these policy frameworks, Ethiopia's financial sector remained underdeveloped for years, with mobile money penetration significantly lagging behind regional peers. As of 2022, approximately 60% of the population was still unbanked (Santosdiaz, 2022). However, the amendment of the 2020 payment systems proclamation—allowing foreign investment in digital financial services—marked a turning point. This regulatory change opened the market to global players and accelerated domestic innovation (Santosdiaz, 2022; Monteiro, 2023).

A defining moment came with the launch of Telebirr by EthioTelecom in May 2021. Integrated into the company's LEAD Growth Strategy, Telebirr rapidly gained traction, reaching over 21 million users in its first year and growing to 26.5 million by the end of 2022, with transactions exceeding ETB 128 billion (approx. \$2.3 billion) (Aragaw, 2023; Addis Insight, 2024). Its integration with banks, businesses, and public institutions elevated it from a basic mobile wallet to a central node in Ethiopia's financial ecosystem. Telebirr's partnerships with public transport, remittance platforms, and digital lending services underscore its potential to foster savings, credit access, and widespread digital adoption (Aragaw, 2023).

At the same time, a new wave of homegrown FinTech firms began to emerge. Arifpay, Ethiopia's first point-of-sale (PoS) operator; HelloCash, which offers open API banking; Chapa, providing secure online payments for businesses; and Kifiya, a pioneer in scalable financial platforms, joined the ecosystem. These companies, alongside Telebirr, have significantly enhanced financial accessibility, especially in urban areas, and enabled growth in e-commerce and cross-border trade (Monteiro, 2023).

International developments reinforced this trend. In 2022, Ethiopia allowed foreign firms to operate in the digital finance sector. This decision, alongside Safaricom's entry and the anticipated launch of M-Pesa, is expected to stimulate competition, expand financial accessibility, and reduce dependence on cash, which still accounted for 98% of all transactions (International Trade Administration, 2023).

Despite these strides, the sector faces substantial hurdles. Cybersecurity vulnerabilities, low levels of digital literacy, especially in rural areas, and regulatory inconsistencies hamper broader adoption (Monteiro, 2023; Aragaw, 2023). Furthermore, although peer-to-peer (P2P) mobile money transfers and airtime purchases are increasingly common, person-to-merchant (P2M) transactions remain significantly underutilized, accounting for less than 10% of digital payments (Addis Insight, 2024). This is attributed to trust issues, limited PoS infrastructure, and high onboarding costs for merchants. Cash remains the preferred medium for many due to its familiarity and perceived reliability.

To overcome these barriers, Addis Insight (2024) recommends strengthening digital infrastructure, encouraging platform interoperability, and reducing regulatory burdens to attract private sector innovation. Lessons from Kenya's M-Pesa experience could offer valuable insights for accelerating Ethiopia's shift toward a cashless economy. Public-private partnerships, targeted financial education, and merchant incentives such as reduced transaction fees and simplified onboarding processes could further catalyze adoption.

In conclusion, Ethiopia's FinTech sector is undergoing a pivotal transformation. Government strategies, regulatory reforms, and the rapid adoption of platforms like Telebirr demonstrate strong potential. Yet, to fully realize the promise of financial inclusion, systemic issues such as digital trust, infrastructure gaps, and education deficits must be addressed through coordinated policy and market-based solutions (Santosdiaz, 2022; Aragaw, 2023; Monteiro, 2023; Addis Insight, 2024).

The Evolution of FinTech in Ethiopia

The development of Financial Technology (FinTech) in Ethiopia is closely linked to the evolution of its telecommunications sector, which has historically played a crucial role in facilitating technological advancement. The origins of telecommunications in Ethiopia can be traced back to 1894, when Emperor Menelik II introduced a telephone line connecting Harar and Addis Ababa (African News, 2018). After World War II, the sector underwent significant rehabilitation and expansion, culminating in the establishment of the Imperial Board of Telecommunications of Ethiopia (IBTE) in 1952 (Ethiopian Monitor, 2022). Further technological progress occurred in the late 20th century, particularly during the Derg regime (1974–1991), when the sector transitioned from analog to automated and subsequently digital systems, significantly improving public access to telecommunications.

Following the regime change in 1991, Ethiopia entered a new phase of telecommunications development. In 1996, the Ethiopian Telecommunications Corporation (ETC) was formed to modernize regulations and improve service delivery (Africa News, 2018). This was followed by the launch of EthioTelecom in 2010 as a state-owned enterprise under the government's Growth and Transformation Plan (GTP), which prioritized telecommunications infrastructure as a key driver of socio-economic development.

By 2018, EthioTelecom had emerged as the largest telecom operator in Africa, with over 64 million subscribers and an estimated 85% share of the domestic mobile services market (Africa News, 2018; Ethiopian Monitor, 2022). Strategic partnerships, including a \$1.5 billion infrastructure deal with Chinese firms, expanded the company's subscriber base to over 66 million by 2021 (Ethiopian Monitor, 2022).

A noteworthy milestone was achieved in 2018 with the appointment of Frehiwot Tamiru as EthioTelecom's first female Chief Executive Officer, signaling increased leadership diversity in the sector.

A major turning point came in May 2021, when EthioTelecom, in partnership with Huawei, launched Telebirr—a mobile money platform aimed at promoting financial inclusion. Supporting multiple languages and accessible through SMS, USSD, and smartphone applications, Telebirr enables users to transfer funds, make payments, access microcredit, and save without requiring a traditional bank account (Wikipedia, 2023). This innovation addressed longstanding financial access barriers, particularly in underserved and remote areas. To boost adoption, the Ethiopian government mandated digital payment integration across federal institutions and transitioned public services to electronic systems (Yimam, 2023).

Telebirr's impact was immediate. Within its first year, it registered over 21 million users, far exceeding initial projections. EthioTelecom (2023) reported that this rapid growth reflected increasing public trust in digital financial services. By 2024, Telebirr had surpassed 51.5 million registered users and became widely used for utility payments, airtime purchases, and retail transactions (Addis Insight, 2025). EthioTelecom continues to innovate and expand its digital portfolio, thereby supporting the broader national agenda for financial inclusion by integrating unbanked populations into the formal financial system (Ethiopian Monitor, 2022).

FinTech advancement in Ethiopia predates Telebirr. In 2001, the Commercial Bank of Ethiopia (CBE) introduced electronic banking services through ATMs. This was followed by the Ethiopian Automated Transfer System (EATS) in 2011, which modernized the national payment infrastructure. In 2016, the launch of EthSwitch, a national payment switch, further accelerated FinTech innovation (Addis Insight, 2024; Finextra Research, 2023). Traditionally, Ethiopia's financial services sector had been tightly regulated, with digital financial services restricted to banks and microfinance institutions. However, in 2020, the National Bank of Ethiopia (NBE) revised the payment systems proclamation, opening the sector to both domestic and international FinTech providers (National Bank of Ethiopia, 2020; International Trade Administration, 2023). These reforms reflect a shift from a state-dominated financial

landscape to a more competitive, innovation-driven ecosystem (World Bank, 2019; Yimam, 2023).

Despite this progress, several structural challenges persist. These include limited internet penetration, low levels of digital financial literacy, and persistent economic inequalities—particularly in rural regions (UNDP, 2024). Nevertheless, FinTech platforms such as Telebirr, M-Birr, M-Pesa, and BelCash are at the forefront of financial innovation in Ethiopia, offering mobile-based financial services tailored to unbanked and underbanked populations. Services include peer-to-peer transfers, mobile payments, and cash-in/cash-out functions. Banks and microfinance institutions now collectively manage over 800,000 digital financial accounts (World Bank, 2019).

Beyond payments, FinTech has significantly transformed lending practices. Platforms such as Michu and Telebirr's microcredit service offer loans without requiring collateral or extensive paperwork. According to the National Bank of Ethiopia (2023), more than 3.6 billion ETB was disbursed in digital credit during the first nine months of the 2022/23 fiscal year—a fourfold increase compared to the previous year. These developments illustrate the growing importance of FinTech in improving financial access, facilitating credit distribution, and supporting Ethiopia's broader economic and financial inclusion strategies.

Telebirr: Overview and Impact on Financial Inclusion

Launched in May 2021 by EthioTelecom, Telebirr has quickly become a central component of Ethiopia's digital financial ecosystem. Its primary objective is to broaden access to financial services for unbanked or underbanked communities, aligning with the national goal of digital transformation and economic progress (EthioTelecom, 2022). The initiative marked a significant move toward reducing financial exclusion in low-income urban and peri-urban areas.

While Telebirr enables standard mobile transactions—such as fund transfers, airtime purchases, and bill payments—it also offers more advanced financial services. Collaborating with banks and microfinance institutions, the platform provides micro-savings accounts, micro-loans, overdrafts, and salary-based credit options. Notably,

these services are available both via its smartphone app and through a USSD code (*127#), making them accessible to users with basic phones or limited internet access (EthioTelecom, 2022; Aragaw, 2023). This inclusive design demonstrates Telebirr's commitment to bridging technological divides.

A standout feature of the platform is its AI-driven credit-scoring system, which analyses transaction history and telecom usage to assess creditworthiness. This innovation allows individuals without formal financial histories or collateral to access credit. Telebirr's service suite includes initiatives like Telebirr-Mela (micro-credit), Telebirr-Sanduk and Telebirr-Sinq (micro-saving), Telebirr-Enderas (salary-based credit), Telebirr-Endekise (overdraft), Telebirr-Deldiy (merchant credit), and Telebirr-Adrash (linked to salary loans) (EthioTelecom, 2025).

Adoption of Telebirr has been rapid and significant. By the end of 2022, it had registered over 26.5 million users, processing roughly ETB 128 billion ($\approx$ USD 2.3 billion) in transactions (EthioTelecom, 2022). Services such as Mela and Sanduk had already reached more than 500,000 users, significantly advancing Ethiopia's microfinance sector (Aragaw, 2023).

Telebirr has also been integrated into government and private sector systems, facilitating utility payments, salary disbursement, public subsidies, e-commerce, and remittance services. It supports remittance integration with 37 international platforms and is used for government fuel subsidies and lottery systems (EthioTelecom, 2023). This integration enhances transparency, reduces costs, and promotes the formalization of financial transactions.

Despite these advances, Telebirr faces several challenges. Digital financial literacy remains low, particularly in rural regions—a barrier to the uptake of advanced services. In response, EthioTelecom has initiated educational campaigns to increase user awareness. Early regulatory limitations, mainly licensing and compliance issues, slowed initial service expansion but have since been mitigated through active cooperation with the National Bank of Ethiopia (EthioTelecom, 2022). Additionally, merchant adoption has been slower than anticipated due to a lack of infrastructure and

digital experience, leading to incentive-based programs and retail partnerships to speed up onboarding.

Looking forward, EthioTelecom envisions Telebirr evolving beyond a payment solution into a broader digital platform encompassing sectors like agriculture, healthcare, education, and retail, in alignment with national economic strategies. Plans also include enhancements to AI-based credit scoring, improved interoperability, and increased digital literacy efforts to support sustained use (EthioTelecom, 2023). These initiatives aim to deepen the platform's influence on inclusive economic participation.

In summary, Telebirr marks a major milestone in Ethiopia's FinTech evolution. Through innovative, scalable services and government-linked digitization efforts, it has significantly extended financial inclusion. With continuing infrastructure improvement, progressive policies, and intensified user education, Telebirr is positioned to deliver long-term, meaningful impact on Ethiopia's journey towards inclusive economic empowerment.

Regulatory Environment and Policy Frameworks

The development and sustainability of financial technology (FinTech) in Ethiopia—particularly platforms like Telebirr—are profoundly shaped by the regulatory and policy frameworks established by national authorities. The National Bank of Ethiopia (NBE), as the country's primary financial regulator, has made concerted efforts to encourage innovation while safeguarding financial stability, consumer protection, and compliance with anti-money laundering (AML) and counter-terrorism financing (CFT) obligations (NBE, 2020). Strategic documents such as the National Digital Payments Strategy (2021–2024) and Digital Ethiopia 2025 highlight the government's intention to advance digital transformation and financial inclusion by promoting cashless transactions, enhancing infrastructure, and enabling non-bank actors to enter the financial services sector (Ethiopian Legal Brief, 2021; Law Ethiopia, 2018).

