

MASTERS THESIS

THE DEVELOPMENT OF MOBILE MONEY SERVICES AND FINANCIAL INCLUSION  
IN ZIMBABWE

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## DECLARATION

I Kudzaishe Emily Chingono do declare that except for references specifically indicated in the text and such help as has been provided to me by my supervisor, that this thesis is wholly my own work and has not been submitted at any other University or Technikon for any degree purposes.

Signed by \_\_\_\_\_ on this 3<sup>rd</sup> of September 2024.

## ACKNOWLEDGEMENTS

*And we know that in all things, God works for the good of those who love him, who have been called according to his purpose- Romans 8: 28.*

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## Abstract

**Purpose-** The use of mobile phones in Zimbabwe fostered the development of various financial innovations, such as mobile money services. It is important to note that the use of mobile money services in Zimbabwe has gradually increased. This study was carried out to determine the relationship between the development of mobile money services and financial inclusion in Zimbabwe. The main goal was to determine if there is a correlation between financial inclusion and the development of mobile money services.

**Design and Methodological approach:** This study used a quantitative research design in which time series data was used to generate the analysis. The data used in the study covered a period of 20 years, starting from 2000 to 2020 on a yearly basis. Auto Regressive Distributed Lag (ARDL) Model was used to analyze the relationship.

**Findings:** The ARDL study results showed that in the long run, there is no statistically significant correlation between the development of mobile money services and financial inclusion, and this is suggested by the long-term relationship between the two variables over a period of 20 years. In the short run, the study findings showed that the development of mobile money services have a positive significant influence on financial inclusion with. Therefore, increase in mobile money usage was associated with increase in financial inclusion. Between the period 2000 and 2020, the major determinants of mobile moneys services are age, number of ATMs, financial literacy, income level and mobile phone penetration. The tests also showed that these variables significantly and positively influenced use of mobile money as a financial inclusion tool in Zimbabwe ( $p < .05$ ).

**Research Limitations:** The study did not find a lot of current relevant literature that would explain the relationship between mobile money services and financial inclusion. Majority of the work was carried out in other countries, and little was covered in Zimbabwe.

**Practical Implications:** The study results implies that government should put in place measure to ensure the expansion of mobile money services in the rural areas. The mobile telecommunication firms should ensure increased mobile phone penetration.

**Keywords:** Mobile Money; Financial Inclusion; Income; Education; Literacy; Age; ATMs

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## **LIST OF ACRONYMS**

ATM-Automated Teller Machines

FI- Financial Inclusion

MM-Mobile Money

MMP- Mobile Money Penetration

RBZ- Reserve Bank of Zimbabwe

WB-World Bank



## CHAPTER 1: INTRODUCTION

### 1.1 Introduction

Globally, various policymakers are involved in ensuring that financial inclusion activities are embraced to ensure inclusive economic growth and social development. Abel et al (2018) defines financial inclusion as the extent to which businesses and individuals are said to have access to affordable and useful financial products and services. Similarly, Asuming (2019) defines financial inclusion as the process meant to ensure that there is ease of access, usage, and availability of the formal financial system to all members of the society. Therefore, based on these definitions, it is clear that financial inclusion implies the accessibility of financial services by the majority of people in an economy such that they can easily make payments, have remittance facilities and insurance services which are being offered by the system at affordable rates (Babajide et al, 2015). Factors that contribute to an inclusive financial system come with considerable benefits such as efficient allocation of resources and lower cost of capital in the economy (Demirguc-Kunt and Klapper, 2012). Babajide (2015) allude that financial inclusion in the economy does not only imply access to basic financial services by all individuals, but it is instrumental in poverty reduction and the promotion of better savings in rural areas.

In Zimbabwe, the development of mobile money services provides a glimpse of hope to all the people who were deemed to be financially excluded (Masiyandima et al, 2017). In this regard, Masiyandima et al, (2017) argue that mobile money services are perceived as a grand solution with the capacity to circumvent the geographical isolation of financial services and offer financial services at low costs through the use of mobile telecommunication services. The development of mobile money services is aided by the surge and almost universal use of cell phones together with multiple distributors of airtime (Babajide et al, 2015). Therefore, increasing numbers of people in Zimbabwe began to have access points, such as money agents in pharmacies and post offices, that allow them to collect money that is sent to them via mobile money services ( Abel, Mutandwa and LeRoux, 2018). It is crucial to mention that following the wide acceptance of mobile financial services in Zimbabwe, there have been various efforts by the government to ensure that the majority of the people have better access to various financial services. Therefore, there is need to mention that mobile money was presumed to be one of the indicators of financial inclusion in the study. This implies that in making all the study assumptions and research work, there was need to analyse the extent to which the changes in mobile money transactions would affect the rate of

financial inclusion. In this study, the main aim is to determine the relationship between the development of mobile money services and financial inclusion in Zimbabwe.

## **1.2 Background of the study**

Financial inclusion has attracted great attention in both policy circles and in the academic fraternity in various countries across the globe (Ahmad et al, 2020). In response, financial regulators, banking industry and governments in the world have been involved in efforts to develop and implement different initiatives which can be useful in deepening financial inclusion (Ahmad et al, 2020). Developed economies such as the United States of America came up with legislative measures, for example, the Equal Credit Opportunity Act of 1974 legislation, which requires banks to offer credit to all members of the society without any form of discrimination between the poor and the rich (Alexandre and Eisenhart, 2018). Simmons (2018) similarly highlights that in France, the financial regulators managed to develop measures which emphasize the individual's rights to have a bank account and participate in the formal economy. In India, various micro-finance institutions were promoted to make cheap finance available to the less privileged groups and allow them to make their routine transactions (Tiwari and Fahad, 2006).

However, it is important to note that the degree of financial inclusion in the economies varies based on the stage of economic and financial system development. In Africa, financial inclusion issues have remained a challenge. Most ordinary people are hindered by limited infrastructure and legal problems in gaining access financial services from financial institutions (Rojas-Suarez, 2010; Camara and Tuesta 2014). Therefore, large proportions of people in African countries, especially those in rural locations with limited access to financial services, have remained entirely excluded from financial services (Chen, 2018).

In Zimbabwe, the traditional banking sector has not been able to offer complete financial services to the majority of low-income earners and the less privileged especially those in the rural areas. Rural areas mainly have high costs of establishing the physical infrastructure and low profitability arising from high operational costs and low disposable income. These factors result in failure to provide adequate financial services (Munyanyi, 2014). Regardless of such circumstances, the diffusion of Information Communication Technology (ICT) and mobile network is regarded as a significant factor that can effectively reduce the barriers to financial inclusivity in the country

(Munyanyi, 2014). A study by Park and Mercado, (2015) shows that the development and expansion of ICT in Zimbabwe allows thousands of individuals who are formally excluded from the financial system to carry out various transactions in a cheap and reliable way on their mobile telephones. Therefore, it is against this background that the study investigates the relationship between the development of mobile money services and financial inclusion in Zimbabwe.

### **1.3 Problem Statement**

In the realm of financial inclusion, a crucial issue arises as highlighted by the Finscope Survey (2018) in Zimbabwe, where the financial exclusion rate stood at 23%, marking a substantial improvement from the 45% recorded in 2014. Despite this notable decrease, the assessment of scholars such as Sharma (2016) suggests that any rate of financial exclusion surpassing 15% is considered notably high. Furthermore, the Finscope Survey (2019) underscores that the rate of financial inclusion among adults demonstrates a marked contrast between urban areas, with an inclusion rate of 88%, and rural areas, registering only 61% inclusion.

Given the substantial rural population, the current scenario has the potential to exacerbate financial inclusion disparities within the country, potentially leading to heightened levels of poverty (Lake, 2020). In this regard, Lake (2020) proposes the establishment of an efficient rural banking system and mobile money services as a prudent step for the government and stakeholders to consider. This suggestion stems from the understanding that enhanced financial inclusivity can facilitate greater access to productive investments. The World Bank report (2020) indicates that 74% of Zimbabwean adults refrain from saving due to limited disposable income, showing a preference for mobile money services.

Furthermore, Lake (2020) observes a concerning trend - a 9% increase in dormant bank accounts in 2020, which signifies a decline in financial participation within the banking sector. Evidently, the persistence of the current issue of inadequate financial inclusion bears the potential for widening disparities and financial inclusion inequality in this domain. This study aims to contribute novel insights by exploring the correlation between the development of mobile money services and the enhancement of financial inclusion.

## **1.4 Aim of the Study**

The main purpose of the study is to investigate the relationship between the development of mobile money services and financial inclusion in Zimbabwe, with the aim of better understanding how to deal with financial inclusion inequality.

## **1.5 Research questions**

In undertaking the study, the following are the research questions which guided the research and helped to understand the research phenomenon explicitly:

1. What is the relationship between the development of mobile money services and financial inclusion in Zimbabwe?
2. What are the determinants of mobile money usage as a financial inclusion tool in Zimbabwe?

## **1.6 Research Objectives**

1. To empirically test the relationship between the development of mobile money services and financial inclusion in Zimbabwe.
2. To establish the determinants of Mobile money usage as a financial inclusion tool in Zimbabwe

## **1.6 Statement of hypotheses**

The following hypothesis will be tested in this study:

H<sub>1</sub>: There is a no relationship between the development of mobile money services and financial inclusion in Zimbabwe.

H<sub>2</sub>: Individual variables do not influence Mobile money usage as a financial inclusion tool in Zimbabwe.

## **1.7 Overview of Methodological Approach**

The study uses the time series data which involves the collection of the yearly figures and provision of statistical financial analysis. In order to determine the correlation between mobile money services and financial inclusion, the research spans 20 years, encompassing the timeframe from 2000 to 2020. Yearly data is utilized to encompass the timeframe, ensuring the preservation of

crucial information without any loss. The advantage of using the time series is to ensure that patterns in financial inclusion and mobile money development can be easily identified (Lundqvist and Erlandson, 2014). Moreover, employing time series data provides a chance to undertake data cleansing and opt for appropriate models, as highlighted by Ahmad et al. (2020). The main sources of data are the Finscope survey, Reserve Bank of Zimbabwe (RBZ) and the global economy.

Eviews is used as the statistical program for the data analysis. Financial inclusion and mobile money services are the two primary factors taken into account. The number of mobile money accounts held between 2000 and 2020 is used to measure mobile money services for analytical purposes. However, the volume of transactions made within the same time period is used to gauge financial inclusion. Using time series analysis from the same period, the following factors are taken into account and measured in terms of the determinants of financial inclusion: age, income level, financial literacy, and education.

In comparison to the study by Mcloid (2018), the methodology used in this study is different as Mcloid (2018) solely used the Johanssen Cointegration approach. The study makes use of the Auto Regressive Distributed Lagged Model (ARDL) approach to determine the level of impact the development of mobile money services has on financial inclusion; and the Granger tests of causality to determine the short run and long run effects between the development of mobile money and financial inclusion, as they deem more accurate in analyzing all the factors that influence the relationship. Therefore, the study is using the technique previously employed by Joshi (2015) and Khan (2018) in a related study. The strength of using the ARDL model is that it is considered to be more robust when analysing small sample sizes which are below 50 years in terms of coverage, and this is highlighted in the study Chen (2018). The study reflects the strength of using the ARDL model, as it has the ability to effectively handle limited data points without sacrificing the integrity of the analysis. This is particularly valuable when dealing with small sample sizes, which can often result in statistical instability and unreliable results when using more complex models.

### **1.8 Contribution of the study**

In a period when there is need by the government to increase financial inclusion in the country and ensure better income distribution, this study is important in establishing the relationship between development of mobile money services and financial inclusion. Therefore, the government will obtain great insights on how best the mobile financial services can be promoted in the country to

involve greater proportions of the population in the financial system of the country. In line with the views of Mutsune (2015) it is mentioned that studying such a relationship enables the government to effectively draw policies which meet the needs of the population majority.

Secondly, the study is significant to the banking industry of the country. This is due to the fact that results produced will enable them to determine ways in which the current infrastructure can be expanded to cater for the increasing demand for mobile money services (Mutsune, 2015).

Lastly, the study contributes massively to the mobile telecommunication companies which are offering mobile money services. In Zimbabwe, some of the rural areas are still un-served in terms of the internet and general network provision. Therefore, the study results will help to reinforce the need for the mobile telecommunication companies to expand their mobile network coverage.

### **1.9 Limitations to the Study**

This study is limited as it does not consider other factors which influence financial inclusion. These include economic conditions such as inflation and exchange rate. Secondly, the study does not separate between the urban population and the rural population but rather provides a general observation of the relationship between mobile money services and financial inclusion. Lastly, the study only utilizes one methodology, quantitative study, whereas more information and opinions would have been obtained from qualitative data.

