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MUNHUMUTAPA SCHOOL OF COMMERCE

BERNARD CHIDZERO GRADUATE BUSINESS SCHOOL

DIGITAL FINANCIAL INCLUSION AND HUMAN DEVELOPMENT IN ZIMBABWE: AN ANALYTICAL REVIEW 2011-2021

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APPROVAL FORM

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I declare that the dissertation for the Masters in Development Finance degree at the Great Zimbabwe University, herby submitted by me, is my original work and it has not previously been submitted for a degree at this or any other University, and that all reference materials contained therein have been duly acknowledged.

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DEDICATION

Dedicated to my parents, my family and all those who wish to see a fully developed human being

ABSTRACT

The objective of this study was to examine the relationship between digital financial inclusion and human development in Zimbabwe. It also sought to determine whether human development factors impact the progress of digital financial inclusion. Foreign direct (FDI) investment, trade, remittances, official development assistance (ODA) and inflation all of which affect the flow of funds and are touted to contribute towards the development of a country were used as intermediating and control variables on both human development and digital financial inclusion. The study employed correlation analysis and the least squares regression model to analyze data for the 11 years from 2011 to 2021 . The study finds that a bidirectional relationship exists between digital financial inclusion and human development. Education and income significantly increase the ability and willingness of people to access and use digital financial services. Direct foreign investment, Official Development Assistance and Personal remittances negatively impact the adoption and use of digital financial inclusion. Finding that the use of digital technology to access financial services requires both internet and mobile phones, the study recommends the government and regulators to ensure that they internet is affordable, and network remains available for convenience and usage of financial services when needed. It also important to invest in financial and digital education to increase awareness of the users towards embracing the various digital financial services use cases.

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CHAPTER I

INTRODUCTION

1.0 Introduction

This study seeks to examine and evaluate the relationship between Digital Financial Inclusion and Human Development in Zimbabwe over the period 2011 to 2021. This proposal highlights the background to the study, statement of the problem, research objectives and research questions that will be answered by the study. It will also outline the assumptions, delimitations and limitations of the study before concluding with the dissertation outline and summary.

1.1 Background of the study

In recent years, great attention is given to the United Nations 2030 Agenda for Sustainable Development, along with a new set of development goals that are collectively called the Sustainable Development Goals (SDGs). As espoused by the principle of leaving no one behind, the overall goal of the SDGs is human development (Kara,*et al*., 2020). Human development is a concept where leaders seek to enhance human capabilities and to expand alternative opportunities from which individuals will make choices about their everyday and lifelong needs and wants. (UNDP, 2018; (Chowdhury and Chowdhury, 2022; Matekenya *et al*, 2020).

In the context of the United Nations Agenda 2030, the individual SDGs can be viewed as embodying the expanded choices that people are free to promote to enjoy their lives to the fullest. Specifically, the principal dimensions and indicators of human development are directly captured in four (4) SDGs. These are: life expectancy covered under SDG3 (good health and well-being), knowledge covered under SDG4 (quality education) and standard of living covered under SDG1 (no poverty) and SDG8 (decent work and economic growth). However, the other goals such as zero hunger (SDG 2), Gender equality (SDG5), clean water and sanitation (SDG 6), affordable and clean energy (SDG7), industry, innovation and infrastructure (SDG9), reduced inequality (SDG 10), sustainable cities and

communities (SDG 11) and responsible consumption and production (SDG12) among others are important variables that are interlinked with and influence the realization of the principal dimensions. They are also important for measuring various other indicators of development.

Since its growth to prominence in the 1990s, the concept of human development became an alternative to the income-led measures of a country's development (UNDP, 2018). With the Human Development Index (HDI) as the main indicator, the other measures of human development include the Multidimensional Poverty Index (MPI), Inequality-adjusted HDI, Gender Development Index (GDI), and the Augmented Human Development Index (AHDI).

According to the 2022 UNDP Human Development Report the World Human Development Index has steadily grown from 0.601 in 1990 to 0.739 in 2019 before slumping to 0.732 in 2021 thereby recording a 22% increase since 1990. In Sub - Sahara Africa (SSA), the HDI rose 34% from 0.407 in 1990 to 0.547 in 2021. Meanwhile, Zimbabwe, a member country of the SSA region, started at 0.509 in 1990 but a year later started to recede until 2003, when its HDI stood at an all-time low of 0.439. From 2004 the index started to rise again until its peak in 2018 at 0.602. At the end of 2021 (latest data) the HDI was 0.593. From its lowest point in 2003, Zimbabwe turned around 36% to its 2021 HDI. Considering that Zimbabwe had lost 14% of the value by 2003, it is evident that the country grew faster than the SSA region and the world at large.