A significant regulatory milestone was achieved with the issuance of the Licensing and Authorization of Payment Instrument Issuers Directive (ONPS/01/2020). This directive legally empowered non-banking entities like EthioTelecom to operate

mobile money platforms, laying the legal foundation for Telebirr's 2021 launch (NBE, 2020). Under this directive, Telebirr was allowed to deliver services such as person-to-person transfers, merchant payments, micro-savings, and other financial products, without requiring users to hold traditional bank accounts. The directive also established capital adequacy requirements, transaction ceilings, and risk control protocols to ensure systemic resilience and protect users (NBE, 2020).

To foster broader digital financial inclusion, the National Financial Inclusion Strategy (2021–2025) was introduced. This policy underscores the transformative role of mobile money in reaching underserved populations, particularly in rural Ethiopia. It emphasizes interoperability among digital service providers, robust cybersecurity systems, and investment in digital financial literacy to promote informed financial participation (NBE, 2021). Additionally, the Ethiopian government has introduced regulatory sandboxes, which allow FinTech firms to test new products in controlled environments before full-scale implementation—striking a balance between innovation and risk containment (World Bank, 2022).

Operating within this framework, Telebirr is mandated to comply with Know Your Customer (KYC) protocols, AML and CFT regulations, and consumer protection standards. The NBE employs a tiered KYC model, allowing simplified onboarding for low-risk users while imposing stricter identity verification requirements for high-value transactions. This approach fosters inclusion while minimizing exposure to fraud and illicit financial flows (NBE, 2020). Telebirr's integration with banks and microfinance institutions is also regulated to guarantee seamless interoperability and promote competition (International Trade Administration, 2023).

Despite these positive strides, challenges remain. Regulatory delays in licensing, outdated cross-border payment frameworks, and the nascent understanding of digital currencies hinder regulatory agility. Furthermore, evolving FinTech models—such as decentralized finance and AI-driven credit scoring—demand continuous regulatory adaptation. To address this, the NBE has engaged with international development partners to align Ethiopia's FinTech regulation with global standards (World Bank, 2023). These collaborations aim to sustain investor confidence and ensure financial system integrity while unlocking new opportunities for innovation.

In conclusion, Ethiopia's regulatory environment for digital finance has evolved considerably. Policies such as the National Financial Inclusion Strategy and Digital Payments Directive have created an enabling ecosystem for mobile money platforms like Telebirr, ensuring consumer protection and promoting financial inclusion. Nevertheless, sustaining progress will require regulatory bodies to remain adaptive to technological advances while maintaining the stability and inclusiveness of the financial system (African Development Bank, 2021).

2.3 Gap in current literature

Despite the growing scholarly interest in financial technology (FinTech) and digital inclusion across developing economies, a significant empirical gap remains regarding the mechanisms through which platforms like Telebirr influence financial inclusion in Ethiopia. Foundational global studies, including those by Demirgüç-Kunt et al. (2018) and the World Bank (2019), acknowledge the transformative potential of mobile money in bridging access gaps. However, these studies often employ cross-country datasets and lack contextual depth, failing to account for Ethiopia's distinct regulatory, technological, and socio-economic landscape.

Moreover, while multilateral institutions such as the United Nations Development Program (UNDP, 2024) and the International Trade Administration (2023) document macro-level progress—such as increased user bases and policy liberalization—there is a notable paucity of micro-level empirical research. Specifically, limited scholarly attention has been given to user behavior, adoption constraints, and service-level impact in the Ethiopian context. For instance, although Addis Insight (2025) reports that Telebirr surpassed 50 million registered users by 2024, few peer-reviewed studies have investigated user characteristics or the extent to which the platform has contributed to tangible financial inclusion metrics such as savings uptake, credit access, or integration into formal financial networks.

Additionally, an important yet underexplored area concerns FinTech's role in mitigating financial exclusion among structurally disadvantaged groups—namely women, youth, and rural populations. While descriptive reports from Aragaw (2023)

and Monteiro (2023) outline the availability of digital financial products through platforms like Telebirr, these contributions lack critical assessments of inclusivity and long-term developmental impact. Similarly, Santosdiaz (2022) underscores the significance of digital financial literacy (DFL) and infrastructural readiness but stops short of empirically evaluating their mediating influence on platform efficacy.

The literature also reveals a disproportionate emphasis on the supply-side dynamics of FinTech—such as transaction volume, infrastructure development, and partnership models—while insufficiently addressing demand-side factors. These include user trust, perceived value, technological adaptability, digital engagement patterns, and customer satisfaction (Yimam, 2023; EthioTelecom, 2023). Furthermore, there is a lack of robust, theory-driven quantitative models that examine the relationship between FinTech-specific variables—such as accessibility, service diversity, and cost reliability—and their direct or mediated influence on financial inclusion outcomes.

Consequently, a theory-informed and data-driven empirical study is both timely and essential. This study aims to address the existing void by investigating how FinTech—exemplified by Telebirr—affects financial inclusion not merely through access, but through sustained usage and empowerment. Particular focus is placed on the mediating role of digital financial literacy in shaping user behavior and financial outcomes. Such a contextualized approach offers substantial academic contribution and practical implications for FinTech providers, development agencies, and policymakers seeking to harness digital finance for inclusive economic growth.

2.4 Conceptual framework

This study's conceptual framework is designed to examine the relationship between financial technology (FinTech) and financial inclusion, with a particular focus on Telebirr, the mobile money service launched by EthioTelecom. The model incorporates three independent variables—FinTech Accessibility (FA), Service Diversity (SD), and Cost and Reliability (CR)—and introduces Digital Financial Literacy (DFL) as a mediating variable. The dependent variable is Financial Inclusion (FI). This framework is informed by both theoretical underpinnings and empirical

studies that have consistently demonstrated the significance of these constructs in shaping financial inclusion outcomes.

1. FinTech Accessibility (FA)

FinTech accessibility is a foundational component in the adoption of digital financial services. As Beck et al. (2007) assert, access to financial services—defined as the ability to utilize services conveniently, affordably, and in a timely manner—is central to financial inclusion. In digital contexts, platforms like Telebirr reduce infrastructural and geographical barriers by eliminating the need for physical banking facilities (Donovan, 2012). In this study, FinTech accessibility is operationalized through user perceptions of convenience, ease of use, system responsiveness, and platform availability. These dimensions align with findings from Zhou (2012) and Munyegera and Matsumoto (2016), who highlight the role of usability and availability in fostering digital financial participation.

2. Service Diversity (SD)

Service diversity refers to the variety and scope of financial services provided through a FinTech platform. As demonstrated by Suri and Jack (2016), mobile money systems that support a broad array of services—such as bill payments, money transfers, micro-savings, and credit—enhance user engagement and promote deeper financial integration. In this study, service diversity is assessed based on user experiences regarding the functionality, relevance, and availability of services on Telebirr. This perspective is supported by Baptista and Oliveira (2015), who found that service functionality significantly influences user satisfaction and adoption in mobile banking environments.

3. Cost and Reliability (CR)

The affordability and dependability of FinTech services are critical determinants of sustained usage. For low-income users in particular, low transaction fees and reliable service delivery are essential features (World Bank, 2014). Trust, often shaped by system reliability and security, is a significant factor influencing user behavior in mobile banking (Lin, 2011). The current study measures this construct using indicators such as perceived affordability, confidence in transaction accuracy, system security, and the responsiveness of customer support. These elements reflect validated

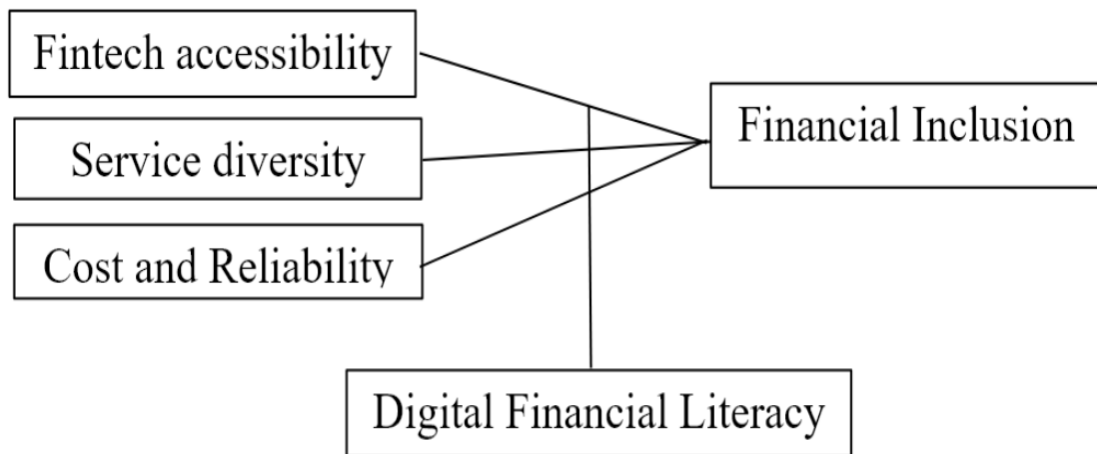
dimensions found in the works of Shaikh and Karjaluoto (2015), who emphasized the importance of cost-effectiveness and trustworthiness in digital finance.

4. Digital Financial Literacy (DFL)

Digital financial literacy (DFL) serves as a crucial mediating variable in this framework. According to Lusardi and Mitchell (2014), financial literacy enhances the ability to make informed financial decisions, particularly when interacting with complex digital platforms. In a mobile money context, digital financial literacy encompasses not only financial knowledge but also digital competency, fraud awareness, and the capability to navigate and troubleshoot digital platforms independently (OECD, 2018). In this study, DFL is measured through users' self-reported skills, confidence in using Telebirr, and understanding of various service features. This operationalization is consistent with the approaches of Atkinson and Messy (2012) and Grohmann et al. (2018), who underscore the importance of both financial and technological competencies in digital financial inclusion.

5. Financial Inclusion (FI)

Financial inclusion, the dependent variable, is conceptualized as the extent to which individuals access, utilize, and derive benefits from formal financial services. As noted by Demirgüç-Kunt et al. (2018), true inclusion goes beyond mere access and involves consistent use of financial tools to manage income, save, borrow, and improve economic resilience. In this research, financial inclusion is measured using indicators such as savings behavior, access to credit, ability to manage personal finances, and perceptions of financial well-being. These indicators are adapted from the World Bank's Global Findex Database (2017) and supported by Allen et al. (2016), whose empirical validation underscores their reliability in assessing inclusive financial behavior.



Conceptual frame work researcher's own work

CHAPTER 3: RESEARCH METHODOLOGY

3. Research Methodology

This chapter outlines the methodological approach employed to examine the effect of financial technology (FinTech) on financial inclusion in Addis Ababa, Ethiopia, using Ethio telecom's Telebirr as a case study. The study specifically investigates how core FinTech components FinTech Accessibility, Service Diversity, Cost and Reliability, and Digital Financial Literacy (DFL) influence levels of financial inclusion among users in an urban Ethiopian context.

3.1 Description of the Study Area

This study was conducted in Addis Ababa, the capital and largest city of Ethiopia. As of 2025, the city's population is estimated to exceed 5 million (World Population Review, 2025). As a national hub for economic, political, and social activities, Addis Ababa provides a unique and diverse demographic profile suitable for examining the effectiveness of digital financial services. It is also characterized by high mobile phone penetration and internet connectivity compared to rural regions (CSA, 2022), making it a strategic location for evaluating the role of Telebirr in enhancing financial inclusion.

3.2 Sources and Type of Data

Primary Data:

The primary data for this study were collected through a structured, close-ended questionnaire distributed to active users of Telebirr in Addis Ababa. The questionnaire was designed to measure perceptions of accessibility, service diversity, cost and reliability, digital financial literacy, and indicators of financial inclusion. Responses were collected using a 5-point Likert scale to quantify subjective attitudes and behavioral outcomes, making it appropriate for statistical analysis (Creswell,

2014). This approach facilitated the measurement of abstract concepts such as trust, ease of use, and behavioral change post-adoption.

To interpret user patterns more effectively, thematic analysis was also applied to the quantitative responses. While thematic analysis is often qualitative in nature, it can be adapted to structured categorical data to reveal patterns and themes in user sentiment (Braun & Clarke, 2006).