### **1.10 Structure of the Paper**

The study is made up of five chapters, with the first chapter being vital in providing an introduction into the study. Chapter 1 lays out the background to the study, contribution, research questions, objectives and statement of the problem. The limitation of the study is provided as well. The second chapter is the literature review section, and it is crucial in providing the theoretical foundation of the study, relevant theories explaining the use of mobile money services. The chapter situates the study after carrying out comprehensive reviews of the currently available studies and sources, considering both international and local perspectives. The third chapter provides all the procedures which are carried out in order to collect and analyse the data. It highlights the methodology used in the analysis of data in order to ensure high reliability of data produced. Chapter 4 highlights the analysis of the time series data that is carried out using ARDL and Granger Causality tests. The

results of the study are presented and discussed in this chapter and discussions that are relevant to the literature are provided in order to ascertain the extent to which the study answers the research problem. The last chapter presents the study conclusions and recommendations, which are based on the results obtained in chapter 4. More so, the chapter suggests future research for this study.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

Chapter 1 discusses the objectives and the research questions of the study. The research aims to determine if there is a relationship between the development of mobile money services and financial inclusion in Zimbabwe, and to establish the determinants of mobile money usage as a financial inclusion tool. This chapter presents an empirical and theoretical literature review to answer the research questions. The chapter begins by conceptualizing financial inclusion. Literature on the impact of financial inclusion on economic development and socio-economic issues such as poverty alleviation is reviewed under the empirical literature review. This chapter is divided into sections. Section 2.2 presents an empirical literature on financial inclusion and mobile money. Section 2.3 provides a discussion on the theoretical review on financial inclusion and mobile money and highlight theories that underpins the relationship between Financial Inclusion (FI) and Mobile Money (MM).

### **2.2 Conceptualisation of Financial Inclusion**

This section explores the development of mobile money and its crucial role in promoting financial inclusion. Financial inclusion is clearly defined, and the sections examine its trends in various communities, with a particular focus on its impact in Zimbabwe, illustrated through a case study. Emphasizing the pivotal role of access and utilization of mobile money services, this section underscores their significance in enhancing financial inclusion in Zimbabwe, with special attention given to the number of adults who open financial accounts, and those with mobile money accounts. This allows one to conclude whether adults in Zimbabwe benefit from the development of mobile money services, resulting in them being financially included in financial institutions.

#### **2.2.1 Financial Inclusion**

Financial inclusion, according to Sarma and Pais (2008), is the process of ensuring that a financial system is easily accessible, available, and usable by all members of an economy. The goal of financial inclusion is to fairly distribute resources to every person. The literature further builds on this definition by emphasizing the importance of equality and affordability. Financial inclusion is the provision of financial services such as deposits, loans, and insurance, ensuring that the poor

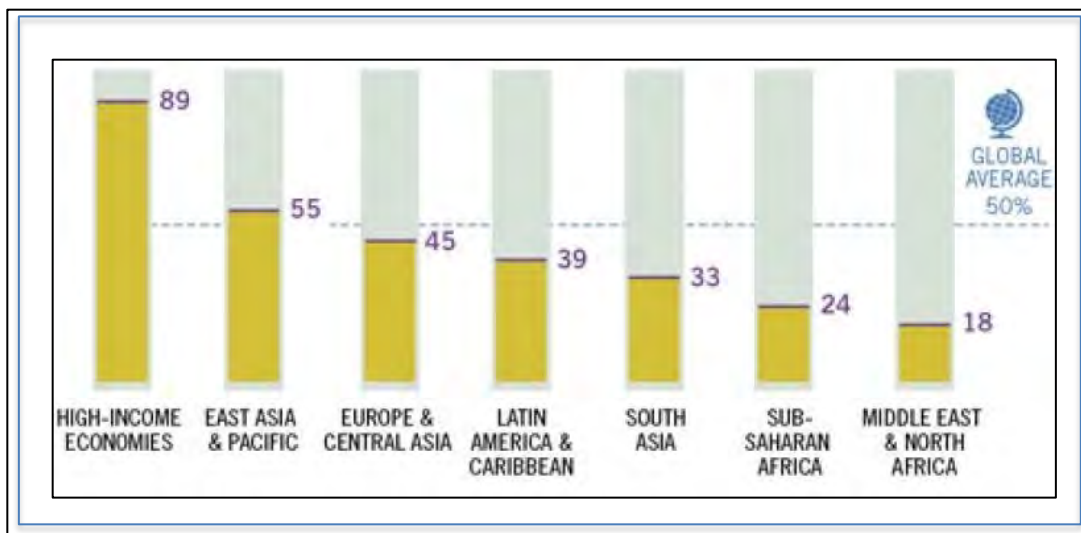
and low-income households have equal access to these services (Munyanyi, 2014). This is supported by Alleman and Rappoport (2012) who define financial inclusion as the delivery of banking services and accessibility of formal bank accounts at an affordable cost to low-income households.

Literature emphasizes the importance of access, use of financial services and the importance of ensuring low-income households do not remain excluded from financial services (Munyanyi, 2014). Prominent researchers such as Gunarsih et al. (2017) critique the mainstream definitions of financial inclusion and argue that financial services are inadequate to explain financial inclusion. In line with Gunarsih et al (2017), authors such as Shirin (2016) emphasize that the definition of financial inclusion should not be solely limited to making financial services accessible or making credit available when needed by marginalized groups. The authors emphasize that the definition of financial inclusion must be appropriate, fair and transparent. People in rural areas and low-income households are the most excluded from financial systems. Banks do not build in rural areas because of the cost of physical infrastructure and lack of profit when providing services due to the low levels of income, thus keeping people in rural areas excluded (Goss et al. 2011; Alleman and Rappoport, 2010; Alexandre et al. 2011; Dermish et al. 2011)

The World Bank Global Findex Report (2014) quantifies financial inclusion as the percentage of people and businesses that utilize financial institutions. Sub-Saharan Africa has been commended for its success in the development of mobile money services that have increased the levels of financial inclusion. 54% of adults in the world have an account, showing a 13%-point increase since 2011 (Findex, 2017). This comes from many people opening accounts at banks or financial institutions. Sub-Saharan Africa, however, has defied this trend by successfully harnessing mobile money services. The introduction of mobile money services has been effective as it reaches people in all areas, rural or urban (Akinyemi and Mushunje, 2020).

Ownership of an account at a financial institution or mobile money provider can be done individually or jointly, according to a definition by Findex (2017). Statistics show that 69% of adults worldwide own an account which gives them an effective financial tool (Demirguc-Kunt et al., 2018). Figure 1 below illustrates the global account ownership between 2011 and 2021.

*Figure 2.1: Account penetration*



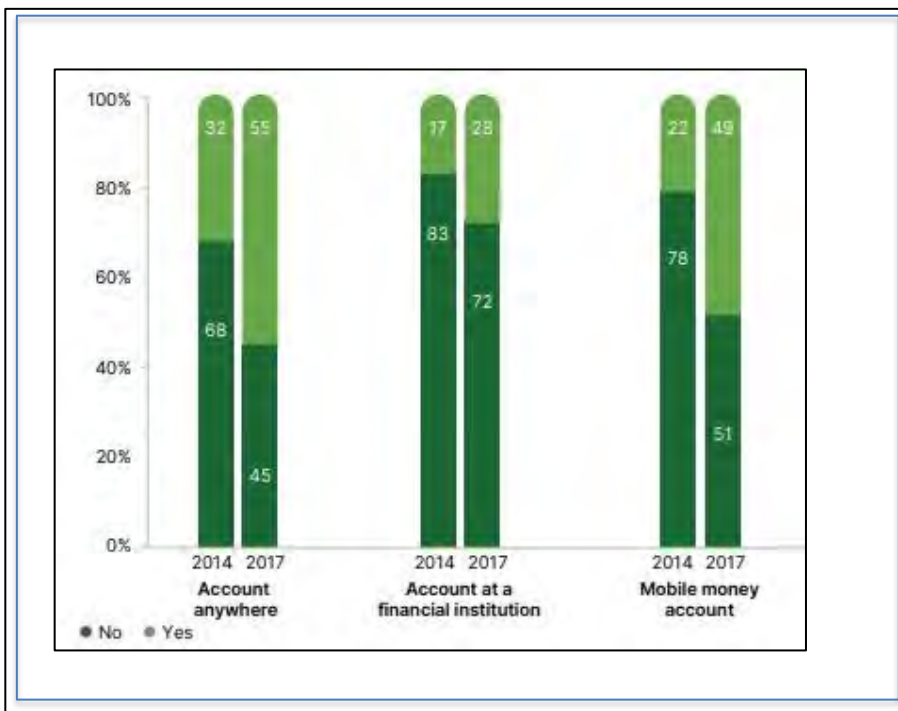
*Source: Demirguc-Kunt and Klapper (2012).*

The figure above indicates the percentage of adults, with an account at a formal institution globally between 2011 and 2017. Higher-income economies show a steady rise in account penetration while developing income economies show a continuous steep increase. As of 2021, the global account ownership was recorded at 76%, with 71% of the adults being in developing countries (Findex, 2021). Adults in developing economies that receive higher levels of income are twice as likely to have an account than those with lower levels of income. The evidence presented above shows that financial inclusion tends to be higher in developed countries. Therefore, developing countries have leaned towards technological innovations that would help boost the levels of financial inclusion in their countries (Demirguc-Kunt et al., 2012).

The global status of financial inclusion in the 2014 Findex Consumer Survey showed that only 30% of adults in Zimbabwe use a banking service as of data collected in 2014. Usage is vital as it offers a more accurate picture, as some individuals can register for an account and never make use of it, thus remaining financially excluded. In order to transact in formal financial systems, individuals must first open financial accounts, without which they are forced to use risky and inconvenient methods (Findex, 2017). Access to financial services results in a higher level of financial inclusion.

Figure 2 below shows the proportion of the adult population in Zimbabwe, with accounts between 2014 and 2018. The statistics show adults with an account anywhere, adults with accounts at a financial institution and adults with a mobile money account. There is a decrease from 68% in 2014 to 45% in 2017 in adults without an account from anywhere. Adults with an account at a financial institution increased from 17% in 2014 to 28% in 2017. Adults with a mobile money account almost doubled, with a rise from 22% in 2014 to 49% in 2017.

Figure 2.2: Proportion of the population with accounts (2014 and 2017)



*Source: Zimbabwe Financial Inclusion Refresh (2020).*

### 2.3 Theoretical literature review

The literature reviewed above demonstrates the empirical relationship between financial inclusion and the development of mobile money services. Therefore, it is critical for this study to theoretically prove whether mobile money can be used as a tool to foster financial inclusion. This section highlights the theories that can be used to analyse whether one can conclude that mobile money is a tool for financial inclusion.

### 2.3.1 Prospect theory

Kahneman and Tversky (1979), proposed a decision-choice model which measured the significance of an individual's choice under risk. This theory was developed as an alternate framework for understanding decisions people make when faced with risk. It was developed as an alternative to the expected utility theory after Kahneman and Tversky (1979) criticized the latter for failing to adequately explain how people make decisions in risky circumstances, making it impossible to forecast decision-makers' choices. Kent et al (2010) define prospect theory as how individuals weigh out risky gambles before they participate in financial markets, and this is supported by McDermott and Kugler (2001) as they define the prospect theory as a theory of decision making under the conditions of risk.

McDermott and Kugler (2001) explain how the prospect theory examines two aspects of decision making and is intended to explain a frequent pattern of choice. These two aspects are the 'framing effect' and the 'evaluation phase'. Framing is the way in which a choice can be affected by the way it is presented to a decision maker. Framing is not only important because of its direct influence on choices available, but also because of its indirect effect on choice through the value and weighting functions of the prospect theory. These functions make up the evaluation phase. Panchasara and Sharma (2020), highlight that the prospect theory stands on four pillars; the reference dependence which is the basis when one decides upon losses and gains; secondly, the higher sensitivity towards loss and this is explained by "loss aversion"; thirdly the risk averseness towards high losses or low gains and this is explained by "diminishing sensitivity", and lastly the probability weighting which highlights the superiority of weights assigned to decisions over objective probability.

This theory is essential in this study as it sheds light on the thought process of different individuals when weighing out the risk of being part of a financial system. For example, people who were part of the financial system in Zimbabwe when it collapsed, might be a bit more skeptical about putting their trust in financial systems. Therefore, they weigh out the risk that is associated with being part of the financial system, and if this risk is high, this can be a contributing factor to high levels of financial exclusion, as explained by loss aversion. However, this study will not employ this theory as it is not a good fit in explaining the full extent of one's desire and willingness to be part of

financial services. This is demonstrated by the theories sole focus on choice under risk, and negating important variables that influence choice, such as accessibility and financial literacy.

