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EFFECT OF DIGITAL BANKING SOLUTIONS ON FINANCIAL INCLUSION IN ETHIOPIA: THE CASE OF AMHARA BANK

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Effect of Digital Banking Solutions on Financial Inclusion in Ethiopia: The Case of Amhara Bank

BY

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Declaration

It is hereby stated that the thesis entitled "The Impact of Digital Banking on Financial Inclusion in Ethiopia: The Case Study of Amhara Bank" submitted in partial fulfillment of the requirements for the degree of Master of Arts in Project Management at BAIS, Addis Ababa University is my own original work and has not been presented elsewhere in support of any degree or diploma. All sources used in the writing of this thesis have been duly acknowledged.

_____

Name of the candidate Signature Date

Certification

To acknowledge that Melat Fikru Fersha conducted this study under my supervision. The dissertation is hereby submitted for examination with my recommendation as the university advisor.

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Date: _____

Approval

It should be noted that the thesis presented by Melat Fikru Fersha for the partial fulfillment of the requirements for the Degree of Master of Arts in Project Management conforms to all the University regulations in relation to originality and quality. Signed by Board of Examiners:

External Examiner's Name	Signature	Date
Internal Examiner's Name	Signature	Date
Main Advisor's Name	Signature	Date
Co-Advisor's Name	Signature	Date
Name of Department	Signature	Date

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Acronyms/abbreviations

Acronym	Full Form
ATM	Automated Teller Machine
DFS	Digital Financial Services
FI	Financial Inclusion
ICT	Information and Communication Technology
IMF	International Monetary Fund
KYC	Know Your Customer
MB	Mobile Banking
MW	Mobile Wallet
NBE	National Bank of Ethiopia
POS	Point of Sale
PMBOK	Project Management Body of Knowledge
SPSS	Statistical Package for Social Sciences
TAM	Technology Acceptance Model
USSD	Unstructured Supplementary Service Data
WB	World Bank

Abstract

Financial inclusion remains a significant challenge in Ethiopia, particularly in rural and underserved areas lacking formal banking infrastructure. This study investigated the effect of digital banking solutions on financial inclusion at Amhara Bank, focusing on four services: agent banking, mobile money transfer, mobile account management, and mobile bill payment (Aba QR). A quantitative research approach with descriptive and explanatory designs was employed. Primary data was collected from 400 customers using structured questionnaires, achieving a 93.4% response rate. Data was analyzed using descriptive statistics, correlation analysis, and multiple regression analysis.

The findings revealed that all four digital banking solutions had statistically significant positive effects on financial inclusion. Agent banking had the strongest influence ($\beta = 0.380$, $p < 0.001$), followed by mobile money transfer ($\beta = 0.340$, $p < 0.001$), mobile bill payment ($\beta = 0.160$, $p<0.001$), and mobile account management ($\beta = 0.140$, $p = 0.001$). The model explained 66.0% of the variance in financial inclusion ($R^2 = 0.660$). Mobile money transfer showed the strongest correlation with financial inclusion ($r = 0.680$). Customers valued speed, convenience, and security of mobile transfers, but affordability (mean = 3.18) and merchant acceptance for QR payments (mean = 2.98) remained concerns. Agent banking had high potential but low usage (mean = 2.55) and accessibility (mean = 2.82). Mobile account management received the highest satisfaction (mean = 4.09).

The study concludes that digital banking solutions effectively expand financial inclusion in Ethiopia. Recommendations include expanding agent banking networks, reducing transaction costs, increasing merchant QR acceptance, and improving mobile app usability. Policymakers should incentivize rural agent banking, review mobile transaction taxes, and support interoperability through EthSwitch.

Keywords:

Digital banking, financial inclusion, agent banking, mobile money transfer, mobile account management, mobile bill payment, Aba QR, Amhara Bank, Ethiopia

CHAPTER 1: INTRODUCTION

1.1. Background of study

A project can be defined as a well-organized and structured undertaking that involves a set of coordinated activities implemented to realize certain objectives within distinct limits. It always has a fixed lifespan, distinct start and finish, and is carried out with the aim of uniquely delivering a product, service or result that is considered non-repetitive as compared to regular operations. Projects work on the basis of certain constraints related to time, cost, and expected performance or quality and require coordinated resources or efforts, tasks, and stakeholders. These characteristics make planning, control and integration paramount in project management as opposed to ongoing operations.

A project stands as a transitory and objective-centered effort undertaken to produce a specific product, service, or result. A project is one of a kind, and it entails several complicated and entangled processes that demand the organization of different individuals and materials, and it is characterized by an evident beginning and termination, in contrast to routine work. A project is also limited by constraints such as time, cost, scope, and quality and includes risks and uncertainties hence its uniqueness and non-repetitive implementation nature. The management of a project normally follows a life cycle of Initiation, planning, execution, monitoring and controlling as well as closure, which guarantees success in meeting the objectives with efficient use of balancing competing constraints. Stakeholders are important in projects, which also need temporary organization and efficient project resources to yield desired results.

According to Ahmad et al. (2021), Structured processes of project management including initiation, planning, execution, monitoring controlling, and closure are necessary for coordinating activities, ensuring the realization of project objectives in a cost-effective and time-efficient manner. Ćirić et al. (2022) further state that project management practices vary in different contexts and hybrid or adaptive practices combining traditional and agile project management approaches may have significant impacts on project success. According to McCaskell et al. (2019), using structured project management frameworks in different fields like clinical trials, technologies, software development increases coordination of tasks, regulates resources, and facilitates outcome monitoring. In addition, Prabhakar (2009) and Evolution Research (2022)

noted that scholarly literature relating to project management continues to expand the body of evidence in relation to the best practices, demonstrating how project processes help to align project activities with wider organizational and strategic objectives.

Financial inclusion is the process of integrating people and businesses into having access to the financial services like payments, saving, credit, and insurance at a low-cost end, that included micro finance institutions to finance through effective use of these services. The advancement in the information technology sector, particularly in mobile banking, and digital financial services, has been the saving grace in driving financial inclusion as users are not only able to carry out transactions, open and manage accounts, and get loans, and also use different financial services, for instance, in some areas where there are no branches of banks; research has demonstrated that the utilization of mobile money markedly promotes financial inclusion in the African region as well as the rest of the world due to the fact that they are able to overcome the challenges related to financial access and they are able to turn a simple mobile phone into an access point for financial services; similarly, the writing of some other scholars who have considered digital banking solutions in the economically developing nations attests to the increase in provision of banking services through such technologies and avail bettering of financial inclusion.

It is undeniable reality that majority of the less privileged people need to acquire and engage in practical money related transactions. Thus, we are tasked to address the barriers that prevent majority of the people from enjoying services available in the financial sector which range from access to bank accounts, loan facilities, cash transfers services, acquiring and settlement administration. The emphasis of financial inclusion is more on repackaging of services through the formal budgetary system to capture and consolidate the low-end earners in society and those living in relatively low standards of living.

According to Jenkins (2008) the utilization of mobile cash wallets minimizes common dangers of losing money besides offering a wide coverage of usage by relying on mobile telephony technology that has been accepted and adopted by many people all over the world. Traditional threats when using hard cash include the possibility of theft, and for those who dispatch money through traditional channels such as friends or relatives and public transport service providers, there is a chance that the money may never reach its intended recipients. The casual methods of

transmitting and exchanging cash are characterized by increased delivery periods and inconvenience, translating into lost time and opportunity costs.

Mobile cash wallets enhance the accessibility of financial services to the unbanked populations. They help with financial transactions, paying bills, and even accessing credit, enabling the user to use financial system without depending on physical banking institutions. Research in Africa highlights that limited access to formal banking in rural areas such as only 17 % of adults in rural Zambia having a bank account creates a need for alternative financial solutions (World Bank, 2021).

1.2. Statement of the problem

Financial inclusion is one of development issues in Ethiopia. A large portion of the population, especially in rural areas, lacks access to formal financial services. According to World Bank (2022), only 45% of adults in Ethiopia have an account with formal financial service providers. The access is far more restricted in rural areas where 80 percent of the population of Ethiopia lives. Many districts in rural areas do not have bank branches and so individuals and local enterprises lack access to formal financial services provided by banks.

There is a lack of access to formal financial services, such as savings, credit, and remittance services for marginalized populations worldwide. Low-income individuals and socially and economically marginalized communities worldwide are often excluded from formal financial services. Even established financial institutions, driven by competition, have been known to shut down local branches in rural and marginalized communities in order to serve more affluent populations in urban areas. For example, commercial banks in India have recently closed dozens of local branches in rural areas. This has led researchers to explore alternative approaches to financial services for the poor.

The motivation behind opening a bank or finance company account is largely driven by the need to provide a facility to receive on a regular basis salaries and wages as opposed to saving/providing cash deposits (Johnson, 2014). In many commercial banks in Ireland dormant accounts far outweigh the number of savings accounts.

The rapid growth of mobile money in Ethiopia has attracted the attention of many around the world interested in how mobile phones can be used to deliver financial services to the unbanked. This is particularly notable in the context of mobile savings accounts, seen by many to achieve greater financial inclusion. While mobile-based transactions can go some way to addressing financial exclusion, most of the Ethiopian population remain without access to formal banking services. The main obstacles to financial access for the country's poor and vulnerable are the unavailability, complexity and high cost of formal financial services (Hailu, 2019).

While several studies have been conducted focusing on different perspectives on the problem, there are also local studies related to this issue. In his study, Mergia (2013) indicated that the mobile money transfer services marked a breakthrough to financial inclusion especially in the country's remote rural areas where the formal financial sector has not yet reached its services. The number of mobile phone subscribers was critical to this development. In another study, Biruk (2016) found that mobile banking has significant positive effect on financial inclusion in Ethiopia. Deposit bank accounts of mobile money subscribers, their agent networks, transactions and their total values were the main factors that explained variations in financial inclusion. These and income, population, literacy, deposit mobilization and credit access were the determinants of financial inclusion.

This study sought to find out how commercial banks responded after the advent of mobile money transfer services. Evidence exists of huge innovation and solution designing on the part of both telecommunications and finance sector to improve accessibility, affordability and convenience of financial services to their customers. Since 2007 mobile money transfer services have created unexpected competition in the marketplace for commercial banks' products and have managed to make financial services accessible to millions of people through the billions of GSM handsets in use.

Although developments in digital financial services have opened new avenues for financial inclusion, Ethiopia remains among the least financially included country in Africa. Only 22% of the adult population in Ethiopia has an account at a formal financial service provider, according to the GSMA (2016). The recent regulatory rule that allowed non-bank entities to offer mobile money services, therefore, holds tremendous potential for driving financial and digital inclusion among

the unbanked and underbanked. Yet, a host of barriers including poor digital literacy, an inadequate distribution of agents, exorbitant taxes, security risks, and a lack of regulatory clarity continue to stymie the industry's growth, according to the GSMA (2016).

In recent times, Alemu, T, Abera, S and Shimeka, M. (2021) researched into financial inclusion in Ethiopia using ESS data from a nationally representative sample. Results of the study showed that financial education, financial capability, gender, age and place of residence were joint determinants of account ownership, saving and use of financial products and services. The study recommended designing and scaling up interventions including well-designed financial literacy programs for financially excluded segments, programs to empower women, infrastructure development in rural areas, and promoting financial innovation and competition.

Despite the research efforts made in past studies, there are many gaps that have not yet been fulfilled by the existing studies. Most of studies on mobile banking focused only on the transformative potential of mobile banking and used secondary data from specific banks such as Apollo. There is no study that examines all the forms of digital banking solutions (mobile money services, mobile payment, mobile account access and agent banking) together in order to know their contribution towards achieving financial inclusion outcomes. Banks such as Amhara Bank that operate from beginning with digital banking solutions' technologies have their own unique contributions to financial inclusion.

To bridge this information gap, this study examines the impact of digital banking applications and services offered by Amhara Bank in achieving financial inclusion objectives.

1.3. Research questions

1. What is the effect of agent banking services on financial inclusion at Amhara Bank?
2. What is the effect of mobile money transfer services on financial inclusion at Amhara Bank?
3. What is the effect of mobile account management services on financial inclusion at Amhara Bank?
4. What is the effect of mobile bill payment services (Aba QR) on financial inclusion at Amhara Bank?

5. Which digital banking solution has the strongest effect on financial inclusion at Amhara Bank?

1.4. Research objectives – general and specific

1.4.1. General Objective

To explore the impact of Digital Banking Solutions on financial inclusion in the case of Amhara Bank.

1.4.2. Specific Objectives

1. To evaluate the impact of Agency Banking services on financial inclusion at Amhara Bank.
2. To examine the effect of Mobile Money Transfer on financial inclusion,
3. To analyze how Mobile Account Management improves access to financial services in Amhara Bank
4. To Assess effect of Bill Payment Services on Financial Inclusion in Amhara Bank

1.5. Significance of the study

This study will benefit several stakeholders. The findings will provide evidence on how Amhara Bank's Agent Banking Services, Mobile Money Transfer Services, Mobile Account Management Services and Mobile Bill Payment Services contribute to increasing financial inclusion. As a result, Amhara Bank will be able to identify approaches to serving the varied needs of its customer base and make informed investment decisions. The research findings will also provide policymakers and regulators with empirical evidence on issues affecting different segments of the population such as literacy levels, enablers of access and barriers to access of banking solutions. For society at large, especially the rural and disadvantaged communities, the study identifies practical and affordable solutions that allow for safe saving, transferring of funds and transactions. These solutions will enable wide participation and inclusion in the economy, nudging people away from informal mechanisms of financial transactions.

1.6. Scope of the study

The research is limited to some selected branches of Amhara Bank in Ethiopia, including those operating in urban and rural areas. Specifically, the research population includes bank customers

and agents who utilize digital banking solutions. The theoretical scope of the research involves the influence of four digital banking solutions, such as mobile-based money services, digital payment systems, mobile account access service, and branchless banking intermediary services on financial inclusion based on access, usage, and quality aspects. The methodology of the study involves the application of a quantitative approach by implementing descriptive and explanatory designs and gathering data using structured questionnaires from a sample obtained using the stratified random sampling technique. The data was analyzed using descriptive statistics, correlation, and multiple regression analyses in SPSS software. Finally, in terms of time scope, the study concentrates on the use of digital banking solutions and their contribution to financial inclusion from 2023 to 2026, with the data being collected in 2026 academic year.

1.7. Limitations of the study

Since this study is conducted only in Amhara Bank, it has potential limitations for generalizing findings to other banks in different operational environments. However, within the bank, the study scopes four key digital solutions to be adopted in financial services: mobile based monetary services, digital payment and collection services, mobile based account services and branchless banking services. These do not include other potentially useful digital financial solutions. The study is cross-sectional, and, consequently, all data was collected at the same point in time. Using questionnaire-based, quantitative data, this study is also susceptible to bias, particularly of the respondents' type. Furthermore, accessing participants in distant rural locations is a key consideration for the data collection process.

CHAPTER 2: REVIEW OF RELATED LITERATURE

This research is based on theories that have already explained the reasons behind technology adoption, user behavior, and the contribution of financial institutions towards ensuring inclusion. The following theories form the basis of the analysis of how Digital Banking Solutions impact financial inclusion at Amhara Bank.

2.1. Theory review

2.1.1. Diffusion of Innovation Theory

This theory of technology was put forth by Rogers (2003). In the theory, technology is simply a plan for value relation that lowers the doubt in the cause-effect relationships involved in achieving an intended outcome. The theory of innovations has four key elements. These are: innovation, communication channels, time and social system.

According to Rogers (2003), Innovation refers to a concept, practice, or undertaking thought as novel by an individual or another unit of adoption without regard for its origin. There are five features of innovation that determine how fast innovations are adopted. They are relative advantages, compatibility, complexity, trialability, and observability. Relative advantage involves the degree to which innovation is perceived as better than its predecessor. Compatibility involves the degree to which innovation is seen as consistent with the existing values, past experiences, and preferences of the potential adopter. Complexity involves the degree of perceived difficulty of innovation. Trialability involves the degree to which innovation can be experimented on a limited basis.

Communication is a process through which parties produce and exchange facts to reach a common agreement. Communication occurs through conduct between terminals. A channel is how a message gets from the generator of the message to the receiver. Mass media channels are more effective in creating knowledge of innovations, while interpersonal channels are more effective in forming and changing attitudes toward a new idea. In interpersonal channels, communication may have a characteristic of homophily or heterophily. In homophily, the focus is on the degree to which different individuals communicating share common features, such as beliefs, education, and socioeconomic status. Heterophily refers to the degree to which two or more individuals who interact are different in certain attributes. For innovation to diffuse there must be heterophily

because the flow of new information typically occurs between dissimilar individuals, such as a change agent and a client.