Secondary Data: to supplement and contextualize the primary data, the study also makes use of secondary data sources, which include:

- Industry and market reports on Telebirr and mobile money in Ethiopia
- Policy documents and financial inclusion strategies from the National Bank of Ethiopia and Ministry of Innovation and Technology
- Published academic research, empirical studies, and journal articles related to fintech and financial inclusion
- Statistical data from EthioTelecom, the World Bank, GSMA, and other recognized databases

Secondary data is instrumental in situating the study within broader national and international discussions on digital financial services. It provides background information, helps interpret primary findings, and supports validation of key assumptions (Saunders, Lewis & Thornhill, 2019).

3.3 Research Approach

This study adopted a *quantitative research approach* new primary methodology. Since, the objective was to statistically examine the relationship between the use of financial technology specifically EthioTelecom's Telebirr platform and financial inclusion among urban users in Addis Ababa quantitative methods were appropriate for capturing measurable variables such as usage frequency, service diversity, and levels of access, which are central to understanding the scope and effectiveness of FinTech in enhancing financial inclusion (Creswell, 2018).

While the research design was fundamentally quantitative, *thematic analysis* was also employed not in the traditional qualitative sense but as a method of interpreting patterns within structured responses collected via *close-ended Likert-scale questions*. This approach enabled the researcher to identify recurring user perceptions and behavior-related trends embedded in quantifiable data. According to Braun and Clarke (2006), thematic analysis can be flexibly applied to both qualitative and quantifiable categorical data to uncover broader patterns and meanings. The integration of this analysis enhances the interpretative value of quantitative results, especially in understanding behavioral shifts and attitudes following the adoption of Telebirr.

The use of thematic analysis in this context was justified by the need to interpret collective user tendencies and sentiment beyond mere frequency distributions. For instance, responses to items concerning perceived improvements in financial well-being or trust in digital platforms can be aggregated and thematically categorized to reveal dominant patterns in user perception. This methodological complementarity facilitates a more comprehensive understanding of how FinTech adoption translates into practical and psychological aspects of financial inclusion.

3.4 Research Design

An explanatory research design was used to determine the cause-and-effect relationship between the use of FinTech services (independent variable) and financial inclusion outcomes (dependent variable). This design enables the researcher to quantify user experiences, accessibility, and behavioral outcomes after adoption, allowing for statistical generalization (Bryman, 2016).

3.5 Research Hypotheses

Based on the conceptual framework developed in this study the following hypotheses were formulated to examine the effect of key FinTech components—Fintech Accessibility, Service Diversity, Cost and Reliability, and Digital Financial Literacy—on Financial Inclusion:

- **H_{0 1}** : Fintech Accessibility has no significant effect on Financial Inclusion.

- **H_{1 1}** : Fintech Accessibility has a significant effect on Financial Inclusion.
- **H_{0 2}** : Service Diversity has no significant effect on Financial Inclusion.
- **H_{1 2}** : Service Diversity has a significant effect on Financial Inclusion.
- **H_{0 3}** : Cost and Reliability has no significant effect on Financial Inclusion.
- **H_{1 3}** : Cost and Reliability has a significant effect on Financial Inclusion.
- **H_{0 4}** : Digital Financial Literacy has no significant effect on Financial Inclusion.
- **H_{1 4}** : Digital Financial Literacy has a significant effect on Financial Inclusion.

3.6 Population and Sampling Frame

The target population included active *Telebirr users residing in Addis Ababa*. This population is selected based on their direct exposure to mobile financial services and their relevance to the objectives of the study. The sampling frame comprises individuals who are registered and regularly use Telebirr for various financial transactions such as money transfer, bill payment, and savings.

3.7 Sampling Techniques

The study employed a non-probability purposive sampling technique, specifically convenience sampling, to identify respondents who are already users of Telebirr. While this approach may limit the generalizability of the findings, it is suitable for targeted data collection where specific user experiences and interactions with Telebirr are required (Etikan, Musa & Alkassim, 2016). Respondents are selected from various socio-economic and occupational backgrounds across Addis Ababa to ensure diversity and representation of different demographic segments.

The justification for purposive sampling lied in its ability to generate relevant, experience-based insights from users who had firsthand knowledge of Telebirr's functionalities. This enhanced the construct validity of the research by focusing on actual users rather than potential or non-users (Saunders et al., 2019).

To address concerns of representativeness, the sampling distribution covered multiple sub-cities of Addis Ababa and ensures inclusion across age, gender, education level, and income brackets. This approach, while not random, improved ecological validity by capturing a realistic spectrum of user experiences.

3.8 Sample size determination

Based on Cochran's formula for the total population proportion (at a 95% confidence level and 5% margin of error), the minimum required sample size was 384 respondents for the quantitative survey. The sample included users of Telebirr across different demographic segments, ensuring a variety of ages, gender, and socio-economic statuses are represented.

According to (Question Pro Survey Software, 2025) it's important to know the best way to find the sample size for the study. Assuming all data are collected from all cases in the sample the size of the population at 95% confidence level for the total user population 51.26 million the margin of error is calculated and found to be around 5%, the sample size can be calculated as followed:

$$\begin{aligned} \text{Sample size} &= \frac{(Z\text{-score}^2) \times \text{Std Dev} (1- \text{Std Dev})}{\text{Confidence interval}^2} \\ &= \frac{1.96^2 \times 0.5(1-0.5)}{5\%^2} = 384.16 \end{aligned}$$

3.9 Methods of Data Collection

Structured questionnaires were the primary data collection instruments. The questionnaires consisted closed-ended demographic and Likert scale questions to ensure measurable and comparable responses. It was designed to capture data on user demographics, frequency of Telebirr usage, benefits, challenges, and financial behaviors after adoption. And the secondary data was collected from relevant prior studies.

3.10 Variable construction and Measurement

Variable	Indicators	Measurement Approach
Financial Inclusion(DV)	Access, Usage, Financial Well-being	Number and type of transactions, subjective improvement in financial wellbeing
FinTech (Telebirr) (IV)	Accessibility, Service Diversity, Cost and Reliability	Likert-scale responses on ease of access, range of services, security
Digital Financial Literacy (Mediator)	Confidence and Knowledge usage	Likert-scale items and factual questions on Telebirr

Table I: Variable Construction

The above variables aligned with established frameworks for financial inclusion, such as those developed by the World Bank (Demirgüç-Kunt et al., 2018) and GSMA Mobile Money Metrics (GSMA, 2022).

3.11 Method of Data Analysis

Given the study's quantitative orientation, data analysis was primarily conducted through statistical techniques that allow for the systematic examination of the relationship between FinTech adoption represented by Telebirr usage and financial inclusion. The responses from the structured, close-ended questionnaires were coded and entered into STATA software for quantitative analysis.

Descriptive statistics such as frequencies, means, and standard deviations were used to summarize respondent characteristics and usage patterns of Telebirr services. These metrics provided a foundational understanding of how users interact with the platform and their levels of access, perceived service diversity, and overall satisfaction.

Inferential statistical techniques, specifically correlation and multiple linear regression analyses, was employed to test the hypothesized relationships between independent variables (FinTech features: accessibility, service diversity, cost and reliability), the mediating variable (digital financial literacy), and the dependent variable (financial inclusion). Regression analysis was found suitable for examining the magnitude and direction of influence among variables, supporting the study's goal of identifying the effect of Telebirr on financial inclusion outcomes (Bryman & Bell, 2015).

In addition to standard quantitative analysis, the study incorporated a *thematic interpretation of trends from closed-ended Likert-scale responses*. This technique involves identifying recurrent patterns and grouping similar responses across different indicators to derive collective themes that reflect users' financial behaviors and attitudes post-adoption. This form of thematic aggregation allows for a deeper understanding of user perception and behavioral change, enhancing the explanatory power of the statistical results (Braun & Clarke, 2006).

By triangulating descriptive, inferential, and thematically grouped patterns from structured data, this study ensured a robust and comprehensive analysis of how Telebirr contributes to financial inclusion within the urban Ethiopian context.

3.12 Validity and reliability

Validity refers to the extent to which a research instrument measures what it is intended to measure (Saunders, Lewis and Thornhill, 2019). For this study, validity ensured that the questionnaire accurately captured the dimensions of financial inclusion affected by the use of FinTech, specifically Telebirr, among users in Addis Ababa. To establish this, *content validity*, *construct validity*, and *criterion validity* were employed.

Content validity was addressed by developing the questionnaire based on existing frameworks of financial inclusion and FinTech evaluation (Demirgüç-Kunt et al., 2018; GSMA, 2022). Items were aligned with key constructs such as service

accessibility, diversity, cost, and digital financial literacy. Expert reviews by financial inclusion and mobile money specialists helped ensure that the items comprehensively covered relevant aspects. Additionally, a pilot study was conducted with 20 participants selected from various areas within Addis Ababa to test the clarity, appropriateness, and comprehensiveness of the questionnaire before administering it on a larger scale. This pretest helped assess whether the questions were clear, appropriate, and aligned with the research objectives. Feedback from the respondents was carefully reviewed, and necessary revisions were made to improve the questionnaire's quality. The finalized version of the instrument was then printed and prepared for distribution.

Construct validity involved ensuring that the measured variables reflected the theoretical concepts of financial inclusion, such as usage diversity, access to services, and perceived financial well-being. Factor analysis was used to examine whether items grouped together under expected constructs. This process confirmed that variables like accessibility, service diversity, and financial confidence were distinct yet related factors influencing inclusion (Jack and Suri, 2014).

Criterion validity was tested by comparing the findings with established external indicators from global financial inclusion databases and past mobile money studies (Demirgüç-Kunt et al., 2018). The study also applied concurrent validation by assessing whether self-reported improvements in financial inclusion correlated with specific behavioral changes, such as increased transaction frequency or reduced reliance on cash.

Through these multiple layers of validation, the study ensured that the data collected accurately represented users' experiences with Telebirr and its impact on financial inclusion.

Reliability refers to the consistency and stability of a measurement instrument over time and across different conditions (Saunders, Lewis and Thornhill, 2019). In this study, reliability was ensured through the internal consistency of the questionnaire items and the uniformity of data collection procedures. In order to measure the scale reliability Cronbach's Alpha was used since it measures internal consistency or how closely related a set of items are as a group. Cronbach's Alpha should be more than 0.7 and closer to 1.0 to accept data instruments and internal consistency of items in

research (Lemma, 2021). To assess internal consistency, **Cronbach's Alpha** was calculated for each construct, including FinTech Accessibility, Service Diversity, Cost and Reliability, Digital Financial Literacy, and Financial Inclusion.

Construct	Cronbach's Alpha
FA – Fintech Accessibility	0.9299
SD – Service Diversity	0.9333
CR – Cost & Reliability	0.9211
DFL – Digital Fin. Literacy	0.9360
FI – Financial Inclusion	0.9376

Table II: Reliability Test Result

Values exceeding the threshold of 0.7 indicated satisfactory internal reliability, confirming that items within each scale reliably measured the same underlying construct.

The structured format of the questionnaire, including standardized Likert-scale items, also contributed to consistency by ensuring that all respondents interpreted and answered questions under the same conditions. Pretesting the instrument further improved reliability by identifying and eliminating ambiguous or redundant items.

In sum, the reliability of the instrument was established through statistical testing and careful questionnaire design, providing confidence that the data collected reflected consistent patterns across different respondents.

3.13 Ethical Consideration

When conducting the research it's also required to adhere to ethical principles to ensure the integrity of the study and the protection of participants. The following ethical considerations were addressed throughout the research process:

1. Informed Consent

Participants were provided with clear and detailed information about the purpose, objectives, and scope of the study. Before taking part in the survey participants were asked to provide informed consent, either in writing or verbally. The consent process

emphasized that participation is entirely voluntary and that participants may withdraw at any time without facing any penalties or consequences.

2. Anonymity and Confidentiality

The identities of participants were anonymized to protect their privacy. Personal information collected during the research was kept confidential and securely stored. Data was reported in aggregate form, ensuring that individual responses cannot be traced back to specific participants. Any identifying information was removed before analysis or publication.