Notwithstanding the growth in human development, the Global Multidimensional Poverty Index (MPI) 2023 report shows that about 1.1 billion people (18%) out of 6.1 billion in 110 countries are poor. Half (537 million) of the world poor people live in Sub Sahara Africa while over a third (387million) live in South Asia. All the poor people live in middle income (2/3) and low-income countries showing income inequalities among the middle-income countries. Also, the groups affected are mostly children (566 million) and the rural people (84%) across all the world regions. In Zimbabwe, global Multidimensional Poverty Index (MPI) value plummeted from 0.156 in 2010 to 0.110 in 2019, and incidence of poverty fell from

36.1 percent to 25.8 percent. About 740 million (16 percent) of the 4,702 million poor people in 2010 had moved out poverty by 2019.

While the available evidence shows that human development and poverty reduction has improved since the 1990s, both the incidence and the intensity of poverty as well as human development levels remain a cause of concern for governments and international organizations such as the United Nations, World Bank (WB) and International Monetary Fund (IMF). These organizations went on to identify that the many people in the world remain trapped in poverty and under development because they were excluded from formal access and usage of financial services. This was aptly summed by the former United Nations Secretary General, Kofi Annan, on 29 December 2003, when he acknowledged that:
"The stark reality is that most poor people in the world still lack access to sustainable financial services, whether it is savings, credit or insurance." The challenge was to address the constraints that exclude people from full participation in the financial sector and help them improve their lives.

In response to the challenge of financial exclusion, the renowned phenomenon of financial inclusion took the world by storm and became an international financial policy objective. One such initiative that internationalized the promotion of financial inclusion was the Maya Declaration on Financial Inclusion in 2011. The Maya Declaration focused on empowering and transforming the lives of all people as well as improving the economic and social potential of the world's poorest by improving their access to financial services and products. The transformation of the lives of all people is by nature human development.

The 2015 United Nations Sustainable Development Goals also identify financial inclusion as an enabler for achieving most of the SDGs (UNSGSA, 2018; Ya *et al*, 2023). A joint project between the UN Global Compact and KPMG (2015) envisioned that financial inclusion would support improved economic well-being which then increases the ability of families and Governments to improve social outcomes. The authors noted that increasing financial inclusion for individuals help achieve SDGs 1, 2, 3, 4 and 10 while expanding financial inclusion to small and

medium sized enterprises help to achieve SDGs 5 and 8. With its increased role, it has become pertinent that all countries develop and implement a National Financial Inclusion Strategy as a show of a country's commitment towards realizing the objective of financial inclusion and ultimately the related SDGs.

Financial inclusion allows broad access to appropriate financial services and is likely to benefit poor people and other disadvantaged groups (Demirgüç-kunt and Klapper, 2021). With access to formal savings and credit mechanisms the poor and other marginalized groups may invest in their families education, preventive health measures, and plan towards reduced vulnerability to illness and other unexpected events hence contributing towards human development.

Although the emergence of technology in financial services came as a challenge towards achieving financial inclusion and SDGs (O'Sullivan, et al. 2021), the United Nations, World Bank and other organizations quickly seized the opportunity to adapt to and promote the phenomenon of digital financial inclusion (UNSGSA, 2018 *et al*).According to the UNSGSA *et al* (2023) inclusive digital financial services can help poor people store and increase savings, cope with unexpected economic shocks, access social benefits more cheaply, and make investments in economic opportunities that can lead them out of poverty.

In general, African countries have made considerable progress in financial development and financial inclusion over the last two decades, with East African countries leading the world in innovative digital financial services (Inoussa, 2021). With the advent of digital financial inclusion, people who were at the lower level of the pyramid have become financially active (Peric, 2015; Mhlanga, 2020). Banks and non-bank institutions are now competing and working together to expand financial access to these underserved and financially excluded populations through digital financial approaches such as mobile banking, internet banking.