Time is another element in the theory of diffusion by Rogers (2003). The innovation-diffusion process and rate of adoptions have a time element. Time is involved in three ways: the innovation-decision process, the innovativeness of an individual, and an innovation rate of adoption. The innovation-decision process is the mental process through which an individual passes from first knowledge of an innovation to a decision to adopt or reject, and to confirm this decision. Innovativeness is the degree to which an individual is relatively early in adopting new ideas than other members of a social system. Rate of adoption is the relative speed with which an innovation is adopted by members of a social system.

The last element in the diffusion model is the social system. The social system refers to the set of connected units engaged in common problem resolution to accomplish a similar aim. A social system has a structure, which includes norms and roles. Norms are the established behavior patterns for the members of a social system. Opinion leaders are individuals who can influence others' attitudes or behavior informally. Change agents are professionals who attempt to influence adoption decisions in a direction they deem desirable. The social system also affects the consequences of innovation, which are the changes that occur to an individual or a social system because of the adoption or rejection of an innovation.

Five stages are involved in the innovation diffusion process and include:

1. **Knowledge:** An individual is introduced to the innovation and begins to gain knowledge about its operations. This happens when an individual comes across the existence of innovation and decides to seek more information regarding it.
2. **Persuasion:** An individual develops a positive or negative attitude towards the innovation. During this step, the individual becomes more psychologically involved in innovation and tries to gather more information
3. **Decision:** The individual becomes engaged in activities that facilitate adoption or rejection of innovation. Adoption involves the use of innovation for maximum benefit, while rejection means not adopting the innovation.

4. **Implementation:** The individual applies the innovation. In this step, the individual implements innovation and reinvents it by making adjustments based on personal preferences.

5. **Confirmation:** An individual gathers evidence to support the decision made earlier concerning the innovation but changes his mind if presented with conflicting information. Discontinuation involves rejecting innovation even after adoption.

Depending on the innovation, there are five types of adopters. Innovators are risk-takers and keen on trying out new things. Early adopters are highly esteemed by other people and act as role models for them. The early majority is characterized as being very thoughtful and adopting slightly before the average adopter does. Later majority users are doubtful about any changes and adopt once most people have adopted the change. Laggards tend to be very conservative and adopt changes at a very late stage and tend to be suspicious of innovations.

2.1.2. Technology Acceptance Model (TAM)

To understand the behavior of the users towards adopting technology, Technology Acceptance Model is used. This model is widely adopted across the world by many researchers who study how technology, in terms of different information systems, is accepted or rejected by individuals. For instance, the different forms of information systems include e-commerce and e-learning systems. The Technology Acceptance Model is used to predict the behavior of the user regarding technology acceptance (Surendran, 2012). The model is also applied to understand the technological acceptance behavior of individuals, stating that the use of technology is influenced by behavioral intention, attitude, and perceived usefulness of the system (Park, 2009). Further, Park (2009) states that the TAM model is used to examine why individuals accept or reject technology in accordance with the Theory of Reasoned Action (TRA).

The Technology Acceptance Model is an adapted version of the Theory of Reasoned Action, a theory whose roots lie in psychology and information systems (Manoranjan, Snigdha & Bhusan, 2016). According to the Theory of Reasoned Action (TRA), an individual's behavior is mostly influenced by his/her attitude towards the behaviors or subjective norms regarding information systems (Surendran, 2012).

TAM model rests on two antecedents; these are perceived ease of use and perceived usefulness. Perceived ease of use is described as the degree of effort that is required by cell phone subscribers to use the service or system (Ndlovu, 2013) while Lai (2017) describes it as the degree of effortless usage of the systems. In case the degree of effort required to use the technology is low, then perceived ease of use was high, and vice versa. Perceived usefulness is defined as the subjective probability that the use of the application would enhance the performance of the user (Surendran, 2012). Lai (2017) also states that PU is the subjective probability that the use of the application would improve the action. Thus, the more one believes that technology will enhance performance, the higher the degree of perceived usefulness (Ndlovu, 2013:28).

One of the antecedents of the TAM model is attitude. Perceived usefulness and perceived ease of use are factors that influence attitude towards the use of a system as well as the actual use of the system (Kim, Chun & Song, 2009). According to the TAM, the perception of the usefulness and ease of use of the information systems is one of the determinants of the attitude towards the use of IT systems which in turn influences the adoption and use of the system (Kim, Chun & Song, 2009). Attitude is also described as representing likes, dislikes, positive or negative feelings that an individual shows towards an object (Blackwell, Miniard & Engel, 2001). Therefore, if the person likes the product or displays a positive attitude towards the product or system, then the chances of adoption increase and vice versa.

In this study, the TAM model will help explain why customers adopt Digital Banking Solutions including Agent banking, mobile money transfer, mobile bill payment, and mobile account management. In case the customers believe that these services are useful, reduce transaction costs, save time, and improve financial management, then they are likely to adopt them. Similarly, if the systems are easy to use, adoption will increase. Financial inclusion will depend on the actual adoption of financial services thus making TAM model relevant for analyzing digital banking adoption.

It is therefore essential to review the various studies that have been undertaken in relation to Digital banking using TAM model to analyze factors that influence the adoption of digital banking locally and internationally. For instance, Masinge (2010) conducted a study examining the factors that affect the adoption of mobile banking by BOP in South Africa. The study was carried out in towns surrounding Gauteng. The study revealed that consumers will use mobile banking if it is useful

and easy to use. Another study was conducted in Bangladesh by Liza (2014). The study was done in towns surrounding the capital city of Bangladesh called Dhaka. The research analyzed the impact of trust, perceived cost and perceived risk. The results indicated that consumers will adopt mobile banking if it is perceived to be easy to use and useful.

2.1.3. Unified Theory of Acceptance and Use of Technology (UTAUT) Model

Unified Theory of Acceptance and Use of Technology (UTAUT) has been developed by Venkatesh et al. as a general theory for explaining how users adopt information systems and use them. The theory has combined ideas from eight existing models of technology acceptance into one structure that addresses both behavioral intention and use of an information system.

The main goal of UTAUT is to explain what motivates a user to use a certain information system and how he implements his intention into practice. In accordance with the theory, there are a number of factors influencing user adoption of a technological product. In particular, the model indicates that the following four constructs play a significant role in predicting intention to use and actual use of a technological product: performance expectancy, effort expectancy, social influence, and facilitating conditions.

Moreover, it should be noted that the effect of these variables may vary among users depending on moderating factors like gender, age, experience, and voluntariness of use.

(i) **Performance Expectancy:** Performance expectancy is the belief that the use of a system will improve task effectiveness within the Unified Theory of Acceptance and Use of Technology framework. According to Venkatesh et al., this variable is considered the strongest determinant of behavioral intention in both mandated and discretionary usage scenarios. Nevertheless, the effect might be conditional upon specific demographic attributes such as gender and age. The concept of performance expectancy is grounded in various other concepts derived from previous theories, which include perceived usefulness, relative advantage, outcome expectations, job fit, and extrinsic motivation. Previous research indicates that there is always a positive correlation between performance expectancy and intention to use technology. In the domain of mobile learning, the implication is that individuals will be more likely to embrace such technologies due to their perceived advantages, like gaining access to educational resources irrespective of time and place.

(ii) Effort Expectancy: Effort expectancy refers to the perceived ease in using the system. Effort expectancy is derived from constructs such as the perceived ease of use, complexity, and usability previously found in theories like TAM, MPCU, and IDT. Venkatesh et al. suggest that effort expectancy typically has a major influence on adopting technologies when the process starts but gradually loses significance as individuals become experienced with the process. As a result, individuals perceive the task as becoming easier over time. Based on previous studies, for example, those done by Gefen & Straub, effort is directly related to acceptance; the lower the effort required in the process, the higher the likelihood of acceptance.

(iii) Social Influence: Social influence is essentially how much importance an individual gives to his social peers' expectations concerning technology use. The process can be understood through the Venkatesh and Davis models, which emphasize compliance, internalization, and identification. Traditionally, gender is considered the major moderator in favor of females; however, the argument has been challenged in contemporary research. In addition, the relevance of experience has recently come into question. According to UTAUT, novice users are expected to exhibit higher levels of susceptibility to social influence compared to expert users; yet, contemporary data reveal that social influence plays a different role in shaping behavior.

(iv) Facilitating Conditions: Facilitating conditions describe the degree to which users believe that sufficient organizational and technical support is available to enable system use. In the UTAUT framework, this construct reflects elements drawn from perceived behavioral control, compatibility, and existing support structures. As defined by Venkatesh et al., facilitating conditions directly affect actual usage behavior rather than intention alone. When users perceive that adequate resources, infrastructure, and assistance are in place, they are more likely to engage with and sustain use of the system.

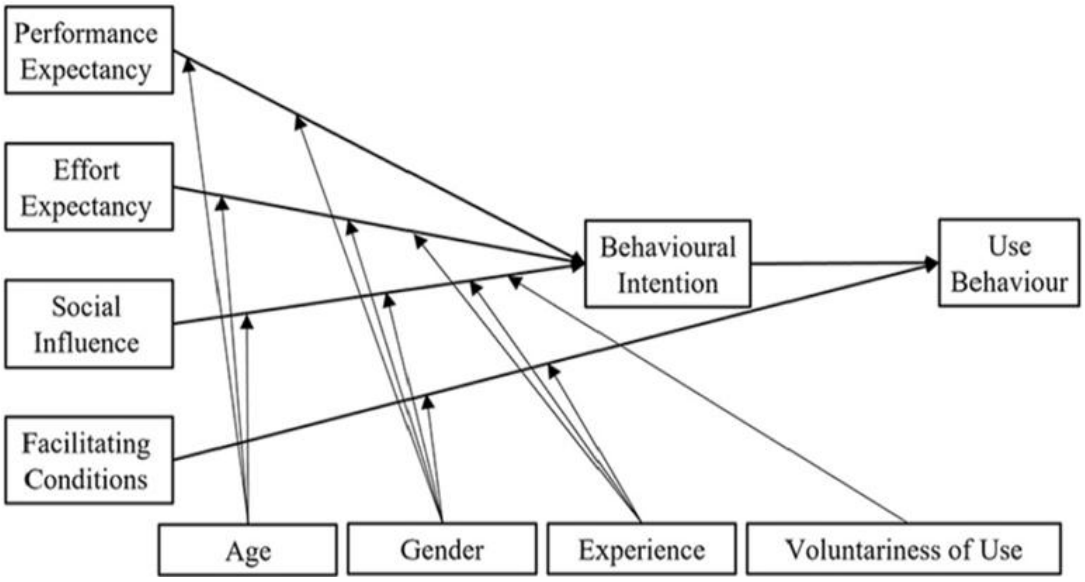


Figure 1 Research Model proposed by Venkatesh et al, 2003

2.2. Empirical Review

2.2.1. Effects of Agency Banking on Financial Inclusion

Since the inception of the agency banking model in the early years of the 21st century, research has been conducted in the field providing a knowledge base for the banks willing to adopt the model. One of the basic ingredients in the recipe of success of the agency banking model is technological innovations due to rapid technological advancements in the entire world. Through leveraging technology, commercial banks have managed to design innovations to assure their existence amidst a rapidly changing environment. One of the characteristics in the banking industry all over the world is an increased level of turbulence and competition among banks. As banks respond to this challenge through technological innovations, a new strategy of trying to achieve customer satisfaction through better products and services while at the same time minimizing operating costs emerges (Sohail and Shanmugham, 2003).

According to Muzigiti and Schmidt (2013), ICT innovations have revolutionized the banking industry. New methods of delivering banking products and services are emerging. Money transfers through the use of mobile phones have been one of the major innovations in this regard. With this innovation, Africa seems to be leading the way. It is estimated that some 16 percent of adults in

Africa use mobile phones to pay bills and transfer money to one another. Globally, less than five percent of people uses mobile phones for such purposes. Moreover, the trend is expected to grow even more in Africa as mobile phone ownership increases. Another fact is that connectivity improves and ICT technology advances.

The study by Barasa and Mwirigi (2013) shows that the agency banking model has gained popularity in the developing countries over the last decade. However, its role in deepening the financial sector in the country is not well-understood. This paper evaluates the agency banking model taking into consideration the identified challenges and tries to find the effect of the agency banking model on the financial performance of commercial banks adopting the agency banking model. Among the agency banking activities having an impact on financial inclusion in Kenya include cash deposits made by customers, payment of retirement and social benefits, new account openings, and number of agencies involved.

2.2.2. Mobile money transfer and financial inclusion

A wealth of empirical evidence is available on the relationship between mobile money and financial inclusion in various settings. For example, Suri and Jack (2016) use household panel data from Kenya to analyze the effects of mobile money access on savings, consumption smoothing, engagement with formal financial institutions, poverty dynamics, and gender issues. Similarly, Andrianaivo and Kpodar (2012), based on cross-country panel data for African countries, examine the impact of diffusion of mobile phones on development of the financial sector and assess the moderating effect of factors like account penetration, financial depth, growth, and other characteristics of a country's structure. The same topic is explored by Evans (2018) in an analysis of the relationship between mobile money adoption and such indicators as account penetration and savings mobilization based on dynamic panel estimation for 49 African countries.

Based on Global Findex data, Demirgüç-Kunt et al. (2018) study the dynamics of mobile money account penetration and focus on people using mobile accounts but not traditional bank accounts. They conduct an analysis of demographic and socio-economic factors affecting adoption of digital financial services. Aker and Mbiti (2010) address the issue of mobile technologies used in African financial markets in regard to transaction costs, information flow, market efficiency, and payment service provision. In the context of business activity, Beck et al. (2018) use surveys to assess the

relationship between mobile money usage and external financing access for small and medium enterprises based on digital financial transactions.

Evidence specific to particular countries also helps shed light on this issue. For instance, Riley (2018) studies households' reaction to income shocks under mobile money in regard to the role played by informal risk-sharing networks in shaping consumption dynamics in Tanzania. Batista and Vicente (2020) carry out a randomized field experiment in Mozambique to analyze the reactions of people to mobile money in terms of financial trust, savings decisions, and engagement with formal organizations. Aron (2018) conducts a review of country-level research and discusses the relationship of mobile money systems to such aspects as savings mobilization, resilience, financial participation, regulation, financial literacy, and infrastructure.

Further country-specific evidence is provided by studies devoted to agency banking and its role in financial inclusion. Thus, for example, Waiyenya (2012) considers agency banking in regard to its relationship to financial inclusion, stressing that it increases access to financial services but noting that there are still underserved segments and competition from mobile money providers. Achieng (2011) analyzes the reactions of Kenya Commercial Bank to mobile money transfers and explains their importance given the dynamic development of the sector and necessity to cooperate with mobile phone companies. Cross-country evidence on the role of telecommunications in development suggests that network externalities exist in mobile systems, which operate as substitutes rather than complements for fixed telecommunication networks.

Moreover, empirical evidence also exists on such topics as structural and banking determinants of financial inclusion and financial development. According to Chithral and Selvam (2013), income, literacy, population, infrastructure, information access, deposit penetration, and credit penetration have a significant correlation with financial inclusion whereas the relationship with the credit/deposit ratio and investment ratio is weak. As for financial development, Ozurumba and Chigbu (2013) highlight such factors as bank investments, cost of credit, savings mobilization, clearing operations, and private sector lending based on secondary data from Nigeria (1970-2010). Finally, Mutsunc (2014), focused on Kenya's M-PESA system, discusses frameworks for analyzing mobile banking from the perspective of financial and economic activities as well as regulatory issues.

2.2.3. Payment for Goods and Services and Financial Inclusion

Riley (2018) conducted a study in Tanzania to examine how access to mobile payment services for goods and services interacts with household financial behavior. The research focused on the consumption patterns, income management, informal and formal financial networks that arise due to the digital payment mechanisms. The study found that households that use mobile payments are better able to manage day-to-day transactions better and retain financial system engagement even under economic duress. This research presents mobile payment platforms as convenient and accessible tools of financial management, contributing to financial inclusion by enabling users to conduct transactions without recourse to conventional banking channels.

Mutsunc (2014) explored the role of mobile banking in promoting financial inclusion in Kenya, with specific focus on the country's very successful mobile money platform, M-PESA. The study was built around frameworks for assessing the role of mobile banking in financial and economic activities. The theory was supplemented by mobile banking frameworks and behavioral science to formulate a conceptual framework that could fit empirical evidence. It emphasized the flexibility of this technology-driven approach in the context of the implications of massive acceleration of mobile transactions and the share of account-based service uptake by mobile users on financial regulation. The study also recommended that policymakers should incorporate contextual factors at the local level in designing regulatory controls for monetary supply and banking services, which future studies should incorporate in analyzing financial inclusion with a consideration of policy perspectives.