### **2.3.2 Technology Acceptance Model (TAM)**

Technology adoption is the decision made by individuals to make use of an innovation, and individuals go through many mental processes before accepting new ideas; with adoption as the final action (Straub, 2009). Many studies introduce theories that help one understand how users are influenced to make decisions towards the adoption of different innovations. TAM is relevant in this study as it is used by many researchers to predict how accepting individuals are to interacting with technology. TAM is theoretically formulated on the underlying basis of the theory of reasoned action and the theory of planned behavior (Habidin et al, 2020).

The theory of reasoned action (TRA) explains the relationship between the attitudes and behaviors of individuals, that influence their decision making (Van Eeuwen, 2017).

The theory of planned behavior (TPB) assumes that the behavior of an individual is determined by the attitude of a person and their subjective norms (Pikkarainen et al., 2004). Therefore, TAM, is founded on the principles of the attitude paradigm of an individual. An important extension of TAM is that is explains beyond TRA and TPB. TAM model suggests that when individuals are presented with a new technological innovation, two important factors influence their choice about how and when they will use it (Davis, 1989).

These two factors are perceived usefulness (PU) and perceived ease of use (PEOU). Davis (1989), defines PU as the extent to which, using the technological innovation would enhance their participation. This is supported by Lee et al.(2003), who wrote that TAM assumes that an individual's acceptance to innovation is determined by PU and PEOU. PU is a vital determinant of acceptance to individuals, and PEOU is the extent to which a user expects the innovation to be free of effort (Islam and Gronlund 2012). So, PU and PEOU influence the attitude of individuals.

This study is underpinned on this theory, as it is the most efficient in substantiating the impact of the development of mobile money services in fostering financial inclusion. This is supported by many authors, whose work cemented the importance of identifying factors that are crucial in decision making especially with the adaptation to innovation. It is rooted in the core of financial

inclusion factors, which are ease of use and accessibility. This makes the theory more efficient in determining the relationship between mobile money development and financial inclusion.

### **2.3.3 Diffusion of Innovation (DOI)**

The DOI is used to explain the adoption of mobile money as a tool to foster financial inclusion. DOI explains how a new idea or technology can spread through societal structures. Diffusion, according to Rogers (1982), is the process by which innovation spreads over time among members of a system through channels, and innovation is a practice that is perceived as new by individuals.. Tobin (2010) states that innovation diffusion is achieved by how the systems accept and adopt an idea or a technology. This theory is vital in answering the research object of this study- “is mobile money a tool to foster financial inclusion”. It is important to analyse how individuals view the development of mobile money as a financial service provider.

Roger (1982) highlights the following characteristics as vital for any innovation; relative advantage, compatibility, complexity, trialability and observability (Tobin, 2010). The concept of relative advantage illustrates how people perceive innovation to be superior to the behavior it replaces. Trialability demonstrates how a new idea can be tested on a smaller scale before being deciding whether to accept or reject the idea. Observability is the extent to which an innovation's effects are apparent to other people (Ncube et al. 1995).

## **2.4 Empirical Literature Review**

This section provides an empirical literature review on financial inclusion and mobile money services. The development of mobile money has been said to have a positive impact on financial inclusion, by increasing participation in financial systems. These sections will review the empirical literature to ascertain the key arguments and themes .

Research has demonstrated that financial inclusion is being increasingly recognized as a valuable instrument for promoting economic expansion and advancement (Aron 2018; Demirguc-Kunt et al. 2018; Di Castri 2013; Sharma 2016; Kim et al. 2018; Lahaye et al. 2015; Van, 2019). Financial exclusion is recognized by Ahmad et al. (2020) as a major barrier to economic growth . supporting evidence for this claim is provided by writers such as Oyewo Babajide and Oyewole Oyedayo (2014), who argue that financial inclusion and economic development go hand in hand.

Furthermore, because unbanked people have unrealized potential that might boost the economy, a nation's development greatly depends on the extension of banking and financial services to them (Oyewo Babajide and Oyewole Oyedayo (2014).

Economic development is important but not fully adequate when it comes to poverty alleviation. Voica (2017) states that accessible and inexpensive financial systems for the poor people facilitate the development of sustainable economic growth. These opportunities allow a quicker infiltration of the unbanked individuals to attain economic integration (Voica, 2017). Empirically, Park and Mercado (2018) analyse the importance of financial inclusion to lower poverty rates and conclude that when financial inclusion increases, poverty rates begin to decline as people have more access to financial services.

There has been great growth in the financial sector of Africa, but many individuals and firms remain excluded from the financial services in African countries (Demirguc-Kunt et al., 2018). African countries continue to lag behind other developing countries as barriers such as the cost of owning a bank account, and distance to access a bank account are resulting in many individuals being financially excluded (Abel et al., 2018). If taken seriously, the introduction and adoption of innovations and technology may help reduce these factors that hinder individuals from having access to financial services. An evident example is the success of mobile money services in Africa, which has shown that innovation can change how people engage in financial transactions. Such innovations have successfully lowered entry barriers, thus expanding access (Peruta, 2018).

According to Gunarsih et al. (2017), financial inclusion can play a significant role in reducing poverty and promoting economic expansion. This is due to the fact that having access to financing can raise investments in human capital, decrease shock sensitivity, and improve employment prospects. Access to a robust system can enable impoverished individuals in emerging nations to integrate into the economy, promote economic growth, and hedge against financial shocks more readily. However, the impoverished's inability to save, pay off debt, and safely manage risk makes them more vulnerable to poverty because they lack access to financial services (Donovan, 2012). The socio-economic benefits of financial inclusion are part of the reason why governments all over the world have been working towards complete financial inclusion for their countries. According to the World Bank Global Findex Report (2014), about 50 countries worldwide have implemented policies that are aimed at boosting the levels of financial inclusion. Governments have

implemented policies that work towards bridging the financial inclusion gap. Levels of financial inclusion can vary due to non-structural factors such as policies. Policies can hinder financial inclusion through excessive reliance on state-owned banks or an inability to provide macroeconomic stability (Barajas et al. 2020). Several policies are structured to foster financial inclusion include facilitating greater banking competition and lowering the barriers to entry that limit individuals from opening accounts (Arun and Kamath, 2015). As governments work towards policies that provide inclusive financial services for all, it is important to address the reasons why financial inclusion numbers may be low in different countries.

Not every family or business requires access to every financial service. Eight percent of adults in Lithuania, a high-income nation with high levels of financial inclusion, reported not having a bank account in 2017 because they could access financial services through family members, while three percent said they didn't see the need for one (Barajas et al. 2020). Therefore, in order for people to understand the advantages of using financial services, governments would need to put policies in place that would promote financial education.

#### **2.4.1 Financial Inclusion: The African case**

In the African context, rural areas are historically marginalized and almost entirely populated by low-income African populations. Low-income households make up the majority of the population in the majority of Sub-Saharan African nations. Research indicates that the development of mobile money services has contributed to increased financial inclusion among the poor (Akinyemi and Mushunje, 2020). This is due to reasons such as banks and financial institutions finding it more cost-effective to provide services to customers that receive higher incomes, translating into higher-income countries having higher levels of financial inclusion (Donovan, 2012). Factors such as size and density of population as well as demographic factors, such as young and old-age dependency ratios, have also been cited as factors that influence the agency to provide financial services.

In South Africa, the government created a financial inclusion policy that enables job creation, and the government intervenes by fostering entrepreneurship and enterprise development (National Treasury, 2020). The South African government put in place the National Development Plan (NDP) that works towards eliminating poverty, reducing inequality and achieving full employment for all (Mhlanga et al., 2021). The target of the NDP includes 99 per cent of the population owning

a bank account by 2030. The policy focuses on ensuring that financial inclusion interventions are structured to meet the target of the NDP (National Treasury Republic of South Africa, 2020).

The Nigeria National Financial Inclusion Strategy, which has a defined aim for greatly boosting access to and utilization of financial services, is another active example of how financial inclusion policies are needed (Abiola et al. 2019). The first step towards financial inclusion, according to the Central Bank of Nigeria, is gaining access to an account, whether at a formal or informal institution. According to the Central Bank of Nigeria (2018), it serves as a doorway to financial services like credit and loans. These studies highlight the efforts made by governments to implement financial inclusion laws, which enhance citizens' quality of life while also having a favorable effect on socioeconomic problems including unemployment and poverty alleviation.

In Zimbabwe, the need to empower women and reduce FI has resulted in studies highlighting that the government needs to put in strategies that support the development of fintech and the adoption of pricing strategies specific to the women and other marginalized individuals in Zimbabwe (Munyanyi, 2014). According to Napier et al. (2012), many women are marginalized and financially excluded, so governments need to have policies that specifically target women as their empowerment can help them improve their quality of life. Andrianaivo and Kpodar (2012) state that an increase in access to financial services for women in rural areas helps narrow the financial infrastructure gap, where the costs of distance and time are very high for formal banking services.

These case studies show how African countries have developed and implemented country-specific policies to increase levels of financial inclusion. Looking at a broader spectrum, levels of financial inclusion are different in low-income countries compared to high-income countries (Barajas et al. 2020). High income countries are early adopters of technological innovations at a much faster pace as compared to low-income countries. This is explained as an advantage for low-income countries by Andres et al. (2010), who states that low-income countries then benefit from the early adoption by high income countries, through a leader-follower model that has lower adoption costs.

Studies show that there is a correlation between financial inclusion and favorable outcomes such as a decrease in poverty and income inequality (Beck et al., 2015; Demirgüç-Kunt et al. 2018). Chibba (2009) provides support for this by highlighting the significance of financial inclusion in

tackling challenges related to poverty, access, and income equality. According to the Reserve Bank of Zimbabwe (2007), financial inclusion attempts to guarantee universal access to basic financial services, advance economic growth, and encourage a saving culture in rural communities. According to Allen et al. (2012), who advocate for the advancement of financial inclusion in rural areas, one issue contributing to financial exclusion is the highly urbanized financial systems that impede the poor and lower-class people in developing nations from accessing financial services.

#### **2.4.2 Measurements of Financial Inclusion**

In order for governments to implement policies that will positively increase the levels of financial inclusion, it is important to efficiently measure financial inclusion and analyse the determinants of financial inclusion. Studies show the different variables that are used to determine the levels of financial inclusion, with many of these studies zoning in on “the number of adults with a bank account” (Allen et al., 2012; Munyanyi 2014; Findex 2017; Abel et al.2018; Barajas et al. 2020). In addition to knowing how many adults have an account, it is key to measure usage of the accounts that these individuals own, in order to paint a clear picture of the level of inclusion, as usage and access are key in effectively measuring financial inclusion (Munyanyi, 2014).

Other proxies used to measure financial inclusion include age, education, financial literacy and income levels. Abel et al (2018), state that these proxies have a positive relationship with financial inclusion. In terms of age, one gains more knowledge on the various financial products, and this allows them to fully utilize the products (Hovos et al. 2013). Educated people are able to make informed decisions about different financial products and this improves their access to the products. Garcia and Tessada (2013) state that education helps one participate skilfully in financial markets. More so, higher levels of education allow one to have a good paying job and thus earning a higher income. Many women in rural areas are unemployed therefore have very low income and this is a logical explanation as to why women in rural areas would be financially excluded (Munyanyi, 2014). Financial literacy is a good predictor for the demand of financial products as it allows those who are financially literate to weigh out the disadvantages and advantages of certain products (Lusardi and Mitchell 2007; Cole et al., 2009).

The development of mobile money services is one of the most prosperous innovations. This study aims to determine the relationship between the development of mobile money services and

financial inclusion. Research, particularly in Sub-Saharan Africa, suggests that mobile money can be a key tool in advancing financial inclusion (Myeni et al. 2020; Demirguc-Kunt et al. 2018; Di Castri 2013; Munyanyi 2014; Thulani et al. 2014).

### **2.4.3 Mobile Money**

For those who are financially excluded, the emergence of mobile money has offered a glimmer of hope. According to earlier research, mobile money is thought to be able to get around weak banking infrastructure and remote locations by distributing low-cost financial services over the mobile phone network. (Donovan, 2012). According to Ahmad et al. (2020), mobile money services can be used for person-to-person transfers of money, payments between individuals and businesses, access to bank accounts, bill payment, deposit, and consumer withdrawal. Therefore, mobile money can serve as a link between low-income households and the formal financial sector. In emerging nations, mobile money services are being quickly implemented as a vital instrument to further the objective of financial inclusion. Sub-Saharan Africa had a little over 23% financial inclusion in 2011, according to statistics; however by 2017, that number had risen to 43%, mostly due to the expansion of digital financial services (Oji, 2015).

