Adoption of Mobile Banking and Its Effect on Saving Practices

The case of Customers of Commercial Bank of Ethiopia: Dire Dawa Cluster

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SCHOOL OF GRADUATE STUDIES

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(Specialization: Development Economics, 2022)

Declaration

I hereby declare that this MSc/MA/MPH/MBA/ MD+ Specialty or equivalent thesis / PhD dissertation is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis / dissertation have been duly acknowledged.

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ACRONYMS AND ABBREVIATIONS

ATM	Automated Teller Machine
CBD	Central Business District
CBE	Commercial Bank of Ethiopia
CBS	Core Banking Solution
GSM	Global System of Mobile
ICT	Information Communication Technology
SMS	Short Message Service
MB	Mobile Banking
WAP	Wireless Application Protocol
NBE	National Bank of Ethiopia
POS	Point of Sale
OLS	Ordinary Least Square
WB	World Bank
GPRS	General Packet Radio Service
GSMA	General service
BOP	Balance Payment

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ABSTRACT

Digital finance is one of few areas where there has been a real revolution in services and leap frogging over deficient traditional infrastructure. Hence, mobile banking services have greatly transformed the financial inclusion landscapes in developing countries where majority have high inaccessibility to formal financial services. This study aimed to identify the effects of mobile banking services on saving habits of customers of Commercial Bank Ethiopia Dire Dawa cluster. It used both primary and secondary data sources. Two stage sampling technique was employed to select sample respondents. First five CBE bank branches will be selected out of nineteen branches in the cluster area randomly. The 385 samples are also distributed to five branches based on probability proportion to sample size. It employed both descriptive statistics and econometrics method of data analysis. The result of chi-square tests indicated that mobile banking saving adopter customers were mainly found to be male, the cross tabulation result shown that the most mobile banking service adopter are age group between 26-35,the least adopter age group are above age of 55.The age of respondent is found to be statistically significant to differentiate the adopter and non-adopter at less than 10% probability level. Furthermore the result of the study revealed that degree holder were highly adopted the mobile banking service and illiterates were the least adopter. the Binary Logit model parameter estimated to determine the likelihood of adopting mobile banking services and perceived transaction cost were negatively related while age, monthly income, perceived usefulness, perceived easy to use, perceived credibility, perceived self- efficacy and technology awareness were positively correlated. Moreover, the OLS model was estimated to show the effect of mobile banking usage on saving practice of the customers, in which mobile banking services adoption, having Master degree, monthly income, influenced amount of saving in the bank positively and significantly.

The bank should make their mobile banking as simple and easy to use as possible so that customers do not perceive them as being complicated or difficult to use. Although saving is not yet common practice in Ethiopia generally and particularly in Dire Dawa. CBE have to

work hard in mobile banking service because the estimated effect of mobile banking adoption on saving practice of customers indicated that mobile banking service usage have positive and significant effect.

Key Words: Mobile banking, Saving, Binary logit, OLS.

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1. INTRODUCTION

1.1. Background of the Study

Before the introduction and enablement of mobile web service in 1999, mobile banking was completed primarily through text or SMS; it was known as SMS banking. European banks were on the frontier of mobile banking service offering, using the mobile web via WAP support. Chandrasekar and Essayas.(2018)

SMS banking and mobile web were the most popular mobile banking products before 2010, with the development of smart phones with ios or Android operating systems, mobile banking application (apps) began to evolve. Clients were able to download the banking apps onto their smart phones with more sophisticated interfaces and improved transactional abilities. Chandraseker and Essayas.(2018)

To date, much financial institutions make use of both SMS and mobile application to keep their clients informed of their account activities or to send out alerts regarding possible fraud and/or updates and maintenance of service provision.

Examples can be a text message from a bank, notifying users that their ATMs or apps will not be accessible during particular time period due to system maintenance, or a confirmation text from the bank regarding transfer carried out by the client via mobile app.

Mobile banking allows consumers to be able to access banking services from anywhere.

Businesses and business owners are now able to save time by making use of mobile application to process their payments or even receive funds from clients directly to their phone numbers. It is particularly popular among small to medium-sized enterprises (SMEs).

With mobile technology, banks are able to cut down on operational costs while still maintaining client’s satisfaction. The fact that any client of a bank can make use of their app to request a service, such as opening an account or even the ability to schedule debit orders or other payments from an application, allows for larger transactional volumes, eventually driving business growth.

In developing countries, 2.5 billion people are 'unbanked' and have to rely on cash or informal financial services which are typically unsafe, inconvenient and expensive. Traditional "bricks and mortar" banking infrastructure struggles to make the business model work to serve low-income customers, particularly in rural areas (WB,2019) However, over one billion of these people have access to a mobile phone, which can provide the basis for extending the reach of financial services such as payments, transfers, insurance, savings, and credit (WB, 2019).

The adoption of mobile telephony to provide financial services in Africa has become instrumental in integrating the hitherto unbanked segments of the population to the mainstream financial systems.

The liquid savings option provided by the mobile money, accessible anywhere and anytime could increase family assistance and hence, it may have a negative impact on individual savings. Moreover, the withdrawal tax feature of mobile money may help people resist unneeded expenditures on the one hand but it may discourage them to put money in their account and dismiss its effects on saving son the other hand (Jackline, 2019).

Moreover, the availability of the mobile money agents in both rural and urban areas offers a more convenient alternative for users of both informal and formal savings mechanisms to use mobile money as their saving alternative because mobile money users do not need to travel long distances to get to the nearest bank (Wamuyu, 2016).

The evidence on the affiliation between mobile money and savings behaviors was showed. For instance, a randomized experimental study conducted in Mozambique found that farmers that used mobile money increased their savings and investments in farm produce as compared to mobile money none/users (Batista and Vicente, 2017). An earlier survey study examining the use of mobile money among smallholder farmers in Kenya also found that mobile money used increased farmers' incentives to save for future purchases of farm inputs, and as a result, farmers who used mobile money sold larger quantities of their produce and made higher profits than non-users (Kikulwe, Fischer and Qaim, 2014).

Suri and Jack (2016) also found that mobile money increased the savings behaviors and financial resilience behaviors of female-headed households where majority of the women

reported using their savings to change their occupational choice from agriculture into business. These findings indicate that mobile money can positively affect the saving behaviors of women. Survey results from Burkina Faso also showed that mobile money use increased the propensity to save for emergency purposes among low-educated, rural residents, low-income earners, female and irregular income earners (Ky, Rugemintwari and Sauviat, 2017). These studies imply that mobile money use increases the capacity of the rural poor to save

Ethiopia has made good progress in terms of expanding financial inclusion more effort is needed to bridge the gap with comparable countries especially in access and usage of digital financial services. According to the Findex data (2017) two-thirds of Ethiopian adults do not have a transaction account with women accounting for a disproportionate share of the unbanked; and only 35 percent of adults have an account at a formal financial institution. People rely more on informal institutions for their financial needs although 62 percent of adults reported saving money in the past year only 26 percent had their savings in a formal financial institution. At the same time, 41 percent of Ethiopians response shows they borrowed money but only 11 percent borrowed from a financial institution. And also from other barriers, 'Insufficient funds" is also reported as a key barrier for financial inclusion as well as distance, and lack of proper documentation is from other barriers.

Almost all individuals pay utility bills with cash. Importantly, financial inclusion paves the way for individuals and businesses to access financing to improve skills and invest in enterprises without which private sector growth and job creation would not be feasible (WB, 2019). Payment systems in Ethiopia were radically modernized in 2011, although more work remains to be done. The national e-payment switch, EthSwitch, was launched in 2016, with the goal of allowing interoperability of automated teller machines (ATMs), mobile money and, point of sale (POS) networks. The system is currently active for ATM switching, but the platform for mobile payments interoperability is yet to be introduced and integrated with service-providing banks. Despite progress made the NBE needs to improve oversight of payment systems and services. Ethiopia hasn't taken advantage of digital financial services (DFS) that have driven access to and usage of financial services in Sub-Saharan Africa (Fantahun, 2016).

1.2. Statements of the Problems

Mobile banking is an innovative service. Which has been perpetuated by the development and diffusion of the mobile communication technology, Angens;2008) expressed this innovative as “the financial service delivered via mobile networks and performed on mobile phone. Indeed, this service provides much convenience and promptness to the banks customers along with cost savings. Many banks and telecommunication companies are interested in expanding their market through mobile services such mobile banking and mobile money.

Even if this product currently has huge impact on the capital mobilized by financial sector in Ethiopia not that much research was conducted related to factors affecting mobile banking service usage. But there is research conducted on mobile banking service in east Africa like in Kenya and Uganda. However, those researches are focused on adoption of mobile banking not the effect of mobile banking on saving habits of customers. Furthermore, there is no study conducted related to the effect of mobile banking usage on the saving behavior of customers in Ethiopia particularly in Dire Dawa. Moreover, the saving habit of customer in Ethiopia is highly low that can be enhanced by using mobile banking easily that need this study to identify the correlation between mobile services and saving culture. In addition, the mobile infrastructures are developing in relation to quality and accessibility both in urban and rural Ethiopia. But readiness to use mobile banking to mobilize savings has significant limitation that requires detailed study like this.

The study of Hayat (2017), finding showed that Perceived usefulness, perceived ease of use, perceived self-efficacy, relative advantage and perceived risk as major influencing factors for mobile banking adoption. However, perceived credibility and perceived cost were found to have insignificant effect on mobile banking usage for bank customers located in Ethiopia but this research needs further study because there are other factors for adoption of mobile banking like crowdedness in the counter area and also epidemic diseases like Corena at resent times increases significantly the usefulness of mobile banking service.

Research survey finding shoes that mobile money use increased the propensity to save for emergency purposes among low-educated, rural residents, low income esrners, female and irregular income earners (Ky,Rugernintwari and Sauviat,2017). This needs further research

survey because there are mobile banking users with regular income, highly educated, high-income earners who live in urban that save for future permanent investment and for different payment purposes in the future.

Mobile banking increases access to cash, it may have less or no impact on saving for predictable events in the future (Batistu and Vicente, 2017). But this research also needs further study because of different services facilitated by mobile banking customers prefer to save for predictable events in the future payment like service bill payment Tele, water and bill, payment and for education fee payment.

According to the study conducted Shem *et al*. (2017) in Kenya, Uganda, Malawi and Zambia confirmed that availability and usage of mobile phones to provide financial services promotes the likelihood of saving at the household level. Having access to mobile phone boosts not only the likelihood of saving but also the amount of saving because of the convenience of using mobile banking frequency of using it increases Both forms of savings, that is, basic mobile phone savings stored in the phone and bank integrated mobile savings are likely to be promoted by use of mobile phones. Thus, growing and deepening the scope for mobile phone financial services is an avenue for promoting savings mobilization, especially among the poor and low income groups with constrained access to formal financial services.

Musa and Annet (2016) also studied the impact of mobile money services have on an individual's saving behavior in Uganda and using Probit model. Their results revealed that being a registered mobile money user increases the likelihood of saving. Using mobile money to save is more prevalent in urban areas and in the central region than in other regions. This can be explained by several factors. First, rural dwellers on average tend to have lower incomes and thus have a lower propensity to save compared with their urban counterparts. Second, poor infrastructure in rural areas in terms of the lack of electricity and poor telecommunication network coverage may limit the use of mobile phones and consequently the use of mobile money as a saving mechanism.

Overall, the use of mobile money as a saving mechanism is still very low, but in recent years mobile banking service incorporated different types of bill and service payment which indirectly boost the likelihoods of individual saving behavior's but previous researches have

so many limitations. They do not show the impact of mobile banking on saving behavior of individual because of recently upgraded mobile banking technology services and increased telecommunication infrastructure coverage in rural and urban areas.

In Ethiopia there is not much research conducted related to the relationship between saving and adoption of mobile banking but more research was conducted on factors for adoption of mobile banking even if in recent years because of so many factors like NBE regulation significant number of customers are using mobile banking for future utility payment and for third party transfer so much that have direct relationship with saving so researcher have to engage in this area for further .study should have to be conducted.

1.3. Objectives of the Study

1.3.1. General Objective of the Study

The general objective of this study is to assess the effect of mobile banking on saving practices among customers of commercial bank of Ethiopia in the case of Dire Dawa Cluster

1.3.2. Specific Objectives of the Study

The specific objectives of the study are

- To identify the factors affecting the adoption of mobile banking among customers of commercial bank of Ethiopia in the case of Dire Dawa Cluster
- To evaluate the effect of mobile banking on saving practices among customers of commercial bank of Ethiopia in the case of Dire Dawa Cluster

1.4. Scope of the Study

The study was limited to CBE branch located in the city of Dire Dawa, Ethiopia. It is concerned in evaluating the usage of mobile banking on individual saving practice. Further; the study's focus on cross-sectional study design may also limit the extent to which the findings can be generalized.

1.5. Significance of the Study

The finding of this study may help the bank to understand and acknowledge the importance of mobile banking and its outcomes on increasing savings. This research finding also give to executive officers to draw strategies and mitigation on factors of not using mobile banking

service by customers The finding of the study will also add to the existing body of knowledge in respective field of areas. It might appear as a source of information or stepping stone to researchers and others interested bodies to conduct similar research in the field.