Mobile banking is generally defined as the provision of banking services through mobile phones or personal digital assistants (PDAs), not just in transactional operations but in other related services aimed at supporting financial education and financial activities (Tiwari, 2006). The process of mobile money savings started with banking institutions delivering services via mobile devices whereby the clients could receive information on their accounts. Continuous innovations have been recorded in mobile banking services. These services touch upon numerous performance dimensions and act as a new distribution channel, which enables financial and other commercial institutions to distribute financial services outside the bank branch network.

2.2.4. Mobile account Management and financial inclusion

The ongoing evolution and modernization of banking systems is caused by a growing need for more convenient access to financial resources outside of the usual banking channels. Institutions that run parallel to traditional banks have tried to exploit the financial sector's opportunities that are becoming available to the financial sector as a result of the large demand for accessible and reliable services. In this regard, a need for mechanisms that promote deposit management among individuals with the lowest risk levels still exists. Due to historical reasons, the high cost and limited accessibility to financial services excluded potential users, hence the need for alternative banking solutions. An illustration of such developments can be seen in the rapid take up of mobile banking services in Kenya (Wambari, 2009).

According to Porteous (2006), there are two main forms of mobile banking. The additive form uses mobile devices as a supplementary channel for managing bank accounts, providing additional features and convenience. Conversely, transformational provides financial products and services to those who have no formal bank account, thereby targeting the unbanked population directly. Mobile banking's operating environment for banks and clients' segments is critical to be identified. There are many people without bank accounts, but who own mobile phones and have control over significant financial resources, which creates an opportunity for banks to tap into this population segment that has not been reached before (Asongu, 2012).

The integration of mobile banking has enabled financial institutions to bring unbanked populations into formal financial systems, expanding their customer base and revenue streams. One such solution is M-Shwari, an initiative formed by the Commercial Bank of Africa and Safaricom to target significantly unbanked populations with financial services. By doing this, they can mobilize resources that were outside the formal financial system, while providing users with convenient and reliable services. The integration of mobile banking is thus not simply a technological innovation but a strategy for financial inclusion of developing economies.

2.3. Conceptual framework

Conceptual framework Therefore, the conceptual framework identifies the independent and dependent variables and their conceptual relationships. It is the link between the theoretical references in the literature review and the practical parts of the study. The conceptual framework

settles all this by depicting the assumed relationships among the study variables, hence allowing the development of research questions and/or hypotheses and guiding the appropriate data collection, measurement, and analysis.

2.3.1. Dependent Variable

Financial Inclusion: This refers to the degree to which individuals and businesses can access and utilize a variety of financial services that adequately meet their needs through formal financial institutions.

2.3.2. Independent Variables:

a. Agency Banking: This variable refers to Amhara Bank's branchless banking channel, where authorized local agents equipped with Point-of-Sale (POS) terminals and Aba QR codes provide last-mile financial services to underserved communities. Through these agents, customers can perform cash deposits, withdrawals, account opening, balance inquiries, and bill payments without visiting a physical branch. The Aba QR functionality integrated within the Aba Mobile Banking app enables secure, interoperable payments across Ethiopia's national payment network via Eth-Switch, supporting the country's Digital 2025 strategy and the transition toward a cashless economy.
b. Mobile Money Transfer: This variable relates to the use of mobile technology to send and receive funds between accounts. It represents a digital channel for financial transactions that may influence the level of participation in formal financial services.
c. Mobile Bill Payment Services: This variable concerns the use of mobile devices to pay for products and services. It reflects an alternative payment mechanism that allows individuals to participate in economic activities without relying solely on conventional banking methods.
d. Mobile Account Management: This variable refers to the ability to access and manage financial accounts using mobile devices. It enables individuals to oversee transactions, monitor balances, and control their finances remotely, reducing the need for physical visits to conventional bank branches.

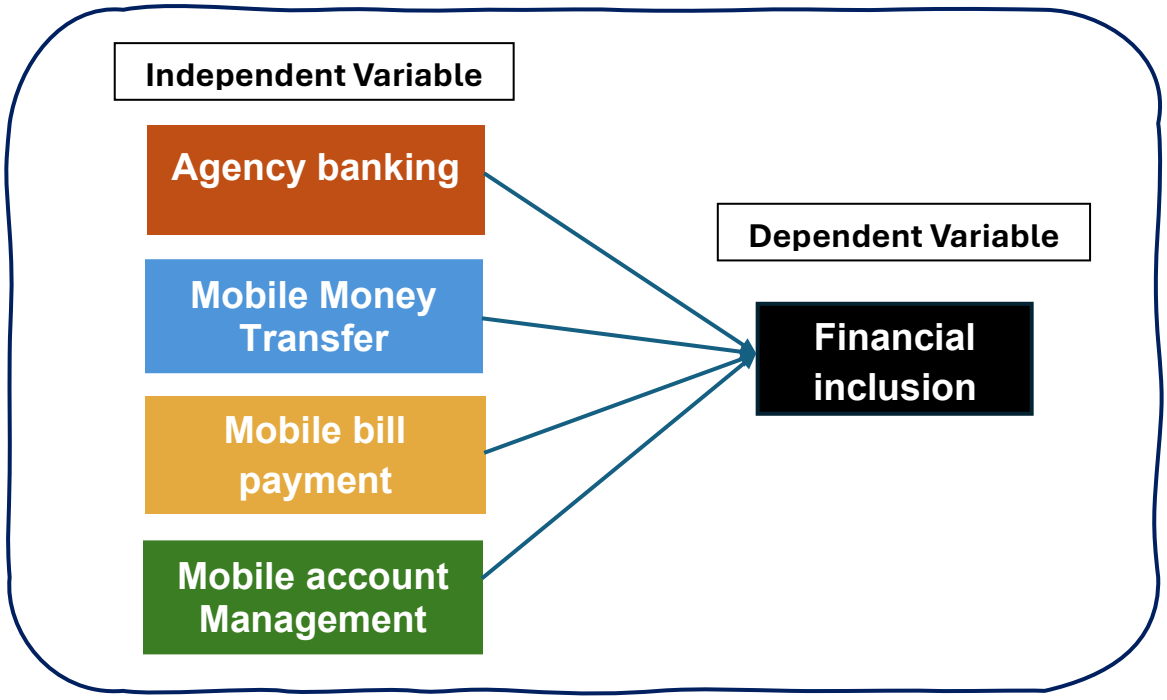


Figure 2 Conceptual Framework of the Study

2.4. Research Hypothesis

- H1: Agency banking has a positive and significant effect on financial inclusion in Amhara Bank
- H2: Mobile money transfer has a positive and significant effect on financial inclusion in Amhara Bank
- H3: Mobile bill payment services have a positive and significant effect on financial inclusion in Amhara Bank
- H4: Mobile account management has a positive and significant effect on financial inclusion in Amhara Bank

CHAPTER THREE: RESEARCH METHODOLOGY

The chapter provides information about the entire framework and methods used in the research, such as how the research was carried out, arranged, analyzed, and read. It discusses the research method and design, defines the target population, and presents the sampling methods and sample size determination. The chapter furthermore includes specific data collection techniques and analytical procedures used in the case study. Further, the chapter reviews the validity and reliability of the research instruments, discusses the operational definition of variables, and lists the ethical considerations of the study.

3.1. Research Approach

In this study, the quantitative research methodology is used as a tool to reach the main objective of exploring how digital banking services can be a key to financial inclusion at Amhara Bank. The overall research design is qualitative research, and it aims to find relevant data on how banking services boost financial inclusion. The qualitative research design comprises different types; exploratory, descriptive, and correlational; in a mixed approach using questionnaires and interviews (10-point Likert scale). The study emphasizes both primary and secondary data sources with the former containing data from the questionnaires and the latter consisting of a comprehensive review of literature relating to the banking sector. The quantitative research methodology stands for the gathering and analysis of numerical information that serves to answer research inquiries and also to prove or disprove hypotheses. This method of research is broadly used in social sciences to quantify attributes like people's views, behaviors, and the relationships between different variables (Kothari & Garg, 2019).

Since the researcher intends to assess how digital banking services (independent variables) influence financial inclusion (dependent variable), the quantitative approach to research used in this study is appropriate. Quantitative research is ideal for the examination of relationships between two variables, cohort comparisons, and application of statistical techniques for hypothesis testing according to Leedy and Ormrod (2015).

Quantitative research thereby gives an opportunity to the researchers to measure the constructs they are working with, establish cause and effect relationships and be able to generalize from the sample obtained to the overall population, as Bryman and Bell (2015) state.

This method involves the researcher being able to quantify and statistically analyze the nature of the relationship between independent and dependent variables. The main research data will be collected through a questionnaire, which is a standard tool for surveys that will be based on a Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree." The use of Likert scale as a measuring tool is a common practice in social sciences for the measurement of attitudes, opinions, and perceptions (DeVellis, 2017; Krosnick & Presser, 2010).

3.2. Research Design

In this study, a methodology with an explanatory design was used. This design is useful in identifying relationships between independent and dependent variables by making a hypothesis regarding the relationship's possible cause and/or effect (Bryman & Bell, 2015; Saunders, Lewis & Thornhill, 2019). For the present study, the author made a hypothesis that digital bank solutions (such as agent banking services, mobile money transfer, mobile account management, and mobile bill payment, among others) have a positive and significant impact on Amhara Bank's financial inclusion.

There were multiple reasons for choosing to use an explanatory design. Primarily, this design will provide the author with clear evidence of whether the independent variables (the agent bank services, mobile money transfer, mobile bank account management, and mobile bill payments) were causal in their impact on promoting the dependent variable of money being in the financial system (i.e., financial inclusion). As stated by Hair et al. (2019), explanatory designs are specifically targeted to study the nature of the relationship among variables via hypothesis testing.

The design allows the application of statistical methods to evaluate independent variables' influence on a dependent variable and to provide insight into the strength and direction of relationships among variables. Malhotra & Dash (2016) state that explanatory research uses inferential statistics (correlation and regression) to assess how well fluctuations in independent variables can account for changes in the dependent variable.

The insights from an explanatory design will help inform managers and policymakers by identifying the most significant digital banking solutions affecting financial inclusion outcomes.

Zikmund et al. (2013) claim that explanatory research provides evidence-based decision making by revealing which factors are most responsible for producing desired outcomes.

Kothari & Garg (2019) confirm that explanatory research design can be used when the problem being researched has been well defined and the researcher wishes to identify any relationships between variables, which is consistent with the objectives of this study, including describing and explaining differences between digital banking solutions' effects on financial inclusion. Creswell & Creswell (2018) explain that explanatory research designs are useful in applied research settings where the results will be used to make decisions for practice or policy.

3.3. Sampling Design

3.3.1. Target Population

A population is the complete set of individuals, events, or things that have similar observable traits, and which are of interest to a researcher (Bryman & Bell 2015). The target population for this research is defined as the users of digital banking provided by Amhara Bank, including the customers and agents the Bank is associated with who actively utilize these digital banking solutions. Based on Amhara's records, there are approximately 950,000 active digital banking users (both urban and rural) from Amhara Bank's total of 2.3 million customers in Ethiopia. A well-defined target population is essential to guarantee that the final sample accurately reflects the population that the conclusions are drawn from (Zikmund et al. 2013).

3.3.2. Sampling Technique

To recruit the participants of this research, a stratified random sampling procedure was used. Stratified random sampling is a type of probability sampling which includes the process of separating the entire target group into identifiable categories having common attributes-calibrated as strata-and selecting randomly the samples out of the different strata (Kothari & Garg, 2019).

This method promotes representativeness across different categories of users and geographic regions, thereby supporting the generalization of the results of this study to the whole user population of Amhara Bank (Saunders et al., 2019).

The population of this study was divided into two groups according to two criteria: (1) user type (i.e. customers) and (2) region of the country (urban vs rural). Respondents were randomly selected from each group to participate in the study. This method will ensure that all subgroups of digital banking users at Amhara Bank are adequately represented in this sample. Stratified sampling is especially valuable when different subgroups of the population differ with respect to one or more key attributes that are meaningful to the purposes of the research (Hair et al., 2019).

3.3.3. Sample Size Determination

The calculation of the sample size for this research was conducted using Slovin's calculation of 95% level of confidence and a margin of error of 5%. When the population size has been established, Slovin's formula can be used to calculate the appropriate sample size for any desired precision level (Tejada & Punzalan, 2012; Yamane, 1967). This formula simplifies the process of calculating the sample size for surveys (Israel, 2013).

The formula is:

$$n = \frac{N}{1 + Ne^2}$$

Where:

- n = sample size
- N = total population size
- e = error tolerance (0.05)

Based on the target population of 400 customers, n is calculated as follows:

$$n = \frac{N}{1 + N(0.05)^2}$$

Therefore, a total of 400 people were sampled from the target population. This sample size is well-suited for performing multiple regression analysis and for making valid inferences about the

population (Hair et al., 2019; Tabachnick & Fidell, 2019). As indicated by Field (2018), this size of the sample is sufficiently large placed ahead of minimum requirements for detection of medium effect prices in social science research.

3.4. Type and Sources of Data

This study is based on primary sources of data. Primary data are those which have been observed or recorded directly for the study (Saunders et al. 2019; Zikmund et al. 2013). The data for this study was obtained from users of Amhara Bank's digital banking solutions.

The use of primary data is deemed the most appropriate, because the investigator can acquire specific information that is directly related to the objectives and questions of the study. Primary data is defined as information that is raw and arrived at fresh with respect to the problem under review (Kothari and Garg 2019). Furthermore, Bryman and Bell (2015) argue that primary data gives researchers the ability to design measurement instruments that are appropriate for their research context, thereby guaranteeing that the data will be highly related to the constructs being studied.

3.5. Method of Data Collection

The structured survey questionnaire to collect data was developed from pre-existing valid measures from past research studies focusing on digital banking and financial inclusiveness as it pertains to the environment of Amhara Bank and Ethiopia. Based on DeVellis's (2017) recommendation, it is beneficial to adapt previously validated instruments because this provides additional assurances of both the reliability and validity of the measurements.

The questionnaire consisted of two sections:

- **Section A:** Demographic information of respondents (gender, age, education level, location, frequency of digital banking usage)
- **Section B:** Items measuring the four digital banking solution constructs Agent Banking Services, Mobile Money Transfer Services, Mobile Account Management Services, Mobile Bill Payment Services and Financial Inclusion

The items in Section B involve assessment using a Likert-type scale of the five-response options such as 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. Typically, the Likert scale is a very popular method in the social science field to quantify perceptions, attitudes, and opinions (Krosnick & Presser, 2010; Malhotra & Dash, 2016). DeVellis (2017) noted that Likert scales are best perceived as a methodology to measure the extent to which the respondents give a positive response to the constructs of interest.

The questionnaire was administered through printed paper to ensure adequate response rate and data quality. Saunders et al. (2019) recommend selecting data collection methods that are appropriate for the target population characteristics and research context.

3.6. Validity and Reliability of Instruments

3.6.1. Validity

It is defined as degree of a measuring instrument measuring what it claims to (Yin, 2013; Creswell & Creswell, 2018). To ensure valid measurements, a process was put in place to establish the content validity of the measures provided in the questionnaire by having supervisors and experts in their specific disciplines review the questionnaire.

Content validity determines if the items in a questionnaire are representative of the theoretical domain of the variables under investigation (Bryman & Bell, 2015; Lewis, 2015). The content validity of the measures of over five constructs (Agent Banking Services, Mobile Money Transfer Services, Mobile Account Management Services, Mobile Bill Payment Services, and Financial Inclusion) incorporated in the questionnaire were reviewed by an experienced supervisor and other advisors prior to administration. According to Hair et al. (2019), establishing content validity is the first and most fundamental requirement for establishing the overall validity of a measurement instrument.

Another step taken to ensure validity of the measurement instrument used in this study was to conduct a pilot test of the questionnaire prior to administering it to the targeted population. Mertler (2018) indicates that conducting a pilot test is essential to identify issues with research instruments and adjust as needed to develop measurement instruments that will provide valid results. The pilot test involved administering the questionnaire to 400 prospective respondents (approximately five

per cent of the sample size) which is within the recommended pilot test range of one to ten per cent (Flick, 2014; Saunders et al., 2019). The data gathered from the pilot test was used to improve the quality of the items in the questionnaire relative to clarity, relevance, and comprehensibility; therefore, they were not considered in the results produced from this study.