Mobile money is defined by Anyasi and Otubu (2009) and Davids (2012) as financial services that are provided to customers via mobile devices. Due to limited banking infrastructure and accessibility, mobile money by design provides unbanked people with access to financial services, particularly those in emerging and developing nations (Peruta, 2018). According to research, mobile money provides users with straightforward financial services (Munyanyi, 2014; Masiyandima et al. 2017; Myeni et al. 2020).

Studies have shown that mobile money plays a significant role in promoting financial inclusion. According to Andersson-Manjang et al. (2020), there was a rise in the number of mobile money accounts registered in most African nations in 2019—more than 481 million. Furthermore, Ketly and Kasi (2015) point out that mobile money is an affordable alternative for financial access due to the rise in the almost ubiquitous use of mobile phones as well as the abundance of airtime distributors that can serve as access points. According to Ahmad et al. (2020), mobile money technology can reach up to 58 times the number of bank branches and up to 26 times the number of Automated Teller Machines (ATMs). Thus, mobile network operators target people of all economic levels and have a high penetration rate into rural areas, in contrast to traditional banking

and financial services (Andersson-Manjang et al. 2020). It is anticipated that mobile banking will enable formerly underprivileged groups to access capital and market opportunities, hence reducing poverty (Kasseeah and Tandrayen-Ragoobur, 2012).

Although many developing countries are moving towards implementing mobile money services, it is crucial to assess the willingness and response of individuals to mobile money usage. In South Africa, about 11.5 million people are members of the National Stokvel Association of South Africa. One of the contributing factors to the high use of informal financial services is the perception that banks have high fees, too much paperwork, and a slow response time (Bophela and Khumalo, 2019). The “stokvel” is a peer-to-peer savings circle where the subscribers contribute a fixed sum of money to a common pot and take turns collecting it at the end of a period of time (Bophela and Khumalo, 2019). Similarly, studies done in Zimbabwe have highlighted that Zimbabwe’s ongoing cash shortage has allowed Ecocash to continue benefiting from the liquidity challenges by improving the ease and speed of transactions (Munyoro et al. 2017).

Therefore, a key component in the increase of financial inclusion has been as a result of fintech innovation, the adoption of mobile money accounts, mostly in Sub-Saharan Africa (Bajaras et al. 2013). However, other studies by researchers such as Peruta (2018) still question whether the adoption of mobile money services is higher in countries where one’s access to formal banking service is very low. These questions whether people who have no access to traditional banks adopt mobile money more compared to bank account holders. Mago and Chitokwindo (2014) provide evidence that poor adults are more likely to have a mobile money account as compared to wealthier adults. Furthermore, bank account ownership in Zimbabwe is very low among poorer individuals because of insufficient documentation. Twenty per cent of adults without a bank account lack the required documentation needed by the banks for one to be able to open a bank account (Findex, 2017). Therefore, it is likely that people without access to traditional banks adopt mobile money more. Key factors of mobile money adoption include the diffusion of information on the benefits of using mobile money services, and how to use the services (Peruta, 2018).

In order to assess the effectiveness of mobile money as a tool for financial inclusion, it is essential to examine the penetration of these services into places where there is a dearth of information about them. According to Thulani et al. (2014), the use and accessibility of mobile money by the rural populace demonstrates the beneficial impact that mobile money services have

had on financial inclusion. However, Peruta (2018) contends that because financial goods are more common in urban areas where knowledge is distributed, Zimbabwe's illiterate and rural populations are said to be the least frequent consumers of mobile money. As a result, it is crucial to have an impact on legislators as they create national policy frameworks that effectively support and facilitate mobile money in Zimbabwe.

#### **2.4.4 Mobile money and Financial Inclusion**

Studies done in Brazil, Uganda, Burkina Faso, South Africa and Kenya have observed a positive relationship between mobile financial service access and the unbanked section of the population. Mbiti and Weil (2011) state that after the launch of M-Pesa in Kenya in 2007, most Kenyan households have access to financial products. Similarly, in 2012 Burkina Faso successfully launched a mobile money service known as M-ligdi. According to N'dri and Kakinaka (2020), 60% of Burkina Faso adults were financially excluded. The M-ligdi service has successfully penetrated all demographics in Burkina Faso's rural and urban. The M-ligdi allowed adults who use mobile money services to access the full extent of financial services. Bongomin et al. (2014) indicates that in rural Uganda, mobile money services have transformed the way individuals bank. This is because mobile phones have become an easily accessible and affordable financial service.

Myeni et al (2020) aimed to answer whether mobile money accelerates financial inclusion in Eswatini and concluded that mobile money did accelerate financial inclusion in Eswatini. The 2014 Finscope Consumer Survey shows that mobile money does not seem to be reaching those who are structurally excluded from the financial systems and suggested financial inclusion strategies in order to enhance access in all areas. However, in 2018 the Finscope Consumer Survey then highlights that mobile money usage had increased from 28% in 2014 to 70% in 2018. (Magongo, 2019) acknowledges that this success is as a result of policies such as the National Financial Inclusion Strategy of 2017 being implemented, increased levels of financial literacy and empowerment programs. The collaboration between banks and mobile money services has increased the chances of individuals having access to financial services. Mobile money users are able to withdraw funds from any ATM of any participating banks. More so, these results show that individuals who own a bank account have a higher chance of being users of mobile money (Aker and Mbiti 2010; Jack and Suri, 2011).

Mobile money, like any other payment system, is vulnerable to various hazards despite possessing some distinctive features that add to its appeal. According to Baganzi and Lau (2017), these dangers include money laundering, financing of terrorism, threats to privacy and security, fraud, and liquidity issues. It also exposes customers to additional risks related to lost funds resulting from criminal activity by mobile carriers, agents, or other payment service providers, or from faulty transmissions. Additionally, any issues with relationships between banks, international corporations, agent network managers, and agents who collaborate to provide the services could prevent users from accessing the services. Users may experience difficulty from this, but it may also make it impossible to complete transactions, which would be detrimental to the nation's commercial community as a whole (Baganzi and Lau, 2017).

## **2.5 Determinants of mobile money as a tool for financial inclusion**

Ozili (2018) mentions that digital finance can lead to greater financial inclusion. Mobile money has been received as a positive technological innovation and its use has been greatly linked to its impact on financial inclusion. Money mobile has been identified as a tool that can foster financial inclusion because it provides affordable and convenient banking to people at all levels of income (Ozili, 2018). The accessibility and affordability of mobile money allows millions of poor customers to move to secured digital platforms (Scott et al. 2017). This section highlights the determinants of mobile money as a tool for financial inclusion.

### **2.5.1 Mobile Money**

Mobile money is a cheaper and cost-effective alternative to the fees that are associated with formal financial institutions (Thulani and Chummun, 2014). Reduced costs involve the reduction in transportation costs for those in rural areas, as they do not need to travel to urban areas to send and receive money (Mas et al. 2010). In addition, mobile money services allow people without formal bank accounts to engage in safe savings mechanisms (Thulani and Chummun, 2014). Mobile money is a convenient platform that allows individuals to carry out day to day transactions with ease.

### **2.5.2 Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)**

Studies by authors such as Omwansa et al. (2013) determined that in order to critically analyze whether mobile money is a tool for financial inclusion, it is necessary to include additional factors like perceived trust and perceived cost of mobile money services. This is because the original TAM

model was developed for use in the field of information systems. According to Munir et al. (2013), PU and PEOU have a big impact on how widely mobile money services are used. Compared to PEOU, PU is found to have a greater influence on adoption behavior. Furthermore, Sayid et al. (2012) used TAM to measure the adoption of mobile money in a study conducted in Somalia. This study concluded that PU and social influence are important factors determining the adoption of mobile money. They also added variables like perceived risk (PR) and social influence. Given that PEOU is thought to have a major impact on the adoption of mobile money, their findings on PEOU are at odds with the results of several TAM research (Dass and Pal, 2011).

### **2.5.3 Transaction Cost**

In Kenya, Micheni et al (2013) carried out a study analyzing transaction cost and facilitating conditions on the adoption of mobile money. The study indicates that transaction cost is not significant in influencing the adoption of mobile money. Facilitating conditions are significant; and this study is contrary to the findings of Omwansa et al. (2013) as this study shows that transaction cost is significant. Chitungo and Munongo (2013) use a model of TAM that includes social norms and perceived risks and perceived costs (PC). This study is done on the rural population of Zimbabwe, and the findings indicate that PR and PC deter the adoption of mobile money adoption, resulting in a negative relationship.

These studies show that TAM as a model is very effective, however the methodology must be modified to be country specific to accommodate the specific environment. Different countries embrace mobile financial services differently due to variations in these factors, which makes it necessary to do research in various nations or areas (Abdinoor and Mbamba, 2017). According to numerous studies, adoption of mobile financial services is significantly influenced by perceived utility (Chitungo and Munongo 2013; Davis 1989; Sayid et al. 2012).

## **2.6 Development of mobile money services and Financial Inclusion in Zimbabwe**

In Zimbabwe, before the dawn of mobile money, the rate of financial inclusion expansion was relatively low. Mavhiki and Shumba (2022) pointed out that the poor, low-income earners and the unbanked were largely excluded from the formal financial system of the country. This is supported by Munyoro (2023) who outlined that economically disadvantaged groups in Zimbabwe used to pay their bills in cash or send their cash to families using the buses or as hand parcels.

This was one of the riskiest methods of carrying out transactions and was very unreliable besides being slow.

Mbengo and Phiri (2015) explained that development of mobile money services in Zimbabwe is one of the accepted developments since it directly influenced the level of financial inclusion. Since 2010, the number of the poor, low-income earners and the other unbanked individuals have been adopting the new innovation when making transactions. This is one of the indicators of increasing financial inclusion. In one of the arguments on the benefits of mobile money services in Zimbabwe, Magarura (2019) asserted that nowadays, the poor as well as the unbanked persons are able to formally participate in the mainstream financial service sector and they are in a position to keep their financial balances in their electronic wallets and carry out transactions in real time. It is also crucial to note that in Zimbabwe, the mobile money service providers have been able to develop convenient and fast financial services platforms in a branchless manner with the aim of ensuring that everyone can make a transaction and be able to contribute to the formal financial services sector.

In analyzing the nexus between mobile money and financial inclusion, Masocha and Dzomonda (2020) stated that in Zimbabwe, there is a direct relationship between mobile money services and financial inclusion. Masocha and Dzomonda (2020) pointed out that while there has been slow adoption of the mobile money services, there has been a rapid response in terms of financial inclusion. This is supported by Mazambani and Rushwaya (2020) who explained that there has been a notable decline of the number of the people who were financially excluded in the country following the expansion of mobile money services by Netone, Telecel and Econet mobile money companies. Dube et al (2021) also echoed the above stating that, the convenience provided by mobile money services implies that the unavailability of the banks and other financial services in the rural areas and other remote parts of the country is no longer a matter of consideration since mobile money services can penetrate across the whole country. Ultimately, Chitokwindo (2021) agreed that development of mobile money services in Zimbabwe had a direct impact on the expansion of financial inclusion.

Furthermore, the expansion of the mobile money services has been linked with the increase in the number of people who are part of the formal financial service sector in the country.

Kufandirimbwa et al (2022) argued that in recent years, millions of low-income earners in the country have been able to adopt mobile money services and now carrying other transactions such as insurance, savings and other financial tools for their daily needs. Therefore, one can state that mobile money services in Zimbabwe, directly impact the level of financial inclusion in the country. What is common in these assertions is that the scholars seem to agree that mobile money services in the beginning were more advantageous to the population groups which previously were financially excluded.

However, Chigusiwa and Mudavanhu (2023) have a different view and stated that development of mobile money services have little contribution on financial inclusion of the country. Chigusiwa and Mudavanhu (2023) stated that in the remote and other rural parts of the country, there is still a lot of trust deficit hence a significant proportion of these populations remain financially excluded. This has been opposed by Chenjerai (2020) who pointed out that requirements for one to have a mobile money account are currently soft and reasonable such that majority of the people are preferring to have those services in place of bank account opening. Therefore, Chnjerai (2020) concluded that a positive relationship exists between mobile money services and financial inclusion in Zimbabwe.

In addition, Geweke and Mese (2022) asserted that mobile money services have led to the increase in access to financial services in the country. In support of this assertion, Mayo (2020) alleged that introduction of mobile money in Zimbabwe enabled a higher percentage of individuals in the remote and underserved areas to access financial services and also overcome the constraints which are imposed by the banks. In this regard, there is need to state that development of the mobile money services is not only meant to reduce pressure on the banking system but to overcome the challenges as well as limitations of the conventional banking system.

Gondo (2021) also argues that mobile money services play a significant role in financial inclusion expansion. In a study undertaken by Kanyenze, Kondo and Chitambira (2021) in Masvingo province to explore the impact of mobile money services on the banking sector, it was revealed that 56% of the individuals who opened the mobile money accounts had a higher likelihood of opening the actual bank accounts. Kanyenze et al (2021) concluded that in Zimbabwe, majority of the transactions was being done using the RTGS system and card-less economy was rapidly

developing. Consequently, it was more convenient for the customers to have both the formal bank account and mobile money account so that they can conveniently switch their funds and make convenient transactions.