1.6. Limitation of the study

The scope of the study was limited on public bank which is CBE in Dire Dawa, Ethiopia: future studies should however consider private banks widening the scope in order to drown a comprehensive generalization. Mobile technology is recently inaugurated in Ethiopia so in this research it become hard to use time serious data because of the limitation of data and also financial sectors are distributed in wide geographical areas it become difficult to collect data from all banks because of budget and time and data scarcity so this research is limited to dire dawa city branches

1.7. Organization of the Study Report

This research report organized in five chapters. The first part includes the introduction part of the research including statement of the problem objectives, scope, significance and limitation of the study. The second chapter mainly deals with theoretical review of banking sector in Ethiopia and the empirical review of factors affecting adoption of mobile banking and its effects on saving behavior. The conceptual framework of the study also included. The third chapter include the methodology of the study including description of the study area and the research design(data source and method of data collection ,sample size and sampling technic and method of data analysis. The fourth chapter presents result and discussion of the study including profile of respondents mobile banking service usage factor affecting the mobile banking service. As well as the effect of mobile banking on saving. The last chapter includes conclusions and recommendation of the study.

2. LITERATURE REVIEW

This chapter deals with important theoretical concepts on birth and growth of bank services in Ethiopia, mobile bank services and empirical studies on factors affecting the adoption of mobile banking and effect of mobile banking on saving habits of customers.

2.1. Definition of terms and concepts

Mobile banking is the act of doing financial transactions on a mobile device (cell phone, tablet, etc.). This activity can be as simple as a bank sending fraud or usage activity to a client's cell phone or as complex as a client paying bills or sending money abroad. Mobile banking is usually available on a 24-hour basis. In these days, mobile banking services classified into three types (Chandrasekar and Essayas 2018).

A. Mobile Banking over Wireless Application Protocol (WAP): - It is a service that allows accessing bank account details and transacting over the internet through a mobile banking application. Now-a-days Mobile Banking is using either mobile data services (2G, 3G or even 4G in certain regions) or Wi-Fi. Mobile banking applications are optimized for iOS, Android and Blackberry phones.

B. Mobile Banking over SMS: - Mobile Banking via Short Message Service (SMS) services, it does not require downloading any application; it is the most common types of mobile banking service. SMS services are available on all phones whether smart phone or not, with or without General Packet Radio Service (GPRS) connectivity. As Mobile Banking via SMS works like any other SMS service. To get updates on customers‟ bank account, it required to send a text message to a specified number and receive instant replies as per customer request.

C. Mobile Banking over Unstructured Supplementary Service Data (USSD):- A convenient form of Mobile Banking based on Unstructured Supplementary Service Data (USSD) was introduced targeting the rural areas. The services of Mobile Banking through USSD can be reached any individual with any mobile phone whether smart phone or not, with or without a GPRS (General Packet Radio Service) connection. Mobile Banking over USSD, contrasting with the SMS, is based on real-time interaction between a customer and the bank.

Though the service is free of charge from the bank, other charges by the mobile network provider may be applicable.

2.1.1. Advantages of mobile banking

Mobile banking is a powerful way to deliver savings services to the billion people worldwide who have a cell phone. It has a number of advantages over traditional banking methods as it breaks down geographical constraints; it also offers other advantages such as immediacy, security and efficiency (Pallab and Munish, 2013).

First, the mobile phone can serve as a virtual bank card where customer and institution information can be securely stored, thereby avoiding the cost of distributing cards to customers. In fact, the subscriber identity module (SIM) card inside most if not all GSM phones is in itself a smartcard (similar to the virtual bank card). Thus, the bank customer's PIN and account number can be stored on this SIM card to perform the same functions as the bank virtual card (Fantahun, 2016).

Second, the mobile phone may serve as a point of sale (POS) terminal. As such a mobile phone may be used to transact and communicate with the appropriate financial institution to solicit transaction authorization. This is the same functions of a POS terminal at malls, retail, or other stores. A mobile phone can duplicate this functionality with ease (Henok, 2015).

Third, the mobile phone can also be used as an ATM. A POS is used to pay for goods or services at the store. If we consider cash and access to savings as "good and services" that customers buy at the store, then that POS will also serve as cash collection and distribution point which basically is the function of an automatic teller machine (ATM) (Serkalem*et al*., 2018).

Fourth, the mobile phone may be used as an Internet banking terminal. This providing two fundamental customer services: a) instant access to any account; and b) the ability to make payments and transfers remotely. As such, the mobile phone device and wireless connectivity bring the Internet terminal into the hands of otherwise unbanked customers (K. S. Chandrasekar and Essayas 2018).

2.2. Theoretical Review of Banking Sector In Ethiopia

The early history of banking in Ethiopia dominated with its distinctive mixture of foreign and government financial institutions.

A. Emperor Haile Selassie period

The first bank to be established in Ethiopia was the Bank of Abyssinia in 1905.It was owned and managed by the British-owned National Bank of Egypt. It was given a banking monopoly for fifty years, including the right to issue notes and coins. In 1931, the Bank of Abyssinia was replaced by the Bank of Ethiopia which was wholly owned by the government and members of the Ethiopian aristocracy, becoming the first 100% African-owned bank on the continent; it was also authorized to issue notes and coins and to act as the government's bank. After the liberation in 1942, the State Bank of Ethiopia was established. It became operational in 1943, with 43 employees and two branches, and acted as the country's central bank. The first governor was a Canadian. The Bank also acted as the country's main commercial bank, while a few much smaller foreign banks continued to operate. The country's first development bank was founded in 1951: The World Bank provided $2 million towards the founding of the Development Bank of Ethiopia, and invested a further $2 million in 1960. In addition to the commercial banks, the government established two development banks, both of which were 100% state owned. The Agricultural and Industrial Development Bank (AIDB) was set up in 1970, taking over two earlier development banks: The Development Bank of Ethiopia and the Ethiopian Investment Corporation which had been established in 1963 as the Investment Bank of Ethiopia (Aderaw and Manjit, 2017).

B. Socialist Period

The fragile and inefficient state-dominated banking sector that existed in Ethiopia during the military government (1974-1991) was a major hindrance to economic growth. Monetary and banking proclamation No. 99 of 1976 came into force on September1976 to shape the bank's role according to the socialist economic principle that the country adopted. The commitment to continued government ownership of existing financial institutions was extremely strong. The government was also very determined not to allow private and foreign banks into

Ethiopia, not even as minority partners with Ethiopian banks. The main institutional changes proposed were, therefore, very much less radical than elsewhere in Africa, being limited to the following:

C. Post socialist period

Following the change of government in 1991, and the subsequent measures taken to liberalize and reorient the economy towards a system of economy based on free market principle, the financial market was deregulated. A proclamation number 84/94 was issued out to effect the deregulation and liberalization of the financial sector, and as the result a number of private banks and insurance companies were established following the proclamation. Moreover, directives issued in subsequent years further deepen the liberalization mainly including the gradual liberalizations of the interest rate, foreign exchange determination, money market operation, etc. In the year 2013/14, there were 16 private banks operating including three public banks, namely the Commercial Bank of Ethiopia, the Construction and Business Bank, and the Development Bank of Ethiopia. Other financial institutions operating in the economy includes 17 insurance companies, one pension fund and about 31 Micro Finance Institutions with a business focus mainly in the rural areas but in reality concentrated in urban area. The Development Bank of Ethiopia (DBE) is a specialized bank in project financing and is not a deposit taking institution (NBE, 2013/14).

The number of banks in Ethiopia remained at 19 of which 16 were private and 3 government in the first quarter fiscal budget year NBE (2019/2020) report These banks opened 6604b ranches

during the review period, thereby raising the total number of bank branches to 6,604. As a result, one bank branch served about 15,702people. About 31.2 percent of the total bank branches were located in Addis Ababa. Of the total bank branches, the share of public banks was 30.9 percent and that of private banks 69.1 percent. Meanwhile, the total capital of the banking system amounted to Birr 103.2 billion, of which public banks accounted for 55.8percent and private banks 44 percent. The share of Commercial Bank of Ethiopia, the biggest state owned bank, in total capital of the banking system was 48.4 percent. During the review quarter, Birr 39.6 billion was disbursed in fresh loans, indicating a

31.8percent annual increase. Of the total new loans disbursed, the share of public banks was 29.5percent and that of private banks 70.5 percent. Domestic trade was the major beneficiary of the total new loans accounting for Birr 8.3billion (21 percent) followed by international trade (Birr 7.7 billion or 19.6percent), industry (Birr 7.2 billion or 18.2percent) and agriculture (Birr 4.1 billion or10.3 percent) (NBE, 2019).

The banking sector has enjoyed high growth, high profits, and high returns almost without interruption for over a decade. Growth over the past ten years has been a very high annual rate of 28 percent for deposits, 31 percent for loans, and 22 percent for profits WB, (.2019) Contrary to popular perceptions of 'excessive' returns at Ethiopian banks, their average return on equity is actually not much different from banking returns seen in most emerging markets; the sector's profits are 1 percent of GDP, unchanged from its share a decade ago (WB, 2019).

2.2.1. Challenges of mobile banking

According to Sarta (2012) cited in Henok (2015) five major challenges were identified in addressing the issue of financial inclusion through mobile banking.

I. **Regulatory Challenge**: As the Internet allows services to be provided from anywhere in the world, there is a danger that banks will try to avoid regulation and supervision. What can regulators do? They can require even banks that provide their services from a remote location through the Internet to be licensed. Licensing would be particularly appropriate where supervision is weak and cooperation between a virtual bank and the home supervisor is not adequate.

II. **Legal Challenge**: Electronic banking carries sensitive legal risks for banks. Banks can potentially expand the geographical scope of their services faster through electronic banking than through traditional banks. In some cases, however, they might not be fully versed in a jurisdiction's local laws and regulations before they begin to offer services there, either with a license or without a license if one is not required.

III. **Operational Challenge**: The reliance on new technology to provide services makes security and system availability the central operational risk of electronic banking. Security threats can come from inside or outside the system, so banking regulators and

supervisors must ensure that banks have appropriate practices in place to guarantee the confidentiality of data, as well as the integrity of the system and the data.

IV. **Reputational Challenge**: Breaches of security and disruptions to the system's availability can damage a bank's reputation. The more a bank relies on electronic delivery channels, the greater the potential for reputational risks.

V. **Personal Information**: Internet banks need to collect personal information in order to do business, but if they do not follow local information collection laws then there could be lawsuits and government penalties.

2.2.2. Mobile Banking in Ethiopia

The status of mobile banking at Africa level has been increasing and by the year 2017, it was around 12%. However, the share of Ethiopia is extremely low as the country is lately established regulation of mobile banking in 2013. Even the traditional banking service penetration is very low and the rural community near to 80 percent of the total inhabitants has no good access to banking services. With the ratio of one bank to 37,500 populations, Ethiopia has the least bank penetration and because of this fact, citizens are using traditional way of exchange activities with high opportunity cost (Birku, 2019).

After a year in 2014/15, there were only two mobile money deployment in Ethiopia those are M.Birr and Hello Cash mobile money. Based on the data from National bank of Ethiopia (NBE) in 2017[3], the mobile penetration rate reached 51.2%. However, of this mobile subscriber, only 0.9% is mobile banking service users. The percentage of mobile banking users to total mobile subscribers and total population is 0.9% and 0.4% respectively implying that mobile banking service is at infant stage. On the other hand, the total bank to population ratio shows that large numbers of populations mainly in the rural areas are deprived of access to banking. Hence, with the help of ICT convergence, mobile banking could able to increase banking penetration with more access to financial services particularly for rural communities.

2.2.3. Mobile Money Adoption and Saving Behavior

In developing countries, people often have to rely on informal saving mechanisms to manage their finances, as an alternative, due to the lack of access to formal financial services such as saving accounts. Because of this, several initiatives have been undertaken either by private

or government entities to promote branchless banking such as mobile money. In some cases though, informal saving mechanisms may fit the needs of the individuals to save for anticipated objectives and hence make less relevant the reliance on the innovation of mobile money (Serge *et al*., 2017).

Informal saving mechanisms such as participating in savings groups (ROSCAs), or investing in land, jewels and livestock, may be considered convenient. Indeed, to deal with anticipated events like starting up or developing a business, people can easily sell their physical assets since the date of the event is preset. For individuals participating in ROSCAs, they can preset the startup date according to the date they are assigned to receive the pot, as many ROSCAs use a predetermined order to allocate the savings pot. Yet, these saving mechanisms involve high risk taking. For instance, some ROSCAs disband and often without warning. Moreover, holding illiquid assets expose individuals to loss or theft and assets depreciation (Morawczynski, 2009).

Individuals with low access to formal financial institutions, also known as the unbanked, often rely on informal savings methods that are unsafe, inconvenient and unreliable Hove and Dubus, (2019) In this context, individuals may consider adopting mobile money as an alternative saving device because mobile money account is personal and relatively safe, and they can easily determine their own target to reach in order to realize their investment project. However, several studies show that planning for long term objectives requires less access to the money (Karlan*et al*., 2014). In the same vein, Dupas and Robinson (2013) provide evidence that expanding savings access, especially bank accounts, increases business investment. Thus, using saving devices which restrict access to cash until a target date is attained would be more adequate to plan for anticipated objectives. Thereby, as mobile money increases access to cash, it may have less or no impact on saving for predictable events compared to saving for unanticipated events for which mobile money may prove to be better-suited (Batista and Vicente, 2017).