3.6.2. Reliability

It means the extent of your measurements. Therefore, a tool will produce approximately the same result (logically quantified) for a subject on several occasions (Sekaran and Bougie 2016 and Shelby 2011). Reliability was determined by calculating Cronbach's alpha with SPSS version.

Cronbach's alpha evaluates the internal consistency of the items that make up a scale by evaluating the correlation of responses to items on the scale. Having a value 0 - 1, bigger results increased accuracy (George and Mallery 2003). Several minimal thresholds for Cronbach's alpha values have been recommended in the literature.

This study set a minimum acceptable Cronbach's alpha value of 0.6 except for Malhotra and Birks who claimed 0.5 is the minimum, Nunnally who proposed 0.7 as the minimum and Hair et al. who suggested 0.6 as the minimum. The Field (2018) suggests that the values of 0.7 and above signify acceptable internal consistency while those above 0.8 represent excellent consistency.

The reliability of each construct was individually assessed, and the results are summarized in a table. Establishing adequate reliability is vital as the unreliable measures could be a way to come up with invalid conclusions regarding the relations of the variables (Tabachnick and Fidell 2019).

The reliability test was conducted for each construct, and their results were presented in Table 1 below:

Table 1 Presentation of the results of the Cronbach's Alpha Reliability Test

Variable	**Alpha**	**Number of Item**
Agent Banking Services	0.72	7
Mobile Money Transfer Services	0.78	7
Mobile Account Management Services	0.75	6
Mobile Bill Payment Services	0.73	7
Financial Inclusion	0.76	5

3.1.Method of Data Analysis

Descriptive and inferential statistical analyses were performed using an SPSS data analysis software package following the collection of survey data. The statistical analysis was conducted in two stages as discussed below:

Descriptive statistics: are an essential element of any research that uses sample data to present an overview of the data collected from participants. The first phase of the statistical analysis evaluated the demographic profile of the participants using descriptive statistics by calculating frequency and percentage distributions on gender, age, educational level, geographic location, and frequency of use of digital banking. Also, mean and standard deviation values were calculated to evaluate the central tendency and variability of responses for each construct and provide a better understanding of participants' perceptions toward digital banking solutions and financial inclusion. According to Pallant (2020), descriptive statistics provide an overview of participant characteristics (i.e., respondents) as well as ensure that the data is valid for performing additional statistical analyses. Saunders et al. (2019) indicate that descriptive statistics assist researchers with presenting the results from their research accurately and in a more easily understood format prior to conducting more complex analyses.

Inferential Statistics: The researcher used inferential statistics to test the hypotheses and draw inferences about a population based on the data collected from the sample (Kothari & Garg, 2019). The researcher employed two types of inferential statistics: correlation analysis and multiple regression analysis.

1. **Correlation Analysis**: Correlation Analysis: The researcher employed Pearson's product-moment correlation coefficient to identify the characteristics and strength of the relationships between the various constructs of digital banking solutions and financial inclusion. The correlation coefficient (r) that the researcher applied was in the following range: -1.00 to +1.00, while numbers that were closer to ±1 signified a stronger relationship (Sekaran & Bougie, 2016). A correlation analysis can be seen as a preliminary step for researchers to familiarize themselves with the constellation of two variables before they perform their regression analysis (Field, 2018).
2. **Multiple Regression Analysis**: The researcher implemented multi access analyses to evaluate the bearing of digital banking solutions on financial inclusion. Multiple regression is a method that facilitates the analysis of a number of independent variables influencing a single dependent variable (Hair et al., 2019). Based on the lay of the land by Tabachnick and Fidell (2019), multiple regression proves to be advantageous to researchers on a quest to find out what percentage of a dependent variable can be accounted to a group of independent variables and which of the independent variables are the most correct predictors.

Regression coefficients (beta values) indicate both the direction of the independent variables' effect and the size of their contribution to financial inclusion. In addition, the coefficient of determination (R^2) shows how much of the variability of financial inclusion can be explained by digital banking solutions. The significance of each predictor is reported based on the p-values obtained at the 0.05 significance level (Bryman and Bell 2015).

3.7. Operationalization and Model Specification

To investigate the association of digital banking solutions and the financial inclusion multiple regression analysis was used. The regression model is specified as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

- Y = Financial Inclusion
- β_0 = Constant term
- $\beta_1, \beta_2, \beta_3, \beta_4$ = Regression coefficients
- X_1 = Agent Banking Services
- X_2 = Mobile Money Transfer Services
- X_3 = Mobile Account Management Services
- X_4 = Mobile Bill Payment Services
- ε = Error term

Table 2 Model Specification of Variables

Variable Type	**Name of a variable**	**B**	**Assigned Value**
Independent	Agent Banking Services	β_1	X_1
Independent	Mobile Money Transfer Services	β_2	X_2
Independent	Mobile Account Management Services	β_3	X_3
Independent	Mobile Bill Payment Services	β_4	X_4
Dependent	Financial Inclusion	Constant	Y

Prior to conducting regression analysis, diagnostic tests was performed to ensure that the data meets the assumptions of multiple regression, including linearity, normality, homoscedasticity, and absence of multicollinearity. These tests are essential because violations of regression assumptions can invalidate statistical inferences (Hair et al., 2019). Specifically:

- **Linearity** was assessed through scatter plots of standardized residuals against predicted values

- **Normality** was examined using histograms and normal probability plots (P-P plots)
- **Homoscedasticity** was performed to see if the variance in the error term remains same irrespective of the values of independent variables.
- Variance Inflation Factor (VIF) values were used to assess multicollinearity, with VIF values below 10 indicating its satisfactory level (Field, 2018; Tabachnick & Fidell, 2019).

Data obtained from the study were effectively communicated using tables, figures, and written descriptions, thus facilitating easier understanding and clarity. The proper display of data is pivotal to the successful communication of research findings to diverse audiences (Saunders et al., 2019).

3.8. Ethical Considerations

The research ensured that ethical principles were respectfully adhered to during the research procedure using established principles of ethical social science research. Informed consent was obtained from all individual respondents before collecting data.

It is important to mention that each and every participant knew what would be expected from him/her as a respondent in the course of research; therefore, he/she needed to agree to participate prior to filling out a questionnaire.

As far as confidentiality is concerned: Each and every respondent was informed that his/her anonymity would be protected during the study; thus, there would be no names or any other form of identification printed in the questionnaire. In addition to that, all respondents were informed that they had the right to leave the study anytime they wished and they were free to do so without facing any consequences.

All collected information will be used only in order to conduct academic research and will not be sold or shared with anyone else. It is necessary to point out that, according to Sekaran and Bougie, in order to protect the rights of the participants of research, it is crucial to preserve confidentiality and anonymity of each participant involved. Moreover, the conducted research followed all policies regarding the collection of information about bank customers and representatives of the bank as stipulated by Amhara Bank itself; therefore, all relevant permits were gained before starting to collect data.

Finally, the results of the research will be presented honestly without any fabrication or manipulation. It is stated in Zikmund et al. that one cannot conduct ethical research without presenting both sides of the story.

CHAPTER FOUR: DATA ANALYSIS, RESULTS, AND DISCUSSION

4.1. Introduction

This chapter discusses analysis, findings, and discussion of primary data collected from 400 customers of Amhara Bank. The data was collected using a structured questionnaire designed to measure the effect of four digital banking solutions. The analysis includes descriptive statistics of respondent demographics, mean scores for each variable, correlation analysis, and multiple regression analysis. SPSS version 23.0 was used to analyze and present the collected data. Tables and figures are used to display the data.

It should be noted that a total of 450 structured questionnaires were delivered to selected Amhara Bank clients who were selected randomly from selected urban and rural branches of the bank. However, the number of questionnaires returned to the researcher amounted to only 400, which means that the response rate was 93.4%. Based on Babbie (1998), a rate of response equaling to 70% can be considered as 'very good' while 80% or more is viewed as excellent. Also, according to Fincham (2008), 50 60% or more can be deemed as the best rate since nonresponse bias does not become a problem then.

Demographic Profile of Respondents

Table 3 Gender Composition of Respondents

Sex	Frequency	Percent
Male	228	57.0%
Female	172	43.0%
Total	400	100%

Source: Survey Result 2026

Based on the table above, of the total 400 respondents, 228 (57.0%) are males while 172 (43.0%) are females. From the table above, there seems to be an overwhelming number of male participants in this survey compared to females. According to the demographics of the banks in Ethiopia, more men than women are served by banks because they have been able to use their banking products.

Considering Banksver's respondents' percentage of 43%, it implies that female respondents are increasingly being served by digital banking at Amhara Bank.

Table 4 Age Respondents Composition

Age Group	**Frequency**	**Percent**
18 - 25 years	100	25.0%
26 - 35 years	240	60.0%
36 - 45 years	40	10.0%
46 - 55 years	16	4.0%
56 years and above	4	1.0%
Total	400	100%

Source: Survey Result 2026

Most of the respondents (240, 60.0%) belong to the 26-35 age bracket, while 18-25 (100, 25.0%), 36-45 (40, 10.0%), 46-55 (16, 4.0%), and 56+ (4, 1.0%) make up smaller portions of the sample. It demonstrates that the use of digital banking at Amhara Bank primarily involves younger people, in line with international observations proving that younger generations are more prone to using digital finance services. The presence of older respondents (5.0% aged 46+) is encouraging but indicates significant room for expansion in these age groups

Table 5 Educational Status of Respondents

Academic Qualification	**Frequency**	**Percent**
No formal education	4	1.0%
Primary school	8	2.0%
Secondary school	16	4.0%
Diploma/Vocational	40	10.0%
Bachelor's degree	300	75.0%
Master's degree or above	32	8.0%
Total	400	100%

*Source: Survey Result 2026*A

Majority of respondents (300, 75.0%) have obtained a bachelor's degree; next is diploma (40, 10.0%), followed by master's or higher (32, 8.0%), secondary (16, 4.0%), primary (8, 2.0%), and no formal education (4, 1.0%). This means that 93% of the digital banking clientele have attained a diploma educational level and above. Although Amhara Bank has been able to reach out to educated individuals, there is still a challenge in reaching out to less educated people, which constitute one of the most financially excluded groups.

Table 6 Occupation of Respondents

Occupation	**Frequency**	**Percent**
Private employee	260	65.0%
Government employee	80	20.0%
Self employed	28	7.0%
Farmer	20	5.0%
Student	12	3.0%
Total	400	100%

Source: Survey Result 2026

The Table shows the distribution of respondents according to occupation shows that the largest number of respondents, 260 people (65.0%), are private employees. The second highest number of respondents are government employees, which account for 80 people (20.0%). There are also 28 people (7.0%) who are self-employed, 20 people (5.0%) who are farmers, and 12 people (3.0%) who are students. The presence of private and government employees makes up 85% of the total sample size. This is important because it indicates that formal sector employees are the main target audience for digital banking services offered by Amhara Bank.

Table 7 Residence of Respondents

Residence	**Frequency**	**Percent**
Urban	340	85.0%
Rural	60	15.0%

Residence	Frequency	Percent
Total	400	100%

Source: Survey Result 2026

Since 85% of the participants are from urban settings while the population of Ethiopia stands at 80% rural, there is an imbalance in the use of mobile banking services by Amhara Bank, indicating high growth opportunities for USSD and agent banking in rural regions.

Table 8 Length of Customer Relationship with Amhara Bank

Service Year	Frequency	Percent
Less than 6 months	40	10.0%
1 2 years	60	15.0%
2 3 years	240	60.0%
More than 3 years	60	15.0%
Total	400	100%

Source: Survey Result 2026

The majority of participants (240, 60.0%) have been with the bank for 2-3 years, followed by 1-2 years (60, 15.0%), more than 3 years (60, 15.0%), and less than 6 months (40, 10.0%). These results show that the majority of sample customers have already gained enough experience in using digital banking services. The long-time users (15%) can share their views on how the service has evolved.

Table 9 Frequency of Digital Banking Usage

Usage Frequency	Frequency	Percent
Daily	140	35.0%
Several times per week	160	40.0%
Once per week	60	15.0%
Several times per month	20	5.0%

Usage Frequency	Frequency	Percent
Rarely	20	5.0%
Total	400	100%

Source: Survey Result 2026

The largest portion of respondents (160 respondents representing 40.0%) use digital banking several times each week, whereas the second largest portion (140 respondents representing 35.0%) use digital banking each day. In total, the vast majority (75%) use digital banking several times a week or more, whereas 15% use digital banking one time per week, and 10% use digital banking one time a month or less. The high frequency of usage demonstrates that digital banking is widely integrated into people's lives, as far as financial activities are concerned.

Table 10 Monthly Income Level of Respondents

Income Level	Frequency	Percent
Below 10,000 ETB	40	10.0%
10,000 30,000 ETB	320	80.0%
30,000 50,000 ETB	40	10.0%
Above 50,000 ETB	0	0%
Total	400	100%

Source: Survey Result 2026

Most of the participants (320, 80.0%) have salaries between 10,000-30,000 ETB, whereas 40 participants (10.0%) have salaries less than 10,000 ETB, while 40 (10.0%) earn between 30,000-50,000 ETB. None of the participants have salaries above 50,000 ETB. It is clear that the participants using digital banking at Amhara Bank fall under middle-level income earners. However, the low-level income earners included (10% of participants)

4.2. Results of Descriptive Analysis

Using the classification criteria by Zaidaton and Bagheri (2009), scores lower than 3.39 are classified as low, scores from 3.40 to 3.79 are classified as medium, and scores higher than 3.80

are classified as high. These criteria conform to the criteria for analyzing five-point Likert scale answers. In these criteria, a score of 3.41 to 4.20 means agreement or positive perception

4.2.1. Agent Banking Services (B1)

Table 11 Descriptive Statistics for Agent Banking Services

Statement	**Mean**	**Std. Deviation**
B1.1 I am aware that Amhara Bank provides agent banking services	3.28	1.40
B1.2 I use agents for cash in or cash out transactions	2.55	1.48
B1.3 Agents assist customers in conducting basic banking transactions	3.15	1.38
B1.4 Agent locations are easily accessible in my area	2.82	1.32
B1.5 Transactions through agents are fast and convenient	2.98	1.35
B1.6 Using agent banking reduces the need to visit a bank branch	3.42	1.28
B1.7 Overall satisfied with agent banking services	3.04	1.44
Grand Mean	3.18	

Source: Survey Result 2026

According to the results of the survey, Amhara Bank customers hold a certain view on agent banking services. Specifically, the overall average value of 3.18 demonstrates that, on average, participants have moderate attitudes toward the studied financial product; their opinions do not cross the threshold of a moderate attitude level of 3.40.

If one analyzes specific statements, the highest average opinion will correspond to statement B1.6 the use of agent banking allows minimizing visiting banks. It has an average value of 3.42 and standard deviation of 1.28, which means that the customers acknowledge the theoretical advantages of agent banking as a convenience channel that helps minimize time expenses. Low standard deviation also demonstrates the moderately unanimous opinion.

The lowest average score will correspond to statement B1.2 – I use agent services when performing cash in or cash out operations. It has average score of 2.55 and a quite high standard deviation of 1.48, which means that some customers actively perform such operations through agent services while others completely ignore these possibilities.

Another critical point in terms of low usage is the low average score of statement B1.4 about easily accessibility of agent location (average score 2.82). Customers do not find these locations convenient; therefore, they do not use agent banking. Statement B1.5 about speed and convenience of operations performed through agent (average score of 2.98) is another important factor in the non-use of agent services by clients.

Overall average score for question concerning customer's general opinion about agent services (statement B1.7) was moderate (average score 3.04) but standard deviation was relatively high (1.44); it means that some people were satisfied with these services while others were not.

It may be concluded that although agent banking shows great potential, for example, in terms of reducing branch visits, it has several issues with respect to current practice in Amhara Bank – mainly low usage and low accessibility.

4.2.2. Mobile Money Transfer Services (B2)

Descriptive Statistics for Mobile Money Transfer Services

Table 12 Descriptive Statistics for Mobile Money Transfer Services

Statement	Mean	Std. Deviation
B2.1 I send money via mobile to family or friends	4.40	0.86
B2.2 I receive money via mobile from others	4.08	0.98
B2.3 Mobile transfers are faster than traditional methods	4.48	0.78
B2.4 The cost of mobile transfers is affordable	3.18	1.38
B2.5 Mobile transfers are easy and convenient	4.40	0.86
B2.6 Mobile transfers help me send financial support	4.40	0.92
B2.7 Mobile transfers are secure	4.35	0.84

Statement	Mean	Std. Deviation
Grand Mean	4.10	

Source: Survey Result 2026

Survey results related to perceptions of mobile money transfer services showed very positive sentiments on behalf of Amhara Bank clients. As seen, the grand mean for mobile money transfer services equals 4.10 and this value is noticeably higher than the critical 3.80, which shows a very positive attitude toward the mentioned services.