With regards to the situation obtaining in Zimbabwe, the official figures show that by the end of 2022, the number of mobile phones which were subscribed to mobile money was 9.2 million (Rani, 2020) This was a massive increase from 7,6 million of 2020. The implication of such developments in the country is that there is an increasing number of people who are beginning to participate in the country's formal financial sector in Zimbabwe. Mbiti and Weil (2021) also pointed out that, high rate of mobile money adoption is mirroring what is transpiring in other similar developing countries such as Kenya and Rwanda. Therefore, there is need to note that mobile money services are doing more good than harm on the financial inclusion of the country. The affordability and accessibility of the mobile money services provides a conducive environment for more people to be part of the financial service sector.

## **2.6 Gap in the literature**

The literature review section has been fundamental in the expansion of financial inclusion in Zimbabwe. The various studies consulted in the literature review section points out to the fact that development of mobile money services in the country have been linked with the improvement in financial inclusion. However, a research gap still exists in terms of the empirical evidence linking the two variables. Scholars such as Oyewo et al, (2014) are of the belief that development of mobile money services are directly linked to higher levels of financial inclusion. On the contrary, scholars such as Oji and Munyanyi (2015) are of the belief that there is no relationship between the two variables. Mobile money in Zimbabwe has been expanding but there has been less correspondence with the level of financial inclusion. While there have been attempts to link the two variables, there is still lack of literature pertaining the level of the relationship. In situating the study, there is need to explore how the changes in the use of the mobile money services have been affecting the level of financial inclusion. While significant efforts have also been shown in past studies, there is need to point out that they were not based on the Zimbabwean context. Therefore, this study played a crucial role in explaining the current situation in Zimbabwe and how events have been folding over the period selected for analysis.

## **2.7 Chapter Summary**

From the information above, the most appropriate model to use for this study would be the Technology Acceptance Model (TAM), since this paper is looking at the relationship between mobile money and financial inclusion. It explains fully the factors that affect the adoption of mobile money services, and this information is vital because this looks at mobile money as a tool that fosters financial inclusion.

## CHAPTER 3: METHODOLOGY

### 3.1 Introduction

The research methodology chapter is focused on presenting the different procedures which are undertaken to obtain and analyse data. In addition, the chapter is meant to generate both validity and reliability of the study results. In this regard, the methodology chapter includes the research paradigm, the model specification, theoretical framework and estimation techniques. This chapter covers research paradigm, model specification, theoretical framework, econometric techniques utilized in the analysis, definition of variables and a priori expectations, data description and sources and diagnostic tests.

### 3.2 Research Design

This section details the overall strategy which is used in conducting the study. In order to address the overarching research issues, the study employs a quantitative research approach and analyses secondary data. The model specification, theoretical underpinnings, definitions of the dependent and independent or explanatory variables, and a priori expectations are examined in this part. The ARDL Model is used by the study to address research object 1: the correlation between the development of mobile money services and financial inclusion. Financial inclusion is the dependent variable, whereas the development of mobile money services is the independent variable. ARDL Model is used to analyse the time series data of Zimbabwe. It is considered that the lagged values of the independent variable have no additional predictive power on the values or patterns of the dependent variable when testing the research hypothesis. The degree of significance of the association between the two variables is indicated by the test statistic (p-value). According to Mcloid (2018), there is more evidence that refutes the null hypothesis when the p-value is less. Lower p-values of less than (0.05) indicated that the null hypothesis should be rejected, whilst higher values of more than (0.05) indicated that the hypothesis should be accepted.

Research objective 2 : establishing the determinants of mobile money usage as a financial inclusion tool in Zimbabwe is analysed using ARDL Model whereby all the independent variables are measured to determine their level of influence on financial inclusion. The determinants of financial inclusion such as income level, age, number of ATMs, cost of mobile transactions, education and income level are tested against the dependent variable (financial inclusion). Stationary tests are

carried out in the beginning and are followed by bounds tests in order to determine the presence of co-integration between the variables. In the event of co-integration, it means that long term relationships between the variables exist, and that they move together. In these tests, the F-statistic value which exceeds upper critical values means the presence of co-integration and long-term relationship, while the lower F-statistic value means the absence of co-integration.

### **3.3. Model Specification and Theoretical Framework**

Based on the philosophical perspective of objectivism, the proposed study employs the ex post facto research design, which emphasizes that the use of data that is not manipulated by the researcher (Simon and Goes, 2013). Therefore, with that perspective in mind, the study will employ secondary data. This study first adopts the approach followed by Sekantsi and Motelle (2018) who examined the relationship between mobile money and financial inclusion using the Autoregressive Distributed Lag (ARDL) bounds testing procedure. The ARDL is unique as it provides unbiased long run estimates, and it provides both long run and short run effects on each of the variables (Lenka and Sharma, 2017). Therefore, this model is effective in this study as it captures more information on the variables used to determine the relationship between the development of mobile money services, and financial inclusion.

### **3.4 Definition of Variables**

#### **3.4.1 Financial Inclusion (FI)**

The degree to which people in the economy can meet their needs and desires through transactions by having access to reasonably priced and practical financial services and products is known as financial inclusion (RBZ, 2022). According to a related study by Barajas et al. (2020), financial inclusion is the ability of a nation's population to use and access financial services and products in order to raise their standard of living. Financial inclusion outlines savings, credit, payments, mobile money, and other transactions as the primary financial services.

#### **3.4.2 Number of ATMs per 100,000 people (ATMs)**

Access and usage of financial services is a vital indicator of financial inclusion, and the number of ATMs that are available to a certain sample size helps one analyze whether all individuals have access to this service. Beck et al., (2015) indicate that high ATM intensity in a demographic and

geographic translate to greater access to the use of financial services. This variable is vital because it serves as a proxy that highlights the average number of people who are served by each ATM outlet. According to Nguyen (2020), number of ATMs alongside number of adults with bank accounts are some of the commonly used indicators for financial inclusion. Studies show that there is a positive relationship between number of ATMs per sample size, and financial inclusion.

### **3.4.3 Mobile Money Penetration (MMP)**

Mobile money penetration is the extent to which the country's mobile financial services are being adopted by the individuals (Anderson et al, 2000). These services include mobile banking and mobile payments which are available to the general population. According to Adrianaivo and Kpodar (2012), one way that mobile phone adoption influences economic growth is by increasing financial inclusion by making mobile financial services available to those who are not as well-off. Because mobile money lowers the cost of delivering new services, it makes it possible to do away with the necessity for location-specific distribution channels like banks and ATMs (Anderson et al., 2000). The penetration of mobile phones is vital in the success of mobile money as a tool for financial inclusion. Low penetration of mobile phones in a country that has a large financially excluded population is a set back to the success of mobile money fostering financial inclusion (Fanta, 2016). The ability of mobile money to enable people to access financial services that are not offered by financial institutions is more important to its success than the overall level of financial inclusion. The success of mobile money services is positively correlated with high mobile phone penetration.

### **3.4.4 Financial literacy (FL)**

Financial literacy is vital because it allows individuals to make use of financial products with a clear understanding of the advantages and disadvantages. Financial literacy is vital in financial inclusion and the adoption of mobile money services (Lusardi, 2019). Comprehending the significance of financial inclusion and recognizing the benefits associated with embracing innovations like mobile money hinges on individuals' knowledge and familiarity with these services. A study by Young (2013) indicates that age and income have an impact on financial literacy. Similarly, there is also a positive relationship between education and financial literacy. People who are more educated tend to show positive attitudes towards the adoption of mobile money as a tool that fosters financial inclusion (Young, 2020; Widyastutia et al, 2020). Therefore,

it is vital to have campaigns that educate people on the importance of adopting and making use of mobile money services in order to ensure their inclusion in financial services.

#### **3.4.5 Age**

According to Tuesta et al (2015), one's level of income, education and age are vital variables in the determination of their use and access to financial services. Findex (2012) conducted a survey that illustrates that 33.1% of adults have an account and a formal financial institution. When it comes to the adoption of technological innovations such as mobile money, age increases the chances of adopting these products. Age influences the cost involved in having an account. As people age, the cost of owning a bank account is seen as a barrier more and more (growing by 1% annually). A person's likelihood of sharing a bank account with a family member increases with age. On the other hand, elderly individuals are more likely to view distance as a barrier. This finding, which is consistent with that of Cámara et al. (2014), indicates that older people do not understand the benefits of using information and communications technologies to obtain formal financial services.

#### **3.4.6 Income level (Inc)**

Income level is an important variable because it shows you that low-income individuals are less likely to own a bank account whether with a bank or through mobile money services. The level of income is vital because poor people are too poor to save so they do not make use of financial services. Therefore, this variable shows us a barrier to having a financial inclusive system. High income individuals are more likely to financially included compared to lower income individuals. Therefore, income levels have a positive relationship with financial inclusion and the adoption and acceptance of mobile money services.

#### **3.4.7 Education level (Edu)**

Given that the adoption of mobile money is low among the uneducated, it is necessary to build mobile money applications in a way that makes them usable by individuals without formal education. People's decisions to use mobile money are influenced by their level of education (Tobin 2012). Ownership of a mobile phone is associated with education level. This highlights how crucial education is to the uptake of new technologies. The use of mobile money is greatly facilitated by education, and its absence may prevent use. All educational levels are positively correlated with owning a mobile money account, which is in line with Baguma's (2013) finding that those with

less education are less likely to utilize mobile money, which calls for a more user friendly redesign of the service (Fanta, 2016). According to Tuesta et al. (2015), acceptance of technical advancements like mobile money increases by 14% with each level of education.

### 3.5 Data description and sources

To address objective (i) -mentioned above, a longitudinal time horizon is used to examine the changes in the behaviour of the variables over 20 years (2000-2020). The study utilises a timeseries annual data for variables such as financial inclusion, mobile money and trust account balances collected quarterly. For robustness, multiple proxies for financial inclusion and mobile money are used. These variables are mentioned above. The data is sourced from the Findex database, Finscope, the World Bank and the Reserve bank of Zimbabwe. Table 3.1 shows the data sources and their period of publication.

*Table 3.1: Data Sources*

<b>Variable</b>	<b>Source</b>	<b>Time Period</b>	<b>Measurement Method</b>
Financial Inclusion (FI)	World Bank (Findex)	Annual (2000-2020)	Count of Individuals making transactions
Mobile Money (MM)	World Bank (Findex)	Annual (2000-2020)	Count of Individuals with accounts
Education level (Edu)	Government Survey	Annual (2000-2020)	Enrolments in Secondary and tertiary education
Income (Inc)	Government Survey	Annual (2000-2020)	Monetary value
Age (Age)	Government Census Data	Annual (2000-2020)	Years or Age groups
ATMs (ATMs)	Financial Institutions	Annual (2000-2020)	ATMs per 1000 population
Mobile Money Transactions (MMT)	Reserve Bank of Zimbabwe	Annual (2000-2020)	Number of transactions carried out within a year
Financial Literacy (FL)	Government Survey	Annual (2000-2020)	Enrolments in Secondary and tertiary education
Mobile Money Penetration (MMP)	Government Survey	Annual (2000-2020)	Number of mobile devices in use

Source: Author's compilation

## 3.6 Estimation techniques

### 3.6.1 Autoregressive Distributed Lag (ARDL)

The ARDL or the bound test procedure was developed by Pesaran and Shin (1999) and advanced by Pesaran et al (2001). The long-term relationship between mobile money and financial inclusion is examined in this study using the ARDL. This model is considered ideal as it has so many benefits over other cointegration procedures. For instance, ARDL can be used regardless of whether the underlying regressors are mutually cointegrated, I(0), or I(1). Furthermore, when the sample size is limited, this process is employed for cointegration analysis of empirical macroeconomic studies. It provides robust and valid statistical representations of the long-running model (Sekantsi and Motelle, 2018). In this model, elements which capture the long run dynamics include the lagged variables. These are included in order to capture the assumed persistence of the effect of past values on independent variables on the current values of the dependent variable. Cointegration is one of the elements which helps to capture the long run dynamics in the model between the independent and dependent variables. The presence of the co-integration indicates that variables in the study would move together in the long run even when they seemed to deviate in the short run (Sekantsi and Motelle, 2018).

On the other hand, the first difference terms are used in the ARDL model to capture the short run dynamics. The study took the difference between the consecutive observations of the variables and focused on changes or deviations from the long run equilibrium. The study is able to capture the adjustment process towards the long run equilibrium and also in capturing the short run through the error correction term (ECT). The coefficient of ECT is used to indicate the rate at which the variables converge back to their long run after deviations or shocks experienced in the short run dynamics.