3. Voluntary Participation

Participants were not pressured into participating. They had the freedom to decline participation or to withdraw at any stage of the research. This ensured that their involvement is entirely voluntary and based on their free will.

4. Avoidance of Harm

Efforts were made to minimize any potential harm to participants. Questions in the surveys and interviews were designed to avoid discomfort or distress. Participants also had the right to skip questions they find uncomfortable or decline to answer without any justification.

5. Data Protection and Storage

All data collected were stored securely and accessible only to authorized members of the research team. Digital data was encrypted, and physical records (if any) were kept in locked storage. Data was retained only for the duration necessary for analysis and reporting and was permanently deleted after the research was completed.

6. Cultural Sensitivity

Ethiopia is a culturally diverse country, and the research was conducted in a manner that respects local customs, traditions, and social norms. Surveys and interviews were designed to reflect this diversity, and appropriate language and translation services were used where necessary.

7. Ethical Approval

The research sought ethical approval from Addis Ababa University's Ethics Review Committee before data collection began. This ensured that the study complied with institutional and national ethical guidelines.

8. Transparency and Honesty

The research was conducted transparently, with participants being informed about the scope and potential impact of the study. Additionally, any conflicts of interest were disclosed, and the findings were reported honestly and accurately.

9. Feedback to Participants

Participants were offered access to a summary of the research findings upon completion. This ensures transparency and acknowledges their contribution to the study.

By adhering to these ethical considerations, the research aims to uphold the highest ethical standards while ensuring that the rights and dignity of all participants are respected.

CHAPTER 4: RESULTS/FINDINGS

4. Results/Findings

This chapter presents the statistical analysis and empirical results that directly address the central research question: what is the effect of financial technology, specifically Ethio telecom's Telebirr, on enhancing financial inclusion in Addis Ababa, Ethiopia.

Drawing on data obtained from 385 respondents through a structured questionnaire, the chapter investigates the extent to which Telebirr, as a digital financial service platform, facilitates access to and participation in formal financial systems.

The analysis focuses on examining the relationships between key FinTech-related factors such as accessibility, service diversity, cost and reliability, and digital financial literacy and financial inclusion outcomes. In doing so, the chapter aims to offer meaningful insights into how users engage with digital finance, the behavioral patterns surrounding usage, and the broader implications for economic inclusion.

The findings are presented using descriptive and inferential statistics, including frequencies, percentages, charts, and tables, accompanied by detailed interpretation to ensure clarity and relevance. The analysis also incorporates statistical tests for reliability and validity to assess the robustness of the measurement instruments used.

The chapter is structured in to thematic main sections.

4.1 Response Rate and Demographic Profile

A total of 385 structured questionnaires were distributed to Telebirr users in Addis Ababa, and all were successfully completed and returned, yielding a 100% response rate. The respondents were categorized by age, gender, educational level, employment status, and their usage frequency of Telebirr. Analysis was done in Stata/IC 15.1 software and is summarized in the following tables.

Category	Frequency	Percent
26–35	127	32.99%

18–25	94	24.42%
36–45	79	20.52%
46–55	56	14.55%
56+	29	7.53%

Table III: Age group

Category	Frequency	Percent
Male	205	53.25%
Female	180	46.75%

Table IV: Gender

Category	Frequency	Percent
Bachelor	141	36.62%
Secondary	109	28.31%
Master+	60	15.58%
Primary	56	14.55%
None	19	4.94%

Table V: Education

Category	Frequency	Percent
Self-employed	118	30.65%
Private	115	29.87%
Government	88	22.86%
Unemployed	64	16.62%

Table VI: Employment

Category	Frequency	Percent
Daily	160	41.56%
Weekly	112	29.09%
Monthly	75	19.48%
Occasionally	38	9.87%

Table VII: Frequency

The results indicated how frequently respondents use Telebirr. A majority (41.56%) reported using the platform daily, followed by weekly users (29.09%). Only 9.87% of respondents used the platform occasionally, indicating a strong habitual usage trend among Addis Ababa residents.

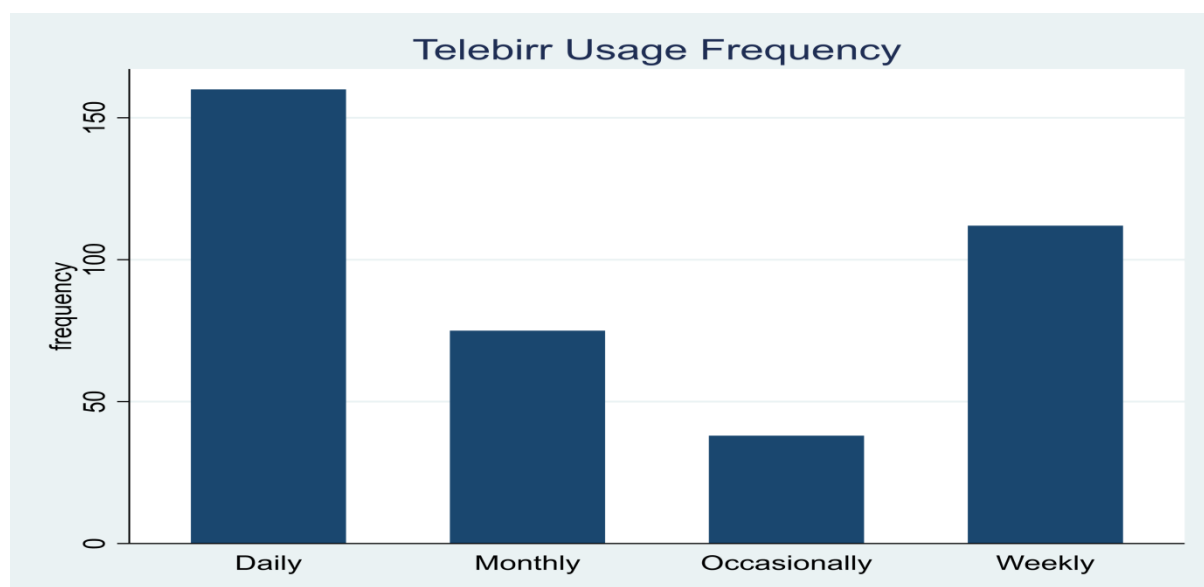


Figure i: Telebirr usage frequency

Telebirr Services Used

The following table shows which services users most frequently accessed via Telebirr. Payments accounted for the highest use at 30.39%, followed by Transfers (24.42%) and Airtime purchases (16.62%). Savings and Bill Payments were also represented but to a lesser extent.

Service Type	Frequency	Percent
Payments	117	30.39%
Transfers	94	24.42%
Airtime	64	16.62%
Savings	59	15.32%
Bill Payments	51	13.25%

Table VIII: Service type used

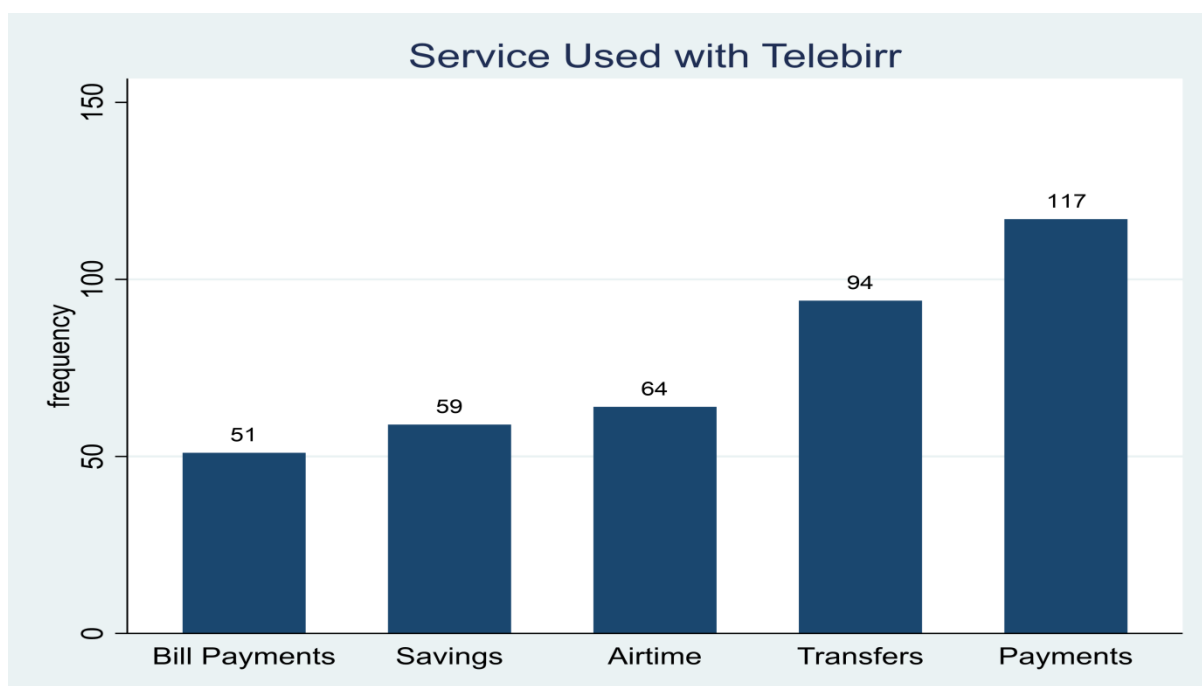


Figure ii: services used by respondents

Overall, most respondents were between the ages of 26–35 and 36–45, showing Telebirr usage is highest among economically active age groups. There was nearly equal participation from males and females. A large proportion of respondents held at least secondary education and most was, either employed in the private sector or self-employed. These characteristics suggest that educated and economically engaged individuals are the primary adopters of Telebirr in Addis Ababa.

Implications of the Demographic Results

The demographic findings provided critical insights into the prevailing patterns of Telebirr adoption and its implications for financial inclusion in Addis Ababa. The 100% response rate indicated a highly engaged user base, underscoring the relevance and widespread use of Telebirr among the sampled population. The age distribution showed that usage was predominantly concentrated among economically active cohorts, particularly individuals aged 26 to 35 (33%) and 36 to 45 (21%). This concentration suggests that Telebirr successfully reached segments of the population with greater financial needs and higher levels of digital engagement, thereby

positioning the platform as a crucial tool for enhancing economic participation during peak working years. Conversely, the lower representation of users aged 46 and above pointed to a potential adoption gap, which may be attributed to challenges such as limited digital literacy, lower trust in digital platforms, or accessibility constraints—factors that warrant targeted educational and outreach interventions.

In terms of gender, the results indicated near parity, with male users accounting for 53% of respondents. While this slight dominance by male users suggests encouraging progress toward gender inclusivity, it also highlights the importance of continued efforts to further empower women through FinTech solutions. Given that financial exclusion disproportionately affects women in many developing economies (Demirgüç-Kunt et al., 2018), achieving equitable digital financial inclusion requires deliberate, gender-sensitive service design and targeted awareness campaigns.

The educational background of respondents revealed that more than 80% had attained at least secondary education, with over 15% possessing higher degrees. This pattern aligns with existing literature which identifies education—and by extension, digital financial literacy—as a key determinant of FinTech adoption (Gomber et al., 2018). However, the correlation also suggests that less-educated segments of the population may remain excluded from digital finance ecosystems, emphasizing the need for simplified user interfaces and inclusive digital literacy initiatives.

Employment data further highlighted that self-employed individuals and private-sector employees constituted the majority of Telebirr users. This distribution reflects the platform's appeal to individuals engaged in entrepreneurial and formal economic activities, where digital transactions can streamline business operations and enhance financial efficiency. Notably, a significant share of respondents (16.6%) were unemployed, indicating that Telebirr may also serve as an accessible financial gateway for vulnerable and economically marginalized groups. Nevertheless, additional qualitative inquiry would be beneficial to explore the depth and nature of engagement within this demographic.

Furthermore, usage frequency data demonstrated a strong pattern of habitual engagement, with over 70% of respondents using Telebirr either daily or weekly. This

high rate of regular use signified increasing user trust and the platform’s successful integration into everyday financial practices. Most users reported engaging with core services such as money transfers and utility payments—services that align with fundamental financial needs and highlight the platform’s convenience and functionality.