According to the study conducted Shem *et al*. (2017) in Kenya, Uganda, Malawi and Zambia and employed both ordinary least square (OLS) and Logit model confirmed that availability and usage of mobile phones to provide financial services promotes the likelihood of saving at the household level. Not only does access to mobile financial services boost the likelihood to

save, but also has a significant impact on the amounts saved, perhaps due to the frequency and convenience with which such transactions can be undertaken using a mobile phone. Both forms of savings, that is, basic mobile phone savings stored in the phone and bank integrated mobile savings are likely to be promoted by use of mobile phones. Thus, growing and deepening the scope for mobile phone financial services is an avenue for promoting savings mobilization, especially among the poor and low income groups with constrained access to formal financial services.

Musa and Annet (2016) also studied the impact of mobile money services have on an individual's saving behavior in Uganda and used Probit model for analysis. The results revealed that being a registered mobile money user increases the likelihood of saving with mobile money. Using mobile money to save is more prevalent in urban areas and in the central region than in other regions. This can be explained by several factors. First, rural dwellers on average tend to have lower incomes and thus have a lower propensity to save compared with their urban counterparts. Second, poor infrastructure in rural areas in terms of the lack of electricity and poor telecommunication network coverage may limit the use of mobile phones and consequently the use of mobile money as a saving mechanism. Overall, the use of mobile money as a saving mechanism is still very low, which could be partly explained by legal limitations that do not incorporate mobile finance services into mobile money. The absence of interest payments on mobile money savings may also act as a disincentive to save through this mechanism.

Serge *et al*. (2017) investigated whether the use of mobile money can help individuals build savings to face predictable and unpredictable life events in Burkina Faso and the results showed that using mobile money increases the propensity of disadvantaged groups such as rural, female, less educated individuals and individuals with irregular income to save for health emergencies. Safety and the possibility to transfer money within the sub-region associated with mobile money may be factors that increase the propensity of mobile money users to save for health emergencies.

Jackline (2019) also examined whether the use of mobile money affects the savings patterns of individuals that are vulnerable to financial exclusion, that is, the low-income earners, low educated, women and rural habitants in Kenya. The Logistic model

regression are used as the empirical estimation method for testing the statistical significance of the correlation between mobile money usage and the savings behaviors of the individuals. Individuals that use mobile money perceive it as a trustworthy, efficient and reliable store of value especially making savings for future use. This analysis also finds statistically significant evidence suggesting that mobile money use significantly increases the propensity to save for individuals in demographic groups (female, low income, low education and rural community) that are more susceptible to the unique challenges that lower accessibility to formal financial service.

From this literature review part, we can understand that the factors for the adoption of mobile banking rely on education, income level. Gender, telecommunication infrastructure a, but those research does not incorporate resent amendment on additional service provided by mobile banking service like service payment like, water electric power telecommunication bill payment which have significant impact for the adoption of mobile banking. This research gap is also observed in research conducted on the impact of mobile banking on saving behavior of customers because of technology and infrastructure advancement more features are changing on mobile banking service this research will incorporate new changes on this service.

2.3. Empirical Review

2.3.1. Factors Affecting the Adoption of Mobile Banking

The widespread and increasing use of mobile devices in Africa creates expectations that mobile banking adoption can increasingly extend to people at the BOP. By 2017, 38% of the people in the sub Saharan Africa had a broad connection which consequently accelerates digital and financial inclusion (GSMA, 2018b). For instance, there were 135 live mobile money services in 39 countries in Sub-Saharan Africa delivering financial inclusion to the unbanked populations as of 2017 (GSMA, 2018b). It is envisaged that among the estimated 56% of people in Sub-Saharan Africa who still, at the end of 2017, did not have a unique mobile connection, will in the future become mobile users and be able to benefit from mobile banking technology. Besides mobile connectivity, bank account ownership is one of the factors that influence the adoption of mobile banking (Pankomera and Van, 2018).

There is growing interest in the potential for mobile banking technologies to reach the unbanked population in Sub-Saharan Africa, a region where large portions of the population have access to a mobile phone but remain outside of the financial system. Income, education and institutional trust have a significantly positive effect on the behavioral intention to adopt mobile banking (Marybeth, 2020).

Factors affecting the adoption of mobile banking in United Bank Addis Ababa city customers were technological and Organizational factors from the institutional perspective and customers' experience and voluntariness of use from customers' perspective that had strong and positive relation with adoption of m-banking. However, gender and age from the customer's view and Environmental factor from the institutions view had a negative relationship with mobile banking adoption (Serkalem*et al.*, 2018).

The study conducted by Firdisa (2019) on the determinants of mobile banking adoption at Commercial Bank of Ethiopia in case of Bako district identified that quality of internet, lack of awareness, relative advantage, awareness, trial ability, experience, gender, education, income and age are the factors that are significantly influencing customers' adoption decisions of mobile banking.

The result of the research of Ebisa (2020) indicated that, drivers of M-banking are relative advantage, perceived ease of use and perceived usefulness while challenges are perceived risks, trust reliability and lack of ICT infrastructure for Cooperative Bank of Oromiya in Ethiopia.

The study of Aklog (2018) that conducted on factors affecting for the adoption of E-banking in Commercial Bank of Ethiopia at Gondar city revealed that perceived benefit, ease of use, perceived risk, role of supporting institutions and internal capability of the bank were significantly associated with e-banking adoption. However, the influences of perceived benefit and ease of use were more contributing than other factors. The multiple regression result also identified that perceived benefit, perceived risk, ease of use, internal capability of banks and role of other supporting institution were the factors affecting users to adopt e banking. Meanwhile, infrastructure and governing regulations was found to be insignificant in this study.

According to the study conducted in Dakar (Senegal) by employing a sequential logit model to identify the determinants of m-banking adoption at deferent level of this process showed that age was the only determining factor in the first stage of adoption, that is, "knowledge" of m-banking. In the second phase, other factors appeared in addition; cognitive factors came into play, such as literacy, education level, as well as financial factors such as membership in a ROSCA (rotating credit and savings scheme) that influenced the 'possession' of m-banking. At the final stage of the adoption process, the variables education level, wages and owning a business were the factors involved in the adoption of m-banking (Francois *et al*., 2015).

The study of Aynalem (2017) conducted on factors affecting usage of mobile banking service in Commercial Bank of Ethiopia at Addis Abeba indicated that customer and staff awareness, device feature, customer perception, customer preference, ease of use and utilization, telecom infrastructure, and lack of suitable legal and regulatory framework were the major factors of M-Banking usage found in the study area.

The study conducted to identify attributes that influence the adoption mobile banking innovation among university students in Ghana since most banks have started reaching their customers directly via mobile phones found that relative advantage, compatibility, observe ability, complexity, perceived risk, trial ability and service satisfaction as critical factors influencing the adoption of mobile banking in Ghana (Robert, 2013).

The study conducted on both private and government commercial banks in Addis Abeba explained that perceived trust in the M-bank service emerged as the most significant factor that impacts on the adoption of m-bank service following, perceived usefulness, awareness and perceived ease of use as major influencing factors for mobile banking adoption whereas Perceived self-efficacy were found to have insignificant effect on mobile banking usage for bank customers located in Addis Ababa (Brikty, 2017).

According to the survey of Babatope*et al*., (2020) conducted on determinants of mobile money technology adoption in rural areas of Africa that covered ten countries, namely Ghana, Kenya, Lesotho, Mozambique, Nigeria, Rwanda, Senegal, South Africa, Tanzania, and Uganda revealed that age, years of education, unemployment, and ownership of bank accounts affect both the adoption and the amount of money sent using mobile

money technology. While, age, bank account ownership, and net monthly income were determined both the adoption of mobile money and the amount of money received using mobile money technology.

Abel (2019) also used the alogit analysis and confirmed that usage frequency of mobile banking service is significantly affected by age of the user (subscriber for ATM services), gender (subscriber for ATM services), and network interruption, lack of security, login difficulty, service charge and doubt of the user about security. Nevertheless, the availability of Forex information in the mobile banking service package does not have significant relationship with usage frequency. Particularly, age of the user, log in difficulty, service charge and network interruption have extremely strong relationship with the usage frequency of customers towards mobile banking services.

The study of Wondwossen (2019) investigated factors that determine bank customer's intention to adopt electronic financial technologies in Ethiopia and the TAM model was employed to identify exogenous factors. This study showed perceived ease of use, perceived usefulness, perceived financial trust, subjective norm and awareness about new electronic finance technology positively predicts bank customer's intention to adopt the technologies.

The study of Gadise and Tekabe (2017) that included commercial banks including bay Bank, Bank of Abyssinia, Addis International bank, Awash international Bank, Commercial bank of Ethiopia (CBE), Dashen Bank, Nib International Bank, Oromia International Bank, United bank, Wegagen Bank, and Lion Bank revealed that cost, trust, privacy and security are significant determinants of e-banking service adoption among customers of commercial banks in Ethiopia.

The study of Beza (2020) that used structural Equation Modeling revealed that perceived usefulness, perceived ease of use, attitude towards e-banking, perceived behavioral control, subjective norms, behavioral intention, awareness as well as the availability of internet/network connection have a significant positive impact on users e-banking usage practice in Ethiopia.

Worku (2017) also used Binary Logit to identify the factors that determine the use of mobile banking services among customers of Commercial Bank of Ethiopia in South Addis Ababa

District and found out that sex, income, perceived security of the technology, perceived usefulness of the service, experience on technology and voluntarism to use have positive and significant effect on the use of mobile banking service.

The study of Hayat (2017) that involved customers of commercial banks of Ethiopia found in Addis Ababa districts (East, west North and South Addis districts), Hawassa districts, Shashemene district and Adama district and used logistic regression model showed that perceived usefulness, perceived ease of use , perceived self-efficacy, relative advantage and perceived risk as major influencing factors for mobile banking adoption. However, perceived credibility and perceived cost were found to have insignificant effect on mobile banking usage for bank customers located in Ethiopia.

2.4. Conceptual Framework of the study

The conceptual framework of the study developed based on the review of the study and practical observation of the area under study. The adoption of mobile banking services can be affected by behavioral factors and socio-economic factors of the customers. Besides, use of mobile banking can affect the saving behavior of the customers positively (Figure 1)

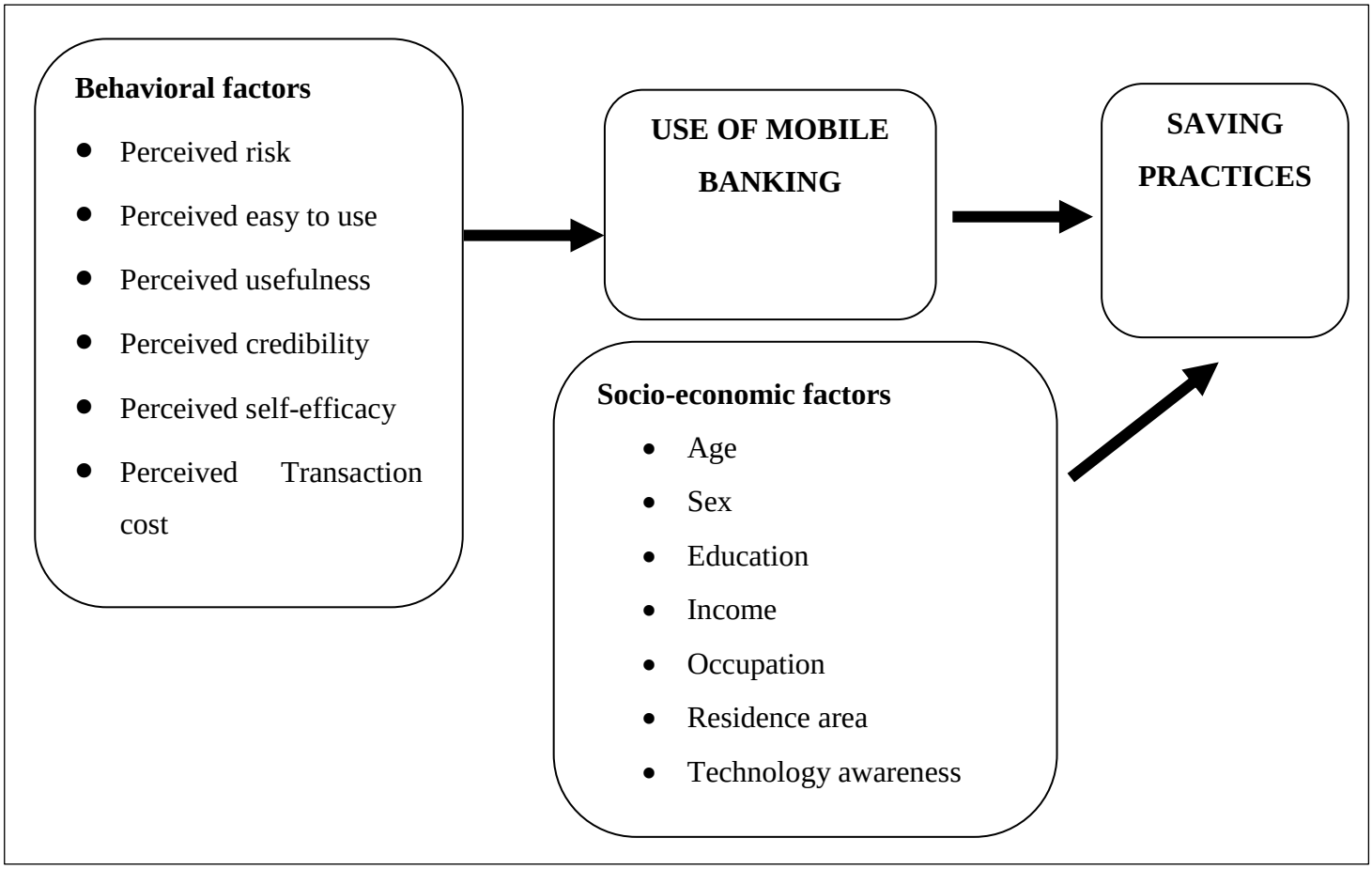


Figure 1 conceptual framework

3. METHODOLOGY

This chapter presents brief description of the study area, the sources of data and methods of data collection, sample size and method of sampling, and the method of data analysis which include both descriptive statistics and econometric model.