The study transforms the financial inclusion model into an ARDL framework as follows:

#### Equation 1

Short run ARDL:

$$Y=C+\beta_1Y(-1)+\beta_2X + \beta_3X (-1)+ \varepsilon t$$

Y=dependent variable

X=Explanatory variable

C=constant term

E=error term

The equation was converted to suit the study as follows:

$$FI = c + \beta_1 FI(-1) + \beta_2 MM + \beta_3 ATMs(-1) + \beta_4 FL(-1) + \beta_5 Age(-1) + \beta_6 Inc(-1) + \beta_7 Edu(-1) + \beta_8 MPT(-1) + \varepsilon_t(1).$$

Where:

FI= Financial Inclusion

MM= Mobile Money

ATMs=Automated Teller Machines

MMP= Mobile Money Penetration

Edu=Education

FL= Financial Literacy

$\beta$ =Long run Coefficient

$\varepsilon_t$ = error term

The long run equation is also stated as follows:

## Equation 2

Long run ARDL :

$$FI_t = \alpha + \beta_1 MM_t + \beta_2 ATMs_t + \beta_3 MMP_t + \beta_4 FL_t + \beta_5 Age + \beta_6 Inc_t + \beta_7 Edu_t + \beta_8 MPT_t \dots (1)$$

$$\Delta FI_t = \alpha + \beta_1 MM_t + \beta_2 ATMs_t + \beta_3 MMP_t + \beta_4 FL_t + \beta_5 Age + \beta_6 Inc_t + \beta_7 Edu_t + \beta_8 MPT_t + \varepsilon_t \dots (2)$$

Where:

FI= Financial Inclusion

MM= Mobile Money

ATMs=Automated Teller Machines

MMP= Mobile Money Penetration

Edu=Education

FL= Financial Literacy

$\beta$ =Long run Coefficient

$\alpha$ =constant

$\varepsilon_t$ = error term

$\Delta$  = first difference operator,

As per ARDL, the Wald Test (F-statistic) is utilized to conduct a cointegration test between the variables. The projected long run coefficients of the variables' one period lagged level are limited by the test to equal zero. In the ARDL model, the upper bound values suggest that the variables are integrated of order one, whilst the lower bound values presume that the various variables are integrated of order zero. Therefore, the null hypothesis of no cointegration cannot be rejected if the estimated F statistic is less than the lower bound value  $I(0)$ . On the other hand, the null hypothesis is disproved, and it is determined that the variables are cointegrated if the F statistic is greater than the upper bound value  $I(1)$ . However, if the F-statistic lies between the two boundaries, the result becomes ambiguous. Following ARDL's determination of cointegration between the variables, the established cointegration regression is used to compute the long- and short-run error correction models.

### **3.5.2 Non-Stationarity and Unit root tests**

Non-stationary tests are carried out to determine the extent to which the series are consistent with the unit root tests. ARDL model can only be carried out when the variables are non-stationary (Nkoro and Uko, 2016), therefore, the unit root test is applied to determine whether the variables are non-stationary on their own, before conducting causality tests. In addition, the non-stationary tests are carried out to ensure high level of accuracy of the ARDL model based on the assumed relationship between the variables (Hung-Pin, 2014). More so, as one of the expectations of the ARDL model, it is required to ensure that variables are integrated in the same order.

### **3.6 Conclusion**

In this chapter, the study provides the research design which is utilised in order to collect and analyse data. The main model which is explained in the study is the ARDL model, and it is used to determine the relationship between the development of mobile money and financial inclusion in Zimbabwe. The main sources of data which are used for analysis are provided within the chapter. Elements capturing the short run and long run dynamics are explained as well as the error

correction terms. The strengths and weaknesses of model are also explained together with the procedures undertaken in the full data analysis.

## **CHAPTER 4: PRESENTATION AND ANALYSIS OF RESULTS**

### **4.1 Introduction**

In this section of the study provides the empirical results obtained from the time series data collected from the previously mentioned data sources. The results presented in this chapter are in line with the guiding research objectives mentioned as follows:

1. To empirically test the relationship between the development of mobile money services and financial inclusion in Zimbabwe.
2. To establish the determinants of Mobile money usage as a financial inclusion tool in Zimbabwe

The presentation and analysis of the results are in line with the ARDL model which is proposed in the previous chapter. The results presented in this chapter are based on the time series data sources covering a period of 20 years being from year 2000 to year 2020 in Zimbabwe. It is also important to note that multiple components are used as proxies to the independent variable (development of mobile money) in order to expand the explanations. The dependent variable in the study is financial inclusion (mobile transactions). The chapter includes the descriptive statistics of all the variables used in analyzing the results in and showing the relationships. Tests of stationary, ARDL and Granger Causality test results will also be presented based on the time series data covering the afore mentioned period.

### **4.2 Descriptive Statistics**

In measuring the relationship between development of mobile money (MM) and Financial Inclusion (FI), mobile money development is measured using the number of accounts held by people in Zimbabwe during the period 2000 to 2020 while financial inclusion is measured using the volume of transactions carried out over the same period. Descriptive statistics for the two variables are shown on Table 4.1.

*Table 4.1 Descriptive Statistics for Objective 1*

	FI	MM
Mean	155.750	72.916
Median	98.478	71.350
Maximum	582.489	85.00
Minimum	68.963	39.700
Std. Dev.	123.718	19.971
Skewness	2.186	-0.080
Kurtosis	7.725	1.418
Jarque-Bera	36.274	2.211
Probability	0.000	0.330
Sum	3270.761	1531.250
Sum Sq. Dev.	306125.3	7976.941
Observations	20	20

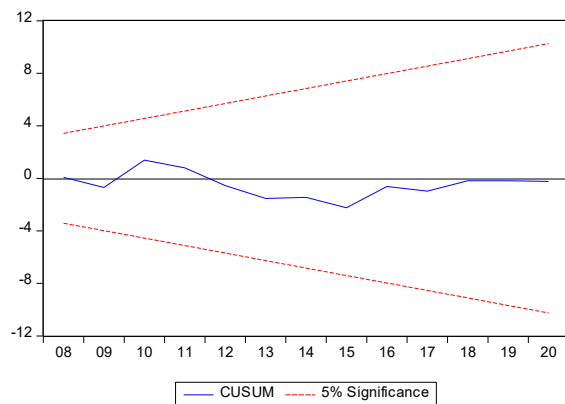
Source: Author's Computation from Eviews 10

On Table 4.1, 20 observations are made covering a period from year 2000 to year 2020. The mean for the number of mobile money accounts for the period is 73 with reference to the total number of people who had mobile phones in the country, and this indicates that people are adapting to, and accepting the innovation of mobile money services. The mean for mobile transactions carried out is 155.75. In terms of skewness, mobile money accounts are found to be negatively skewed (-.080) while mobile money transactions are positively skewed (2.1865). The Kurtosis value of the number of mobile accounts is 1.4182 while the number of mobile transactions had a Kurtosis value of 7.7258. Therefore, according to Mcloid (2018) when the Kurtosis value is greater than 1, the distribution is too peaked. For example, in 2018, the number of mobile accounts owned reached its peak while the number of transactions carried out reached the peak in 2012. This is shown on

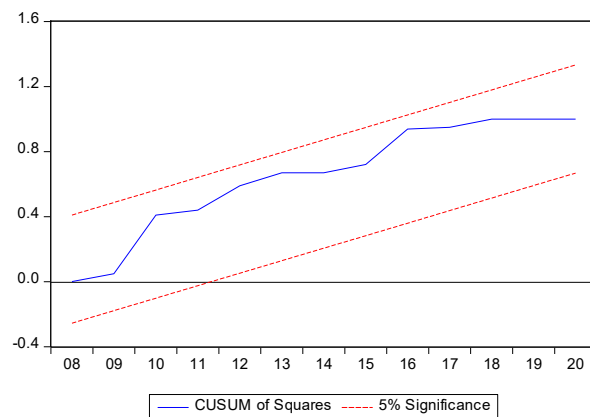
appendix 4.1. Lastly, the Jarque-Bera test of normality for mobile money accounts held is 2.21 ( $p=.33089$ ) while mobile transactions representing financial inclusion had 36.27( $p=.0000$ ). Therefore, it implies that data for mobile accounts held follows a normal distribution over the stated period while the data for mobile transactions held was not normally distributed ( $p<.05$ ).

#### 4.2.1 CUSUM and CUSUM of Squares Test

In order to determine the stability of the data in the study, CUSUM and CUSUM of Squares tests were carried out. The tests involved the calculation of the cumulative sum of the recursive residuals. This was based on the idea that all the movements outside the critical lines would mean variability while movements within the critical lines suggested stability. The results are shown on Figure 4.1 and 4.2 respectively.



*Fig 4.1: CUSUM Tests*



*Fig 4.2: CUSUM of Squares Tests*

In the context of the CUSUM tests (Fig 4.1), the null hypothesis ( $H_0$ ) is that the coefficients are stable. The results showed data stability at 5% significance level. The blue line remained within the parameters of the red lines. This implies that the data is stable and can be used for further analysis. On Figure 4.2, the results of CUSUM of squares show that movement of the cumulative sum of squares is within the red lines (5%) significance showing high level of coefficient stability. Therefore, both the CUSUM and CUSUM of Squares results are agreeing and showing high stability of the model.

### 4.2.3 Serial correlation test

The serial correlation tests are carried out using the Breusch-Godfrey Serial Correlation LM Test on Eviews. The aim is to test for auto correlation of the data which was used in the ARDL model. The results are presented on Table 4.2.

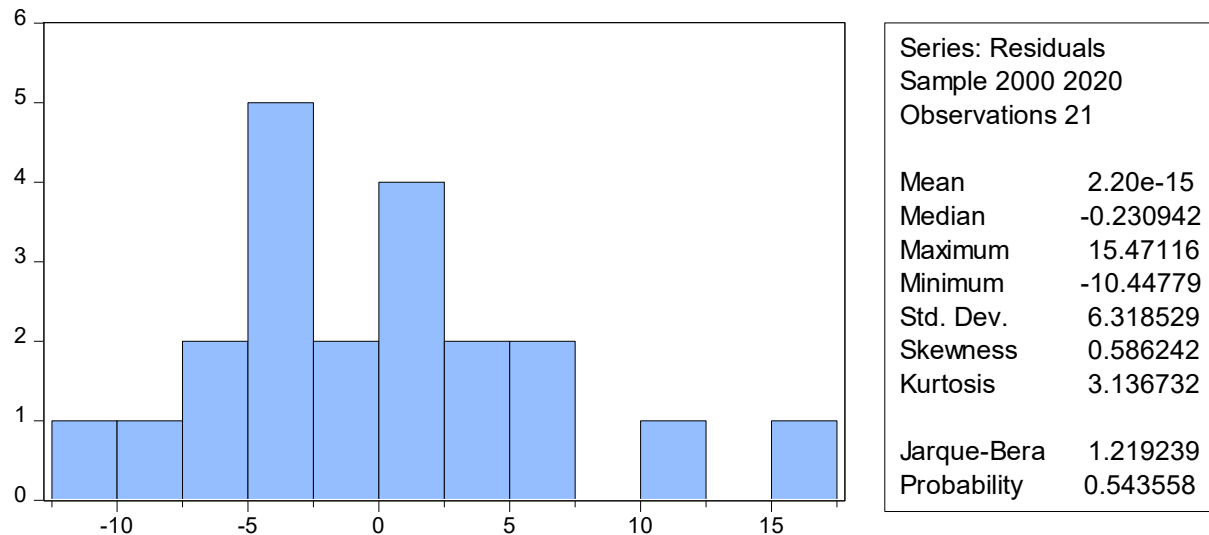
Table 4.2 : Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.244538	Prob. F(2,12)	0.7869
Obs*R-squared	0.822365	Prob. Chi-Square(2)	0.6629

The results show that (F-statistic=0.2445; p=.07869) which implies that we fail to reject the null hypothesis of no serial correlation. In other words, the data residuals of the model used in carrying out the statistical tests have no problem of serial correlation in the residuals for the specified lag.

### 4.2.4 Normality tests

Time series data for both the independent and dependent variables were subjected to normality tests using the Jarque –Bera test. The aim was to assess whether the data set followed the normal distribution.



The results showed (Jarque-Bera=1.21; p=0.5436) which implies that the data did not significantly deviate from the normal distribution. The higher probability of 0.54 above 5% significance level also meant that we failed to reject the null hypothesis that the data is normally distributed.

Therefore, there was a goodness of fit which allowed further tests to be carried out between the independent and dependent variables.