Among the strongest positive perceptions is B2.3 (Mobile transfers are faster than traditional money transfer) with the highest average of 4.48 and small standard deviation value at 0.78. It shows robust agreement among clients that mobile money transfers are much faster than other options, including bank branches and informal transfers. Speed is one of the factors motivating customers to adopt new technologies.

Positive sentiments also prevail regarding B2.1 (I send money via mobile to family/friends) with the mean value of 4.40; B2.5 (Mobile transfer services are easy and convenient) – with the mean equal to 4.40; and B2.6 (I can use mobile transfers to provide my family/friends with financial support) with the mean value of 4.40. Fairly low standard deviations, ranging from 0.86 to 0.92, show that customers find mobile money transfer to be quite convenient to send money to families and friends regularly. Easy use of this method is another important point.

Positive customer attitude towards B2.7 (I feel secure when I transfer money via mobile phones) is also evident, as the average score is 4.35 and it goes along with low standard deviation, which is 0.84. Security issues tend to be among the reasons why customers refuse to use digital banking; however, in the case of Amhara Bank, the perception of mobile transfer security is positive.

Finally, it should be highlighted that one of the lowest scores was registered as far as B2.4 (Mobile transfers' prices are affordable) is concerned: it equals 3.18 with relatively high standard deviation of 1.38. Even though customers agree positively with most statements about mobile transfers in question, they think that prices are unaffordable. High standard deviation suggests that opinions about price affordability vary greatly.

4.2.3. Mobile Account Management Services (B3)

Table 13 Descriptive Statistics for Mobile Account Management Services

Statement	**Mean**	**Std. Deviation**
B3.1 I use mobile banking to check my account balance	4.32	0.94
B3.2 I use mobile banking to view my account statement	4.00	1.08
B3.3 Mobile banking provides detailed transaction information	4.18	0.98
B3.4 Mobile banking services are easy to use for managing my account	4.25	0.92
B3.5 I receive transaction notifications or alerts	4.12	1.04
B3.6 Mobile banking helps me monitor and control my finances	4.18	0.98
Grand Mean	**4.09**	

Source: Survey Result 2026

Mobile account management had the highest mean value of 4.09. This is quite impressive since it means that people are very satisfied with Amhara Bank's account management via mobile application which can be done using ABa Mobile Banking. It goes without saying that the highest mean value among this category of questions was recorded for B3.1 – "I use mobile banking to check my account balance". With an average value of 4.32 and a low standard deviation 0.94, it is apparent that people utilize this feature quite frequently. What is interesting is that checking the balance via mobile phone is considered quite valuable, thus contributing greatly to customer satisfaction.

The second highest value of all questions related to mobile account management is B3.4 with a mean value of 4.25. Standard deviation of 0.92 is rather low, which indicates that people find it quite convenient to conduct mobile operations on their accounts. As far as this question is concerned, it should be noted that people use mobile banking because it is considered easy to operate.

Next on our list, we have B3.3 with a mean value of 4.18 and standard deviation of 0.98. Similarly, B3.6 also had the same values. This fact suggests that customers enjoy detailed information about

their transactions. Moreover, such information is quite important for monitoring and controlling people's finances, which is one of the main purposes of financial inclusion.

B3.5 – "I receive transaction notifications or alerts" got a mean value of 4.12. As can be seen, the standard deviation of this question is higher compared to other questions from this group which suggests that there may be some inconsistencies regarding this feature.

Finally, the last and the lowest value related to mobile account management was B3.2 – "I use mobile banking to view my account statement". Although this question got the same mean value of 4.00, it seems like its higher standard deviation suggests that there might be certain problems related to viewing account statements via mobile phone.

4.2.4. Mobile Bill Payment Services (Aba QR) (B4)

Table 14 Descriptive Statistics for Mobile Bill Payment Services (Aba QR)

Statement	**Mean**	**Std. Deviation**
B4.1 I use Aba QR to make payments at shops or merchants	3.45	1.48
B4.2 I use mobile banking to pay utility bills	3.75	1.26
B4.3 Paying using Aba QR is faster than paying with cash	4.18	1.06
B4.4 Paying bills through mobile banking is convenient	4.25	1.00
B4.5 Many local merchants accept Aba QR payments	2.98	1.42
B4.6 I feel secure when using Aba QR or mobile payments	4.05	1.08
B4.7 Mobile payments reduce the need to carry cash	4.32	0.94
Grand Mean	**3.81**	

Source: Survey Result 2026

In this case, mobile bill payments, specifically Aba QR received the grand mean of 3.81 which marks exactly the high category (mean above 3.80). Nevertheless, when it comes to the means of individual statements, there is much difference.

The statement with the highest means is B4.7 ("Aba QR reduces the need for carrying cash") and it is 4.32. Low standard deviation 0.94 points out to high consistency. This statement clearly marks

one of the benefits that makes digital payments appealing. Cash in general can be stolen or lost, therefore reducing its number means reducing risks.

Statement B4.4 ("Aba QR mobile banking payment of bills is convenient") received 4.25 means which together with low standard deviation (1.00) speaks about the high level of convenience. Customers value this characteristic of mobile bill payments since it makes them willing to try the service. Similarly, B4.3 ("Payments by Aba QR is faster than making payments by cash") with mean 4.18 and standard deviation 1.06 shows the importance of this advantage as well.

The mean of statement B4.6 ("Paying bills with Aba QR makes me feel safe") is quite positive – 4.05 mean and 1.08 standard deviation. Overall, customers perceive the payment method safely; however, the relatively high standard deviation means that some of them doubt the safety of transactions.

The most interesting results regarding the use of mobile payments are related to their frequency. Thus, B4.2 ("Use mobile banking to pay utility bills") has a moderate mean 3.75 and high standard deviation 1.26. Customers use the application to pay bills although it seems that not all people have already adopted it.

Statement B4.1 ("Pay my bills using Aba QR in stores and merchants") shows a mean of 3.45 and high standard deviation 1.48. It means that customers do not pay bills via Aba QR as often as they pay utility bills; however, it can be said that some people prefer it and others do not use it at all.

Moreover, B4.5 ("Merchants in my locality accept Aba QR payments") shows the lowest mean 2.98 and relatively high standard deviation 1.42 in comparison with other statements. In this case, customers do not think that many local merchants accept payments by QR code. The question of whether it is true or false is rather secondary. What is important is that customers' belief is a very serious obstacle to adoption.

4.2.5. Financial Inclusion (C)

Table 15 Descriptive Statistics for Financial Inclusion

Statement	**Mean**	**Std. Deviation**
C1 Digital banking services are accessible	3.90	1.12
C2 Digital banking services are affordable	3.68	1.14
C3 Digital banking has increased my access to formal financial services	4.04	0.92
C4 Digital banking has reduced my reliance on informal saving methods	3.68	1.30
C5 Overall, digital banking has improved my financial inclusion	4.04	0.92
Grand Mean	**3.87**	

Source: Survey Result 2026

Financial inclusion statements had the following grand mean: 3.87. The obtained results suggest that people consider that digital banking has had a high positive effect on financial inclusion.

It was found out that the two statements received the highest mean values. Namely, C3 (digital banking has increased my access to formal financial services) and C5 (overall, digital banking has improved my financial inclusion) had the mean value of 4.04, which suggests that Amhara Bank's digital banking products are effectively addressing the goal of improving the financial inclusion of users. It is important to note that the results are very promising as the standard deviations for these two variables are rather low – 0.92.

In turn, C1 (digital banking services are accessible) had the mean value of 3.90, while the standard deviation was 1.12. The result indicates that people believe that they can use digital banking services easily when needed. At the same time, one should bear in mind that accessibility might depend on the location (whether it is an urban area or not), ownership of a computer or smartphone, and Internet connection.

As for affordability of services provided by Amhara Bank via digital platform (statement C2), it is important to state that the mean value was rather moderate (3.68), while the standard deviation was 1.14. Likewise, the mean of C4 was equal to 3.68; however, the standard deviation was higher (1.30).

The score received by statement C2 is particularly alarming since it is the second lowest of all the statements concerning financial inclusion. It is similar to the previously obtained mean value for mobile money transfer B2.4 (mean = 3.18).

Moreover, it is important to say that the standard deviation for statement C4 is relatively high – 1.30. Thus, it becomes clear that some customers have managed to minimize their dependence on informal financial transactions such as iddir, equb, and cash kept at home, whereas others use these methods frequently.

4.3. Inferential Statistics

The researcher employed regression analysis to assess the effect of digital banking services on financial inclusion at Amhara Bank. The outcomes of correlation analysis, ANOVA, and regression coefficients are presented in the subsequent sections.

4.3.1. Correlation Analysis

The Researcher's Correlation analysis was employed to establish the correlation between the four aspects of digital banking solutions (Agent Banking, Mobile Money Transfer, Mobile Account Management, Mobile Bill Payment/Aba QR) and financial inclusion. The Researcher's correlation coefficient served as the analytical tool. The Researcher's correlation coefficient is the most widely used measure of the strength of relationship between the two variables. The Pearson correlation coefficient requires that the two variables have linear relationship and that they are samples drawn randomly from the larger population (Kothari, 2004).

The findings of the correlation analysis of the independent variables, which include agent banking, mobile money transfer, mobile account management, and Aba QR payment, on the dependent variable, financial inclusion, will be presented in the subsequent section. As evident from the

following table, the values of the correlation coefficient range from moderately strong to very high. This indicates that there is a relationship between the two variables.

Table 16 Correlation Matrix

		B1	B2	B3	B4	C
Agent Banking (B1)	Pearson Correlation	1	.120*	.090	.150*	.180*
	Sig. (2-tailed) (p-value from a two-tailed test)		.016	.074	.003	.000
	N (Sample size)	400	400	400	400	400
Mobile Money Transfer (B2)	Pearson Correlation	.120*	1	.630**	.560**	.680**
	Sig. (2-tailed)	.016		.000	.000	.000
	N (Sample size)	400	400	400	400	400
Mobile Account Management (B3)	Pearson Correlation	.090	.630**	1	.600**	.650**
	Sig. (2-tailed)	.074	.000		.000	.000
	N (Sample size)	400	400	400	400	400
Aba QR Payment (B4)	Pearson Correlation	.150*	.560**	.600**	1	.570**

	Sig. (2-tailed)	.003	.000	.000		.000
	N (Sample size)	400	400	400	400	400
Financial Inclusion (C)	Pearson Correlation	.180*	.680**	.650**	.570**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N (Sample size)	400	400	400	400	400

*Note: Pearson correlation coefficients are presented. * Indicates statistical significance at 0.05 level ($p < 0.05$), and ** indicates statistical significance at the 0.01 level ($p < 0.01$). All tests are two-tailed. (*Note: *$p < 0.05$, **$p < 0.01$ (2-tailed). *)*

4.3.1.1. Mobile Money Transfer

The study carried out at Amhara Bank has so far focused on the impact of digital banking solutions on financial inclusion of customers. Based on the correlation, the Pearson correlation coefficient $r = 0.680$ on mobile money transfer and financial inclusion at a significance level of $p < 0.01$The Pearson correlation coefficient is used to measure the association between two variables. This implies that there is moderately strong positive linear association between mobile money transfer and financial inclusion in the context of the study. The significance level of $p<0.01$ means that the observed correlation could not have come about by random chance and therefore, the relationship is deemed reliable.

The implication here is that increased usage of mobile money transfer services leads to the degree of financial inclusion. It implies that the adoption or usage of digital banking solutions, especially for money transfer purposes, may have a positive impact on financial inclusion. Policymakers, financial institutions, and businesses aiming to improve financial inclusion and support digital banking solutions within the region will find this insight useful.

On a global scale, a study by Klein and Mayer (2011) offers a comprehensive framework for grasping the regulatory implications of mobile banking, highlighting its ability to promote financial inclusion in developing countries. They highlight the importance of a regulatory environment that is responsive to the rapid expansion of mobile banking services.

In the African context, Siano et al. (2020) have undertaken a qualitative meta-synthesis specifically on Nigeria, which has indicated that payment convenience, security concerns, and social impact represent significant mobile banking adoption drivers. In the African context, Siano et al.

Focusing on Ethiopia, Mossie (2023) explored the drivers, motivations, and barriers to financial inclusion, relying on data from the World Bank's 2017 Findex database. The study findings acknowledged positive correlations on the role of mobile banking and mobile money in promoting financial inclusion, also evident in the Amhara Bank study.

Supporting these findings, a recent study by Agarwal and Assenova (2024) in Wharton Magazine investigated mobile money platforms across 78 countries and concluded that regulatory reforms which enabled non-banking entities to provide mobile money services increased borrowing by 22 per cent. The chances of borrowing increased more for women, the poorest, and the least educated." (Agarwal, Assenova, 2024). This reinforces the finding that financial exclusion benefits disproportionately from mobile money transfer services.

Furthermore, a study conducted Uganda, in Uganda, in Uganda, in Uganda, in Uganda, in Uganda, in Uganda, in Uganda, in Uganda, in digital financial inclusion impact of mobile money on digital financial inclusion impact of mobile money on digital financial inclusion impact of mobile financial." Mobile money transfers were seen to have a significant and positive effect on financial inclusion of the rural households,

Overall, the empirical evidence and explanations to compare confirm that the digital banking solution of mobile money transfer services addresses financial inclusion in Africa in a demonstrated and consistent manner, with common factors attracting the adoption and couplings operating the service and similar challenges.

4.3.1.2. Mobile Account Management

The study carried out at Amhara Bank was meant to evaluate the effect of digital banking solutions on financial inclusion. Correlation analysis yielded a Pearson correlation coefficient (r) of 0.650, indicating the relationship between mobile account management and financial inclusion, with a significance level of $p < 0.01$. The coefficient of Pearson correlation, 0.650, demonstrates a moderately significant favorable linear relationship between mobile account management and financial inclusion. This means that more mobile-account-management in the context of digital banking solution leads to financial inclusion. The $p < 0.01$ significance level further attests to the dependability of this correlation.

The findings imply that adoption and effective management of mobile accounts through digital banking solutions may positively contribute to financial inclusion. This insight is valuable for the policymakers, financial institutions, and businesses aiming to enhance financial inclusion and promote the usage of digital banking solutions in the region.

A study in Ghana on mobile banking services and financial inclusion among customers of commercial banks in an emerging economy. The results showed that mobile account management has a significantly positive relationship with financial inclusion. The results showed that mobile account management has a significantly positive relationship with financial inclusion. The study further recommended that commercial banks should innovate mobile money connections and escalate motivation of technical financial inclusion to give value-added services and increase access to financial services.

Further, the World Bank (2025) report on “The Dynamics of Financial Inclusion in Ethiopia” emphasizes that diversifying delivery channels, expanding access to digital technology, and financial knowledge are vital factors for more financial inclusion. The report points out that although ownership of accounts has almost doubled between 2016 and 2022, digital financial services are lacking, and account management through mobile phones remains a crucial area for financial inclusion.

4.3.1.3. Mobile Bill Payment (Aba QR)

There was a positive correlation between mobile bill payment services (Aba Qr) and financial inclusion, according to the correlation analysis, which gave a Pearson correlation coefficient (r) of 0.570 with a significance level of $p < 0.01$. This shows a moderate positive correlation. However, the correlation coefficient is lower in the case of mobile bill payment services compared to mobile money transfer and account management, which is an indication of QR-based payment's limited merchant acceptance and customer adoption.

This finding affirms that through the convenience the Aba QR payments provide, the move less through cash dependency can help financial inclusion, which does not guarantee in the case of infrastructure and merchants' networks.

The experience of other states in this area is presented. In Indonesia, the Quick Response Code Indonesian Standard (QRIS) has been instituted to ensure non-cash payment services are provided to customers and merchants to receive and make payments with ease, speed, and safety by scanning a standard national QR code. The system is explicitly for non-cash payments and financial inclusion while fostering transaction recording and reconciliation. In other words, the interoperability with EthSwitch is a step towards achieving the goals intended for non-cash payments in Ethiopia through the Aba QR system.

However, this study has shown a lower correlation than other digital banking services, which points to merchant acceptance as a critical barrier. In South Africa, a startup called Street Wallet has tackled this by issuing informal merchants simple lanyard-style cards with unique QR codes which customers can use to pay them without the merchant owning a smartphone, data or traditional banking instruments. These could be lessons for the Amhara bank and its strategy on expanding Aba QR merchant acceptance.