3.1. Description of the Study Area

3.1.1. Location

The Dire Dawa Administrative (DDA) which has 38 Rural and 9 urban kebele is located in the eastern part of the country specifically lying between $9^0$27' and $9^0$49'N latitudes and between $41^0$38' and $42^0$19'E longitudes. The city is 520 km far from Addis Ababa. In the West, North and East it is bounded by the Somali National Regional States and in the South by the Or Omiya National Regional State

Dire Dawa,in eastern Ethiopia was established in 1902 as relatively lowland link(1200m above sea level(. A.s.) on Djibouti –Addis Ababa railway.

Dire Dawa economy was booming due to the railway line and the emergence of small-and medium-scale industries. However with the influx of contraband goods the town become a notorious center of this illicit trade

According to CSA (2008), the distribution of the total population varies by place of residence. About 84 percent of the total population in the country was found in rural areas, while the remaining 16 percent lived in urban areas. Yet regional data shown indicate that more than half of the population in Dire Dawa is urban residents. The total population of the region is 342,827 in which 232,854 is urban resident while 109,973 was rural dwellers.

In the city all financial institution are aggressively engaged in their business activity including government banks, CBE,DBE,NBE and all private banks and microfinances,

3.2. Organizational Profile of Commercial Bank of Ethiopia

The history of the Commercial Bank of Ethiopia (CBE) dates back to the establishment in Ethiopia in 1942. CBE was legally established as a share company in 1963.In 1974, CBE merged with the privately owned Addis Ababa Bank. Since then, it has been significant roles in the development of the country.

The CBE was established to perform major banking functions, including, accepting saving, demand and time deposits; Providing short, medium and long term loans; Buying and selling foreign exchanges; Buying and selling negotiable instruments and securities issued by the government, private or any other person; and Engaging in other banking activities customarily carried out by commercial banks

Recent Developments in the E-Banking Services Are Various kinds of cards customized to meet customers' demands, Number of E-Card holders reached 1,584,515 (as at June 30, 2015), Number of Mobile Banking subscribers reached 579,461(as at June 30, 2015), 645 ATMs and 1,883 POS terminals deployed (as at June 30, 2015), more than 88 percent of the Bank's branches went on line through T-24 Core Banking Solutions (as at June 30, 2015).

From other Innovations CBE is A pioneer in installing ATM cash dispensers and other e-payment systems in Ethiopia and providing Visa-branded card payment service; A pioneer in giving nationals incoming transfer worldwide through Western Union Money Transfer in early 1990s; Introducing new and innovative bank services and products that attract many customers who were not users due to their belief and demographic reasons

3.3. Research Design

It is cross-sectional study that will employ both descriptive and econometrics method of research.

3.3.1. Data Type, Sources and Methods of Data Collection

This study will use quantitative and qualitative data that will be collected from primary and secondary sources. The data that will be collected include information related to behavioral and socio demographic characteristics (age, educational status. The primary data sources will be obtained from 385 customers which were randomly selected customers and the selected customers based on the random number will be interviewed.

Randomly selected customers through self-administered questionnaires and key informal interview with employees of the bank were used. Secondary data also collected from Commercial bank of Ethiopia, government line offices, and other relevant sources such as books, journals, internet, and related research documents.

3.3.2. Sample Size and Sampling Technique

In research methods, population is the entire aggregation of items from which samples can be drawn. In this study, the target population is comprised all customers of commercial bank of Ethiopia at Dire Dawa cluster which has 19 branches and customers which is our total population form this number we exclude zero balance account and inactive, minimal balance accounts.

There are two methods to determine sample size. One method is to combine responses into two categories (users and non-users of mobile banking) and then use a sample size based on proportion.

The sample size can vary widely from one attribute to another because each is likely to have a different variance. Because of these problems, this study will apply proportionate to size method. Hence, for populations that are large, (Cochran, 1963) developed the Equation to yield representative sample for proportions and used by Aklog (2018).

$$n = \frac{pqZ^2}{e^2}$$

Where n = required sample size for this cross sectional survey's is proportion of the population containing the major interest i.e. proportion of mobile banking adopter from a total population of all customers of Commercial bank of Ethiopia at Dire Dawa cluster is taken 0.5. Because, it has large population but that do not know the variability in the proportion and could not got the previous related result; therefore, assume p=0.5 (maximum variability). In addition, q = (1 – p) = (1-0.5) = 0.5. Z is percentiles of the standard normal distribution corresponding to 95% confidence level which is equals to 1.96.e is margin of error which is 5%. Therefore, the sample size of the study will be 385.

$$n = \frac{0.5 * 0.5 * 1.96^2}{0.05^2} = \frac{0.9604}{0.0025} = 384.16$$

The study population needs to be represented adequately by enough sample size that selected through appropriate sampling technique. Hence, the study population is all customers of Commercial bank of Ethiopia at Dire Dawa cluster and the unit of analysis for this research is individual customers of Commercial bank of Ethiopia at Dire Dawa city.

Accordingly, two stage sampling technique was employed to select sample respondents. First 5 CBE bank (Sabiyan, Chimindfer, Madeya, Biftuadugna and Kefira) branches were selected out of 19 branches in the cluster area randomly. The 385 samples are also distributed to 5 branches based on probability proportion to sample size. For Sabiyan 180, Madeya 30 Chemindfer 105, Biftuadugna 20,Kefira 50 customers Eventually, the total of 385 samples was selected randomly and the selected customers based on the random number will be interviewed.

Table 1.1: summarizes the sampling distribution for each of the selected branches

Sample	Number of population	Corresponding sample size
Sabiyan Branch	50,006	180
Chimin De Fer Branch	14,682	105
Kefira Branch	16,901	50
Madiya Branch	8,648	30
Biftuadugna Branch	5,415	20

3.3.3. Methods of Data Analysis

This study will use both descriptive statistics and econometric methods.

3.3.3.1. Descriptive Analysis

Descriptive statistics such as mean, percentages, standard deviation, frequency of occurrence, chi-square and t-test was employed to analyze socio-demographic, economic and institutional characteristics of the respondents. The statistical significance of the variables was tested for both dummy and continuous variables using chi-square , respectively to compare the adopters and non-adopters of mobile banking.

3.3.3.2. Econometrics Model

The binary logit model was used to identify the factors that determine the adoption of mobile banking and OLS will also be used to determine the effect of mobile banking on saving habits of customers.

I. Binary Logit model

A logistic model will be used to investigate the factors influencing mobile banking adoption in Commercial bank of Ethiopia. The nature of this study is that the dependent variable mobile banking status is a dichotomous categorical variable (use of mobile banking). A logistic regression, namely binary logistic regression, is used to identify explanatory variables that are significantly related to the dependent variable. The logistic regression model is more effective and accurate when analyzing binary data as opposed to the simple linear regression The reasons for not using linear regression are There are no limits on the values predicted by a linear regression, so the predicted response (mean) might be less than 0 or greater than 1, which is clearly outside the realm of possible values for a response probability, the variance for each subpopulation is different and therefore not constant. Since the variance of a binary response is a function of the mean, then if the mean changes from subpopulation to subpopulation, the variance wills also change. Finally, Logistic regression is a practical tool for analyzing data with dichotomous dependent variables and has advantages over several other regression and discriminate analyses (Green *et al.,* 1998; Laukkanen, 2016). Logistic regressions will be used to explore behavioral intention for mobile banking adoption (e.g. Laukkanen&Pasanen, 2008; Laukkanen, 2016).Firdisa (2019) also used to identify the determinants of mobile banking adoption at Commercial Bank of Ethiopia in Case of Bako District.

According to Gujarati (1995), the logit model follows the maximum likelihood estimation technique, and assumes that the random variable follows the normal cumulative density function. It means that the likelihood of an event to occur happens when the utility exceeds a certain critical thresh hold level.

Drawing upon Gujarati (1995) and Aldrich and Nelson (1984) the Logit distribution function for the adoption of mobile banking is specified as:

$$\boldsymbol{p_i = \frac{1}{1+e^{-z_i}}} \quad \textbf{(1)}$$

Where p_i: is the probability of adoption of mobile banking.

Z_i: is a function of n- Explanatory variables (x) and expressed as:

$$\boldsymbol{Z_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_{in} X_n} \quad \textbf{(2)}$$

Where:

$ß_o$: is the intercept.

$ß_1$, $ß_{2,\ldots}ß_n$ are coefficients of the equation in the model.

P_i is not only non-linear in X but also in the $ß_i$'s, which can be written as:

$$\boldsymbol{P_i = \frac{1}{1+e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n)}}} \quad \textbf{(3)}$$

This means that we cannot use the OLS procedure to estimate the parameters. But this problem is more apparent than real because this equation is intrinsically linear, which can be shown as follows.

If P_i is the probability of adoption of mobile banking, then (1- P) the probability of not adoption of mobile banking can be written as:

$$\boldsymbol{1 - P_i = \frac{1}{1+ e^{z_i}}} \textbf{(4)}$$

Therefore, taking the ratio of the probability of adoption of mobile banking can be written as:

$$\frac{\mathbf{P_i}}{\mathbf{1-P_i}} = \frac{\mathbf{1+ e^{z_i}}}{\mathbf{1+ e^{-z_i}}} = \mathbf{e^{z_i}} \textbf{(5)}$$

Now $\frac{\mathbf{P_i}}{\mathbf{1-P_i}}$ is simply the odds ratio in favor of adoption of mobile banking.

Odds ratio; Is measure of association between an exposure and an outcome? The OR represents the odds that an outcome will occur given particular exposure, compared to the odds of the odds of the outcome occurring in the absence of that exposure.

It is the ratio of the probability that the customer will adopt mobile banking to the probability that he/she will not adopting. Finally taking natural log of equation 5 we get:

$$\boldsymbol{L_i = \ln \frac{P_i}{1-P_i} = Z_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_n X_{in}} \qquad \textbf{(6)}$$

Where L_i is log of the odds ratio, which is linear not only in X, but also in the parameters. Thus, if the stochastic disturbance term (U) is introduced, the Logit model becomes:

$$\boldsymbol{Z_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_{in} X_n + U_i} \qquad \textbf{(7)}$$

In reality, the significant explanatory variables do not all have the same level of impact on adoption of mobile banking. The relative importance of quantitative explanatory variables in participation decision can be measured by examining participation elasticity's, defined as the percentage change in probabilities that would result from a percentage change in the value of these variables.

To compute the elasticity, one needs to select a variable of interest, compute the associate P_i vary the X_p of interest by some small amount and recomputed the P_i, and then measure the rate of changes as:

$$\frac{dP_i}{dX_i}$$

Where: dX_i and dP_i stand for percentage change in the explanatory variable (X) and in the associated probability level (P_i) respectively.

When dXis very small, this rate of change is simply the derivative of P_i with respect to X and it is expressed as follows (Aldrich and Nelson, 1984).

$$\frac{dP_i}{dX_i} = \frac{\exp^{(z_i)}}{1 + exp^{(z_i)}} * \frac{1}{1 + exp^{(z_i)}} ß = P_i(1 - P_i) ß$$

The impact of each significant explanatory variable on the probability of adoption of mobile banking is calculated by keeping the continuous variables at their mean values and the dummy variables at their most frequent values (Zero or one).

An econometric software known as SPSS 25 and STATA 14 versions will be employed alternatively to run the Logit model.

3.4. 2Working Hypothesis and Definition of variables for Logit Model

Review of literatures on mobile banking studies, past research studies, and the researcher's knowledge on the topic will be used to establish working hypothesis of this study.

The dependent Variable of the logit model: The dependent variable of the model is adoption of mobile banking service. It is a dummy variable which has a value of 1 if the customer used mobile banking service and 0 if not.

The Independent Variables of the Study: The independent variables of the model are those which are hypothesized to have an association with adoption of mobile banking service. The potential explanatory variables which are hypothesized to determine adoption of mobile banking service by the customer are explained below.

Age (AGE): it is a continuous variable measured in the number of years the respondent alive from birth. The findings of imply that (Hosseing M *et al*., 2015; Joe Muzurura and Farai Chigora, 2019) as a consumer's age increases, the relative risk of adopting mobile banking would be increased. as people get older they are likely not to trust new technologies due to a combined effect caused by declining memory, fear of the unknown, lack of trust security concerns about privacy and confidentiality as well as old people might find mobile banking applications difficult to use as they grow older. Hence, this study hypothesized that higher age negatively related with adoption of mobile banking services.

Education (EDN): it is categorical variable measured in the highest formal education level completed of the respondents. It included illiterate, high school, diploma, degree, and master and above. The findings imply that educated people are likely to adopt new innovations such as mobile banking quickly since they are able to quickly discern issues like perceived usefulness and ease of use. They are also likely to have more knowledge on how to minimize risks and security concerns associated with the adoption of mobile banking (Joe Muzurura and Farai Chigora, 2019). Therefore, this study expected that higher educational level is related with utilization of mobile banking services positively.