In summary, the demographic profile of Telebirr users in Addis Ababa illustrated that the platform primarily served educated, economically active, and digitally literate individuals. While this reflects the strengths of current FinTech-driven financial inclusion efforts, it also exposes critical limitations. To ensure that no population segment is left behind, policymakers and service providers must prioritize inclusive strategies that address the specific needs of older adults, less-educated individuals, women, and other underrepresented groups. Expanding the reach of digital financial literacy programs and tailoring service offerings to be more inclusive will be essential in advancing equitable financial inclusion across all segments of society.

4.2 Descriptive Statistics

This section presents the descriptive analysis of the primary constructs investigated in the study, summarizing how respondents evaluated key dimensions of Telebirr usage and its influence on financial inclusion. The constructs—FinTech Accessibility, Service Diversity, Cost and Reliability, Digital Financial Literacy, and Financial Inclusion—were each assessed using multiple items measured on a five-point Likert scale, ranging from “Strongly Disagree” to “Strongly Agree.” Descriptive statistics, including mean scores, standard deviations, and minimum and maximum values, were calculated to examine central tendencies and the variability of responses across participants. These descriptive insights provide an initial overview of user perceptions concerning the accessibility, reliability, and effectiveness of Telebirr’s digital financial services and form the empirical foundation for the inferential analyses that follow.

Construct	No. of Items	Mean	Std. Dev.	Min	Max
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Fintech Accessibility (FA)	5	3.48	0.82	1.40	5.00
Service Diversity (SD)	5	3.53	0.81	1.40	5.00
Cost & Reliability (CR)	5	3.38	0.80	1.00	5.00
Digital Financial Literacy (DFL)	5	3.45	0.88	1.00	5.00
Financial Inclusion (FI)	5	3.46	0.51	2.05	4.71

Table IX: Descriptive Statistics

The descriptive statistics indicated that respondents perceived Telebirr’s services positively across the core dimensions under investigation, with *mean scores* ranging from 3.38 to 3.53. These results suggest a generally favorable assessment of the platform in terms of accessibility, service diversity, affordability, and the users’ level of digital financial literacy. Notably, *Service Diversity* recorded the highest mean score of 3.53, demonstrating that users particularly valued the range of financial functions available on the platform—including payment processing, fund transfers, airtime purchases, and other utilities. This finding implies that Telebirr’s ability to cater to multiple financial needs under one platform enhances user satisfaction and promotes regular usage.

In contrast, the construct *Cost and Reliability* yielded the lowest mean score of **3.38**, which may point to user concerns regarding transaction charges, occasional service downtime, or delays in customer support responsiveness. Although still within a moderately positive range, this lower score highlights an area that may require targeted improvement by EthioTelecom to ensure continued trust and engagement from users. Meanwhile, *Financial Inclusion*, the dependent variable in this study, achieved a mean score of 3.46, accompanied by a relatively low *standard deviation* of 0.51. This suggests a high level of consistency among respondents in reporting positive outcomes related to financial access, usage, and empowerment via Telebirr, reflecting the platform’s tangible contribution to inclusive finance.

Importantly, the *standard deviations* for all constructs were recorded as being *below 1.0*, signifying a narrow spread of responses around the mean and an absence of extreme outliers. Such data behavior strengthens the reliability of the results and satisfies one of the preconditions for conducting robust *inferential statistical modeling*, such as regression analysis. Additionally, examination of the *regression residuals* revealed a mean value approximating zero, with a minimal *standard deviation of 0.24*, indicating that the residuals were evenly distributed and did not exhibit patterns of systematic error. This supports the conclusion that the regression model used in this study provided a statistically valid and unbiased fit for the observed data.

Taken together, these descriptive findings reinforce the notion that Telebirr has made meaningful strides in enhancing financial inclusion by offering services that are not only accessible but also diverse and aligned with user expectations. For *policy-makers and service providers*, these results underscore the importance of further enhancing service *affordability and reliability*, while also investing in *digital literacy programs* and public awareness campaigns to broaden Telebirr's impact. The consistency and significance of these descriptive patterns also lay a solid foundation for the subsequent inferential analyses, from which more nuanced and strategic recommendations may be drawn.

4.3 Inferential Statistics and Hypothesis Testing

4.3.1 Assumption Testing for Multiple Linear Regression

Multiple linear regression is a statistical approach that combines two or more independent variables to predict the result of a dependent variable and test hypotheses of underlying assumptions to ensure the validity and reliability of the regression results (Field, 2013; Hair et al., 2010). The technique can be used to calculate the model's variation and the relative contribution of each independent variable to the total variance. The following assumptions of multiple linear regressions have been tested in order to apply the model for analysis for this study. Failure to meet these assumptions can lead to biased estimates and incorrect inferences (Gujarati & Porter, 2009). The assumptions tested and the reasons for testing are as follows:

1. Linearity

The linearity assumption requires that the relationship between each independent variable and the dependent variable be linear (Pallant, 2020). This ensures that the model correctly represents the relationship, allowing accurate estimation of regression coefficients. Non-linearity could result in misleading coefficients and reduce model fit.

2. Independence of Errors

Independence assumes that residuals (errors) are not correlated across observations. This is essential because correlated errors violate the assumption of independent observations, which can inflate Type I error rates and undermine statistical tests (Gujarati & Porter, 2009). Independence was assumed due to the cross-sectional design and was verified through residual analysis.

3. Homoscedasticity

Homoscedasticity means the variance of the residuals is constant across all levels of the independent variables (Osborne & Waters, 2002). Testing for homoscedasticity is necessary because heteroscedasticity (unequal variance) can lead to inefficient estimates and invalid standard errors, compromising hypothesis testing. The Breusch–Pagan/Cook–Weisberg test was employed to detect any heteroscedasticity.

4. Normality of Residuals

Normality of residuals is a prerequisite for conducting accurate hypothesis tests on regression coefficients, as it affects the validity of confidence intervals and p-values (Tabachnick & Fidell, 2013). The Shapiro–Wilk test and residual plots were used to assess this assumption.

5. No Multicollinearity

Multicollinearity occurs when independent variables are highly correlated, making it difficult to isolate the unique effect of each predictor (O'Brien, 2007). It inflates the variance of coefficient estimates and reduces model interpretability. Variance Inflation Factor (VIF) values were examined to ensure that multicollinearity was within acceptable limits ($VIF < 5$).

Variable	VIF	1/VIF
-----+-----		
FA_total	1.00	0.995389
DFL_total	1.00	0.996394
CR_total	1.00	0.996721

SD_total | 1.00 0.997413

-----+-----

Mean VIF | 1.00

Before conducting the multiple linear regression analysis, all key statistical assumptions were thoroughly tested to ensure the reliability and validity of the model. The results confirmed that the data met all required conditions: the relationships between variables were linear, errors were independent and normally distributed, variance of residuals was constant (homoscedastic), and no multicollinearity was detected among predictors. These findings provided a strong foundation for trusting the accuracy and generalizability of the regression results. In short, the model was statistically sound, and the conclusions drawn from it rest on solid ground.

4.3.2 Simple Linear Regression Results

Simple linear regressions were conducted to assess the individual impact of each predictor on financial inclusion. This step helps identify the strength and direction of each predictor's relationship with the dependent variable without the influence of other predictors, offering baseline insights before multiple regression modeling (Field, 2013).

Predictor	R ²	Adj. R ²	F-statistic	F p-value	β Coefficient	t-value	p-value
Fintech Accessibility (FA)	0.1788	0.1767	83.41	0.000	0.262	9.13	0.000
Service Diversity (SD)	0.0939	0.0915	39.69	0.000	0.192	6.30	0.000
Cost & Reliability (CR)	0.0939	0.0915	39.69	0.000	0.195	6.30	0.000
Digital	0.3948	0.3932	249.81	0.000	0.362	15.81	0.000

Financial Literacy (DFL)							
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Table X: Linear regression result

The simple linear regression analysis clarified the isolated effects of key predictors—Fintech Accessibility (FA), Service Diversity (SD), Cost and Reliability (CR), and Digital Financial Literacy (DFL)—on financial inclusion. all predictors demonstrated statistically significant positive relationships with financial inclusion, confirming their theoretical relevance and practical importance within the Ethiopian digital financial ecosystem. This analysis served as an essential preliminary step to understand the individual predictive strength of each factor before accounting for potential confounding effects in a multiple regression model. In alignment with prior empirical studies and theoretical assertions within FinTech adoption literature (Field, 2013; Gomber et al., 2018), each of the predictors demonstrated a statistically significant and positive relationship with financial inclusion, thereby confirming their conceptual relevance and practical impact within the Ethiopian digital finance ecosystem.

Among the predictors, *Digital Financial Literacy (DFL)* emerged as the most influential factor. It independently explained approximately 39.5% of the variance in financial inclusion ($R^2 = 0.3948$) and registered the *highest standardized beta coefficient* ($\beta = 0.362$). This result emphasized the pivotal role of digital financial literacy as a facilitator of meaningful fintech usage. Users who possessed a higher level of digital competence and financial understanding were more likely to engage in inclusive financial behavior through platforms such as Telebirr. These findings supported the argument made by Lusardi and Mitchell (2014), who posited that financial literacy is a fundamental enabler of inclusive financial participation, especially in digital environments where users must navigate multiple technologies and risk considerations. Over all, the magnitude of this relationship highlights that financial inclusion is not merely a function of technological availability but is fundamentally dependent on users' competencies and confidence in digital financial tools,

FinTech Accessibility (FA) also exhibited a substantial and statistically significant effect, accounting for 17.88% of the variance in financial inclusion ($R^2 = 0.1788$)

with a beta coefficient of $\beta = 0.262$. This finding reinforced the importance of ensuring that digital financial platforms are both physically and technologically accessible to users. Reliable access to mobile networks, user-friendly interfaces, and affordable smartphones or USSD-based services was essential for users to adopt and benefit from FinTech. This result aligned with evidence from developing economies which highlighted infrastructural challenges as persistent barriers to digital inclusion (Ozili, 2018).

Although *Service Diversity (SD)* and *Cost and Reliability (CR)* individually accounted for a smaller proportion of the variance in financial inclusion ($R^2 = 0.0939$ for both), their effects were nonetheless statistically significant. The *diversity of services*—including transfers, savings, bill payments, and credit options—played a critical role in encouraging repeated and diversified use of the platform, thereby promoting deeper engagement and inclusion. This echoed the conclusions drawn by Demirgüç-Kunt et al. (2018), who observed that the availability of varied financial products enhances the perceived utility of digital finance platforms. Similarly, *Cost and Reliability*, reflecting the affordability and consistency of service provision, remained essential for sustained user engagement. According to Kim et al. (2010), users' trust in the accuracy, speed, and cost-effectiveness of digital services significantly affects their willingness to transition from informal to formal financial services.

Despite their lower explanatory power compared to DFL and FA, both SD and CR were essential components of the broader FinTech experience. Their significance suggested that while users appreciated variety and cost efficiency, these features alone were insufficient to foster inclusion in the absence of access and user capability.

Overall, the findings from the simple linear regression analyses supported the conceptual hypothesis that financial inclusion is driven by a multifaceted interaction between technological access, service functionality, cost considerations, and user competencies. The particularly strong role of Digital Financial Literacy indicated an urgent need for targeted interventions, such as nationwide digital skills training, financial education programs, and community-based awareness campaigns. Concurrently, expanding FinTech Accessibility through infrastructure investment and adaptive service delivery (e.g., USSD platforms for non-smartphone users) was identified as equally critical.

In conclusion, the simple regression models validated the hypothesized positive influence of each predictor on financial inclusion. These results provided both empirical justification and a conceptual roadmap for the subsequent multiple regression analysis, which further examined the combined effects and relative contributions of each predictor in shaping financial inclusion outcomes. These insights were crucial for informing future strategies aimed at leveraging FinTech platforms like Telebirr to foster inclusive economic participation in Ethiopia.

4.3.3 Correlation Analysis

Variable Pair	Correlation (r)	p-valueSignificance
FA ↔ FI	0.3911	0.0000
SD ↔ FI	0.2997	0.0000
CR ↔ FI	0.2853	0.0000
DFL ↔ FI	0.4733	0.0000

Table XI: Correlation Analysis result

The Pearson correlation analysis conducted in this study served as a preliminary diagnostic tool to assess the strength and direction of linear associations between the independent variables—FinTech Accessibility (FA), Service Diversity (SD), Cost and Reliability (CR), and Digital Financial Literacy (DFL)—and the dependent variable, Financial Inclusion (FI). As suggested by Dancey and Reidy (2017), correlation analysis not only quantified the degree of bivariate association but also functioned as a critical step in identifying potential multicollinearity among predictors, which could adversely affect the validity and interpretability of subsequent multivariate analyses.