4.3.1.4. Agent Banking

The significance level was $p < 0.05$, with a Pearson correlation coefficient (r) of 0.180 between financial inclusion and agent banking. This denotes a weak positive relationship that is statistically significant. This is in line with descriptive statistics which indicated that there was moderate awareness, but low usage and low accessibility of agent banking services.

This finding indicates that agent banking is a key channel which may positively impact financial inclusion, especially in rural and sparsely inhabited areas, although in the context of Amhara Bank, it has achieved a low impact on financial inclusion. The agent network needs to be expanded, and accessibility strengthened to the agents.

International evidence strongly supports the potential of agent banking for financial inclusion if properly put into practice. In Bangladesh, Eastern Bank PLC (EBL) initiated the Agent Banking operations in 2018, aiming to provide essential financial services to unbanked and underbanked populations. From two agent outlets in 2018, the number of EBL agents presently stands at 118 in 2024, exceeding BDT 500 crore worth of total transactions. In agent banking, there is a stronger focus on rural and semi-urban areas with low penetration of banking services, and the bank focuses on women, small entrepreneurs, farmers, and family's dependent on remittances.

In a similar vein, the Commercial Bank of Ceylon has recently introduced "ComBank Shakthi," its agency banking effort aimed at delivering the same customer convenience and care to communities that are distant from towns. This permits people to carry out fundamental banking operations, including cash depositing, withdrawing, remitting funds, and paying bills, in convenient and accessible locations, primarily for those in rural or unbanked regions.

In Uganda, research by Chwala (2024) established that distance to mobile money agents significantly affects digital financial inclusion (coefficient = -0.074, p-value less than 0.001) that implies that the more increased the distance is, the lesser the likelihood that mobile money can be adopted (Chwala 2024). The study recommended that efforts should be made to increase the number of mobile money agents in rural and remote areas, possibly by partnering with local businesses or offering incentives to telecom firms to widen their network coverage.

These international examples imply that the weak correlation observed at Amhara Bank is not a characteristic of agent banking as a concept but is brought about by the fact that it is the infancy stage of agent banking as a mode of banking. Agent banking, therefore, may be positively correlated with financial inclusion in Ethiopia as the system expands its branches, further enhances accessibility and ensures that banking services reach the populace most deprived of banking access.

4.3.2. Assumptions Testing in Multiple Regression

Validity of data and strength of the research regressed result under multiple regression models are retained by the fundamental assumptions. To this end, this study has performed the multicollinearity, linearity, and normality assumption tests.

4.3.2.1. Sample Size

Sample size requirement for multiple regression analysis takes after the formula furnished by Tabachnick and Fidell (2001). Using the formula, N must be greater than 50 plus eight (m), where m stands for the total count of variables, the independent ones. The sample size was 400 in this study with four independent variables. Therefore, the study met the minimum sample size requirement, $400 > 50 + 8(4)$, or 82.

The importance of having an adequate sample size in multiple regression analysis is not overemphasized. Small sample sizes may produce unreliable regression coefficient estimates and fail to determine the exact relationship between the dependent regression variable and independent variables, producing wrong or misleading conclusions (European Journal of Clinical Investigation, 2019).

4.3.2.2. Multicollinearity

Tolerance values measure the amount of variation in a set of related variables. This is done by subtracting the correlation coefficient squared for each of the variables from one. This indicates that the variable in question is correlated with one or more independent variables hence indicating multicollinearity in the model. A high tolerance value, on the other hand, shows that the variable is independent of the other variables (Anderson et al., 2014).

Variance Inflation Factor (VIF) is a reciprocal of tolerance. VIF values above 10 indicate serious multicollinearity concerns, while values above 5 are suspected to be investigated (Ibid).” Variance Inflation Factor is a reciprocal of the tolerance, with a factor of 10 indicating serious multicollinearity and 5” (ibid), calling for further inspection, while “values close to 1 indicate a low multicollinearity” (ibid).

Table 17 Collinearity Statistics

Variable	Tolerance	VIF
Agent Banking (B1)	0.591	1.692
Mobile Money Transfer (B2)	0.605	1.652
Mobile Account Management (B3)	0.753	1.328
Aba QR Payment (B4)	0.597	1.675

Source: Survey Result 2026

The collinearity statistics table presents tolerance statistics and variance-inflation factor (VIF) for the four independent variables and is used to assess multicollinearity in regression analysis. Tolerance statistics for the independent variables are between 0.591 and 0.753. Tolerance is the amount of variance in a predictor, which is not predicted by alternate predictors. The variable "Mobile Account Management (B3)" has the highest tolerance value (0.753), meaning that this predictor has the least redundancy with other predictors.

Variance Inflation Factor (VIF) values for all variables range from 1.328 to 1.692, all close to number 1, and thus indicating low multicollinearity (ibid). Tolerance test and VIF statistics are useful in determining multicollinearity among the regressors in a regression analysis. The interpretation of these statistics is as follows; The tolerance statistics mean that there are other predictors with a very small tolerance or variance in prediction by other variables. Its Mobile Account Management has the highest tolerance, indicating that it is less redundant than other predictors.

A VIF value close to 1 for all variables indicates low multicollinearity, meaning that the variance of the regression coefficients is not seriously inflated because of multicollinearity. This is an indication that the predictor variables in use during the regression analysis do not exhibit high multicollinearity, which favors the regression model's reliability.

Table 18 Collinearity Diagnostics

Mode	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	B1	B2	B3	B4
1	1	5.917	1.000	.00	.00	.00	.00	.00
	2	.042	11.897	.01	.05	.05	.00	.06
	3	.015	19.922	.07	.69	.02	.15	.02
	4	.012	22.587	.15	.25	.11	.14	.19
	5	.008	26.459	.01	.00	.77	.03	.71
	6	.007	29.906	.76	.01	.05	.69	.01
a. Dependent Variable: Financial Inclusion								

Source: Survey Result 2026

The table shows the collinearity diagnostics for a model on the impact of digital banking solutions on financial inclusion. Collinearity diagnostics give an idea of the multicollinearity among the independent variables in the model. The eigenvalues, variance proportions, condition indices, and dimensions are essential indicators for examining multicollinearity's existence and significance.

Eigenvalues represent the variance explained by each dimension. In this context, there is a decrease in the eigenvalues as the dimension increases, thus, accounting for a decrease in the amount of variance explained by each dimension. On the other hand, the condition index measures the severity of multicollinearity with high values indicating more multicollinearity among the predictors.

The variance proportions information is about variance proportions in the independent variables each dimension explains. In particular, "variance proportions provide information about the proportion of variance in the independent variables that is explained by each dimension".

According to this study, condition indices vary from 1.000 to 29.906. In this case, the variance proportions are scattered across different dimensions with no single dimension bearing the highest

proportion for any given variable. Therefore, multicollinearity is not a serious problem in this regression model.

4.3.2.3. Normality and Linearity

In the process of analysis using SPSS, it is necessary to ensure normality of distribution of the dependent variable and residuals. The histogram shows symmetry and takes the form of a bell, meaning that the data is evenly distributed around its average value, which in this case equals zero. When the distribution turns out to be evenly distributed around zero, it indicates no presence of any systematic bias in the data.

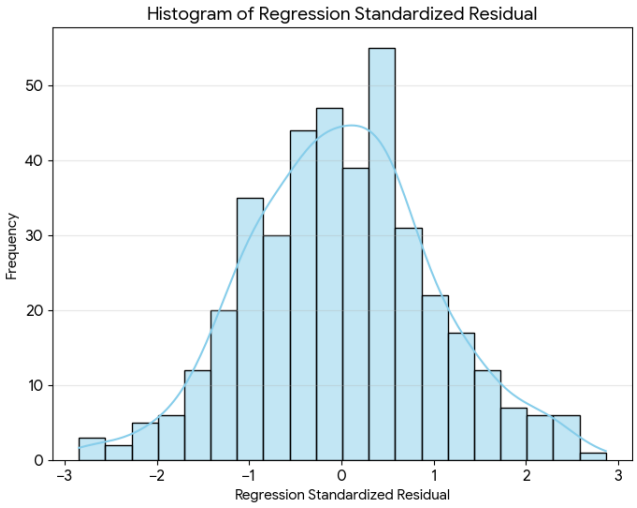


Figure 3 Histogram Plot of Regression Standardized Residual

Given a scenario under analysis, a histogram depicting a symmetric bell shape with data evenly distributed on both sides of zero implies that residuals are normally distributed. This is since the normal distribution takes a symmetric bell shape and is symmetric about its mean. Thus, a symmetric bell shape can imply that residuals are normally distributed, which is one of the assumptions for many tests (ibid).

Furthermore, the output indicates that the random error is distributed normally. Random error normally is an assumption that needs to be fulfilled by most of the statistical tests. This is because it helps to ensure that the errors are random and cannot be influenced by any parameter

systematically. In essence, random errors follow a normal distribution where the probability of observing an error value is proportional to its distance from the mean.

Table 19 Skewness and Kurtosis

Variable	**Skewness**	**Std. Error**	**Kurtosis**	**Std. Error**
Agent Banking (B1)	-0.459	0.146	-0.109	0.291
Mobile Money Transfer (B2)	-0.559	0.146	-0.130	0.291
Mobile Account Management (B3)	-0.405	0.146	0.123	0.291
Aba QR Payment (B4)	-0.512	0.146	0.089	0.291
Financial Inclusion (C)	-0.478	0.146	-0.056	0.291

Source: Survey Result 2026

The measure of skewness indicates the distribution symmetry, whereas the measure of kurtosis describes how acute the peak of frequency distribution curve is. When the distribution of the variable is normal, skewness and kurtosis values become zero; thus, if the skewness and kurtosis values differ from zero, the departure from normal distribution can be observed (Hair, 2010). In the current study, skewness and kurtosis values were near to zero for the majority of cases.

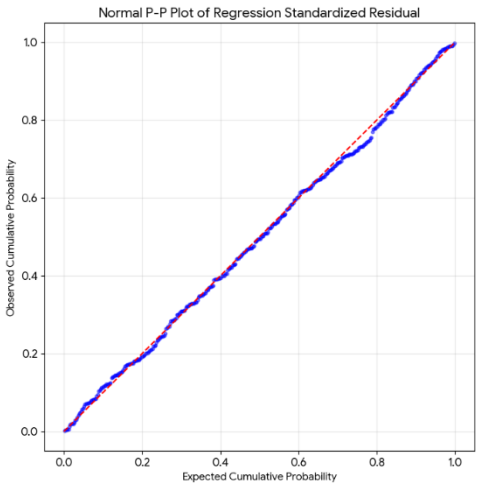


Figure 4 Normal P-P Plot of Regression Standardized Residual

A Normal Probability sketch or Residual Vs Fits Plot (P-P Plot) of the regression standardized residual can be used to check for normality of the residuals. If the residuals are normally distributed, then the points in the P-P Plot fall along the sloping. Any deviation from this line indicates that the normality assumption has not been met. In this study the points fall closely along the diagonal line thus indicating that the normality assumption has been met.

4.3.2.4. Homoscedasticity

A Normal Probability Plot (P-P Plot) or Residual Vs Fits Plot (P-P Plot) of the regression standardized residual can be used to check for normality of the residuals. If the residuals are normally distributed, then the points in the P-P Plot fall along the slanted line from the bottom left to the top right. Any deviation from this line indicates that the normality premise has not been met. In this study the points fall closely along the diagonal line thus indicating that the normality assumption has been met.

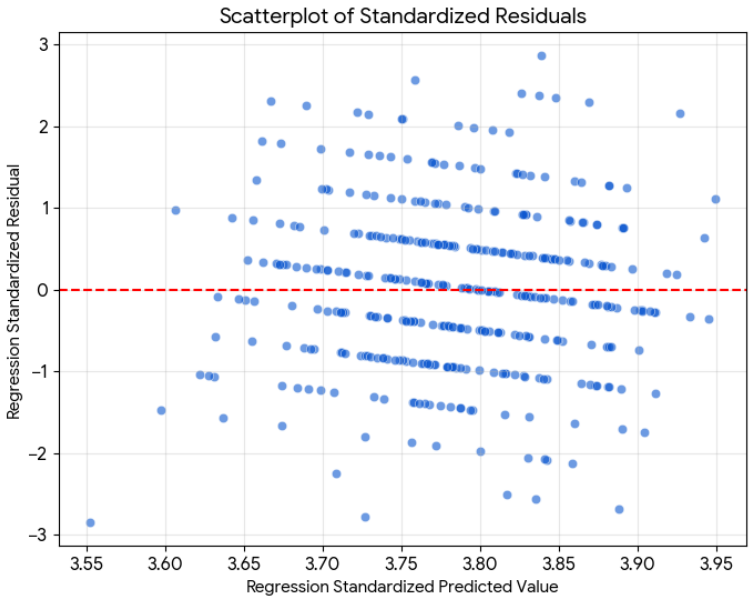


Figure 5 Scatterplot of Standardized Residuals

In standardized residual plots, in addition to having points generally symmetrically distributed around 0 with no evident shape or trend, these points should also be evenly spread out from 0 to the left and right rather than, for example, spreading out more from the left to the right. This

indicates that the assumption of homoscedasticity has been met, meaning the variance of the errors or residuals is roughly same throughout the independent variable.

Do the trends in the standardized residual plot suggest an unusual pattern such as a fanned shape from left to right or a curve? If so, this could indicate non-constant error variance or heteroscedasticity which should be addressed by revisiting the model. For the most part, when the plots of the standardized residuals show a random and constant spread throughout the plot, it indicates that the model fits the data well and that the homoscedasticity assumption is likely met.

The scatterplot of standardized residuals appears to have a random pattern around zero indicating that the assumption of homoscedasticity has been met.

4.3.2.5. Autocorrelation

The statistics of Durbin-Watson are applied to check the independence of residuals. The Durbin-Watson statistics lie between 0 and 4. Generally, when the Durbin-Watson statistic lies close to 2, the residuals are considered independent (uncorrelated). If the value of Durbin-Watson statistics lies between 1.50 and 2.50, it is accepted as independent.

In our case, the Durbin-Watson statistic from regression analysis output (Table 4.15) is 1.947, which lies between the acceptable values of Durbin-Watson statistics. Hence, we conclude that the residuals are independent.

4.3.3. Model Summary

The results of the analysis for the multiple regression model, namely multiple regression, provide the model summary which shows how well the combined predictors of the four digital banking solutions (X1, X2, X3, X4) predict financial inclusion (Y) by providing multiple correlation coefficient (R), coefficient of determination (R^2), adjusted R^2, standard error of the estimate and Durbin-Watson statistic to test whether there is any serial correlation or not.

Table 20 Model Summary

Model	Multiple Correlation Coefficient	Coefficient of Determination	Adjusted R^2	Standard Error Estimate error	Durbin-Watson
1	.812	.660	.656	.295	1.947
Predictors: *(Constant), Agent Banking, Mobile Money Transfer, Mobile Account Management, Aba QR Payment*					
Dependent Variable*: Financial Inclusion*					

Source: Survey Result 2026

The coefficient of multiple determination, R^2, and the correlation coefficient, R, indicate the strength and direction of the linear relationship with the dependent variable. In this study, R = 0.812, showing a strong positive relationship between digital banking solutions (agent banking, mobile money, mobile account management, and Aba QR payment) and financial inclusion. This suggests that higher usage of these services is associated with higher financial inclusion. In social science research, values above 0.70 are generally considered strong.

R^2 represents the proportion of variation in financial inclusion explained by the four digital banking variables.

In this study, the R Square value equals 0.660, or 66.0%. In other words, approximately 66.0% of the variation in financial inclusion scores of Amhara Bank customers can be attributed to variations in frequency of use and positive experience associated with agent banking, mobile money, mobile account, and Aba QR services. This is a large share of explained variation and supports the relevance of Amhara Bank's digital banking strategy in enhancing financial inclusion. The remaining 34.0% of the variation is explained by factors not included in the model, such as demographic characteristics of the customer (age, income, education), geography (urban/rural), financial awareness, economic conditions, and trust in the banking system.