Zimbabwe, like the rest of the world, has also developed a National Financial Inclusion Strategy (RBZ, 2016;2022). According to the Zimbabwe 2022 Finscope Consumer Survey, formal financial inclusion rose from 38% of the adult population

in 2011 to 83% in 2022 while the financial exclusion gap dropped from 40% in 2011 to 12% in 2022. The increase was driven by the increased uptake and usage of mobile money and digital financial services which have helped to break the barriers to the traditional financial services. Per the 2022 Finscope survey, mobile money usage was 74% in 2022, a 20% increase from the 2014 position, with payments, credit, savings, remittances, and insurance being the major use cases of the digital financial services (Finmark Trust,2022).

1.2 Statement of the problem

It has been claimed that financial inclusion is the panacea for poverty reduction and improving the economic well-being of individuals and the informal organizations. At the same time there has been tremendous speed in the creation, adoption, and use of digital financial services in Zimbabwe since the 2011. However, there has not been any research to establish if the growth in digital financial inclusion indeed achieves its objectives of reducing poverty and promoting human development in Zimbabwe. Equally, there has not been any study to determine if the growth in digital financial inclusion is itself a function of the growth in human development.

While few research on financial inclusion and human development exist, they focused on sub-regions for example Sub Sahara Africa (Matekenya *et al*, 2020; Lyons *et al*, 2020; Omokanmi and Ogunleye, 2020; Ofori and Asongu,2021; Xiao and Tao,2022), or grouping of countries (Chowdhury and Chowdhury, 2022; Abdelghaffar *et al*., 2021; Biswas, 2023). While some researchers have attempted to combine the digital and traditional financial inclusion metrics, there is no research that strictly examines digital financial inclusion either as an independent or dependent variable. Although Abdelghaffar *et al* (2021) found a positive relationship between financial inclusion and human development, they recommended that future research incorporate the technological advancement in financial inclusion and the nexus with individual components of human development.

From the foregoing, the research sought to fill the research gap identified by Abdelghaffar *et al*(2021) which is to include a focus on digital technology in determining financial inclusion. This will be greatly significant to the academia, industry and government for reference, decision making on areas and level of participation and policy formulation respectively. Moreover, since the various studies have produced different results on the relationship between financial inclusion and human development based on the region, bloc or country, it has become paramount that country specific studies be carried out.

1.3 Research questions

The research questions which are answered by the research objectives are as follows

- What is the nature and direction of the relationship between digital financial inclusion and human development in Zimbabwe?
- Do the factors of human development influence digital financial inclusion?
- What can be done to enhance the adoption and use of digital financial services for human development.

1.4 Research Objectives

The objectives of this research are to:

1. examine the relationship between digital financial inclusion and human development.
2. determine whether the factors of human development influence digital financial inclusion.
3. make recommendations for enhancing the adoption and use of digital financial services and human development

1.5 Purpose of the study

The study seeks to establish the nature and direction of the relationship between digital financial inclusion and human development as well as investigate those human development factors that affect the adoption and usage of digital financial services in Zimbabwe.

1.6 Significance of the study

Both the national financial inclusion policy and national development strategies enunciate Zimbabwe's desire to become an upper middle-income country by 2030; leaving no one and no place. Coincidentally, the UN 2030 Agenda of the SDGs will also be ending in 2030. It is therefore imperative that the country is aware of how the twin objectives of financial inclusion and human development are interacting with each other to inform policy formulation and directing resources to promote the achievement of both objectives.

Being a new research area, the findings will give the academia a reference point for future research. It can also be the basis for future studies to confirm or validate the findings. Industry players could also seize the opportunities of enhancing digital financial inclusion for widening their own client base while allowing the individuals to become economically empowered and prosperous. Regulators can also use the research to regulate the financial and market conduct of service providers to remove the barriers to digital financial inclusion and promote those factors that enhance the use of digital financial services.

1.7 Assumptions

The researcher made the following assumptions in carrying out this research.

- That secondary data would be easily obtained from various online sources and past research by other organizations such as the World Bank, International Monetary Fund (IMF) and Human Development Reports
- That financial resources and time committed to conduct the research to its logical conclusion would be sufficient.
- The results of the study would be genuine, dependable and useful to any interested party.

1.8 Delimitations

The study was restricted to the review of the available digital financial inclusion and human development data for Zimbabwe for the period 2011 to 2021. Traditional Financial Inclusion metrics were out of scope.