#### 4.2.5 Heteroscedasticity

On this test, there is a need to assess if the data has no problem of heteroskedasticity where the variance of the errors in a regression model is not constant. This is important in ascertaining the reliability of the regression model as well as the validity of the statistical inferences which are drawn from it. The results are shown on Table 4. 4

*Table 4.4 Heteroskedasticity Test: Breusch-Pagan-Godfrey*

F-statistic	0.549127	Prob. F(7,13)	0.7833
Obs*R-squared	4.792341	Prob. Chi-Square(7)	0.6853
Scaled explained SS	5.470482	Prob. Chi-Square(7)	0.6027

The results show that the data does not have a problem of heteroskedasticity (F-statistic=.5492; p=.7833). The Probability Chi-square of 0.6853 means that data is homoscedasticity since it is more than 0.05. Therefore it is good for regression modelling.

#### 4.2.6 R-square Test

The R-square test is also carried to determine the model fit of the data available. This is crucial in order to assess the extent to which the independent variables would be used to predict the dependent variables as well as assessing their predictive power. The results are shown on Table 4.5.

*Table 4.5 R-Square and Durbin-Watson Stat results*

R-squared	0.992454	Mean dependent var	4.250971
Adjusted R-squared	0.988391	S.D. dependent var	0.288944
S.E. of regression	0.031132	Akaike info criterion	-3.818818
Sum squared resid	0.012600	Schwarz criterion	-3.420904
Log likelihood	48.09758	Hannan-Quinn criter.	-3.732460
F-statistic	244.2592	Durbin-Watson stat	2.010381
Prob(F-statistic)	0.000000		

On Table 4.5 the results indicate R- square of 0.9925. This implies that independent variables in the model account for 99.2% of the dependent variable. This is a model fit implying that it can be used for carrying out regression model which is statistically significant. In addition, Table 4.5 shows a Durbin-Watson Stat of 2.0103 which indicates that there is no problem of auto-correlation in the data being used for the model.

#### 4.2.7 Test for non-Stationarity

Unit Root test is carried out to determine if the available time series for both the independent variable and dependent are stationary. This is in line with the views of (Nkoro and Uko, 2016) who state that the ARDL model can only be carried out when the variables are stationary. Heyman, et al (2014), state that a time series is said to be stationary when its statistical properties such as the mean, covariance and variance are constant over a period of time. Therefore, in order for the time series to be used, there should be no trend in the time series. ADF Unit Root Tests are carried out and results shown on Table 4.6. It is vital to carry out the non-stationary tests in order to ensure that results of the model are not spurious.

Table 4.6 ADF Unit Root Tests results for Financial Inclusion (FI) and Mobile Money (MM)

	In Level I(0)		First Difference I(1)	
	ADF		ADF	
Variable	<i>t</i> -statistic	Prob*	<i>t</i> -statistic	Prob*
FI	-3.246422	0.0337	-3.823970	0.0429
MM	-1.604846	0.4618	-2.301055	0.0343
MPP	4.3655	1.0000	-4.8156	0.0013
Age	-3.4527	0.0210	-7.1040	0.0000
Atms	-1.9010	0.3251	-3.4412	0.0223
Edu	2.1860	0.9997	-4.2727	0.0047
Inc	-2.3447	0.1688	-4.4993	0.0025

\*MacKinnon (1996) one-sided p-values.

On Table 4.6, the results show that the independent variables which served as the explanatory variables are statistically significant at ( $p < .05$ ). The *t*-statistic values for all the independent

variables are found to be less than the critical values at 5% showing that all the series used in the study are stationary and able to produce results which are not spurious. There is significant statistical evidence to reject the null hypotheses on this variable. Therefore, the variable is found to be stationary at the first difference I(1). The results on Table 4.6 also reveal that the ADF tests for FI with an intercept only, the time series is found to be stationary at I(1). This is shown by (t-statistic=-3.246422; p=0.0337). Therefore, the null hypothesis is rejected implying that the series is stationary and good for use in ARDL. Chen (2018) also states that the dependent variable should be stationary at I(1) in order for the regression to produce reliable results. This implies that the variable would be used to perform ARDL without producing spurious results.

#### 4.2.7 Bounds Tests

The Bounds tests is carried out in order to determine the level of cointegration between the variables. It is important to determine the extent to which these variables have a relationship. The results are presented on Table 4.4

*Table 4.7 Cointegration and Bounds Tests results for FI and MM*

	Critical value at 90%		Critical value at 95%		Critical value at 97.5%		Critical value at 99%		Conclusion
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	
K									Cointegration
1	3.02	3.51	3.62	4.16	4.18	4.79	2.75	5.58	
F-statistic for Model 1= 6.02									

Table 4.7 demonstrates that, at a 1% significance level, the F-statistic value of 6.02 is clearly greater than the critical value of the upper bound I(1) of 5.58. Consequently, it can be said that cointegration is absent. Therefore, there is a long-term correlation between financial inclusion (FI) and the development of mobile money services (MM). This suggests that the absence of cointegration null hypothesis is rejected. The next step is to estimate the Autoregressive Distributed Lag (ARDL) model.

### 4.3 Empirical Long run and short run ARDL estimation

#### 4.3.1 Long Run ARDL model on relationship between Mobile Money (MM) and Financial Inclusion (FI)

In carrying out the ARDL model, the dependent variable is financial inclusion measured using the number of mobile transactions held over a period of 20 years. The lag selection criteria are Akaike Information Criterion (AIC). The lag selected for Financial Inclusion (FI) is 1 while for mobile money (MM) is 2.

*Table 4.8 Long Run ADRL results*

Dependent Variable: FI

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
FI(-1)	0.559734	0.202488	2.764287	0.0133
C	1.082227	89.77063	0.012055	0.9905
MM	1.003668	1.260859	0.796020	0.0370

According to Table 4.8, ARDL results, financial inclusion positively impacts itself during the first lag. The significance level is at ( $p=.0047$ ). With a substantial positive influence of 1.0037 on the dependent variable, mobile money accounts are significant at ( $p=.0370$ ). The results imply that financial inclusion and the development of mobile money services are positively correlated. These results corroborate those of Chummum (2014), who suggests that there is a favorable correlation between mobile money services and financial inclusion, which is demonstrated by the fact that rural residents use and have access to mobile money.

#### 4.3.2 Short run ARDL Estimations on the relationship between development of Mobile money and Financial Inclusion

After determining the long run ARDL estimations, the next step is to find out the short run equations and determine the relationship. According to Chummum (2019), in the short run there is need to consider the residuals of the original long-term equation in order to determine the

extent to which there will be adjustments towards the equilibrium. The study results are presented on Table 4.9.

*Table 4.9: Short run ARDL Estimations on the relationship between FI and MM*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002027			
		0.006478	- 0.312959	0.7581
D(MM)	0.015106	0.000470	32.10730	0.0000
ECT(-1)	-1.196972	0.222217	-5.386512	0.0000

The error

correction term (ECT) on Table 4.9 is negative and significant at (p=.0000) implying that the long run adjustment is possible. Therefore, the results imply that adjustments towards the equilibrium will at a slow pace. Hammont (2015) elucidates that in the short run, the development of mobile money may not actually translate to financial inclusion but will adjust by the passage of time. Therefore, results support hypothesis 1, and one can conclude that there is a positive relationship between the development of mobile money services and financial inclusion in Zimbabwe.

#### **4.4 Data Analysis on Objective 2: To establish the determinants of Mobile money usage as a financial inclusion tool in Zimbabwe.**

In this section, the research reveals findings obtained through the implementation of the ARDL model, examining both short-term and long-term periods. The intention is to provide recommendations to diverse stakeholders regarding optimal strategies for enhancing financial inclusion in the country.

Cointegration Bounds tests is carried out in order to determine if there is cointegration among the variables. The value of the F-statistics is utilised to identify the presumed existence of the long-term relationship between the dependent variable and the independent variables. The guiding null hypothesis is ( $H_0$ :No long run relationship) while the alternative hypothesis is that ( $H_1$ :there exists a long run relationship). The bounds tests results show that on model 1, the F-statistic value (F=7.02) is greater than the upper bound value (4.16) at 5% significance level (95% critical value).

The null hypothesis was rejected. According to Narayan (2005) this meant that cointegration exists and there is a long run relationship.

Table 4.10: Cointegration bounds tests results for Objective 2

K	Critical value at 90%		Critical value at 95%		Critical value at 97.5%		Critical value at 99%		Conclusion
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	
1	2.02	3.51	2.62	4.16	3.08	4.86	3.75	5.58	Cointegration
F-statistic for Model 1= 7.02									

#### 4.4.1 Long run ARDL model results on the determinants of Mobile Money Usage

The study aims to determine the determinants of mobile money usage through the ARDL Model. This is based on the model equation formulated in the previous chapter. The results pertaining the long run are presented on Table 4.11.

Table 4.11: ADRL long run estimations on the determinants of mobile money usage.

Dependent Variable : MM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPP	0.033001	0.001472	0.680078	0.0094
MMT	7.934306	9.486605	-0.083658	0.0347
INC	0.430221	0.000155	-1.425823	0.0794
FL	0.073165	0.001782	-0.092430	0.0279
EDU	0.420416	0.000733	-0.567191	0.0010
ATMS	0.154109	0.013294	-0.384306	0.0075
AGE	0.121169	0.000525	0.322390	0.0027
C	3.299166	0.068740	47.99510	0.0000

Basing on the results on shown on Table 4.7. the F-static value of 4.65 is greater than the upper bound I(1) of 3.28 at 5% significance level. This indicates that in the long run there is cointegration

between the independent variables and the dependent variables. An increase in the independent variables results of mobile money usage as a financial inclusion tool in Zimbabwe.

Table 4.11 reveals that mobile phone penetration in the country is a significant determinant of financial inclusion in the long run. When the number of people with mobile phones increases in the country by 1%, there will be an increase in mobile money usage by 0.03%. Therefore, the results suggest that mobile phone penetration provides access to financial inclusion through mobile money and carrying out of mobile phone transactions.

Table 4.11 indicates that, 0.15% of the increase in usage of mobile money in Zimbabwe is explained by 1% increase in the number of ATMs. This is in support of the literature by Ahmad et al. (2020) mentioned that accessibility of ATMs by the population create flexibility and accessibility on the part of individuals and they would want to use more of the available mobile money services. Results on Table 4.11 also shows that, age is a significant determinant of mobile money usage in Zimbabwe. Results show that about 0.12% of the changes in mobile money usage is explained by 1% changes in the age of the people. As the people grow, they tend to fully understand the modern means of carrying out financial transactions, and many individuals go on to open bank accounts (Sayid et al, 2012) .

Table 4.11 more so, indicates that education levels in the country statistically and significantly determine the level of financial inclusion in the country ( $p < .05$ ). a 1% increase in the education levels of the individuals would result in 0, 94% increase in the use of mobile money in the country. As individuals become more educated, their ability to understand financial inclusion increases and they will be involved in the number of transaction (Abdinoor and Mbamba, 2017). Their ability to generate income also increase hence higher education levels in the country are associated with financial inclusion.

Income level is a significant determinant of financial inclusion in the long run. The results highlighted in Table 4.11 show that approximately 0.43% of the increases in mobile money usage in Zimbabwe is explained by 1% increase in income levels. Therefore, higher income levels are associated with higher financial inclusion in the long run.

Financial literacy significantly influences mobile money usage in Zimbabwe. Empirical results on Table 4.11 reveal that more than 0.7% of the increases in mobile money usage are explained by the 1% increase in financial literacy. These findings corroborate those of Munyanyi (2014) who also states that financial knowledge positively influences the willingness of the people to use mobile money. Likewise, Kendall et al (2021) also states that low financial literacy in the country dampen the interest of individuals to use mobile money due to lack of trust and poor understanding of the perceived risks. Ultimately, the results above support hypothesis 2, and prove that the individual variables tested in the paragraphs above, do significantly influence mobile money usage as a financial inclusion tool in Zimbabwe.

#### 4.4.2 ARDL Short run results on the determinants of mobile money usage with ECT

*Table 4.12: Short run ARDL Model results on determinants of mobile money usage with ECT*

*Dependent Variable: MM*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001710	0.006392	0.267508	0.7945
D(MPP)	0.000529	0.001482	-0.356814	0.0086
D(MMT)	0.413306	4.948705	0.109447	0.0050
D(INC)	0.300149	0.000126	-1.177701	0.0062
D(FL)	0.051599	0.000991	0.604679	0.0089
D(EDU)	0.000412	0.000447	0.921100	0.0287
D(ATMS)	0.013841	0.011486	-0.334437	0.0450
D(AGE)	0.470768	0.000334	-2.300548	0.0442
ECT(-1)	1.688660	0.227798	-7.412961	0.0000

In the short run, the ARDL model is used to test the factors which are significant in influencing financial inclusion in Zimbabwe. As mentioned in the previous chapter, series of data from 2001 to 2020 is tested and the results are as follows:

The study's findings show that, with a coefficient of 3.7 that is statistically significant at ( $p < .05$ ), the quantity of ATMs in the nation has a considerable short-term impact on financial inclusion. This suggests that if the nation's ATM count rises, so too will the rate of financial inclusion over time. As a result, it may be claimed that, at least initially, the quantity of ATMs in the nation influences financial inclusion. A study by Yadav et al. (2015), which demonstrates that ATM

placement to areas where they can boost account users' convenience and confidence, supports these findings by demonstrating that higher levels of financial inclusion will follow. Based on the premise that, an increase in accessibility of ATMs, positively influences financial inclusion.