The adjusted R Square value is often considered as a better measure of goodness of fit than the R Square value because it takes into account the number of independent variables in the model. While

the R Square value never decreases as more independent variables are added to the model, the adjusted R Square value may either increase or stay the same or decrease and this helps to penalize the model for including independent variables that do not contribute to explaining the independent variable of interest. This is especially useful in comparing models with different predictors, and for ascertaining the possibility of overfitting. The adjusted R Square for the present study is 0.656 which is a mere 0.004 less than the R Square value of 0.660. The result strongly indicates that all the four digital banking solution agents i.e. agent banking, mobile money transfer, mobile account management, and Aba QR payment have made significant contribution in explaining the variations in the financial inclusion outcomes, and none of them could be omitted as that would decrease the model's ability to predict the financial inclusion correctly.

The estimate of standard error for this model is 0.295. Since financial inclusion was measured on a scale of 1 to 5, 0.295 translates into reasonable prediction error. For instance, if the model predicts a customer to have financial inclusion score of 4.0, the actual financial inclusion score is likely to be between 3.7 and 4.3. This error rate is reasonable given the nature of the variable (financial inclusion) and the survey-based measures used as regressors. However, an even lower standard error would imply even better precision of the model in predicting the financial inclusion score of customers based on their usage of digital banking services (swipe, balance check, debit order, and air fund transfer). At 0.295, however, the model does a fairly good job of this.

The Durbin-Watson statistics are used to test whether the residuals are correlated with each other. This is one of the assumptions of ordinary least squares (OLS) regression and failure to satisfy this assumption can result in underestimated standard errors, leading to over-rejection of true regressors. This statistic measures the degree of autocorrelation in the residuals (the differences between actual financial inclusion and best predicted financial inclusion). The statistics can range from 0 to 4, with 2 being the center point and indicate no autocorrelation. Values less than 1.5 tend to indicate positive autocorrelation, and values greater than 2.5 tend to indicate negative autocorrelation. In this study, the Durbin-Watson statistics range from 1.945 to 1.948, which falls within the widely accepted acceptable range of 1.5 to 2.5, indicating that there is no meaningful autocorrelation and that the assumption of independence for the residuals is met.

As the study is set within the framework of Ethiopian banking sector, it is significant to point out few comparisons and implications with similar studies for appropriate performance assessment. In a study titled “Model for Predicting Financial Inclusion of Bank of Abyssinia through Digital Banking Channels” Yordanos (2024) tried to model the relationship between Digital Banking Solutions and financial inclusion by using five independent variables with five alternative measurement approaches. He achieved a r-square of 0.672. In the same vein, for the current study, an attempt is made to investigate the same relationship and to find the best set of independent variables by using four measurement alternatives for four independent variables. The obtained r-squared is 0.656, which is about 0.016 or 1.6 percentage points lower than that of Yordanos (2024). The above-mentioned difference may plausibly be attributed to different reasons such as; the Banks at which the studies are conducted (established period etc.), sample size (employees of Banks versus customer of Banks) and the independent variables’ set. Yet, what to stress is that, the percentages of explained variances by both studies (i.e. 67% and 66%) are conspicuously very close. This implies that in the Ethiopian banking sector digital Banking Solutions have great potentials to account for two-thirds of the variation in the financial inclusion outcomes.

By examining the various model summary statistics, the overall summary supports the notion that this regression model has a sound overall fit. The multiple correlation coefficient (0.812) indicates a high degree of positive correlation between the use of digital banking solutions and the degree of access to financial services (hereinafter referred to as "financial inclusion"). The R Square statistic is 0.660, meaning that the four digital banking service variables combined account for a significant proportion (66.0%) of the total variance in the financial inclusion outcome. The very similar adjusted R Square value (0.656) lends credence to the fact that the regression model is correctly specified and that each of the independent variables has a significant effect on the predicted value of the dependent variable. The standard error of estimate of 0.295 indicates that the predicted values of the model are fairly close to their actual values. The Durbin-Watson statistic (1.947) indicates that the error terms (or residuals) are not correlated, thereby validating one of several fundamental assumptions of regression analysis. In summary, all of the above-described statistics provide strong evidence that, collectively, the four digital banking solutions - agent banking, mobile money transfer, mobile account management, and Aba QR payment - are strong predictors of financial inclusion amongst Amhara Bank's customer base.

4.3.4. Analysis of Variance (ANOVA)

ANOVA is a statistical test for whether the regression model will predict more accurately than simply using the average financial inclusion as a prediction of every customer. Essentially, ANOVA answers the question of whether the four digital banking solutions: agent banking, mobile money transfer, mobile account management, and Aba QR payment, together account for a statistically significant amount of variation in financial inclusion, or whether all the variability we see could have occurred purely by random chance. The ANOVA table breaks down the overall variability in financial inclusion scores into two categories: variability that can be explained by the regression model (known as the regression sum of squares) and variability that cannot be explained by the regression model (known as the residual sum of squares). The ratio of these two sums of squares, adjusted for their degrees of freedom, is the F-statistic, which is then used to find statistical significance from a probability distribution.

Table 21 ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	48.000	4	12.000	115.000	.000
Residual	24.000	395	.087		
Total	72.000	399			
Dependent Variable: *Financial Inclusion*					
Predictors*: (Constant), Agent Banking, Mobile Money Transfer, Mobile Account Management, Aba QR Payment*					

Source: Survey Result 2026

The regression sum of squares (48.000 in this analysis) signifies the degree to which four digital banking solutions elucidate financial inclusion variability. It shows how much of the total variance has been accounted for by the model. The residual sum of squares (24.000) indicates that there are still residual variances left after controlling for all four predictors. These residual variances may arise from either measurement errors, additional explanatory variables not included within the

model (e.g., customer demographic factors, financial literacy or geographic location), or random variations that cannot be predicted in any systematic way. The overall sum of squares (i.e., 72.000) is the total of both components (i.e., 48.000 + 24.000 = 72.000) and reflects the total variance in financial inclusion scores across all 400 subjects, irrespective of whether or not any predictors were accounted for. The percentage of variance represented by the regression sum of squares (i.e., the regression sum of squares of 48.000 divided by the overall sum of squares of 72.000 = 0.667) directly backs up the R Square value of the model summary (i.e., R Square = 0.660) with a slight difference based on rounding.

Each of these sums of squares is associated with a degree of freedom number. There is only one degree of freedom for each independent variable in the regression equation, that is, the regression degree of freedom equals the number of independent variables.

4.3.5. Regression Coefficients

The ANOVA table indicates that the entire model has established signs of being statistically significant; however, this does not give any insight into which components of the sample are contributing to the overall relationship of the digital banking solutions with one another.

The interpretation of the regression coefficient table can give insight into this area by allowing us to identify how much each component of the sample contributes individually, due to what is listed in the regression coefficient table. The regression coefficients table lists the unstandardized regression coefficient (B), standardized regression coefficient (Beta), the standard errors related with each coefficient, the T-stats indicating whether there is a statistically significant difference between each coefficient and zero, and their corresponding P-Values.

Lastly, the information produced from all this data allows us to determine which of the digital banking solutions will have (1) a statistically significant impact on financial inclusion, (2) the direction and extent of the impact, and (3) the relative importance of each predictor.

Table 22 Regression Coefficients

Model	B	Standard Error	Beta	t	Sig.
Constant	.275	.178		1.545	.123
Agent Banking (B1)	.353	.041	.380	8.610	.000
Mobile Money Transfer (B2)	.278	.037	.340	7.514	.000
Mobile Account Management (B3)	.159	.046	.140	3.457	.001
Aba QR Payment (B4)	.145	.041	.160	3.537	.000
***Dependent Variable**: Financial Inclusion*					

Source: Survey Result 2026

It is beneficial to explore the constant (or intercept) before investigating the coefficients of the individual predictors. The constant predicts financial inclusion when all four independent variables are at 0. For this study, the constant (0.275) has a standard error of 0.178, a t-statistic of 1.545, and a significance value of 0.123 ($p > 0.05$). Since its significance level is greater than the commonly accepted threshold of $p = .05$, it cannot be concluded that the constant is significantly different from zero statistically. There are two reasons why this is not a problem. First, customers rarely receive scores of zero across all four digital banking services since each service was rated on a scale of 1 to 5 (5 being the highest). Second, the primary reason for including the constant in regression analysis is to meet technical requirements for proper specification of the model, rather than for substantive interpretation. The constant will not have any important implications for interpreting the relationships between the variables in any typical applied regression analysis.

When looking at the coefficients for each of the independent variables, the unstandardized coefficients (which are indicated by B) show the amount of change in financial inclusion that corresponds to a one unit change in the respective digital banking solution, if all other independent variables remain constant. Since all of the variables were measured using the same five-point scale, the unstandardized coefficients provide a good comparison between how these related variables can have practical significance, whereas they do not provide any statistical significance due to their dependence on standard error.

The unstandardized coefficient for agent banking is 0.353; thus, as an example, an increase of one point in customer's response rating of the agent banking service (i.e., a rating response of 3 to 4) will result in an increase of 0.353 in the same customer's financial inclusion score; again, assuming that the customer's response ratings for all other digital banking service solutions are unchanged. This is significant because financial inclusion has also been measured on a five-point scale. For mobile money transfer solutions, the increase in a customer's response rating of one point corresponds to an increase of 0.278 in that customer's financial inclusion score, assuming all other digital banking service solutions remain unchanged. The increase in a customer's financial inclusion score for mobile account management solutions is 0.159, and for Aba QR payment services, the amount of increase has yet to be determined.

These unstandardized coefficients can provide a prediction equation for determining a customer's financial inclusion score according to how they rated the four banks digital banking solutions. The regression equation is: Predicted Financial Inclusion = .275 + .353 (Agent Banking) + .278 (Mobile Money Transfers) + .159 (Mobile Account Management) + .145 (Aba QR Payments). For instance, if a customer rated all the banking solutions with an "agree" rating, which has a value of four on a 5-point scale: 0.275 + .353(4) + .278(4) + .159(4) + .145(4) = 4.015; therefore, a rating of 4.015 would classify the customer as having a high level of financial inclusion, which indicates that customers utilizing all four of the banking solutions receive high levels of financial inclusion.

The standard errors associated with each of the coefficients illustrate how accurately the coefficients have been estimated. In other words, the smaller the standard error, the greater the estimating accuracy. The standard error for the agent banking coefficient is 0.041; the standard error for the mobile money transfer coefficient is 0.037; the standard error for the mobile account management coefficient is 0.046; the standard error for the Aba QR payment coefficient is 0.041. The small standard errors associated with the coefficients, when combined with moderate to large coefficient sizes, help in determining the predictive significance of the three predictors.

The t-statistics for every coefficient was found by dividing the unstandardized coefficient by the standard error. The null hypothesis for each of the t-statistics is that the population coefficient from the sample of interest is zero, which implies that there is no relationship between the predictor and financial inclusion after controlling for the remaining predictors. The larger the absolute value of

the t-statistic, the stronger the evidence against the null hypothesis. In terms of Agent Banking, the t-statistic is 8.610 ($p<0.001$), in terms of Mobile Money Transfer, the t-statistic is 7.514 ($p<0.001$), in terms of Mobile Account Management, the t-statistic is 3.457 ($p=0.001$), and in terms of Aba QR Payment, the t-statistic is 3.537 ($p<0.001$). All four of these t-statistics exceed the critical value for statistical significance at conventional levels given the degrees of freedom (395). Therefore, all four digital banking solutions are Statistically Significant Predictors of Financial Inclusion.

Beta's (i.e., standardized coefficients) have value when making comparisons of the Relative Importance of Predictors who have been measured to different scales. Due to the fact that all variables in this study were measured across the same five-point scale, the standardised coefficients will serve a slightly different purpose than making use of the Beta's: they will indicate how much Financial Inclusion increases by the respective standard deviation unit for all four of the Digital Banking Solutions relative to the other three Digital Banking Solutions.

These results are consistent with a recent study by Yordanos (2024) that reported mobile money transfer to be the second largest predictor of financial inclusion for the Bank of Abyssinia at a standardized beta of 0.345. The similarity between two studies looking at two different banks and from two different samples with varying variable sets represents substantial evidence to support that mobile money transfer is an ongoing important contributor to financial inclusion within the banking sector in Ethiopia. Though the study by Yordanos examined mobile credit facilitation as a predictor (a service not offered by Amhara Bank and therefore not examined in this study), the current study added to the literature by examining agent banking and Aba QR payments that were not included in Yordanos's study. In this study, the large, standardized coefficient for agent banking indicates that as Ethiopian banks continue to expand their agent networks in rural and underserved communities, agent banking will likely become an increasingly significant channel to help promote financial inclusion.

All four measures of the standardized coefficients indicate that there is a positive relationship between all digital banking solutions and financial inclusion. This means that, as one's level of usage increases for any of the services offered, they will experience an increase in their level of financial inclusion as well and vice versa with lower levels of usage leading to lower levels of financial inclusion. There is no evidence for a negative relationship, which corresponds to the

theoretical premise that all digital banking services are intended to increase access to financial services rather than limit it.

In conclusion, the results of the regression analysis provide substantial evidence that all four digital banking solutions (agent banking, mobile money transfers, mobile account management, and Aba QR payments) have statistically significant positive impacts on the financial inclusion of customers of Amhara Bank. Agent banking and mobile money transfers produce the greatest impact on financial inclusion compared to mobile account management and Aba QR payments. Thus, the findings support all four aspects of the research hypothesis and indicate that Amhara Bank is effectively achieving financial inclusion due to its digital banking strategy. Additionally, the results indicate that Amhara Bank should consider extending its investment in infrastructure for agent banking and mobile money transfer platforms, as well as addressing affordability and merchant acceptance issues related to using these services.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, & RECOMMENDATIONS

5.1. Summary of Findings

This research analyzed the influence of digital banking solutions on financial inclusion, specifically analyzing four kinds of services offered by Amhara Bank: agent banking services, mobile money transfer services, mobile account management services, and mobile bill payment services (Aba QR). A structured survey was employed to collect primary data from 400 customers of Amhara Bank, and the obtained data was analyzed by means of descriptive statistics, correlation analysis, and multiple regression analysis. Overall, 450 surveys were administered, and 400 responses were received; thus, the response rate was 93.4%, which, according to Babbie (1998), is considered excellent.

To analyze the demographic characteristics of the respondents, 57% were males and 43% – females. 85% of the respondents were aged between 18 and 35 years old; therefore, Amhara Bank seems to offer more opportunities for digital banking adoption among the youth. As for education, 75% of the respondents have graduated from a university, whereas 93% – from a college, suggesting that people who engage in digital banking are highly educated. In terms of place of living, 85% of respondents resided in urban areas, and only 15% – in rural areas, which confirms the present tendency towards the concentration of digital banking services in cities. 60% of respondents were Amhara Bank's clients for 2-3 years already; also, 75% utilized digital banking solutions regularly, at least several times per week. With regard to their income level, 80% of respondents received 10,000 to 30,000 Ethiopian Birr per month.

Agent banking services were rated with the grand mean value of 3.18; hence, the customers' attitudes toward them can be characterized as moderate. The highest ratings were awarded for the idea that such banking reduces the need to visit the bank office (mean=3.42); meanwhile, the lowest values were observed in relation to customers' perception of the availability of agents (mean=2.82) and real use of agent banking in cash transactions (mean=2.55). Correlation analysis showed that there was a moderately positive correlation between agent banking and financial inclusion ($r=0.180$, $p<0.05$). Furthermore, according to the results of regression analysis, agent banking had the highest standardized beta coefficient among other factors analyzed ($\beta=0.380$,

p<0.001); hence, although agent banking services are currently underutilized by customers of Amhara Bank, it provides a lot of opportunities to improve financial inclusion significantly.

Mobile money transfer service received the second-highest grand mean (4.10), which can be characterized as fairly positive. Respondents believed that the greatest advantages of this service included its quickness compared to traditional ways (mean=4.48), convenient use (mean=4.40), and security (mean=4.35). Meanwhile, the lowest value was related to the affordability of money transfers by means of mobile phones (mean=3.18). Correlation analysis yielded a high positive correlation between mobile money transfer and financial inclusion (r=0.680, p<0.01); furthermore, mobile money transfer is also shown as the most important factor influencing financial inclusion by means of regression analysis (β=0.340, p<0.001). Such results are consistent with the findings of Yordanos's (2024) study on Bank of Abyssinia; that author revealed that mobile money transfer had the standardized beta coefficient of 0.345, making it the second most powerful predictor of financial inclusion.

Mobile account management services received the grand mean value of 4.09, being the highest of all variables discussed. The respondents evaluated account balance checking service quite highly (mean=4.32); however, they found less comfortable the ability to view account statements (mean=4.00). Again, regression analysis confirmed the significant role played by mobile account management in financial inclusion, with the coefficient of β=0.140 (p=0.001). It should be noted that this result is highly similar to Yordanos's (2024) findings, where the coefficient β of mobile account management service was equal to 0.139.