1.9 Limitations of the study

Since this study was conducted alongside other coursework, there was bound to be pressure to work on the research and study for the other courses in addition to the researcher's own daily work. The researcher will plan and prioritize the research work, including taking leave of absence from work to dedicate time for the research work.

There have been few research specific to the topic and the country for reference purposes. To circumvent this, the researcher applied the literature relating to other countries or regions as well as other variables that may be used as measures of development while financial inclusion was used in place of digital financial inclusion.

1.10 Definition of terms

Human Development (HD)-refers to the process of expanding human choices and preferences to promote a long and healthy life, high living standards, high-quality education, political liberty, gender equality among other sustainable development goals.

Financial Services- A transactional bank account, credit, savings and insurance or participation in the money and capital market are all dimensions of financial services.

Financial Inclusion –It means the broadening of access to and usage of affordable, effective, and safe financial services by everyone.

Digital financial services (DFS) – These are financial services which rely on digital technologies for their delivery by the financial institution and use by consumers. They include mobile money, online accounts, electronic payments, insurance and credit, combinations of them and newer fintech apps,

Digital Financial Inclusion - the deployment of cost-saving digital means to reach the financially excluded and the underserved population groups with formal financial services that are tailor-made to satisfy their needs.

1.11 Dissertation outline

This dissertation is composed of chapter I which introduces the study, followed by chapter II which reviews the related literature. Chapter III outlines the research methodology used by the researcher in detail while Chapter IV focuses on the presentation, analysis and interpretation of data gathered. Chapter V wraps up the dissertation by giving the summary, conclusion and recommendations drawn from the study.

1.12 Summary

This chapter looked at the background of the study, statement of the problem, purpose of the study, objectives, research questions, assumptions, definition of terms, delimitations, limitations of the study and the dissertation outline. The next chapter looks at the literature review.

CHAPTER II

LITERATURE REVIEW

2.0 Introduction

This chapter examines the various literatures relating to financial inclusion, digital financial services, digital financial inclusion and how they impact or are impacted by human development. It defines and discusses the concepts of digital financial inclusion and human development and builds the conceptual framework of how these concepts are related to each other. It also discusses the theoretical framework of how digital financial inclusion is related to human development and concludes with the review of results of empirical studies.

2.1 Theoretical Frameworks

Digital Financial Inclusion and Sustainable Development are separate policy objectives that are being pursued by all countries that subscribe to the United Nations SDGs. Various theories exist on the nexus between finance, be it the financial sector, financial system, or availability of financial services and their relationship with development, be it economic development, economic growth, or human development. The theories of finance and development that have been considered in this paper are discussed hereafter.

Schumpeter (1911) posited that in a well-functioning financial system the efficient allocation of funds to technological innovation can promote economic growth. Also, the components of a developed financial system are robustly correlated with future economic growth, physical capital accumulation, and economic efficiency. However, Robinson (1952) while not totally disputing Schumpeter (1911) argues that a well-functioning financial system is itself a result of improvement in economic performance which in turn attracts finance. As cited by Ababio et al (2020), Lucas (1988) and Stern (1989) consider finance as unimportant factor of growth.

Based on Schumpeter's (1911) theory, the introduction of digital financial services is a technological innovation that has the potential to promote human development. However, based on Robinson(1952), the allocation of capital towards digital financial inclusion initiatives could itself be indicative of the development of the economy to warrant that level of innovation.

According to the Solow Growth Model (1956), the level of output in an economy is a result of changes in the population growth rate, saving rate, and the rate of technological progress. Savings being a financial service are important for accumulating capital that will be available for channeling towards economic activities while the population growth is a source of labour to the economy. According to the model, a sustained increase in capital and labour inputs as well as ideas and new technology results in a steady state of growth.

Levine (2005) maintains that financial development determines the future economic growth of a country. The author asserts that the financial sector can drive economic growth through mobilizing savings, allocation of capital through credit , provision of risk management services as well as its facilitation of payments for goods and services through the financial system. Levine (2005) also theorized that financial development can impact the rate of technological progress through investment in the health and education of the humans who innovate the new technology as well they may want to introduce to make processes easier, safe, efficient, or effective.

The theories highlighted all point to the fact that finance has a positive impact on development as measured by economic growth. Digitalization is a both a financial development but can also be viewed as a technological progress that emanates from financial investment in human education and health. Accordingly, a bi-directional relationship can be expected between digital financial inclusion and human development.