Table 4.12 indicates that age of the people is not a statistically significant determinant of financial inclusion in the short run with a coefficient of 0.470768 ( $p > .05$ ). Therefore, the age of the people in the country is found to have positive effect on the level of mobile money usage financial inclusion in the country. These results are supported by the findings of Abel et al, (2018) that show that there is a positive relationship between age and mobile money usage. The study indicates that, mobile money usage increases with age, because as people increase in age, they become knowledgeable and adaptable towards different financial products and innovations.

Furthermore, the results on Table 4.8 highlight that education level is a significant determinant of mobile money usage in the short run ( $p < .05$ ). Therefore, as the education level of the individuals in the country increases there will be a corresponding increase in financial inclusion. When people increase their education level, they are better positioned to be included in the country's financial system. The findings by Lusardi and Mitchell (2013), suggest that levels of financial inclusion increase with education, thus further suggesting that highly educated individuals are more like to use mobile money and are financially included. The study goes on to emphasize the significance of higher education in increasing levels of financial inclusion and contributing to national development.

Furthermore, Table 4.12 results show that, in the near term, a nation's financial literacy level influences how often people use mobile money, with a statistically significant coefficient of 0.051599 ( $p < .05$ ). Thus, mobile money usage will rise more significantly in tandem with an increase in financial literacy. Grohmann et al. (2020), who emphasized that financial literacy has a positive effect on mobile money usage, support these results by pointing out that educated people better understand the benefits of financial services and feel more confident when using various cutting-edge financial services.

Furthermore, in the short run, the income level in the country is a determinant of mobile money usage with a coefficient of 0.300149 which is significant at ( $p < .05$ ). This translates to income

level among the individuals rising in the short run, and mobile money usage increasing as well . Therefore, when individuals have more income amongst themselves, their ability to use the mobile money facilities also increase. These findings are supported by Chu (2019) who concludes that income levels have a high impact on the willingness of individuals to participate in financial services and adapt different financial innovations. The findings by Bayar et al (2021), support the results and show that the penetration of mobile phones has a significant positive influence on mobile money usage and financial inclusion. The impact is mainly seen in the increase of individuals' access to financial institutions and financial markets in both the short and long run.

Lastly, Table 4.12 highlights that in the short run, the mobile phone penetration is a determinant of financial inclusion with a coefficient of 0.000529 which is significant at ( $p < .05$ ) implying that a 1% increase in mobile phone penetration will result in the increase in mobile money usage by in the short run. It is therefore proper to mention that when more people have access to their mobile phones in the country, their ability to be included in the financial system increases.

The ECT is positive and significant showing that in the long run the system will monotonically adjust itself towards the equilibrium.

#### **4.4 Conclusion**

The chapter presents the main results obtained from the time series data which is analysed using E-Views ARDL model. On research objective 1, the main results show that in the short run, there is a strong positive correlation between development of mobile money and financial inclusion in Zimbabwe. As the development of mobile money increases, there will be a corresponding increase in financial inclusion. On research objective 2, the study results show that in the short run, number of ATMs, Age, mobile phone penetration, financial literacy, income and education significantly determine financial inclusion. Furthermore, in the long run, all the independent variables are found to be significant determinants of mobile money usage in Zimbabwe.

## **CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

In this chapter, the study presents the main research findings in line with the guiding objectives. The conclusions are in line with all the procedures undertaken in testing the models. More so, the chapter provides the main conclusions made on each research objectives as well as providing solutions to the research problem. The study is guided by the following research objectives:

1. To empirically test the relationship between the development of mobile money services and financial inclusion in Zimbabwe.
2. To establish the determinants of mobile money usage as a financial inclusion tool in Zimbabwe

To achieve the above objectives, the data collected is analysed under the following null hypotheses:

H1: There is a positive relationship between the development of mobile money services and financial inclusion in Zimbabwe.

H2: Individual variables significantly influence Mobile money usage as a financial inclusion tool in Zimbabwe.

The study makes use of the ARDL model in order to analyse the time series data. The data which is incorporated in the study ranges from 2001 to 2020. Objective one: the pair wise granger causality tests are used to determine if the relationship exists between development of mobile money and financial inclusion. Objective 2: ARDL model is utilised to show the determinants of financial inclusion on both short run and long run.

### **5.2 Summary and Conclusion**

The study examines the connection between Zimbabwe's financial inclusion and the growth of mobile money services. The study looks into how much changes in the financial services industry's development have an impact on financial inclusion in Zimbabwe. The development of mobile money services in Zimbabwe increased gradually during the period under study (from which the time series data was acquired), as indicated by the literature. In this study, the number of adults

with a bank account or mobile money account, the number of ATMs per 100,000 people, the penetration of mobile phones, education level, age, and financial literacy are the characteristics used to measure the development of mobile money services. Conversely, the dependent variable is financial inclusion.

The study adopts the Technology Acceptance Model and Diffusion of Innovation theory. The commonality in all these theories is based on the need to determine the usage of mobile money services. The study results show that the development of mobile money services is based on the perceptions of the people towards the services as well as the availability of such technologies. With reference to Zimbabwe, financial inclusion has been on the rise gradually and showed that it is largely influenced by the number of transactions which are being carried out on using mobile money services. Despite the use of the models in explaining the relationship between mobile money services and financial inclusion, the study notes that studies are limited in their exploration of other variables which are outside the individual person (Nan et al. 2021). For instance, the studies do not consider the macro-economic variables which can influence the rate of financial inclusion such as inflation, Gross Domestic Product and unemployment.

In analyzing the time series data, the study makes use of the unit root tests in order to get an interpretation of the available series of stationary. Therefore, the ARDL model is used in order to determine the level of influence posed by development of mobile money services on financial inclusion. Empirical results show that mobile money services, to a greater extent accelerate financial inclusion in the country. This agrees with the results of Myeni et al (2020) who also highlights that mobile money development in the economy is a direct way of influencing financial inclusion. Therefore, one can conclude that when a country has a sound mobile money service, there is high possibility of increasing the mobile money services. The study's findings are consistent with the 2014 Finscope survey in that they show how the population's demographics have a significant impact on mobile money services. This suggests that individuals who are structurally disadvantaged or shut out of the mainstream financial system in Zimbabwe do not appear to be receiving mobile money (Munyanyi, 2014). For instance, data analysis revealed that income levels rise in tandem with greater financial literacy, which together have a beneficial impact on financial inclusion.

This study concludes that the Number of ATMs per 100 000 are increasing over the years. This implies that people with bank accounts and those with adequate education in the country are also increasing and their demand is rising ultimately. In line with the literature by Ahamed (2016) this is a sign of increase in financial inclusion. In support of the literature by Asongu (2015) it is also concluded that mobile banking in Zimbabwe is increasing, and more people are now appreciating the need to make use of technology.

Mohammadi (2009) highlighted that financial inclusion, through the use of mobile money is a way of including people who are structurally disadvantaged. For instance, people with no bank accounts can maximize the availability of mobile money services and be part of the financial system of the country. In this regard, the study results paint a picture that people often prefer.

The study also concludes that age of people determines the degree of financial inclusion. In essence, the degree of financial inclusion increases as the age of the individual increases up to a certain age. However, when people age towards retirement, they begin to have less interest in making financial transactions. In line with the views of Olaniyi and Adeoye (2016) the study concludes that age influences the degree of financial inclusion. In developing countries such as Zimbabwe, there is a variation on financial inclusion based on the age of the people involved.

The study further concludes that the education level of the individuals influences the level of financial inclusion in Zimbabwe. This is based on the fact that educated people in the country are better positioned to comprehend the various financial products which are on the market. Duncombe and Boateng (2009) also state that as the education level of individuals increase, they become able to understand the importance of the available financial services and make appropriate decisions in the formal financial markets. This conclusion supports prior studies such as Asongu and Nwachukwu (2016) who state that education level is a vital factor when establishing mobile money services. Therefore, the success of mobile money services will directly and positively influence financial inclusion in the country.

The study also comes to the conclusion that the level of financial inclusion in the country is influenced by financial literacy. People are more likely to use mobile financial services and make wise financial decisions when their level of individual financial product literacy rises. As a result,

as financial literacy rises countrywide, so does the demand for financial services. According to Nandru et al. (2016), a person's level of financial literacy explains all the skill sets required for them to understand the benefits and drawbacks of the financial products that are accessible. In other words, those who are financially educated are also more likely to be involved in their finances and to utilize all of the mobile financial services available to them.

The results in this study support the conclusions made by the studies above, and the study indicates that mobile phone penetration influences the rate of financial inclusion in Zimbabwe. Based on the time series data used, it is revealed that as the rate of mobile phone penetration increases, the degree of financial inclusion in the country is also increasing. The number of people owning a mobile phone and the number of people using the mobile network has been on the rise over the period under review. In this regard the expansion of the mobile network services in the countryside has been on the rise and successfully increasing the rate of financial inclusion in the economy. This agrees with the findings of Musa et al (2015) who highlights that network coverage in most parts of Zimbabwe results in the inclusion of rural people as they are in a better position to understand the importance of making financial transactions using their mobile phones. Therefore, the relationship between mobile money services and financial inclusion in Zimbabwe can be fully explained by the changes in mobile phone penetration.

### **5.3 Recommendations**

#### **5.3.1 Policy Recommendations**

In terms of policy making, the government of Zimbabwe through the Reserve bank should put in place measures to improve the level of financial inclusion in the country. This is based on the fact that mobile money services have been seen to be positively related with financial inclusion. The reserve bank should ensure that mobile operators have affordable financial services which makes it easy for the financially excluded people to afford and make transactions. This is vital in the rural areas where the government has to support the people through effective policy formulation and implementation. Therefore, there is need to ensure that mobile financial transactions have reasonable charges, and they can easily be used for both large and small transactions.

### **5.3.2 Mobile Network Operators**

The mobile network operators in Zimbabwe should ensure data use to ease access of the people especially in rural areas to financial services. In doing so, there is need to prioritize the measures which can be put in place to deal with all the potential risks to privacy. In this regard, there is need to create regulations and implement systems which ensure that there is no abuse of the mobile money services available. There is need to ensure full understanding that mobile money services are subject to privacy regulations, and they require consent to access all the data from the clients. Therefore, the mobile network providers in Zimbabwe should comply with all the data regulations governing their operations. In addition, the mobile network operators together with the government should make efforts to ensure that all the areas of the country are covered with network. This will help to facilitate carrying of transactions and inclusion of all the people within the borders of the country.

### **5.3.3 Government**

The study results show a positive relationship between mobile money services and financial inclusion. Therefore, it is suggested that the government should implement measures to ensure the affordability of mobile phone ownership. When the mobile phones are affordable to the people, they are likely to buy them and take part in the financial system. In this case, mobile ownership especially in the rural areas where most people have been excluded financially is wanted. These people are less likely to open formal bank accounts, hence they will need to have access to the mobile money services. In addition, supporting rural ownership of mobile phone services will improve income distribution between the urban areas and the rural areas.

### **5.3.4 Banks**

Banks are significant stakeholders as far as the financial inclusion is concerned. Therefore, they should invest in more ATMs to allow easy accessibility of funds channeled through mobile money services. The number of ATMS and related infrastructure should be improved in order to ensure convenience. Bank infrastructure such as ATMs play an important role in improving financial inclusion. The study results highlight that the number of ATMs per 1000000 people over the years have been improved and was positively related to financial inclusion. Therefore, in growth points there is need to install these machines.

#### **5.4 Limitations of the Study**

The study was carried out using secondary data based on statistics collected by other organisations and for other purposes. The time series data was only limited to a 20-year period only. The limitation meant that the researcher only relied on quantitative data and would not obtain other primary data from the different respondents.

#### **5.5 Further Studies**

This study paid much attention on the relationship between mobile money services and financial inclusion in Zimbabwe. Adequate attention was also given on the determinants of mobile money services success. However, future research should expand on the number of variables which can influence the financial inclusion. The researcher also recommends that specific study should be carried out concentrating on the rural population. This is because, financial inclusion cannot be judged based on the results obtained from a mixed sample of both rural and urban statistics.

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