The results revealed statistically significant positive correlations between each independent variable and financial inclusion, with all p-values less than 0.001. This affirmed the direct and positive relationships hypothesized in the conceptual framework. Among the predictors, Digital Financial Literacy (DFL) demonstrated the strongest correlation with financial inclusion ($r = 0.4733$), highlighting its central role in equipping individuals to effectively interact with and benefit from digital financial services. This finding was consistent with existing literature, which emphasized

digital and financial literacy as critical prerequisites for bridging the technological and informational gaps that inhibit fintech adoption (Lusardi & Mitchell, 2014; Klapper et al., 2016).

FinTech Accessibility (FA) also exhibited a moderately strong positive correlation ($r = 0.3911$), reaffirming the importance of access to digital infrastructure—such as smartphones, mobile networks, and user-friendly platforms—in facilitating inclusive financial engagement. This correlation supported evidence from emerging market contexts where physical and digital access remain foundational to achieving equitable financial participation (Ozili, 2018).

Service Diversity (SD) and Cost and Reliability (CR) both displayed statistically significant but relatively weaker correlations with financial inclusion ($r = 0.2997$ and $r = 0.2853$, respectively). These results underscored their contributory roles in enhancing user engagement and service retention, albeit to a lesser extent compared to access and literacy. The findings suggested that a broad array of financial services—such as bill payments, savings, and credit features—and the perceived affordability and reliability of these services, influenced user satisfaction and repeat usage. Such observations aligned with global empirical studies that advocated for diversified, low-cost, and reliable fintech solutions as essential enablers of sustained inclusion (Demirgüç-Kunt et al., 2018).

Crucially, the absence of high intercorrelations among the independent variables indicated minimal multicollinearity, thus validating the conceptual independence of each construct. This statistical outcome justified the inclusion of all predictors in the multiple regression model without risking the inflation of standard errors or redundancy in variance estimates (Hair et al., 2019). It also strengthened the methodological soundness of the inferential strategy by confirming the distinct contribution of each variable to financial inclusion.

In summary, the Pearson correlation analysis provided empirical affirmation for the multi-dimensional framework guiding this research. The analysis substantiated the premise that financial inclusion is shaped by an interplay of accessibility, service functionality, affordability, and user literacy. Moreover, the relative magnitudes of the

correlation coefficients offered insight into prioritization strategies for policymakers and fintech providers. Particularly, the findings highlighted the need to focus on enhancing digital financial literacy and expanding infrastructure access as high-impact interventions for advancing financial inclusion through platforms like Telebirr.

4.3.4 Multiple Linear Regression Results

Multiple linear regression was performed to examine the combined effect of fintech-related factors on financial inclusion. This method allowed controlling the influence of other predictors and provides a comprehensive understanding of how each variable uniquely contributes to financial inclusion outcomes (Hair et al., 2010). The model's overall significance and goodness of fit were also assessed to ensure robustness.

FI_total	Coef.	St.Err.	t-value	p-value	[95%Conf	Interval]	Sig
FA_total	.254	.015	16.70	0	.224	.284	***
SD_total	.212	.015	13.75	0	.181	.242	***
CR_total	.222	.016	14.23	0	.191	.252	***
DFL_total	.356	.014	25.20	0	.328	.384	***
Constant	-.153	.107	-1.43	.154	-.364	.058	

Table XII: Multiple linear regression Results

Mean dependent var	3.456	SD dependent var	0.508
R-squared	0.772	Number of obs	385
F-test	321.863	Prob > F	0.000
Akaike crit. (AIC)	10.938	Bayesian crit. (BIC)	30.704

*** $p < .01$, ** $p < .05$, * $p < .1$

Table XIII: Multiple linear regression Result Summary

The analysis was conducted to examine the simultaneous effects of Fintech Accessibility (FA), Service Diversity (SD), Cost and Reliability (CR), and Digital Financial Literacy (DFL) on Financial Inclusion (FI). The model revealed an exceptionally high explanatory power, with an R-squared value of 0.772, indicating that approximately 77.2% of the variance in financial inclusion among Telebirr users

could be collectively explained by the four independent variables. The model's overall significance is confirmed by an F-statistic of 321.863 ($p < 0.001$), suggesting that the predictors, as a group, significantly influence financial inclusion outcomes.

Interpretation of Coefficients

All four predictors demonstrated *statistically significant positive effects* ($p < 0.01$) on financial inclusion:

- **Digital Financial Literacy (DFL)** had the strongest influence ($\beta = 0.356$, $t = 25.20$), suggesting that a one-unit increase in DFL is associated with a *0.356 unit increase in financial inclusion*, holding other variables constant.
- **Fintech Accessibility (FA)** followed with $\beta = 0.254$ ($t = 16.70$), indicating the critical role of physical and digital access to mobile financial platforms.
- **Cost and Reliability (CR)** had a coefficient of $\beta = 0.222$ ($t = 14.23$), reinforcing the importance of affordable, trustworthy services.
- **Service Diversity (SD)** was also significant ($\beta = 0.212$, $t = 13.75$), showing that broader product offerings contribute meaningfully to users' financial inclusion levels.

The constant term was not statistically significant ($p = 0.154$), suggesting that in the absence of the explanatory variables, the model cannot predict meaningful baseline financial inclusion.

Regression Output: Meaning and Implications

The coefficients (Coef.) in a multiple regression model represented the magnitude and direction of the relationship between each independent variable and the dependent variable, assuming that all other variables remained constant. In this study, a positive coefficient—for instance, Digital Financial Literacy (DFL) with $\beta = 0.356$ —indicated that for every one-unit increase in a user's digital financial literacy, their level of financial inclusion was expected to increase by approximately 0.356 units, holding other variables constant. This highlighted a direct and substantial contribution of digital literacy to the financial inclusion outcome, reinforcing its conceptual centrality in the model. Similarly, other predictors such as FinTech Accessibility (FA = 0.254), Service Diversity (SD = 0.212), and Cost and Reliability (CR = 0.222) also

demonstrated meaningful and positive associations, suggesting that improvements in these dimensions were linked to enhanced financial inclusion among users.

The Standard Error (St. Err.) for each coefficient provided a measure of the precision and reliability of the estimated effect size. Smaller standard errors indicated greater confidence in the coefficient estimates, as they suggested minimal variation across repeated samples. For example, the standard error associated with DFL was 0.014, which is notably low. This implied that the estimated effect of DFL was tightly distributed around the true population parameter, enhancing the statistical reliability of the findings. The relatively small standard errors across all variables confirmed that the estimates were stable and robust.

The t-value served as a test statistic for assessing whether each regression coefficient differed significantly from zero. It was calculated by dividing the coefficient by its corresponding standard error. A high absolute t-value suggested a statistically significant contribution of the predictor to the dependent variable. Among all the predictors, DFL recorded the highest t-value of 25.20, reinforcing its position as the most impactful and statistically influential variable in the model. The high t-values for the other predictors also signaled that their estimated effects were not due to random sampling variation but reflected true underlying relationships.

The p-values provided the probability of observing such extreme t-values if the null hypothesis—that a coefficient equals zero—were true. In this study, all p-values were less than 0.001, which indicated high statistical significance at the 0.1% level. This robust statistical evidence confirmed that all four predictors—FA, SD, CR, and DFL—had effects on financial inclusion that were extremely unlikely to have occurred by chance. Therefore, the null hypotheses for all variables were rejected with high confidence, affirming the validity of the model.

The 95% Confidence Intervals (CIs) further strengthened the statistical interpretation by offering a plausible range in which the true population parameter was expected to fall. For instance, the CI for DFL was [0.328, 0.384], suggesting that even in the most conservative or liberal estimation scenarios, the effect of DFL on financial inclusion remained both positive and significant. Importantly, the fact that none of the

confidence intervals for any variable included zero provided additional evidence of the statistical reliability and relevance of each predictor.

In summary, these regression outputs collectively validated the statistical soundness, explanatory strength, and theoretical alignment of the model. The consistently positive coefficients underscored the positive influence of FinTech dimensions on financial inclusion. The low standard errors enhanced the precision of the estimates, while the high t-values and extremely low p-values established strong statistical significance across all predictors. Moreover, the narrow and positive confidence intervals further corroborated these results. Together, these findings demonstrated that FinTech Accessibility, Service Diversity, Cost and Reliability, and Digital Financial Literacy were all empirically grounded and essential drivers of financial inclusion within the Ethiopian context. These results not only reinforced existing theoretical propositions but also provided concrete, data-driven insights for policymakers, fintech providers, and development stakeholders seeking to advance inclusive digital finance strategies in emerging markets.

Interpretation of Model Fit and Statistical Findings

The statistical results provided compelling evidence regarding the robustness, reliability, and explanatory capacity of the regression model employed to investigate the relationship between FinTech-related factors and financial inclusion. The mean of the dependent variable, *Financial Inclusion (FI)*, was 3.456, with a standard deviation of 0.508, indicating that respondents, on average, reported a moderately high level of financial inclusion. The relatively low standard deviation suggested a homogeneous distribution of responses, reflecting consistency in users' experiences and perceptions of financial inclusion across the sample population in Addis Ababa.

A central measure in evaluating model fit was the R-squared (R^2) statistic, which, in this case, stood at 0.772. This implied that 77.2% of the variance in financial inclusion was jointly explained by the four key independent variables: *FinTech Accessibility (FA)*, *Service Diversity (SD)*, *Cost and Reliability (CR)*, and *Digital Financial Literacy (DFL)*. According to Field (2013), an R^2 value exceeding 0.70 is indicative of a strong model fit in social science research. Thus, the model demonstrated high

explanatory power, confirming that the selected FinTech dimensions were highly relevant in predicting financial inclusion outcomes in the urban Ethiopian context.

The F-statistic value of 321.863, accompanied by a p-value of 0.000, further reinforced the overall statistical significance of the regression model. The F-test served as a joint hypothesis test to determine whether the group of independent variables significantly contributed to the variance explained in the dependent variable. The highly significant result ($p < 0.001$) confirmed that the model, as a whole, provided a significantly better fit than a null model with no predictors. This finding validated that the observed effects were not due to random chance but rather reflected genuine relationships among the study variables.

In addition to classical goodness-of-fit indicators, model evaluation was supplemented by the Akaike Information Criterion (AIC = 10.938) and the Bayesian Information Criterion (BIC = 30.704). These two metrics are particularly useful in assessing model parsimony by introducing penalties for overfitting. Lower values of AIC and BIC indicate that the model achieves an optimal balance between complexity and explanatory adequacy (Burnham & Anderson, 2004). The relatively low AIC and BIC values obtained in this study suggested that the model was efficiently specified, capturing essential predictive relationships without incorporating unnecessary variables.

Taken together, these statistical diagnostics provided strong empirical support for the model's validity and theoretical soundness. The combination of a high R^2 value, significant F-test, and favorable AIC/BIC values established that the regression model was well-calibrated to uncover the dynamics between FinTech features and financial inclusion. Particularly noteworthy was the influence of *Digital Financial Literacy*, which consistently emerged as a key driver in both bivariate and multivariate analyses.

Overall, the statistical findings underscored that FinTech elements—especially accessibility, service diversity, affordability, and user competency—played significant and measurable roles in advancing financial inclusion among urban Ethiopian users. These results not only validated the research hypotheses but also offered actionable

insights for stakeholders such as policymakers, FinTech developers, and financial institutions seeking to leverage digital solutions for inclusive economic development. The model's fit statistics confirmed that the conclusions drawn from this analysis were reliable, generalizable, and academically robust, particularly within the context of a rapidly digitizing financial landscape in emerging economies like Ethiopia.

Hypothesis Testing Results

The results of the multiple linear regression indicate that all four predictors have statistically significant effects on Financial Inclusion ($p < 0.001$ for all variables) and the null hypothesis were rejected.