Sex (SEX): it is a dummy variable that takes the value of 1 for male respondents and 0 otherwise. It can be assumed that males are more adopter of mobile banking services than females. This is confirmed the hypothesis that male use of mobile banking innovations increases adoption. (Worku , 2017). This is due to males and females differ significantly in several dimensions' males exhibiting more positive beliefs and attitudes about m-banking than females. They suggested that such differences stem from gender roles and socialization processes. Zinset (2016) and (Novo-Corti, Varela-Candamio, and García-Álvarez, 2014) also have found that the probability of adopting m-banking is lower among women compared with men. The low probability of women's adoption is generally because of their disadvantages compared with men in terms of access to education and employment.

Income (INCM): it is a continuous variable that refers to monthly income level of the respondent in Birr. A higher income amongst customers increase the likelihood of adopting mobile banking innovations is accepted (Kolodinsky *et al*., 2004; Daniel (2014); Worku Simachew, 2017). Accordingly, it is often postulated that customers with higher income levels are more likely to adopt mobile banking products than their counterparts with low income levels.

Occupation (OCPTN): it is dummy variable and takes the value of 1 if the respondents are employed, 0 otherwise. Occupational status is found as significant factor for adoption of mobile banking (Laekemaryam, 2016). Hence, mobile banking will give them time saving advantage by enabling customers to make banking transactions and payments such as payment of utilities and other bills, money transfer etc. without traveling to the bank branches.

Thus, this study expected that those belong to the high-level occupations are more likely to use mobile banking.

Residence Area (RSDARA): it is dummy variable and takes 1 if the respondent is living in urban areas, 0 otherwise. Individuals living in an urban area are more likely to be banked and get various banking services (Allen *et al.*, 2016; Klapper and Singer, 2015; Wentzel *et al.*, 2016). Moreover, those in a rural area were significantly less likely to have a bank account than those in urban areas were (Marybeth Rouse, 2020). Therefore, this study hypothesized that urban dwellers are more likely to adopt mobile banking services than rural residences.

Technology Awareness (TECAWR): it is dummy variable and takes 1 if who has technology awareness, 0 otherwise. It is the knowledge and skills to use the mobile banking technology. The adoption rate of an innovation could be determined by level of awareness of the Customers. Awareness has appositive and significant effect on intention to adopt mobile banking services (Wakungi R Ndinda, 2015; Gizachew kalkidan, 2016). Nebiyu (2017) customers will be rational on their decision if they have information. Since, they have got the right information on mobile banking their attitude changed positively. Hence, this study is anticipated positive relationship between technology awareness and adoption of mobile banking services.

Perceived Risk (PR): it is dummy variable and takes 1 if who perceived risk, 0 otherwise. It is **t**he degrees of risk that customers perceive and their own tolerance of risk tacking are factors that influence their purchase decision. Perceived risk can also cause customer to reject new technological service and it is related to reliability and system failure. Customers are also worried that technology based service delivery will not work as expected and lack confidence that problems can be solved quickly (Ravichandra D. *et al*., 2016). Perceived Risk was negative and significant effect on intention to adopt mobile banking (Nebiyu, 2017). Henceforth, this study hypothesized that Perceived Risk will be negatively correlated with the adoption of mobile banking services usage.

Perceived Easy to Use (PEU): it is dummy variable and takes 1 if who perceived easy to use, 0 otherwise. It is the degree to which a person believes that using a particular system would be from effort" (Davis, 1989). Perceived Ease of Use has a positive and significant effect on

intention to adopt mobile banking (Nebiyu, 2017; Mulualem Worku, 2015). As a result, this study is projected positive effect of perceived ease of use on the adoption of mobile banking services usage.

Perceived Usefulness (PUSF): it is dummy variable and takes 1 if who perceived usefulness, 0 otherwise. It is the degree to which a person believes that using a particular system would enhance their performance" (Davis, 1989). Perceived usefulness suggests a user believes that using a particular IT will be beneficial. The user must also have experience with information technologies. This experience gives the user a basis for evaluating the capabilities of information technologies and how and in what circumstances they may be useful. Perceived Usefulness has appositive relation and significant effect on intention to adopt mobile banking (Nebiyu, 2017; Gizachew Kalkidan (2016). Hence, this study is postulated that perceived usefulness has positive impact on the use of mobile banking services.

Perceived Credibility (trust) (PC): it is dummy variable and takes 1 if who perceived credibility, 0 otherwise. It is pertinent in risky situations and only relevant in contexts where decisions have to be made in situations that involve a degree of (perceived) risk. Since to trust essentially means to take risks and leave oneself vulnerable to the actions of trusted others. Customers don't rely on mobile banking because of threats associated with it. Perceived Trust has positive and significant effect on Intention to adopt mobile banking was confirmed (Ali Quazi and Milind Sathye, 2014; Nebiyu, 2017). Therefore, this study proposed that perceived credibility will affect the likelihood of mobile bank services utilization positively.

Perceived Self-efficacy (PSE): it is dummy variable and takes 1 if who perceived self-efficacy, 0 otherwise. It is an individual's self-confidence in his/her ability to perform a behavior. Taylor and Todd (1995) suggest that resources (i.e., time, money) and the individuals' "self-efficacy" are important elements affecting behavioral intention and actual technology use including the confidence that consumers have in using mobile banking to adopt mobile banking in other developing countries (Venkatesh*et al*., 2012; Ramdhony and Munien, 2013; Hanafizadeh *et al*., 2014). Joe Muzurura and Farai Chigora (2019) also identified that the higher the perceived self-efficacy the higher the probability of behavioral intention to adopt mobile banking services . So that this study is proposed positive correlation between perceived self-efficacy and adoption of mobile banking services.

Perceived Transaction Cost (PTC): it is dummy variable and takes 1 if who perceived transaction cost, 0 otherwise. It is defined as the extent to which a person believes that using mobile banking will cost money (Luarn and Lin, 2005). The cost may include the transactional cost in the form of bank charges, mobile network charges for sending communication traffic including SMS or data and mobile device cost. Accordingly, the study revealed that cost was a key factor stopping people from adopting mobile banking (Kilindini Branch Belynda M. Achieng and Boaz K. Ingari. 2015). Consequently, this study is hypothesized that perceived transaction cost will influence adopting mobile banking services negatively.

2. Ordinary Least Squares (OLS) model

The model also makes use of institutional theories (Sherraden, 1991; Beverly and Sherraden, 1999; Beverly et al., 2008), which relate to innovations in the financial sector that has seen the use of mobile phone financial services promoting access and use of financial services and used by Shem (2017). The model to be estimated is specified as follows:

$si = \alpha i + Xi\beta + Zi\gamma + \varepsilon i$

where *si*is dependent variable and is the proxy for savings or the savings ability for individual *i* which is continuous variable refers to the amount of annual average saved Birr in the account and *Xi* is usage of mobile banking by individual *i*. *Zi* is a vector of control Variables that influence saving at the household level such as sex, age, level of education, residence area (urban vis-à-vis rural), income, occupation, wealth status. While, εi is the statistical disturbance term.

3.5. Working Hypothesis and Definition of variables for OLS Model

Dependent variable is a continuous variable that refers to the amount of saved Birr the customers has in Commercial bank of Ethiopia at Dire Dawa cluster.

The description and hypothesized relationship of the variables in relation to the dependent variable are given below:

Independent variables

Mobile banking services usage: it is dummy variable and takes the value 1 if the customer use mobile banking services 0 otherwise. Mobile phone financial services usage represents those who use their mobile phones for financial services, e.g., to make payments, transfers, savings, etc. Those whose mobile phones are registered with the telecommunication service providers for such services are likely to use the opportunities offered by the mobile financial services to mobilize money or savings for personal or family use as well as entrepreneurship. Savings take different modes including basic mobile savings and bank integrated mobile savings. Mobile banking use affects the savings behaviors of individuals. (Jackline, 2019; Serge Ky, Clovis Rugemintwari, Alain Sauviat. 2017). Hence, this study hypothesized there is positive correlation between mobile banking usage and saving.

Age: it is a continuous variable measured in the number of years the respondent alive from birth. It influences savings patterns. Saving with mobile banking is associated with younger people who can easily maneuver and follow instructions on a mobile phone (technology use).(Musa and Annet, 2016). As people age towards most productive lives, they would tend to save more, but the savings are bound to dwindle as they approach their retirement age and eventually retire from productive work, in line with Life Cycle Hypothesis (LCH) (Shem *et al*., 2017). Therefore, this study hypothesized that age is positively or negatively related with saving.

Sex: it is a dummy variable that takes the value of 1 for male respondents and 0 otherwise. It does however increase the probability of saving for disadvantaged groups (rural, female and less educated individuals (Shem et al., 2017). Arguably, men tend to save formally while women tend to save informally in the merry go rounds and/or women groups, especially in rural and low-income areas. (Mani A. Nandhi. 2012). Accordingly, this study is hypothesized that male are likely to save in bank than females.

Education: it is categorical variable measured in the highest formal education level completed of the respondents. It included illiterate, high school, diploma, degree, and master and above. Literature has demonstrated that those with higher levels of formal education tend to save more. Education have positive and significant coefficient indicates that increasing the education level is positively and significantly correlated with the propensity to save (Serge et al., 2017). Moreover, highly educated individuals may have better access to credit in formal

financial
institutions than less educated individuals as they may be more financially literate (Jackline, 2019). Therefore, this study will be expected that there is positive correlation between level of education and saving practices of the customers.

Income: it is a continuous variable that refers to monthly income level of the respondent in Birr. High income individuals are concerned; our results show a positive and highly significant coefficient of usage of mobile money on the propensity to save the existence of a "threshold income" effect beyond which the use of mobile money is positively and significantly associated with saving (Musa, 2016). Consequently, the level of income is positively related with the saving Practice of customers.

Occupation: It is a dummy variable and indicate the employment status of respondent, Encoded as (Employed privately, OWN BUSINESS, NGO, Government EMP) = 1, (Unemployed, Student) = 0. Individual's employment status (*occupation)* gives important information that may determine their saving behavior. Intuitively, individuals who have a paid activity are more inclined to save than unemployed people. Individuals having a paid activity are more likely to save to develop an activity than those without a Paid activity (Serge et al., 2017). Thus, this study is hypothesized that occupation is positively related with saving habit of customers.

Residence area: it is dummy variable and takes 1 if the respondent is living in urban areas, 0 otherwise. Registered mobile money users in rural areas are less likely to save with mobile money compared with their urban counterparts (Jackline, 2019). In urban areas where formal financial institutions tend to be dense, people are likely to save more compared to the rural areas (Serge *et al*., 2017). As a result, this study is expected that urban dwellers save more than the rural residents.

Technology awareness: it is the dummy variable and takes the value of 1if the customer aware the technology, 0 otherwise. The greater the customer awareness of mobile banking technology, the more likely the customer uses mobile banking to save more (Abel, 2019). Hence, this study is expected technology awareness will affect saving behavior positively.

4. RESULT AND DISCUSSION

This chapter is focused on description of respondents profile results, discussions of the factors affecting the adoption of mobile banking services by using Binary Logit model and the effect of mobile banking service utilization on saving habits using OLS model.

4.1. Profile of Respondents

1. Sex of the respondents

The results of Chi square tests indicated that mobile banking service adopter customers were mainly found to be male (70.93%). While, non-adopter were also mostly found to be females (29.06%). It is statistically significant at 5% level (Table 1). There is also significantly difference between male and female customers related to adoption of mobile banking usage at less than 5% probability level.

Table 1: Sex of respondents

Variable	Description	Adoption of Mobile Banking Services							
		Adopter (258)		Non-Adopter (127)		Total (385)		Chi^2	Prob
		#	%	#	%	#	%		
Sex	Female	75	29.06	95	74.80	170	44.15	12.32**	0.013
	Male	183	70.93	32	25.19	215	55.84		
	Total	258	100	127	100	385	100		
***, ** and * are significant at less than 1%, 5% and 10% probability level respectively									

Source: Survey results and own computation, 2022

2. Age of the respondents

The cross-tabulation result shown in Table 2 that the most mobile banking service adopter aged group is 26-35 years which covers 37.98 while the least adopter group is above 55 years (7.36%). The dominant non-adopter age group is 46-55 years (33.86%) and the lowest non-adopter is found at the age above 55 years (8.66%).

Besides, the age of the respondents is found to be statistically significant to differentiate the adopter and non-adopter of mobile banking utilizer at less than 10% probability level.

Table 2: Age of respondents

Variable	Description	Adoption of Mobile Banking Services							
		Adopter (258)		Non-Adopter (127)		Total (385)		Chi^2	Prob
		#	%	#	%	#	%		
Age group	18 to 25	56	21.71	27	21.26	83	21.56	25.34***	0.062
	26 to 35	98	37.98	17	13.39	115	29.87		
	36 to 45	55	21.32	29	22.83	84	21.82		
	46 to 55	30	11.63	43	33.86	73	18.96		
	above 55	19	7.36	11	8.66	30	7.79		
	Total	258	100.00	127	100.00	385	100.00		
***, ** and * are significant at less than 1%, 5% and 10% probability level respectively									

Source: Survey results and own computation, 2022

3. Education level of respondents

Furthermore, the results of the study in Table 3 revealed that degree holders (47.67%) were highly adopted the mobile banking service and illiterates (2.71%) were the least adopter. However, diploma completed respondents (27.56%) were larger non-adopter and illiterates were the smaller non-adopter group. In addition, there is statistically significant variation between adopters and non-adopters at less than 1% probability level.