2.2 The Concept of Digital Financial Inclusion

According to Aziz *et al* (2021) the concept of financial inclusion refers to all activities or initiatives that make financial services and products accessible and available for use

to all people and organizations. Meanwhile, Thomas (2019) defines financial inclusion as a process that ensures smooth accessibility, availability, and active usage of the formal financial system and services to individuals and firms in an economy. However, the World Bank (2014) points that that access to or availability of financial service without capability and willingness to use is not financial inclusion. This means access, availability and usage dimension should all be in place for a country to be financially inclusive.

The high rate at which digital technology is being adopted globally boosted financial inclusion in low-income countries (Yakubi *et al* (2023). Like Aziz *et al* (2021) before them, Yakubi *et al* (2023) believe that digital technology such as mobile phones can introduce new and affordable digital products and widen the range of available financial services required to address the needs of the excluded and underserved customer segments. Digital technology and mobile phones can also be seen as a digital access distribution channel that can conveniently reach out to large numbers of low-income and financially excluded people in remote and rural areas (Aziz *et al.,* 2021; Yakubi *et al* , 2023). The use of digital technology such as mobile phones, internet and mobile banking to provide financial services to all people is what is now called digital financial inclusion.

The use of digital technology such as mobile phones has the potential of fast-tracking the financial inclusion process in Sub Sahara Africa (Kuada, 2019). This is because digital financial services are cost effective, time efficient, and flexible to reach the users. Customer do not need to spend time and expenses travelling to the bank branch in order carry out transactions. They also do not need to wait in unending queues solely to conduct simple transaction like transfer the money or even pay for utility bills (Kuada, 2019; Yakubi *et al*,2023). They can transact at any time whether in the comfort of their home or office, or while travelling.

Some researchers have tested whether digital financial services promote financial inclusion. Evans (2018) and Durai and Stella (2019) as cited by Yakubi *et al* (2023) found that the use of digital technology, internet and mobile phones promotes the process of financial inclusion and socio-economic development in Africa and India

respectively. Fernandes *et al* (2020), Tiony (2023) and Kouladoum, *et al* (2023) found that digital financial technology had a positive impact on financial inclusion in Mozambique, Kenya and Sub Sahara Africa respectively.

With increasing digitalization, the traditional measures of access, availability and usage of financial services pale into insignificance. In traditional financial inclusion, access is measured by number of ATMs or bank branches while usage is measured by the number of people with loan, deposit and savings accounts in formal financial institutions. Under digital financial inclusion access and availability are measured by mobile subscription, proportion of people with access to internet as well as the number of registered mobile money agents. Usage of digital financial services is measured by percentage of adults who have a mobile account, use the internet to pay and use mobile phone to receive salary or make utility payments. (Kera, *et al*, 2021). In both traditional and digital distribution channels account ownership is a key indicator of financial inclusion, because having an account enables an individual to store money, build savings, make payments, send, and receive remittances and access credit (World Bank 2014; Makina 2019)

2.3 Human development factors affecting inclusive finance.

It is important to note that the various definitions of financial inclusion acknowledge the existence of barriers that prevent people from accessing or using formal financial services. These range from restrictions from using financial services due religious or cultural reasons even though people may have access, restriction to access or usage due to high costs for the services or regulatory barriers and human development factors such as low, unstable, or no income, high financial illiteracy rates (lack of knowledge and understanding), poor infrastructure or limited access to social amenities. A person with low or no income cannot save and is not eligible to access credit facilities as they lack security (Ababio et al, 2019; Imane and Oubejja,2023).

Williams et al (2023) examined the effects of illiteracy and unemployment on financial inclusion in rural areas of Nigeria between 2017 and 2022. The result showed that the higher illiteracy and higher unemployment is negatively associated with lower financial inclusiveness. The World Bank (2020) identify geographical barriers, volatile

and low income, and financial illiteracy as some of the demand side barriers to digital financial inclusion.

Kara, *et al* (2020) found that higher income and accumulated wealth are key requirements for accessing formal credit as banks assess borrowers' ability to payback predominantly through applicants' income levels and generated wealth. Therefore, it is plausible to expect a direct link between income and wealth levels on the one hand and access to formal credit on the other. The authors also found that educational attainment and financial literacy are strongly linked to better financial decision-making, greater wealth, and the ability to access credit from financial institutions.