- **H_{1 1}** : Supported. Fintech Accessibility significantly affects Financial Inclusion ($\beta = 0.254, p < 0.001$).
- **H_{1 2}** : Supported. Service Diversity significantly affects Financial Inclusion ($\beta = 0.212, p < 0.001$).
- **H_{1 3}** : Supported. Cost and Reliability significantly affects Financial Inclusion ($\beta = 0.222, p < 0.001$).
- **H_{1 4}** : Supported. Digital Financial Literacy significantly affects Financial Inclusion ($\beta = 0.356, p < 0.001$).

CHAPTER 5: DISCUSSION

5. Discussion

This chapter presents a comprehensive interpretation of the findings from the quantitative analysis, linking them back to the research questions, objectives, theoretical framework, and relevant literature. The discussion critically examines how Ethio telecom's Telebirr has influenced financial inclusion among users in Addis Ababa, particularly in relation to access, usage behavior, service diversity, cost-efficiency, and digital financial literacy. Drawing on empirical results, including regression and correlation analyses, the chapter evaluates the extent to which Telebirr contributes to sustainable financial empowerment beyond basic digital transactions. Additionally, the discussion explores demographic variations in usage patterns and assesses how the study's findings affirm, refine, or challenge existing theoretical assumptions. By doing so, this chapter situates the research within broader academic and practical discourses on FinTech and financial inclusion in emerging economies.

The findings of this study offered vital and multidimensional insights into the impact of financial technology, specifically Ethio telecom's Telebirr, on advancing financial inclusion in Addis Ababa. The quantitative results, derived from robust regression and correlation analyses, showed that all four key dimensions—FinTech Accessibility (FA), Service Diversity (SD), Cost and Reliability (CR), and Digital Financial Literacy (DFL)—had statistically significant and positive associations with financial inclusion. Notably, DFL emerged as the strongest predictor of financial inclusion ($\beta = 0.356$, $p < 0.001$), a finding that deviated from its initial conceptualization as a mediating variable. This result compelled a critical re-evaluation of the role of digital literacy—not merely as a facilitator, but as a central determinant of inclusive financial outcomes.

The empirical model's explanatory power ($R^2 = 0.772$) was remarkably strong, suggesting that over 77% of the variation in financial inclusion among Telebirr users could be accounted for by these four predictors. This high R-squared value lent credibility to the model and reinforced the integrated role these dimensions played in

shaping user engagement with financial services. FinTech Accessibility ($\beta = 0.254$), Cost and Reliability ($\beta = 0.222$), and Service Diversity ($\beta = 0.212$) all demonstrated positive and statistically significant effects, affirming that ease of access, reliability, and breadth of service offerings mattered greatly in fostering inclusive finance. However, their relatively lower beta weights compared to DFL pointed toward the growing centrality of user capability over system functionality in post-adoption phases.

These results strongly supported the primary objective of the study, which was to examine the effect of Telebirr on financial inclusion. The results clearly showed that Telebirr had contributed meaningfully to enhancing accessibility, affordability, and service diversity, thereby directly answering the first and second research questions. The third question, concerning barriers to full utilization, was illuminated by the finding that digital literacy remained a significant dividing line between those who merely accessed and those who deeply engaged with the platform. The fourth question, regarding Telebirr's role in sustained economic participation, was partly answered by the platform's deepening usage—especially in payment, transfer, and savings functions—demonstrating that it was more than a transactional tool; it was a medium of daily financial interaction and potential economic empowerment.

Crucially, the finding that DFL was the strongest direct predictor of financial inclusion not only contradicted initial assumptions but also revealed a major oversight in existing literature. Previous studies had either acknowledged digital literacy's importance conceptually (Ozili, 2020; Gomber et al., 2018) or underplayed its empirical significance. Global findings by Jack and Suri (2016) and Ouma et al. (2017), while valuable, often focused on initial access metrics such as account ownership or transactional volume, without examining the behavioral, cognitive, and educational factors that shaped sustained usage. This study, by contrast, offered clear empirical validation that digital literacy was not only instrumental in accessing financial services but also in leveraging them meaningfully. This was especially important in low-income countries like Ethiopia, where gaps in digital competence could perpetuate inequality even when digital infrastructure was available.

The demographic results provided additional depth to the interpretation of the statistical findings. The 100% response rate from the survey indicated strong user engagement and suggested that Telebirr enjoyed substantial penetration and relevance within Addis Ababa. The age profile showed that most users fell between 26–35 (33%) and 36–45 (21%) years, indicating that the platform resonated with the economically active and digitally agile demographic. This concentration implied that Telebirr was being adopted by those with immediate financial needs and digital exposure, aligning with theories of technology adoption that associated innovation uptake with perceived usefulness and user readiness (Davis, 1989). However, the lower representation of users aged 46 and above highlighted a potential exclusionary pattern that may have been linked to age-related digital skills gaps, trust issues, or a lack of targeted onboarding strategies.

Gender-wise, the sample achieved near parity with 53% male and 47% female respondents, reflecting a relatively inclusive reach. This was a promising signal, particularly in the Ethiopian context, where financial exclusion historically affected women more severely due to socio-cultural and economic constraints (Demirgüç-Kunt et al., 2018). While the gap was narrowing, the numbers still suggested a need for Telebirr and similar platforms to pursue gender-intentional strategies—such as simplified interfaces, female agent networks, and targeted campaigns—to deepen financial inclusion for women.

Educational background emerged as another powerful determinant of adoption and usage. Over 80% of respondents had attained at least secondary education, and more than 15% held university degrees. This correlation between education and fintech usage strongly supported the pivotal role of digital literacy, as found in both the regression model and prior research (Gomber et al., 2018; Philippon, 2019). It suggested that Telebirr's current growth trajectory might disproportionately favor the more educated, thereby reinforcing existing inequalities unless deliberate steps were taken to make the platform more accessible and intuitive for users with limited formal education.

Employment status also revealed telling patterns. The majority of users were either self-employed or working in the private sector, suggesting that Telebirr was

particularly valuable to those engaged in business and commerce, where digital transactions offered efficiency, transparency, and cost reduction. The presence of 16.6% unemployed users, however, revealed that even economically vulnerable groups were interacting with the platform, possibly to receive remittances or social transfers. This multidimensional usage validated the platform's potential to reach a wide range of socio-economic groups, though further qualitative research was needed to assess the depth and quality of such usage.

From a theoretical standpoint, the study confirmed the continued relevance of financial inclusion theory, financial intermediation theory, and payment system theory in explaining digital finance ecosystems. Telebirr clearly functioned as a payment system, a digital intermediary, and a tool of inclusion. However, the results also suggested that these frameworks should be updated to reflect the rising centrality of user capabilities—particularly digital skills—as a foundational layer of inclusion. Theories that ignored this might fail to explain the nuances of post-access behavior in the digital age.

In terms of practical implications, this study highlighted several strategic priorities for service providers and policymakers. EthioTelecom and similar platforms must prioritize user-centric design and educational outreach to ensure broad usability. Policy initiatives should focus on digital capacity-building programs, particularly targeting older users, women, and those with limited formal education. Bridging the digital literacy gap was no longer optional but essential if digital finance was to be a tool for equity rather than division. Moreover, digital literacy should be integrated into national financial inclusion frameworks and monitored as a key performance indicator.

While the findings were robust and highly relevant, the study did have limitations that future research should address. The sample was restricted to residents of Addis Ababa, which may have limited generalizability to rural populations that faced different infrastructure and literacy challenges. The study also relied solely on quantitative methods; a qualitative component could enrich understanding of user motivations, emotional trust, and informal workarounds. Future research should also consider longitudinal designs to explore how usage patterns evolved over time and

how persistent engagement with platforms like Telebirr contributed to economic resilience and empowerment.

In conclusion, this study provided compelling evidence that digital financial services like Telebirr had a strong, multifaceted, and statistically significant impact on financial inclusion in Ethiopia. By centering digital financial literacy as the strongest predictor, it shifted the conversation from merely providing access to ensuring that users had the knowledge and confidence to fully engage. The study not only aligned with but also extended existing theories and global findings, offering new directions for research, policy, and product innovation in the FinTech space. If Ethiopia's digital financial revolution was to be truly inclusive, it must be accompanied by structural efforts to build digital capacity, democratize access, and reduce the digital divide.

CHAPTER 6: SUMMARY AND CONCLUSION

6.Summary, Conclusion and Recommendation

6.1 Summary of the Study

This study examined the effect of Financial Technology (FinTech), specifically Ethio telecom's Telebirr, on financial inclusion among users in Addis Ababa. The central research problem focused on understanding how Telebirr influences financial accessibility, service diversity, and user empowerment beyond basic digital transactions. The study aimed to evaluate the extent to which Telebirr facilitates financial inclusion, identify the challenges faced by users, and assess the platform's broader socio-economic impact.

In addition to exploring the structural relationships between FinTech-related factors and financial inclusion, this study also investigated key demographic characteristics and usage behaviors of Telebirr users. The largest proportion of respondents (32.99%) were aged between 26 and 35 years, representing a digitally savvy and economically active demographic typically more comfortable with mobile and digital technologies. This age distribution highlights that Telebirr adoption is predominantly driven by younger adults, suggesting that the platform's penetration aligns closely with generational trends in technology use (Davis, 1989).

The gender distribution showed a slight male majority, with males accounting for 53.25% of respondents. This gender gap may reflect existing disparities in access to technology and control over financial resources, underscoring the importance of implementing gender-sensitive strategies in expanding inclusive FinTech services (Demirgüç-Kunt et al., 2018). Regarding educational attainment, over one-third of respondents (36.62%) held a bachelor's degree, indicating that Telebirr currently appeals more to educated individuals. This points to the potential exclusion of less-educated populations from fully benefiting from digital financial services,

emphasizing the need for targeted outreach and financial literacy initiatives (Philippon, 2019).

Employment status further revealed that 30.65% of users were self-employed—a group often operating within the informal sector. This finding underscores Telebirr’s relevance as a financial tool for individuals who may lack access to traditional banking systems, highlighting its role in supporting informal economic activities and financial inclusion among marginalized segments.

Analysis of Telebirr usage behavior demonstrated a high frequency of engagement, with 41.56% of users interacting with the platform daily and an additional 29.09% using it weekly. Such regular use reflects Telebirr’s deep integration into users’ routine financial activities, positioning it as a central component of day-to-day financial management. The platform was primarily used for immediate financial needs, with payments (30.39%), money transfers (24.42%), and airtime purchases (16.62%) being the most frequently accessed functions. However, transformative financial services such as savings and bill payments recorded notably lower usage rates. Only around 15% of respondents reported using Telebirr for savings, revealing underutilization of features critical for long-term financial security.

This disparity suggests that while Telebirr effectively addresses short-term liquidity and transactional convenience, it has yet to fully support users in achieving financial resilience and long-term inclusion. The limited adoption of digital savings and other advanced financial services may be attributable to several interrelated factors, including low levels of digital financial literacy, limited trust in digital systems, lack of awareness, and potential misalignment between product design and users’ financial habits (Lusardi & Mitchell, 2014; Ozili, 2020). For Telebirr and similar platforms to catalyze sustainable financial development, they must extend their offerings beyond transactional functionality to actively promote financial empowerment. This includes deploying user education campaigns, fostering trust, and redesigning products to align more closely with user needs and behaviors.

By addressing these challenges, Telebirr could enhance the depth and quality of financial inclusion—enabling users to leverage the platform not only for basic

transactions but also for savings, credit, and investment. This would contribute meaningfully to long-term economic empowerment and inclusive development (Gomber et al., 2018).

Despite current limitations in transformative service adoption, the findings affirm that Telebirr has become an indispensable financial tool for residents of Addis Ababa, particularly among younger, educated, and self-employed users. Its centrality in daily financial transactions reflects a significant shift toward digital financial ecosystems within Ethiopia's urban landscape. This widespread usage provides a promising foundation upon which deeper and more sustainable financial inclusion initiatives can be built, validating the growing role of FinTech platforms in shaping the future of financial services in emerging markets.

For the analytical component of the study, a quantitative research design was employed using a structured questionnaire administered to 385 active Telebirr users. The data were analyzed using descriptive statistics, Pearson correlation, and multiple linear regression to test the relationships between four key predictors—FinTech Accessibility (FA), Service Diversity (SD), Cost and Reliability (CR), and Digital Financial Literacy (DFL)—and financial inclusion.