Table 3: Educational level of respondents

Variable	Description	Adoption of Mobile Banking Services							
		Adopter (258)		Non-Adopter (127)		Total (385)		Chi^2	Prob
		#	%	#	%	#	%		
Education Level	High school	17	6.59	29	22.83	46	11.95	108.32***	0.001
	Diploma	65	25.19	35	27.56	100	25.97		
	Degree	123	47.67	31	24.41	154	40.00		
	Masters and above	46	17.83	17	13.39	63	16.36		
	Illiterate	7	2.71	15	11.81	22	5.71		
	Total	258	100.00	127	100.00	385	100.00		
***, ** and * are significant at less than 1%, 5% and 10% probability level respectively									

Source: Survey results and own computation, 2022

4. Occupational status of respondents

The results of the study in Table 4 also indicated that business owners (24.42%) utilized mobile banking services more while (24.41%) were non-adopter. However, privately employed respondents (26.77%) and unemployed (14.96%) were mainly non-adopters of mobile banking services respectively. Similarly, occupation is not statistically significant to indicate the disparities between adopters and non-adopters.

Table 4: Occupational status of respondents

Variable	Description	Adoption of Mobile Banking Services							
		Adopter (258)		Non-Adopter (127)		Total (385)		Chi^2	Prob
		#	%	#	%	#	%		
Occupation	Unemployed	14	5.43	19	14.96	33	8.57	119.154	0.614
	Employed privately	81	31.40	34	26.77	115	29.87		
	Own Business	63	24.42	31	24.41	101	26.23		
	NGO	44	17.05	21	16.54	58	15.06		
	Government Employee	56	21.71	22	17.32	78	20.26		
	Total	258	100.00	127	100.00	385	100.00		
***, ** and * are significant at less than 1%, 5% and 10% probability level respectively									

Source: Survey results and own computation, 2022

5. Monthly income

The chi square test result shown in Table 5 that the most mobile banking service users obtained above 10,900 Birr monthly income which covers 34.50% while the least adopter got 0-1650 Birr (6.20%). Similarly, the leading non-adopter is under income group of 7,801-10,900 and they are accounted for (22.83%). The bottommost non-adopter got 1651-3200 Birr monthly salary and accounted for (7.87%). Farther, the monthly income of the respondents is found to be statistically significant to distinguish the adopter and non-adopter of mobile banking utilizer at less than 1% likelihood level.

Table 5: Monthly income of the respondents

Variable	Description	Adoption of Mobile Banking Services							
		Adopter (258)		Non-Adopter (127)		Total (385)		Chi^2	Prob
		#	%	#	%	#	%		
Monthly income in Birr	0-1650	16	6.20	11	8.66	27	7.01	127.32	0.000
	1651-3200	36	13.95	10	7.87	46	11.95		
	3201-5250	37	14.34	26	20.47	63	16.36		
	5251-7800	45	17.44	23	18.11	68	17.66		
	7801-10900	35	13.57	29	22.83	64	16.62		
	above 10,900	89	34.50	28	22.05	117	30.39		
	Total	258	100.00	127	100.00	385	100.00		
***, ** and * are significant at less than 1%, 5% and 10% probability level respectively									

Source: Survey results and own computation, 2022

6. Residence Area

The results in Table 6 reveal that 71.71% of the mobile banking service users dwelled in urban while 28.29% of them lived in rural areas. Likewise, 73.23% of non-adopters were rural resident and 26.77% of non-adopters were inhabited in urban centers. Additionally, the type of residence area found to be statistically significantly differentiating the existing disparity between adopters and non-adopters at less than 5% probability level.

Table 6: Residence areas of respondents

Variable	Description	Adoption of Mobile Banking Services							
		Adopter (258)		Non-Adopter (127)		Total (385)		Chi^2	Prob
		#	%	#	%	#	%		
Residence Area	Urban	185	71.71	34	26.77	219	56.88	37.23	0.0451
	Rural	73	28.29	93	73.23	166	43.12		
	Total	258	100.00	127	100.00	385	100.00		
***, ** and * are significant at less than 1%, 5% and 10% probability level respectively									

Source: Survey results and own computation, 2022

4.2. Mobile Banking Services usage

The results of the study indicated that 258 (67.01%) of the respondents have used mobile banking services while 127 (32.99%) of them have not utilized (Table 1-6).

Table 6.1. Mobile Banking Services usage

S.N	Are you active mobile banking user	Total	
		#	%
1	Yes	258	67.01
2	No	127	32.99

The mobile banking service user respondents also reported that most of them (73.26%) started using mobile banking services with in less than one year and 26.74% of the used for more than one year (Table 7).

Table 7: Starting time of mobile banking service usage

S.N	How long you have been using mobile banking?	Total	
		#	%
1	Less than 1 year	252	73.26
2	Greater than 1 year	133	26.74
	Total	**385**	**100.00**

Source: Survey results and own computation, 2022

Moreover, knowing the rate of mobile banking service usage for certain services provided is essential and provides valuable comment for management of banks. This is because it could give an indication whether the service is meeting customer needs or not.

Table 8: Rate of mobile services usage

S.N	Type of service	Mean	Std. Deviation	Minimum	Maximum	No of respondents
1	Balance Inquiry	3.85	0.997	0	4	385
2	Own Account Transfer (Transfer between your accounts)	1.82	1.011	0	4	385
3	For Utility Payment	2.35	1.012	0	3	385
4	Payment to others (Transfer to any CBE account)	1.72	0.873	0	3	385
5	To Buy Air Time (Top-up Service)	3.52	0.962	0	4	385

Source: Survey results and own computation, 2022

Hence, customers were asked to rate how frequently they used the services ranging from never to always on a numerical scale of 0-4 (0-never to 4 always) to measure frequency of use of mobile banking services for the particular task. The results of the respondents rating in Table 8 indicated that balance inquiry and to buy air time utilities were dominantly usage services with the mean value of 3.85 and 3.52 respectively. And also the least usage by customers was payment to others (transfer to any cbe account) what the bank have to dig out the reason of why the customer are not using this service this one is the core one when we

compare it from other service and the same is also true for own account transfer (Transfer between your account) which resulted mean value of 1.82 which was the next least one.

4.3. Factors Affecting Adoption of Mobile Banking Services

The respondents of the study were also requested to rate how important the identified factors were in influencing their decision to sign up for mobile banking ranging from strongly Disagree (1) to Strongly Agree (5) on a numerical scale. Accordingly, the results in Table 9 revealed that the higher average mean score calculated factor is technology awareness (3.8935); the 2nd factor is perceived ease to use (3.8507); the 3rd factor is perceived usefulness (3.4854) whereas the least factor is perceived transaction cost (2.0113). This is vital for mobile banking service providers to understand the factors which determine the adoption of mobile banking in order to be able to provide services which meet the clients' anticipations and demand.

Table 9: Factors affecting adoption of Mobile banking services

S.N	Factors affecting adoption of Mobile banking services	Mean	Std. Deviation	Minimum	Maximum	No of respondents
1	Perceived usefulness	3.4854	0.6676	1.00	4.54	385
2	Perceived ease of use	3.8507	0.6779	1.14	4.67	385
3	Perceived Credibility	2.6215	0.8523	1.14	5.00	385
4	Perceived Self-Efficacy	2.9358	0.6191	1.59	4.09	385
5	Perceived Risk	2.3985	1.0347	1.00	4.54	385
6	Perceived Transaction cost	2.0113	0.8111	1.00	5.00	385
7	Technological Awareness	3.8935	0.8032	1.21	4.54	385

Source: Survey results and own computation, 2022

In addition, Table 10 showed that 67.83% of the respondents are using mobile banking regularly after they signed up for the service. When signed up the service 61.63%, of the respondents had mobile phone that supports the service and 65.89% of the respondents did not have to purchase a mobile phone that supports the service. About 72.48% of the respondents thought their income influence their usage of mobile banking. When requested about security

problem, 66.28 % of them stated there were security concerns that have been raised while using mobile banking. Out of the total 56.59% of them assumed the bank's advertisement on mobile banking was interesting enough to encourage and 77.13% of them believed their attitude towards change affects their usage of mobile banking.

Table 10: Mobile banking service usage practices

S.N	Mobile banking service usage practices	Response					
		Yes		No		Total	
		Frq.	%	Frq.	%	Frq.	%
1	Are you using mobile banking regularly after you signed up for the service?	175	67.83	83	32.17	385	100.00
2	Did your mobile phone support mobile banking at the time you signed up the service?	159	61.63	99	38.37	385	100.00
3	Did you have to purchase a phone that supports the service?	88	34.11	170	65.89	385	100.00
4	Does your income influence your use of mobile banking?	187	72.48	71	27.52	385	100.00
5	Are there any security concerns that have been raised concerning your bank's mobile banking services	171	66.28	87	33.72	385	100.00
6	Do you find your bank's advertisements on mobile banking appealing or interesting enough to encourage customers to sign up?	146	56.59	112	43.41	385	100.00
7	Does your attitude towards change (how you perceive change) affect your use or uptake of mobile banking	199	77.13	59	22.87	385	100.00

Source: Survey results and own computation, 2022

4.4. Econometrics Model Analysis

4.4.1. Selection Variables for Binary Logit Model

Binary Logit model was employed to estimate the effects of the hypothesized explanatory variables on the probabilities of using mobile banking services. Data was subjected to STATA 14 for WINDOWS to undertake the econometrics analysis. Prior to the estimation of the model parameters, it is crucial to look into the problem of multicollinearity or association among the potential candidate variables. Hence, the variance inflation factor (VIF) was used to test the degree of multicollinearity among continuous and dummy variables (Table 11). The values of VIF for variables were found to be small (*i.e.* VIF values less than 10). Based on the VIF result, the data have no serious problem of multicollinearity. As a result, all the explanatory variables were retained and entered into Binary Logit analysis.

Table 11: Variance Inflation Factors (VIF) of the Explanatory Variables

S.N	Variable	VIF	1/VIF
1	**Age (AGE)**	1.15	0.869
2	**Education (EDN)**		
	High school Completed	1.18	0.848
	Diploma Completed	1.12	0.892
	Masters and above	1.14	0.877
	Illiterate	1.17	0.855
3	**Sex (SEX)**	1.06	0.941
4	**Income (INCM)**	1.18	0.848
5	**Occupation (OCPTN)**	1.96	0.510
6	**Residence Area (RSDARA)**	2.00	0.500
7	**Perceived Usefulness (PUSF)**	1.30	0.772
8	**Perceived Easy to Use (PEU)**	1.13	0.884
9	**Perceived Credibility (PC)**	1.03	0.967
10	**Perceived Self-efficacy (PSE):**	1.03	0.967
11	**Perceived Risk (PR)**	1.15	0.869
12	**Perceived Transaction Cost (PTC)**	1.15	0.869
13	**Technology Awareness (TECAWR)**	1.34	0.744
	Mean VIF	1.26	

Source: Survey results and own computation, 2022

Similarly, the contingency coefficients, which measure the association between various dummy and categorical variables based on the chi-square, were computed in order to check the degree of association among the discrete variables. The values of contingency coefficient ranges between 0 and 1, in which zero indicates no association between the variables and values close to 1 indicates a high degree of association. The acceptable level of correlation between each pair of the independent variables should be at 0.80 or less (Bryman and Cramer, 1999). Accordingly, there was no serious problem of association among discrete explanatory variables as the contingency coefficients did not exceed 0.75 which is often taken as a cut-off point. Hence, all the ten dummy and one categorical variables were entered into Binary Logit analysis (Table 12).

Table 12: Contingency Coefficient for Dummy and Categorical Explanatory Variables for Binary Logit model

Variable	High school	Diploma	Masters and above	Illiterate	SEX	OCPTN	RSDARA	PUSF	PEU	PC	PSE	PR	PTC	TECAWR
High school	1.00													
Diploma	0.015	1.000												
Masters and above	0.061	0.416	1											
Illiterate	0.249	0.501	0.363	1										
SEX	0.357	0.066	0.085	0.503	1.00									
OCPTN	0.512	0.216	0.253	0.009	0.099	1								
RSDARA	0.421	0.057	0.055	0.057	0.043	0.098	1							
PUSF	0.045	0.063	0.351	0.293	0.011	0.038	0.443	1						
PEU	0.096	0.310	0.057	0.510	0.037	0.3750	0.406	0.091	1					
PC	0.408	0.255	0.012	0.066	0.021	0.437	0.007	0.003	0.441	1				
PSE	0.018	0.001	0.451	0.168	0.071	0.258	0.067	0.304	0.069	0.331	1			
PR	0.072	0.032	0.069	0.092	0.008	0.004	0.063	0.003	0.081	0.057	0.351	1		
PTC	0.316	0.022	0.083	0.076	0.308	0.503	0.307	0.005	0.502	0.033	0.058	0.61	1	
TECAWR	0.067	0.131	0.502	0.409	0.118	0.009	0.299	0.018	0.301	0.221	0.061	0.331	0.450	1

Source: Survey results and own computation, 2022

4.4.2. Econometrics results of Binary Logit model

The overall goodness of fit for the binary Logit model parameter estimates was assessed. Hence, the log likelihood ratio test is applied to assess the overall joint significance of the independent variables in explaining the variations in the customers' likelihood to adopt mobile banking services. The null hypothesis for the log likelihood ratio test is that all coefficients are jointly zero. The model chi-square tests applying appropriate degrees of freedom indicate that the overall goodness of fit of the Logit model is statistically significant at a probability of less than 1%. This shows that jointly the independent variables included in the Logit model regression explain the variations in the customers' probability to use mobile banking services. The McFadden's Pseudo R^2 is also calculated and the values indicated that the independent variables included in the regression explain significant proportion of the variations in the customers' probability to use mobile banking services (Table 13). Accordingly, a set of 13 variables were included in the model and used in the logistic regression analysis. These variables were selected based on the theoretical explanations and empirical studies that have been undertaken before.