Matekenya *et al* (2020) citing Arora (2012) points that the low human development and high illiteracy levels in developing economies may prevent a large section of the population from benefitting from financial inclusion efforts because of low awareness and comprehension of the financial services available. This corroborates the findings of Munongo and Bizah (2017) who identified relatively low levels of ICT literacy due to lack of proper usage training by the service provider as well as operational challenges such as the lack of local dialects on the mobile application, inhibitive costs, intermittent service interruptions which are outcomes of low income and low standard of living(infrastructure).

Tay, Tai and Tan (2022) find that while developing countries, embrace and improve digital financial inclusion to help reduce poverty there is a persistent divide between gender, the wealthy, and the poor, and urban and rural areas regarding access to and usage of digital financial services. While Chamboko (2022) did not find gender as a predictor of using digital financial services, the youth lagged while the level of education, the source of income, locality, and the level of income were important determinants of how individuals use digital financial services in Zimbabwe.

2.4 The Concept of Human Development

The concept of human development is about making a better life for everyone (Ababio et al, 2019; Peet & Hartwick (2009)). This involves satisfying basic needs like having enough food, keeping a good health, a having safe place to live, basic services being

available and accessible by everyone, as well as being afforded dignity and respect. Human development. Matekenya *et al* (2020) citing AfDB *et al* (2013) defined human development as the expansion of alternatives available to individuals as well as the opportunities that allow them to live their lives to the fullest.

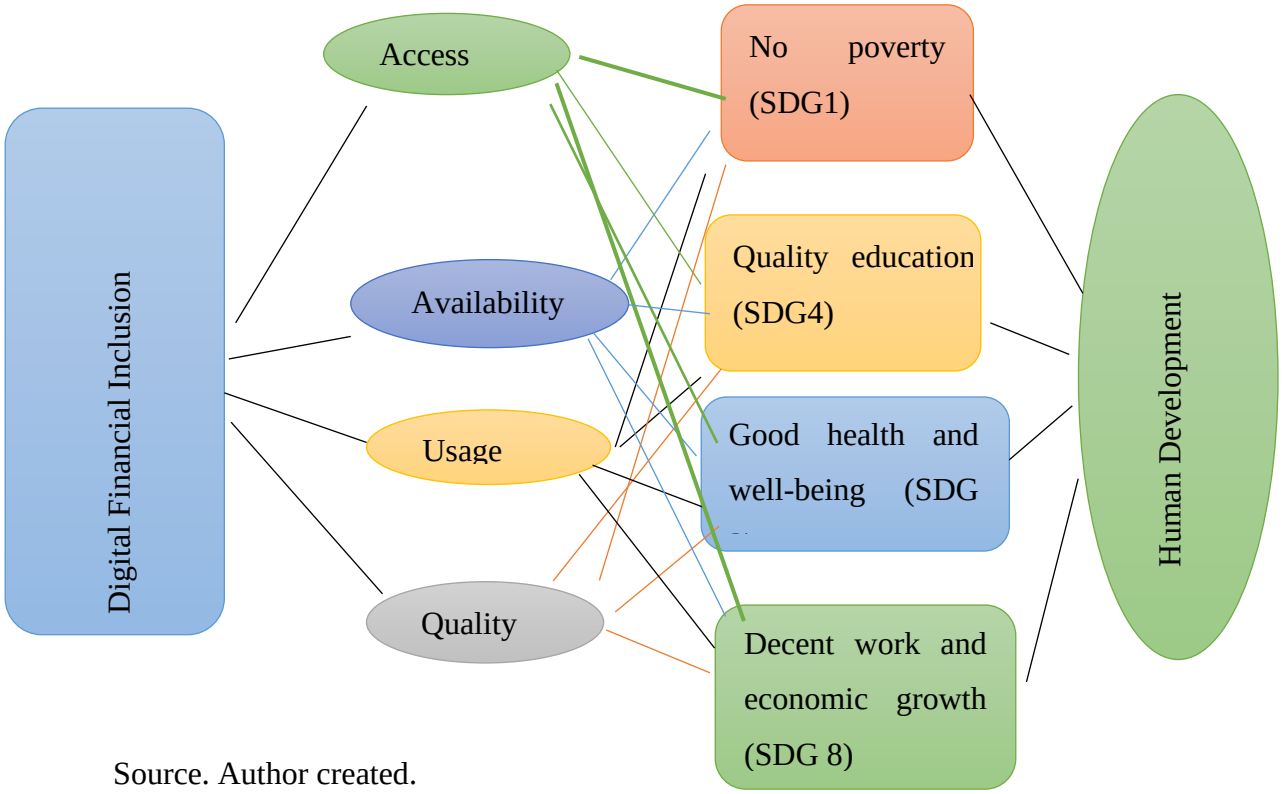
According to Chowdhury and Chowdhury (2022) the modern view of human development indicates that building the capacity and capabilities of humans help them to access productive asset base and generate their own income. In this context, the authors argue that financial inclusion allow people with capacity to access diverse asset bases which would help them to generate earnings opportunities.