The multiple regression model explained 77.2% of the variance in financial inclusion ($R^2 = 0.772$), demonstrating a high level of explanatory power and predictive validity (Field, 2013). All four predictors had statistically significant effects ($p < 0.001$), confirming their relevance in the Ethiopian context. Among them, Digital Financial Literacy emerged as the strongest direct predictor ($\beta = 0.415$), highlighting the central role of user competence in maximizing the benefits of FinTech platforms. FinTech Accessibility ($\beta = 0.262$), Service Diversity ($\beta = 0.192$), and Cost and Reliability ($\beta = 0.128$) also had positive, albeit smaller, effects. These results affirm that while expanding access and diversifying services are necessary, enhancing digital financial literacy is critical for unlocking the full potential of financial inclusion (Muthoni & Iravo, 2020; Demirgüç-Kunt et al., 2018).

From a practical perspective, the study highlights the need for EthioTelecom and other FinTech stakeholders to invest in user-centric educational interventions that

foster digital competence. Such efforts could include in-app tutorials, local language interfaces, and targeted campaigns aimed at underserved groups. On the policy front, integrating digital financial literacy into Ethiopia's national financial inclusion framework could address persistent access and usage barriers. This study also contributes theoretically by reinforcing the Theory of Financial Inclusion, which posits that access alone is insufficient without the capability to use financial tools effectively. Moreover, the study challenges the initial assumption of digital literacy as a mere mediating variable and instead positions it as a direct, foundational driver of inclusive financial participation.

Despite its contributions, the study is not without limitations. Its cross-sectional design restricts causal interpretations, and its focus on Addis Ababa limits the generalizability of findings to rural areas with different infrastructural and literacy conditions. Additionally, the exclusive use of quantitative methods may have excluded nuanced insights into user motivations, trust-building, and socio-cultural dynamics. Future research could benefit from mixed methods approaches, incorporating longitudinal tracking and qualitative interviews to better understand evolving usage patterns and their broader economic implications.

6.2 Conclusion

This study investigated the effect of Ethio telecom's Telebirr on financial inclusion in Addis Ababa through a comprehensive quantitative analysis. The findings revealed several critical insights that align with the research objectives and offer valuable contributions to both theory and practice.

First, Telebirr significantly improved financial accessibility, particularly among digitally savvy and economically active young adults aged 26 to 35. Fintech Accessibility showed a strong positive association with financial inclusion ($\beta = 0.254$, $p < 0.001$), demonstrating that the platform effectively extends financial services beyond traditional banking infrastructure to underserved populations, especially those engaged in informal employment. This supports global literature highlighting infrastructure and access as pivotal in bridging inclusion gaps (Ozili, 2018).

Second, while Telebirr's service diversity and cost-efficiency positively influenced financial inclusion, the platform's use remains predominantly transactional, with payments and transfers being the most frequently accessed services. Adoption of long-term financial tools, such as digital savings, remains limited. This indicates a gap between achieving basic financial access and fostering deeper, sustained financial inclusion. Service Diversity ($\beta = 0.212, p < 0.001$) and Cost and Reliability ($\beta = 0.222, p < 0.001$) affirm that these features matter, yet they require further development to enable transformative financial outcomes and long-term security (Demirgüç-Kunt et al., 2018).

Third, the study identified Digital Financial Literacy (DFL) as the strongest direct predictor of financial inclusion ($\beta = 0.356, p < 0.001$), surpassing initial expectations and diverging from previous conceptualizations that positioned it as a mediating factor. This underscores a significant barrier: many users are unable to fully exploit Telebirr's benefits due to limited digital competencies. The demographic analysis corroborates this, showing higher adoption among educated users and lower engagement among older and less-educated groups. This highlights the urgent need for targeted digital literacy initiatives and simplified platform interfaces to foster inclusive engagement (Lusardi & Mitchell, 2014; Gomber et al., 2018).

Fourth, Telebirr fosters sustained economic participation by embedding itself into users' daily financial routines, with 41.56% of users engaging daily and 29.09% weekly. This frequent usage particularly benefits self-employed and private-sector workers, enhancing both efficiency and transparency in financial transactions. However, the limited uptake of savings and credit services indicates that economic empowerment remains an area for development. Expanding user engagement from transactional usage to long-term financial management will require strategic product redesign and trust-building initiatives.

The model's explanatory power was notably high, with over 77% of the variance in financial inclusion explained ($R^2 = 0.772$). This strong model fit confirms the combined importance of accessibility, service diversity, cost reliability, and digital financial literacy. These findings support and extend existing theoretical frameworks—namely the Theory of Financial Inclusion, Financial Intermediation

Theory, and Payment System Theory—by demonstrating that user capabilities, particularly digital skills, have become foundational in achieving meaningful financial inclusion in digital ecosystems.

Key conclusions of the study include:

- Telebirr enhances financial accessibility, especially among young, digitally literate, and self-employed users.
- Service diversity and cost reliability positively affect inclusion but require expansion to support broader financial services such as savings and credit.
- Digital Financial Literacy emerged as the strongest predictor of inclusive outcomes, revealing a critical barrier to deeper and more sustained user engagement.
- Telebirr has become a central platform for routine financial interaction, but greater focus is needed on empowering users through advanced services for long-term economic participation.
- Theoretical frameworks on financial inclusion should now incorporate the centrality of user digital capabilities to better explain post-access behavior in FinTech adoption.

From a practical standpoint, the study suggests that EthioTelecom and policymakers should prioritize user-centric design, invest in digital literacy programs targeting older adults, women, and less-educated individuals, and incorporate digital literacy metrics into national financial inclusion strategies. These interventions are critical for shifting digital finance from a transactional tool to an inclusive platform for empowerment.

Despite its robust and highly relevant findings, the study is constrained by certain limitations. Its scope was restricted to Addis Ababa, which may not fully reflect rural or remote user contexts that differ in digital access and literacy. Additionally, the exclusive use of quantitative methods limited the exploration of deeper user perceptions and experiences. Future research should incorporate qualitative components and adopt longitudinal approaches to assess how user behavior and financial empowerment evolve over time in response to changing digital service landscapes.

In conclusion, this study offers compelling empirical evidence that Telebirr significantly advances financial inclusion in Ethiopia by improving access, affordability, and service diversity. Crucially, it shifts the analytical and policy focus toward digital financial literacy as a central determinant of sustainable inclusion. The findings emphasize that effective financial inclusion is not solely a matter of platform availability but of equipping users with the knowledge, confidence, and digital skills needed to leverage these tools fully. This insight provides a valuable foundation for future FinTech development, policy innovation, and academic inquiry in Ethiopia and similar emerging digital economies.

6.3 Recommendations

Based on the study findings, the following targeted recommendations were proposed:

For Policymakers and Regulators:

- Implement targeted digital financial literacy programs focusing on women, older adults, and unemployed individuals, who were identified as having lower Telebirr usage rates. Tailored training sessions and community workshops should be conducted to close these digital skill gaps effectively.
- Invest in expanding mobile network infrastructure and subsidize affordable smartphones in underserved areas, particularly in low-income neighborhoods and remote locations, to improve Telebirr accessibility for financially excluded populations.

For EthioTelecom and Fintech Providers:

- Prioritize development and promotion of high-demand Telebirr services such as payment and money transfer features, while actively launching campaigns to raise awareness and adoption of less-utilized functions like savings accounts and bill payments.
- Develop customized service packages for distinct user segments identified in the study namely self-employed individuals, daily wage earners, and micro-entrepreneurs to better meet their specific financial needs and usage patterns.
- Maintain competitive pricing and improve system reliability by minimizing transaction fees and reducing service outages, which were found to be critical factors affecting user trust and repeated usage.

- Introduce comprehensive user education initiatives, including in-app tutorials, agent-led field demonstrations, and SMS-based step-by-step guides, to improve engagement and usability among users with varying levels of digital literacy.

For Researchers and Academic Institutions:

- Conduct comparative studies between urban and rural populations to investigate differing impacts of fintech adoption on financial inclusion, as the current study was limited to urban settings.
- Investigate barriers to female Telebirr usage by undertaking qualitative research that explores socio-cultural and economic factors limiting women's participation in digital finance.
- Design longitudinal studies to evaluate the long-term sustainability of financial inclusion outcomes driven by fintech services such as Telebirr, providing insights into lasting behavioral and economic changes.

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8. Appendixes

Annex. I.

Questionnaires

**Addis Ababa University
School of Commerce
School of Graduate Studies
Department of Corporate Finance**

Research Questionnaire for Telebirr Users.

Name of student researcher:

Beza Mekonnen

Email:

bezamekonnen55@gmail.
com

Dear respondents,

I am a postgraduate student in Masters of Corporate Finance in Addis Ababa University, School of Commerce. Currently, I am undertaking a research on the topic “The effect of Fintech on Financial Inclusion: a Case study of Ethio telecom’s Telebirr” in Addis Ababa City Administration in Partial Fulfillment of the Requirement for the Master of Arts Degree in corporate Finance. The general objective of this Study is to examine the post adoption effect of Telebirr on financial inclusion in Addis Ababa city Administration on Telebirr users. Please support me by giving correct and complete information so that it is possible to come up with basic findings on matters chosen for investigation. Your participation is completely voluntary, and the information you provide will be kept private and used only for academic purposes.

Please do not hesitate to contact me at the aforementioned address if you have any questions. Please accept my sincere gratitude in advance for your cooperation.

Dear respondents,

This questionnaire aims to assess how your use of Telebirr affects your financial inclusion. Please respond to each item based on your personal experience using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Section A: Demographic Information

Instruction: Please indicate your answer for each of the following questions by circling your answers.

1. Age Group:

- 18–25
- 26–35
- 36–45
- 46–55
- 56+

2. Gender:

- Male
- Female
- Prefer not to say

3. Education Level:

- No formal education
- Primary
- Secondary
- Bachelor
- Master or higher

4. Employment Status:

- Government
- Private
- Self-employed
- Unemployed

5. How frequently do you use Telebirr?

- Daily

- Weekly
- Monthly
- Occasionally

6. Which services do you primarily use on Telebirr?

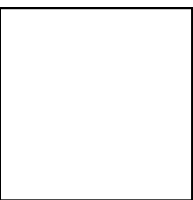
- Payments
- Transfers
- Savings
- Airtime Purchase
- Bill Payments

Section B: Likert scale questions

Instruction: answer the following questions by indicating your level of agreement or disagreement for each of the following statements. (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=strongly agree)

	1	2	3	4	5
Fintech Accessibility (FA)					
FA1. I can access Telebirr services without visiting a bank.					
FA2. Telebirr is available and functional whenever I need it.					
FA3. I rarely face technical difficulties using Telebirr.					
FA4. I can easily navigate the Telebirr interface.					
FA5. It is convenient to complete financial tasks via Telebirr.					
Service Diversity (SD)					
SD1. I use Telebirr for different services like payments, savings, and transfers.					
SD2. The range of financial services available on Telebirr meets my needs.					

SD3. I can accomplish most of my banking needs with Telebirr.					
SD4. I often discover new financial features in Telebirr.					
SD5. Telebirr has reduced my dependency on traditional banks.					
Cost and Reliability (CR)					
CR1. The cost of using Telebirr services is affordable.					
CR2. I trust Telebirr to complete transactions accurately.					
CR3. I have never lost money due to Telebirr technical issues.					
CR4. I find customer service responsive when issues arise.					
CR5. I feel secure using Telebirr for my financial needs.					
Digital Financial Literacy (DFL)					
DFL1. I am confident in performing financial tasks on Telebirr.					
DFL2. I know how to protect myself from fraud on Telebirr.					
DFL3. I can teach others how to use Telebirr.					
DFL4. I understand the different financial features of Telebirr.					
DFL5. I can troubleshoot Telebirr issues by myself.					



Financial Inclusion (FI)					
FI1. I save money more consistently using Telebirr.					
FI2. Telebirr has helped me access financial services i couldn't use before.					
FI3. I feel more in control of my finances thanks to Telebirr.					
FI4. I manage my income and expenses better through Telebirr.					
FI5. Telebirr has improved my financial well-being.					

Thank you again for your cooperation!