Table 13: Results of estimates of the Binary Logit for adoption of mobile banking services

Binary logistic regression			Number of obs=385	
			LR chi2(16)=464.40	
			Prob > chi2= 0.0000	
Log likelihood= -11.923462			Pseudo R2=0.9512	
Adoption of mobile banking services				
Variables	Odds Ratio	Std. Err.	z	P>z
AGE	210.3328*	647.351	1.74	0.082
EDN				
1	0.041	0.168	-0.78	0.435
2	0.020	0.061	-1.29	0.195
3	3.211	10.183	0.37	0.713
4	0.123	0.532	-0.49	0.627
SEX	2.422	7.8636	0.27	0.785
INCM	1.001*	0.0002	1.84	0.066
OCPTN	0.052	0.1414	-1.09	0.277
RSDARA	1.073	1.8896	0.04	0.968
PUSF	7.514*	8.8212	1.72	0.086
PEU	9.014**	9.2398	2.14	0.032
PC	2.599*	1.4191	1.75	0.08
PSE	4.458**	3.1842	2.09	0.036
PR	0.938	0.3406	-0.18	0.859
PTC	0.124**	0.1132	-2.29	0.022
TECAWR	5.618*	5.2045	1.86	0.062
_cons	7.71E-10	5.60E-09	-2.89	0.004
***, ** and * are significant at less than 1%, 5% and 10% probability level respectively				
Source: Survey results and own computation, 2022				

Besides, among 13 explanatory variables 8 variables were found to be statistically significant to determine the likelihood of adopting mobile banking services. Perceived transaction cost were negatively related while being monthly income , perceived usefulness, perceived easy to use, perceived credibility, perceived self- efficacy and technology awareness were positively correlated.

Age (AGE): It found to be positive and significantly related less than 10% significant level

With the probability of adoption of mobile banking services. The odds ratio of 210.33 for the age of the customer implies that, other things being constant, increasing the age increases the probability of using mobile banking services by factor of 210.33. This is not in line with the proposed hypothesis and the findings of (Hosseing M *et al*., 2015; Joe Muzurura and Farai Chigora, 2019).The reason behind this might be as age increases individual experience of using technology and also might have an access to buy modern mobile cell phones.

Income (INCM): it is revealed that monthly income in Birr of the customer is positively and significantly correlated with the likelihood of adopting mobile banking services at less than 10% probability level. The odds ratio of 1.001 for the monthly income infers that, other things being constant, increasing the income by one Birr increases the probability of using mobile banking services by factor of 1.001. This is consistent with the anticipated hypothesis and the results of (Kolodinsky *et al*., 2004; Daniel (2014); Worku Simachew, 2017). This might be explained that customers with higher income levels are more likely to demand mobile banking products that make easy to access their money whenever they want than their counterparts with low income levels.

Perceived Usefulness (PUSF): It is positively and significantly correlated with the likelihood of adopting mobile banking services at less than 1% probability level. The value of the odds ratio 1.048 indicated that good perception of the mobile banking service increased the chances of adoption by the factor of 1.048. This is also in consistent with the assumed correlation and the study of Nebiyu (2017) and Gizachew Kalkidan (2016) indicated similar findings. This may be elaborated that if a user believes that using a particular innovation will be beneficial she/he will be enthusiastic to use the technologies for the intended purpose immediately.

Perceived Easy to Use (PEU): it is also positively and significantly affected the adoption of mobile bank services as predicted at less than less than 1% probability level and increased its rate of adoption by the factor of 2.508 as the odds value indicated. Likewise, Nebiyu (2017) and Mulualem Worku (2015) were found similar correlation between them. This may be elucidated that the information technologies and innovations which are simple to use can be adopted easily within short period of time.

Perceived Credibility (PC): It is influenced the adoption of mobile bank services positively and significantly as forecasted at less than 1% probability level. And the value of odds ration indicated that it increased the likelihood of utilization by 1.406 factor. This is may be because to trust any IT fundamentally means to take risks and leave one vulnerable to the actions of trusted others in using the innovations. Moreover, Ali Quazi and Milind Sathye (2014) and Nebiyu (2017) identified the same results.

Perceived Self-efficacy (PSE): the value of the odds ratio of 1.362 revealed that is positively influenced the adoption of mobile banking service and increased its rate of adoption by 1.362 factors. Farther, it is statistically significant at less than 5% probability level. This might be illuminated that persons' abilities are essential elements persuading behavioral intention and actual technology use including the confidence that consumers have in using mobile banking. Similarly, Venkatesh*et al*., (2012); Ramdhony and Munien,(2013); Hanafizadeh *et al*., (2014) as well as Joe Muzurura and Farai Chigora (2019) found the same results. It is also in line with the assumed hypothesis.

Perceived Transaction Cost (PTC): It is negatively and significantly related with the adoption of mobile banking services at less than 5% probability level with the odds ratio value of 0.589 that decreased the probability of adoption proportion of mobile banking by the factor of 0.589. This is might be due to high transactional cost in the form of bank charges, mobile network charges for sending communication traffic including SMS or data and mobile device cost can discourage customers to use the services. This is also similar results with the study of Kilindini *et al*., (2015) and predicted assumption of the study.

Technology Awareness (TECAWR): it influenced the adoption of mobile bank services positively and statistically significant at less than 5% probability level as forecasted and increased the rate of adoption by 2.244 factors. This may be because being conscious on technology benefits and having knowledge and skill to use innovations like mobile for bank services encourage customers to adopt effectively. This is also identical with the findings of the study conducted (Wakungi R Ndinda, (2015); Gizachew kalkidan, (2016); Nebiyu (2017)).

4.4.3. Selection Variables for OLS Model

The OLS model is employed to identify the effect of mobile banking services usage on saving habits of customers using STATA 14 version for windows. Before the estimation the presence of multicollinearity among dummy and continues independent variable and within continuous independent variables were tested using Variance Inflation Factor (VIF).

Table 14: Variance Inflation Factor (VIF) of explanatory variable for OLS model

S.N	Variable	VIF	1/VIF
1	Mobile banking service usage (MBSU)	2.15	0.465
3	Age (AGE)	3.14	0.318
3	Education (EDN)		
	High school Completed	1.53	0.654
	Diploma Completed	4.21	0.238
	Masters and above	1.33	0.752
	Illiterate	2.87	0.348
4	Sex (SEX)	1.92	0.521
5	Income (INCM)	2.51	0.398
6	Occupation (OCPTN)	1.24	0.806
7	Residence Area (RSDARA)	3.60	0.278
8	Technology Awareness (TECAWR)	1.74	0.575
	Mean VIF	2.39	

Source: Survey results and own computation, 2022

The computed VIF result for each variable in **Table 14** is less than 10 which also indicates absence of Multicollinearity among the explanatory variables. Therefore, all dummy and continuous hypothesized variables included in the model.

Similarly, the contingency coefficients, which measure the association between various dummy and categorical variables based on the chi-square, were computed in order to check the degree of association among the discrete variables. The acceptable level of correlation between each pair of the independent variables should be at 0.80 or less (Bryman and Cramer, 1999). Accordingly, there was no serious problem of association among discrete explanatory variables as the contingency coefficients did not exceed 0.75 which is often taken as a cut-off point (Table 15).

Table 15: Contingency Coefficient of Dummy and Categorical Explanatory Variables for OLS model

Variable	MBSU	High school	Diploma	Masters and above	Illiterate	SEX	OCPTN	RSDARA	TECAWR
MBSU	1								
High school	0.006	1.00							
Diploma	0.050	0.109	1.000						
Masters and above	0.035	0.160	0.086	1					
Illiterate	0.043	0.047	0.084	0.073	1				
SEX	0.123	0.092	0.029	0.045	0.100	1.00			
OCPTN	0.019	0.063	0.091	0.136	0.100	0.029	1		
RSDARA	0.030	0.015	0.034	0.109	0.155	0.003	0.225	1	
TECAWR	0.513	0.037	0.022	0.471	0.294	0.118	0.353	0.137	1

Source: Survey results and own computation, 2022

4.4.4. Econometrics results of OLS model

The overall goodness of fit of the OLS model conducted that indicated by F-test results. The probability (*Prob > F*) tests whether the independent variables have no power to explain the dependent variables or not. Given a p-value of 0.000% we can reject the null hypothesis. In other words, the null hypothesis is that joint test whether all the coefficients are equal to zero or not. We can reject such a hypothesis and conclude that jointly the coefficients are significantly different from zero and they can predict the dependent variable (saving habits of the customers).

R^2 is the percentage of the variance of the dependent variable to the variance of the independent variable. Thus, how much of the variation in the dependent variable that can be explained by the independent variables. The *coefficient of determination*, or R^2, is also a measure that provides information about the goodness of fit of a model. In the context of regression it is a statistical measure of how well the regression line approximates the actual data. It is therefore important when a statistical model is used either to predict future outcomes or in the testing of hypotheses. (Table 16).

Table 16: Results of estimates of the OLS for effect of mobile banking services on saving habits

Source	SS	df	MS	Number of obs =385
				F(11, 373)=4.89
Model	5.72E+09	11	519843483	Prob > F=0.0000
Residual	3.96E+10	373	106268801	R-squared=0.1261
				Adj R-squared=0.1003
Total	4.54E+10	384	118115992	Root MSE=10309
Saving	Coef.	Std. Err.	T	P>t
ADOPTMOB	3961.212**	1870.06	2.12	0.035
INCM	0.1003***	0.02104	4.76	0.000
AGE	-65.867	85.6785	-0.77	0.443
EDN				
1	1620.257	2562.05	0.63	0.528
2	-369.035	2536.4	-0.15	0.884
3	309.040	2609.67	0.12	0.906
4	5120.990*	2915.54	1.76	0.08
SEX	-377.965	1480.53	-0.26	0.799
OCPTN	-677.509	1143.88	-0.59	0.554
RSDARA	-207.030	1241.15	-0.17	0.868
TECAWR	-530.046	612.217	-0.87	0.387
_cons	12230.460	4085.17	2.99	0.003

***, ** and * are significant at less than 1%, 5% and 10% probability level respectively
Source: Survey results and own computation, 2022

Accordingly, the OLS model was estimated to show the effect of mobile banking usage on saving habits of the customers, in which mobile banking services adoption, having a Master degree, monthly income influenced amount of saving in the bank positively and significantly. (Table 16).

Mobile banking service usage (MBSU): it is positively and significantly affected the amount of saving of customers at less than 1% probability level. The value of its coefficient indicated that holding all other variables constant using the mobile banking services increases the amount of saving in Birr by 1.8601 units. This is may be mobile phones and network providers for such services are likely to create the good prospects offered by the mobile financial

services to mobilize money or savings for personal or family use as well as entrepreneurship. Savings take different modes including basic mobile savings and bank integrated mobile savings. It is the expectation of this study and in line with the findings of Jackline, (2019), and Serge et al., (2017).

Education (EDN): Those who have advanced level of formal education (Master and above) statistically associated with saving at less than 10% probability level positively and increased the savings by 1.3187. An explanation for this phenomenon is that those who are more educated have high literacy on savings issues and may use it for long term investments loan. This is similar with the prediction and coincided with the findings of Serge et al., (2017) and Jackline (2019).

Sex (SEX): is negative and statistically significant for having a savings at less than 5% probability level. This indicates that the likelihood to more savings product is high among females than males. Hence, being male decreased the savings by 0.5066 units. This may be the sociocultural settings in dire Dawa area where women are the main financial decision makers and are more likely and engage in savings groups and to save for future activities than men. It is consistent with the findings by Suri and Jack (2016) who found that women save with the aim of changing their occupational choice from agriculture into business rather than for short-term purposes.

Income (INCM): Monthly income is positively and statistically significantly related with the savings at less than 5% probability level as predicted. Holding all others variable constant it increased the amount of saving by 1.3079 units as monthly income by one Birr. This may be explained that mobile owners were wealthier customers who utilized mobile money on the tendency to save the existence of income effect as similar findings of Musa (2016) observed.

Residence Area (RSDARA): urban dwellers were positively and significantly influenced the saving habits at less than 5% probability level as forecasted and increased the amount by 0.2432 units. The may be rural residents have less access to formal financial services because the institutions are mostly located in urban centers which are difficult to access like World Bank (2016) findings confirmed.

Technology Awareness (TECAWR): it is positively and significantly affected the savings at less than 5% probability level as projected and increased the saving by 2.0325 units. This might be briefed that customers with more knowledge and skill about the technology are more likely to operate mobile banking to save more and Abel (2019) also found out similar study results.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

This study was also able to conceptualize how Perceived usefulness, perceived ease of use, perceived credibility, perceived Self-efficacy, perceived Risk, perceived cost affect mobile banking adoption. In this study a five (5) Likert Scale was used to measure all of the variables. Conclusions drawn on the determinant factors influencing consumers' adoption of mobile banking are:

. Perceived usefulness was found to have a positive significant influence on mobile banking adoption which indicates that the sample is aware of the importance of perceived usefulness.