The United Nations Development Programmed (UNDP) (2018) defines human development process of expanding human choices and preferences to promote a long and healthy life, high living standards and high-quality education among other basic needs. It maintains and publishes the Human Development Index (HDI), Multidimensional Poverty Index (MPI) and Gender Development Index (GDI) among other measures of human development. This study uses the Human Development Index to measure human development since its yearly data is readily available compared to the Multi-dimensional Poverty Index which is only available on selected years. The HDI is a geometric mean of indices for long and health life (life expectancy), knowledge (average years of schooling) and standard of living.

2.5 Conceptual Framework: Digital Financial Inclusion and Human Development

Conceptually, Digital Financial Inclusion accelerates the pace at which sustainable development goals and human development are achieved (Klapper *et al*, 2021; UNSGSA,2023). It addresses many of the traditional challenges that preclude people from being able to physically access and use brick and mortar banking halls. Also, human development factors such as financial literacy, infrastructure development and income level or jobs can also influence the willingness or ability of users to access and utilize digital financial services. As a result, the study anticipated a bi-direction relation between the two variables. The relationship between digital financial inclusion and human development can therefore be conceptually depicted as follows:

Figure 2.1: Conceptual Framework of the relationship between Digital Financial Inclusion and Human Development



Source. Author created.

Access to and usage of financial services may encourage business start-ups and allow individuals to invest in health and education, manage risk and lessen the burden of financial shocks, and therefore, impact positively on human development (United Nations Global Compact & KPMG, 2015; Matekenya *et al* 2020). In their report the UNSGSA et al (2023) finds that Digital financial services can enable financing for billions of people facing emergencies, such as health crises, natural disasters and conflict. The report also notes that the digitization of public sector wages and social protection schemes in recent years, especially during the pandemic, prompted millions of previously unbanked women to open accounts and survive the harsh economic environment.

Digital financial inclusion helps households and small businesses manage weather shocks and invest in a green future. For instance, smallholder farmers in Mali use index insurance to cope with severe storms, while farmers in Kenya adopt climate-smart

agricultural practices through mobile platforms facilitating access to seeds or fertilizer, markets, and financing (UNSGSA et al,2023).

Brune et al. (2011) as cited by Kuada (2019) found that increased financial access through commitment savings accounts in rural Malawi improved the wellbeing of poor households as it helps them improve their farm output. In Ghana insured farmers were able to buy more fertilizers, plant more acreage, hire more labour and have higher yields and income, which have led to fewer missed meals and fewer missed school days for their children. (Karlan, et al ,2014)

After examining the general opportunities of applying digital financial services, Tamburi and Yusheng (2019) recommended Sub-Saharan African countries to use digital payments to beneficiaries of their humanitarian activities. Similarly, Rohatgi *et al* (2020) recognize that digital financial services can accelerate achievement of USAID health goals for example through digital payments platform towards medical aid or health facilities. This shows that use cases of digital financial services can conceptually positively impact human development.

Digital financial inclusion also stands to increase when human development factors such as level of education and financial literacy, income level, digital infrastructure and good health of the population increases. With increases in available income and reduction in poverty, individuals begin to save, thereby pooling funds for capital accumulation and allocation into the economy. Increased financial literacy increases participation in the financial system without fear of the unknown.

2.6 An Empirical Review of Financial Inclusion and Human Development

Soro and Senou (2023) examined the effect digital financial inclusion on income inequality (as a measure of human development). The results indicate that in the short term digital financial inclusion leads to a decrease in income inequality. However, in the long run, there is a negative and significant effect of digital financial inclusion on inequality. In a separate but similar study, Kanga *et al* (2022) found that fintech diffusion and financial inclusion (digital financial inclusion) have long-run effects on

GDP per capita (as a measure of human development) over and above their short-run impact.