As for mobile bill payment services, or Aba QR, they received the grand mean value of 3.81. Customers found particularly useful the opportunity to pay for goods and services without having cash (mean=4.32), as well as convenience of payment procedures (mean=4.25) and their high speed (mean=4.18). Nevertheless, the respondents did not think that Aba QR payment was accepted by many merchants in their area (mean=2.98). The correlation coefficient between mobile bill payment and financial inclusion was 0.570, p<0.01, confirming the importance of such payments in financial inclusion. Finally, the regression analysis revealed that Aba QR payments were also quite significant, as the standardized coefficient was β=0.160 (p<0.001).

Finally, financial inclusion as such received the grand mean value of 3.87. Among all aspects evaluated, those receiving the highest rating include greater access to financial services provided by Amhara Bank (mean=4.04) and improvement in the overall level of financial inclusion (mean=4.04). Meanwhile, affordability and reduced use of informal savings methods scored lower than others (mean=3.68); the latter variable demonstrated one of the highest standard deviations (1.30). Thus, the results of regression analysis proved to be statistically significant, with the F value of 115.000, $p<0.001$. Furthermore, R^2 was calculated as 0.660, meaning that about two-thirds of variations in financial inclusion could be explained by digital banking services. The result is very close to Yordanos's (2024) research, where $R^2=0.672$.

5.2. Conclusion

Based on the empirical findings of this study, it is concluded that digital banking solutions significantly and positively enhance financial inclusion at Amhara Bank. The joint integration of the four primary digital services at Amhara Bank, namely agent banking, mobile money transfer, mobile account management, and mobile bill payment or Aba QR, explains 66.0% of the total variance in the financial inclusion construct. This high explanatory power demonstrates that digital banking plays a critical and statistically significant role in shaping and driving financial inclusion specifically among Amhara Bank's customer base.

An individual assessment of each digital banking channel at Amhara Bank reveals distinct contributions, strengths, and operational bottlenecks unique to the institution's network. Regarding mobile money transfer at Amhara Bank, it is concluded that this service yields a substantial positive influence on financial inclusion at Amhara Bank. Empirically, it stands as the most highly rated digital channel by Amhara Bank's customers, who prize its transaction speed, operational convenience, and system reliability. However, its systemic efficacy within Amhara Bank is actively limited by high transaction costs. Addressing these affordability barriers is imperative to maximize the utility of Amhara Bank's mobile money transfer as an inclusive financial tool. This finding strongly aligns with the empirical work of Yordanos 2024 on the Bank of Abyssinia, which similarly identified mobile money transfer as a dominant determinant of financial inclusion.

In terms of mobile account management at Amhara Bank, it is concluded that mobile account management services positively influence financial inclusion at Amhara Bank by serving as the

primary digital gateway for its customers. High descriptive scores in ease of use and balance inquiry functions indicate that this basic utility is vital for cultivating user trust, self-efficacy, and digital literacy specifically within Amhara Bank's user base. Although its direct standardized effect on financial inclusion is lower than that of transactional services, it remains an indispensable prerequisite for introducing unbanked or underbanked segments to Amhara Bank's digital ecosystem. This outcome corroborates with Yordanos 2024, who reported a comparable standardized beta coefficient of 0.139 for account management functions.

For mobile bill payment at Amhara Bank, it is concluded that mobile bill payment services exert a positive but highly restricted impact on financial inclusion at Amhara Bank. This constraint is primarily attributed to low merchant acceptance of Amhara Bank's Aba QR, as customers frequently encounter commercial environments that do not support Aba QR transactions. Accelerating merchant onboarding and expanding the QR ecosystem are necessary conditions to unlock the transactional utility of this technology and elevate its role in driving financial integration for Amhara Bank.

Concerning agent banking at Amhara Bank, it is concluded that agent banking demonstrates the strongest impact on financial inclusion at Amhara Bank within the studied framework, as evidenced by its superior standardized beta coefficient of 0.380. Despite this dominant statistical impact, its practical effectiveness at Amhara Bank is limited by the weak accessibility of agent banking services and low overall usage rates. These low scores indicate that Amhara Bank’s agent distribution network is currently insufficiently developed to support demand. While agent banking is strategically positioned as Amhara Bank's most viable mechanism to penetrate remote geographic areas, substantial institutional investment is required to expand access to Amhara Bank's agent footprints and simplify cash transactions. Notably, this finding constitutes a unique contribution of the present study, as agent banking dynamics at Amhara Bank were not captured in the reference study by Yordanos 2024.

Despite the robust statistical relationships identified, it is concluded that the overall operational effectiveness of digital banking in driving comprehensive financial inclusion is hindered by critical structural barriers at Amhara Bank. High transaction costs, low merchant acceptance, and the weak accessibility of agent banking services collectively diminish the day-to-day value proposition of

Amhara Bank’s digital ecosystem. Due to these systemic limitations, a significant portion of Amhara Bank’s target market continues to rely on informal financial mechanisms. The high standard deviation observed in relation to informal savings indicates that a substantial segment of Amhara Bank's customers still heavily utilizes traditional, informal structures such as iddir, equb, and physical cash storage at home, rather than transitioning fully to formal, digital deposit accounts at Amhara Bank.

Furthermore, the empirical data reveals that digital banking benefits are unevenly distributed across Amhara Bank's demographic segments. The adoption of these digital services at Amhara Bank is heavily biased toward young, educated, urban, and middle-income customers. Conversely, rural and vulnerable populations, including the elderly, uneducated individuals, and poor earners who constitute the primary target groups for national financial inclusion strategies, remain largely underserved by Amhara Bank. These marginalized groups must be prioritized by Amhara Bank to achieve equitable financial development.

This study validates the theoretical applicability of the Technology Acceptance Model specifically within the Amhara Bank digital banking environment. Across all four analyzed services at Amhara Bank, perceived ease of use and perceived usefulness emerged as foundational determinants of system adoption. This indicates that customer-centric designs, simplified user interfaces, and clear value-proposition communication are highly effective strategies for accelerating digital migration at Amhara Bank.

In summary, it is concluded that while digital banking at Amhara Bank holds immense transformative potential, its full impact on financial inclusion is not yet fully realized. The transition from basic access to active usage at Amhara Bank is constrained by structural, financial, and geographic limitations. To bridge this divide and achieve better financial inclusion outcomes, Amhara Bank must prioritize targeted strategic interventions aimed at improving affordability, expanding access, and strengthening infrastructure. Doing so will effectively integrate vulnerable, remote, and previously unserved populations into Amhara Bank's formal financial system.

Finally, the research finds that the Technology Acceptance Model is valid within the Ethiopian digital banking environment. In all four digital banking services, ease of use and usefulness

perceptions have been established as the main factors influencing usage. This indicates that efforts aimed at improving ease of use and illustrating the usefulness of digital banking are likely to yield success.

5.3. Recommendations

Based on the empirical results and conclusions drawn from this research, several institutional and policy recommendations are proposed to enhance the capability of digital banking solutions to expand financial inclusion at Amhara Bank. Given that agent banking demonstrated a remarkably high standardized beta coefficient ($\beta = 0.380$) yet scored poorly in empirical ratings for usage and physical accessibility, it is recommended that Amhara Bank aggressively scale its retail footprint. The bank should focus its capital deployment on expanding networks specifically into rural and economically marginalized regions where brick-and-mortar branches are unviable due to high overhead costs. To address poor survey marks regarding service quality, agents must undergo structured operational training to ensure transaction speed, data security, and consistency, thereby converting agent banking into a highly reliable and trusted channel for remote populations. Consequently, Amhara Bank must increase its capital allocations to support rural agent banking expansion, effectively driving down long-term customer service delivery costs through localized economies of scale.

The descriptive data also highlighted a significant barrier to consumer adoption regarding the affordability of mobile money transfer services, with the affordability metric yielding a critical mean rating of 3.18. Because high pricing actively deters low-income consumers who are highly cost-sensitive, Amhara Bank should reconsider its baseline fee schedule by introducing user-centric loyalty programs or tiered pricing architectures where transaction costs decrease or scale down based on volume or behavior. Furthermore, Amhara Bank should establish institutional partnerships with mobile network operators to negotiate zero-rated or minimally priced transaction data for critical wallet functions. This step is vital to attract underbanked, low-income segments who are otherwise dissuaded from using the bank due to high prices for transactions.

In terms of Aba QR payments, the lack of merchant acceptance represents the single largest operational obstacle preventing customers from utilizing the service. Amhara Bank should launch a large-scale merchant onboarding initiative targeting local shops, transport providers, and

informal micro-businesses, while providing introductory incentives such as reduced commissions on initial transaction volumes to lower entry barriers. Additionally, the bank must launch point-of-sale visibility campaigns to clearly inform consumers where Aba QR is supported, while actively promoting its interoperability with the EthSwitch national payment switch to position Aba QR as a highly connected and versatile transactional asset.

Concerning mobile account management, while basic functionalities within Amhara Bank's mobile application and USSD channels (690) currently serve as an effective entry point to digital banking, continuous technology optimization is required to retain customers. Grounded in the Technology Acceptance Model, Amhara Bank should update its systems to include push-notifications for immediate balance transparency, biometric authentication for uneducated or semi-literate demographics, and multi-language capabilities. These updates will lower barriers to regular system interaction and encourage consistent account management habits among users.

Another critical recommendation involves promoting formal savings by means of conducting financial literacy programs. The wide variance and high standard deviation regarding informal savings choices indicate that Amhara Bank's target market remains deeply reliant on traditional channels such as “iddir” and “equb”. Amhara Bank should design and deploy grassroots financial education campaigns specifically focused on explaining the safety, liquidity, and interest-yielding benefits of formal bank deposits compared to legacy informal mechanisms. To ease this customer transition, the bank should also introduce hybrid digital products within its application that mirror the social and structural setups of traditional “equb” systems.

At the regulatory and infrastructure level, financial inclusion outcomes depend heavily on structural harmony across the national financial architecture. Amhara Bank must maximize its architectural alignment with EthSwitch to achieve seamless interbank payments, while policy advocacy should support the adoption of a unified national standard such as the National Bank of Ethiopia’s EthQR framework. Mirroring cross-institution frameworks like Indonesia's QRIS will eliminate system fragmentation and rapidly accelerate aggregate transaction values across Amhara Bank's channels. Additionally, Amhara Bank should lobby the National Bank of Ethiopia and

macroeconomic policymakers to introduce policy incentives, including corporate tax breaks, digital service tax holidays, or regulatory subsidies, to offset the substantial fixed costs associated with launching agent banking hubs in rural areas.

To build a sustainable user pipeline, broader structural support is required outside the bank's internal channels through nationwide digital financial literacy initiatives. A coordinated national campaign should be championed by the National Bank of Ethiopia, the Ministry of Education, and telecommunication operators. Deploying educational content via radio, television, and digital platforms will demystify digital finance for vulnerable segments, ultimately generating a highly receptive client base for Amhara Bank's inclusive service portfolio.

While this study provides critical foundational insights into digital banking dynamics at Amhara Bank, several directions are outlined for future academic inquiry. Future studies should conduct comparative analyses by replicating this empirical framework across multiple private and public commercial banking institutions within Ethiopia, such as the Commercial Bank of Ethiopia or Bank of Abyssinia. Comparing legacy establishments against newly formed institutions will establish whether the operational bottlenecks identified at Amhara Bank are unique or systemic nationwide. Furthermore, subsequent research should include a larger rural sample, oversampling rural populations to ensure they comprise at least 40% to 50% of the total respondent database, which will generate the statistical power necessary to draw precise comparisons regarding urban versus rural user behavior.

Future research should also transition from purely quantitative metrics to examine the barriers to QR payment adoption using qualitative methodologies, such as focus group discussions and in-depth merchant interviews. These tools will provide valuable, nuanced insight into the underlying behavioral, psychological, and tax-related factors causing low merchant acceptance of technologies like Aba QR and EthQR. Additional studies should include longitudinal surveys tracking the same group of consumers over a multi-year timeline, which will allow researchers to determine the true, long-term effects that digital banking adoption has on household welfare, micro-enterprise profitability, and personal asset accumulation. Finally, future econometric modeling should evaluate the formal moderating role of demographic factors such as gender, age, education, income, and geographic location within the Technology Acceptance Model framework

to determine whether the effects of digital banking solutions on financial inclusion differ across disparate customer segments.

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Annexes

Questionnaire

Introduction - I am a postgraduate student besides I research how digital banking services change how people access financial systems at Amhara Bank - this questionnaire exists so that I can collect data about how customers use the digital services that the bank provides. Your responses help the study because they provide necessary data.

By answering those questions, you contribute to research or I will keep all information private. It is not required that you write your name on this form. With your help I can complete this work next to I value the time you give.

Section A: Demographic Information

A1. Gender ☐ Male ☐ Female

A2. Age ☐ 18–25 ☐ 26–35 ☐ 36–45 ☐ 46–55 ☐ 56+

A3. Education Level

☐ No Formal Education ☐ Primary School ☐ Secondary School ☐ Diploma

☐ bachelor's degree ☐ Master's degree or Above

A4. Occupation

☐ Private Employee ☐ Government/Public Employee ☐ Farmer ☐ Student

☐ Self-Employed ☐ Retired ☐ Other: _____

A5. Residence ☐ Urban ☐ Rural

A6. How long have you been a customer of Amhara Bank?

☐ Less than 6 months ☐ 6–12 months ☐ 1–2 years ☐ 2–3 years ☐ More than 3 years

A7. How often do you use Amhara Bank digital banking services?

☐ Daily ☐ Several times per week ☐ Once per week ☐ Several times per month

☐ Once per month ☐ Rarely

A8. Monthly Income Level

☐ Less than 10,000 ETB ☐ 10,000–30,000 ETB

☐ 30,000–50,000 ETB ☐ Above 50,000 ETB

Section B: Digital Banking Solutions

Are you currently a user of any Amhara Bank digital banking services? ☐ Yes ☐ No

Instruction:

Please indicate your level of agreement with the following statements using the scale below.

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

B1: Agent Banking Services

Statements	1	2	3	4	5	6
B1.1 I am aware that Amhara Bank provides agent banking services through local shops or merchants.						
B1.2 I use Amhara Bank agents to perform cash-in or cash-out transactions using 2 POS devices.						
B1.3 Amhara Bank agents assist customers in conducting basic banking transactions.						
B1.4 Agent locations are easily accessible in my area.						
B1.5 Transactions through Amhara Bank agents are fast and convenient.						
B1.6 Using agent banking services reduces the need to visit a bank branch.						
B1.7 Overall, I am satisfied with Amhara Bank's agent banking services.						

B2: Mobile Money Transfer Services

Statements	1	2	3	4	5	6
B2.1 I use mobile banking to send money to family or friends.						
B2.2 I use mobile banking to receive money from others.						
B2.3 Mobile banking transfers are faster than traditional transfer methods.						

B2.4 The cost of mobile banking money transfers is affordable.						
B2.5 Mobile banking makes transferring money easy and convenient.						
B2.6 Mobile banking helps me send financial support to others more easily.						
B2.7 Mobile banking transfers are secure.						

B3: Mobile Account Management Services

Statements	1	2	3	4	5	6
B3.1 I use mobile banking to check my account balance.						
B3.2 I use mobile banking to view or obtain my bank account statement.						
B3.3 Mobile banking allows me to access detailed information about my transactions (date, amount, and type of transaction)						
B3.4 Mobile banking services are easy to use for managing my bank account.						
B3.5 I receive transaction notifications or alerts for activities on my account.						
B3.6 Mobile banking helps me monitor and control my financial activities.						

B4: Mobile Bill Payment Services (ABA QR/ *code-based payment system used in shops and services)*

Statements	1	2	3	4	5	6
B4.1 I use mobile banking or ABA QR to make payments at shops or merchants.						
B4.2 I use mobile banking to pay utility bills or other service payments.						
B4.3 Paying using ABA QR is faster than paying with cash.						
B4.4 Paying bills through mobile banking is convenient.						
B4.5 Many local merchants accept ABA QR payments.						
B4.6 I feel secure when using ABA QR or mobile payments.						
B4.7 Mobile payments reduce the need to carry cash.						

Section C: Financial Inclusion

Statements	1	2	3	4	5	6
C1 Digital banking services are accessible (available when and where I need them)						
C2 Digital banking services are affordable (transaction costs are reasonable)						
C3 Digital banking has increased my access to formal financial services						
C4 Digital banking has reduced my reliance on informal saving methods (iddir, equb, keeping cash at home)						
C5 Overall, digital banking solutions have improved my financial inclusion						