 The perception of ease of use was also found to have a positive significant influence on mobile banking adoption.

 Perceived Self-Efficacy found to have a positive significant influence on mobile banking adoption. This implies that users' knowledge, ability and skills are needed to use the new information technology.

 The perception of transaction cost has emerged in this study as negatively and significantly influence on customers' adoption of mobile banking. Therefore the study implies that the cost consideration of mobile banking users of CBE did prevent them to use mobile banking services.

Perceived Risk has emerged in this study as negatively but insignificant influence on customer's adoption of mobile banking. Therefor the study implies that the risk consideration of mobile banking users of CBE did not prevent them to use mobile banking service.

Technology Awareness customers will be rational on their decision if they have information. Since, they have got the right information on mobile banking their attitude changed positively. Hence, this study is anticipated positive relationship between technology awareness and adoption of mobile banking services.

Financial services inclusions landscapes of Ethiopia are changing rapidly thanks to the growing mobile phone financial services. The change is positive given that hitherto unbanked or under-banked segments of the population are being reached by affordable, accessible and

sustainable financial services through mobile phones. Mobile banking service are the most accessible to both men and women living in urban and rural areas. They are just walking distances away to their users. Besides the mobile money transfer services, usage of mobile financial services is skewed towards savings, proving the earlier literature right that previously unbanked segments of the population need not only credit facilities, but also savings facilities that suit their lifestyles and entrepreneurial practices Mobile banking are bridging this gap by enabling them save conveniently from the comfort of their homes or the vicinity of their business sites, solving both the problems of distance and transaction costs that have hindered traditional financial services providers in the past from tapping the resources of these market segments. Use of mobile phones financial services should therefore be encouraged and enhanced throughout the country.

The empirical results based on Dire Dawa city branches provide evidence regarding the impact of mobile financial services on savings. Those who utilize mobile financial services are more likely to save than those who do not. Deepening and expanding the scope of mobile financial savings is an avenue for promoting and mobilizing savings particularly for the poor and low income earners who have limited access to the formal banking system. The accessibility, convenience, affordability and the safety associated with mobile financial services is a major catalyst in the expansion and growth of mobile financial services

This study is aimed to show the effects of using mobile banking services on savings in Dire Dawa areas although saving is not yet common practices in Ethiopia generally and Dire Dawa particularly. This study demonstrated that among 13 explanatory variables 8 variables were found to be statistically significant to determine the likelihood of adopting mobile banking services. perceived transaction cost was negatively related while master and above holder, monthly income, perceived usefulness, perceived easy to use, perceived credibility, perceived self- efficacy and technology awareness were positively correlated.

Farther, the estimated effect of mobile banking adoption on saving habits of the customers indicated that mobile banking services usage, Master degree, monthly income, influenced amount of saving in the bank positively and significantly.

5.2. Recommendations

The following propositions are forwarded based on the findings of the study to enhance savings by using mobile banking services effectively. Accordingly, mobile financial services predominantly excluded poor, female, rural dwellers, low educated and aged customers who have limited access to mobile banking services. As a result, banking sectors should continue to innovate and invest in mobile banking services which allow poor, female, rural dwellers, low educated and aged customers to have more alternatives and get more values from mobile banking services.

The CBE banks should make their mobile banking as simple and easy to use as possible so that customers do not perceive them as being complicated or difficult to use. The bank should emphasize in designing different banking features of the service considering customers' lifestyle, culture and language. Besides, the bank needs to project higher security when providing mobile banking services and let its customers know how the security issue is reveled in order to yield higher customers' recognition.

Mobile money as a store of value encourages females and urban residents to save for future use while looking at mobile money as a medium of exchange would encourage users save money for short-term purposes such as emergencies. Therefore, the bank needs to design and expand the mobile banking services in rural areas and for females.

Higher education and more technology awareness are the determinant factors both adoption of mobile banking services and savings. Hence, the bank needs to improve public awareness and innovation knowhow through sensitization, mainstream media, social media etc. to expand its services throughout both rural and urban area.

Moreover, additional research could also be done to evaluate how mobile banking contributes to cashless banking, whether it complement or substitute internet banking and how it can be incorporated with internet banking, bearing in mind the traditional banks services is need to be innovative and will change to paperless and branchless. This will enable the banks to identify whether they are on the right truck in embracing technological innovation to achieve their goals and visions of compatible banking of the future.

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ANNEXES

1. QUESTIONNAIRE

Dear Participants

The title of this thesis is "The Effect of Mobile Banking on Saving Habit among Customers: A case of Commercial bank of Ethiopia Dire Dawa Cluster"

The aim of this project is to assess the effect of mobile banking on saving habit among customers of commercial bank of Ethiopia. This questionnaire is prepared to supplement the data obtained from other sources.

This survey questionnaire is being distributed to get relevant information from randomly selected mobile banking users and non-user participation is totally voluntary. The investigator respectfully requests your kind cooperation in answering the whole question as frankly as possible and your response will be recorded anonymously and strict confidentiality will be maintained.

Biruk Ashenafi Debebe

Tel. No. 0915747889

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Thank you very much in advance for your cooperation!

GENERAL INSTRUCTION

This questionnaire contains four sections and 10 pages that will be expected to take approximately 15 to 20 minutes to complete. Please provide your responses to the questions based on the instructions under each section.

SECTION I: PROFILE OF RESPONDENTS

Please indicate the following by ticking (√) on the spaces in front of the response options:

1. Sex

0.Female	
1.Male	

2. Age of the respondents_____ years

18-25	26-35	36-45	46-55	55+

3. Highest Formal Educational level achieved _____ grade in years

1.ILLITERAT	
2.High school Completed	
3.Diploma Completed	
4.Degree Completed	
5.Masters and above	

4. Occupational status

(1)Non-employed	
(2)Employed privately	
(3)Own Business	
(4)NGO	
(5)Government Employee	

5. Monthly income of the respondents _____ Birr (ETB):

(1) 0-1650	
(2) 1651-3200	
(3) 3201-5250	
(4) 5251-7800	
(5) 7801-10900	
(6) >10900	

6. Where Do You Live

(1)Urban	
(2)Rural	

SECTION II: MOBILE BANKING USAGE PRACTICES

Please answer the following by ticking (√) on the spaces in front of the response options

7. Are you active mobile banking user?

1(Yes)	
0(No)	

8. How long you have been using mobile banking?

(1) Less than 1 year	
(0) Greater than 1 year	

9. On a scale of 1 to 5 please state how often you use the following services on average in a month, by ticking the appropriate box, where

0- Never, 1 - Rarely, 2 – Sometimes, 3- Often, 4 – Always

		(0) Never	(1) Rarely	(2) sometimes	(3) Often	(4) Always
A	Balance Inquiry					
B	Own Account Transfer (Transfer between your accounts)					

C	For Utility Payment					
D	Payment to others(Transfer to any CBE account)					
E	To Buy Air Time(Top-up Service)					

S.N	**Mobile banking service usage practices**	Response	
		Yes	No
1	Are you using mobile banking regularly after you signed up for the service?		
2	Did your mobile phone support mobile banking at the time you signed up the service?		
3	Did you have to purchase a phone that supports the service?		
4	Does your income influence your use of mobile banking?		
5	Are there any security concerns that have been raised concerning your bank‘s mobile banking services		
6	Do you find your bank‘s advertisements on mobile banking appealing or interesting enough to encourage customers to sign up?		
7	Does your attitude towards change (how you perceive change) affect your use or uptake of mobile banking		

SECTION III: FACTORS AFFECTING MOBILE BANKING ADOPTION

Please indicate the extent to which you agree or disagree with each of the following statements by ticking **“√”** from 1 to 5 that best represents your level of agreement with the statement.

Note: 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree

The following are some factors affecting when adopting Mobile banking services, please indicate level of your choice.		(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree
Perceived usefulness						
1	I find Mobile banking useful for my banking needs					
2	It Reduces number of customers come to the banking hall					
3	No time limit to access bank account and					
	information					
Perceived ease of use						
4	Learning to use mobile banking is easy for me.					
5	Our bank provide guidelines on the use of mobile banking facility					
6	Mobile banking requires a simple registration process.					
7	Using mobile banking makes it easier for me to conduct my own banking transactions					
Perceived Credibility /Compatibility						

8	Using mobile banking fits well with the Way I like to control and manage my banking transactions.					
9	I use mobile banking because I am doing everything with my cell phone					
10	I am satisfied with current mobile banking service this stage because it is already a part of my daily life.					
11	I know that my banking details are safe if my phone is stolen					
Perceived Self-Efficacy						
12	I do not need anyone to teach me how to use mobile banking because I can learn it by my self					

13	I use mobile banking because it has a built – in help facility for assistance					
14	I use mobile banking because I have seen someone else using it					
15	I use mobile banking because someone has shown me how to do it					
Perceived Risk						
16	I do not trust the technology provided by the banks					

17	Mobile banking is unreliable because I afraid that my personal or transaction detail would be leaked during message passing					
18	If I lose the mobile phone as a mobile banking user, in the meantime, I will lose my money as well.					
Perceived Transaction cost						
19	It costs a lot to use mobile banking					
20	Using mobile banking increases my banking costs					
21	There are financial barriers (Cost of mobile phone)					

Technological Awareness						
22	I have Knowledge And Skill How to Use Mobile Banking					
23	I Have All The Information About Mobile Banking					
24	For Me It Is Easy To Use Any Mobile Phone Technology					

SECTION IV: EFFECT OF MOBILE BANKING SERVICES ON SAVING HABIT

1. How Much Do You Save For Usage of Mobile Banking Service? _____ Birr

(1) 0-24	
(2) 25 -3200	
(3) 3201-5250	
(4) 5251-7800	
(5) 7801-10900	
(6) >10900	

2. How many times you go to bank to withdraw cash before using mobile banking

1. Daily	
2.once in week	
3.twice week	
4.monthly	

3. After using mobile banking how many times you go to bank for withdrawal of cash.

1. Daily	
2.once in week	
3.twice week	
4.monthly	

4. How much of money you received or paid through mobile banking service monthly?_____ Birr

(1) 5-2000	
(2) 2001-3000	
(3) 3001-4000	
(4) 4001-5000	
(5) 5001-10000	
(6) >10001	

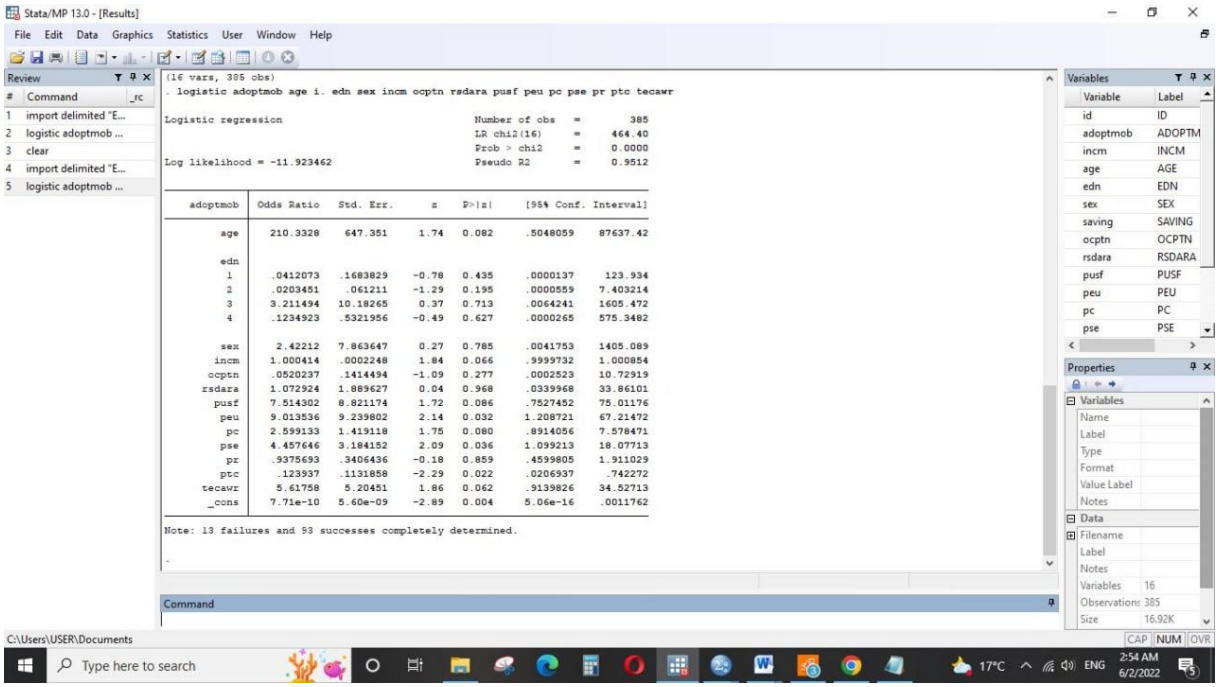
5. Do you think that mobile banking improves your saving habit?

1(Yes)	
2(No)	

Thank you for your co-operation

ANNEXES

2. Result of binary logit model



3. Result of OLS model