Still on digital inclusion, Silue (2021) also noted that an active mobile money account has a higher positive impact on growth (as a measure of development) than standard inclusion. In the same manner, Lyons et al (2020) upon examining the relationship between poverty and financial and digital inclusion across seven developing countries in South Asia and Sub-Saharan Africa found that increases in various measures of financial and digital inclusion are associated with significant reductions in poverty, including food insecurity.

Ababio *et al* (2019) empirically investigated whether the level of human development drives greater financial inclusion, and vice versa in the contexts of frontier markets. Using the dynamic panel data and the generalized methods of moments (System-GMM) methodology, the study found a bi-directional relationship between financial inclusion and human development. Of the human development factors, income level, financial literacy, and healthy lives were found to be the decisive factors for scaling up financial inclusion in the banking industry. The results confirmed the findings of Sen and Laha (2018) who also found a positive and significant bi-directional relationship between financial inclusion and human development in several selected countries of the world.

Helmy (2021) examined the back-and-forth relationships between human development and financial inclusion and their ultimate effects on the process of economic development in Egypt and the BRICS countries. The study found that, in the BRICS countries, there is a mutual interdependence relationship between human development and financial inclusion in the interest of economic development. Of the human development components only the education index had a positive and powerful effect on the status of financial inclusion. The level of per-capita income had a negative impact on the status of financial inclusion while the life expectancy index was statistically insignificant to explain changes in the status of financial inclusion in the BRICS countries. The results were consistent with those of Panday (2023) who also found that financial inclusion had a significant impact on human development in the BRICS territories.

However, the results of Helmy's (2023) study on Egypt, found that due to the spread of inequity in education and income, human development, and financial inclusion work in two opposite directions, which may result in undesirable repercussions for the state of economic development. Financial inclusion as represented by ratio of deposits to domestic savings was found to positively affect human development. However, the other financial inclusion indicator, ratio of private credit to domestic savings was found to negatively affect human development, thereby rendering the overall financial inclusion impact on human development insignificant. Of the human development factors, education had a negative impact on financial inclusion while life expectancy and income level were not statistically significant.

Tekin (2020) also carried out a study to determine whether the financial developments of countries influence the basic human development of the individuals and whether human development indicators have an impact on financial development. The results showed that there is long-term cointegration relationship and two-way causality between financial and human development in developing countries. While investigating the determinants of financial inclusion Le *et al*, (2020) found that countries with strong economic growth and higher income have a significantly higher financial inclusion index, as people have more resources/incomes and better chances to utilize financial services. It was also observed that the higher the literacy, the better the financial inclusion as people with higher literacy have better knowledge of using financial services wisely. Due to its effect on income; unemployment rates was found to have a negative impact on the financial inclusion index. The findings by Le et al (2020) demonstrate that human development factors have a significant effect on financial inclusion.

In a study to explore the effects of financial inclusion on economic growth in a global perspective Azimi (2022) found a long-run relationship between economic growth and financial inclusion. Financial inclusion had a significantly positive impact on economic growth which implies that financial inclusion is an effective tool in fostering rapid economic growth in the world. The study also found evidence of a bidirectional causality between economic growth and financial inclusion and unidirectional causality relationships showing the impact of credit to the private sector, foreign direct

investment, inflation rate, the rule of law and school enrolment ratio towards economic growth.

Samak and Abdelghaffar (2023) explored the relationship between financial inclusion and human development by conducting a systematic review of the literature. Their analysis revealed a positive relationship between financial inclusion and human development, with financial inclusion having the potential to promote education, health, and entrepreneurship, and to reduce poverty and income inequality. Human development factors such as education, gender, and social networks intermediate the impact of financial inclusion on human development.

Kamalu and Ibrahim (2023a) used panel quantile regression to examine the effect of financial inclusion on the different levels of human development in Organization of Islamic Corporation countries. The findings show that financial inclusion promote higher human development in countries with medium human development, because of increase in income and investment. Through an Indian interstate analysis Kumari (2022) also investigated whether financial inclusion contributes to human development. The results which used the Pearson Correlation matrix, showed that financial inclusion had a positive correlation with economic growth and standard of living and a negative relation with poverty. Accordingly, the study concluded that financial inclusion drives economic and thus human development through promoting the access and use of formal financial systems.

In another study, that focussed on the impact of financial access on human development, Kamalu and Ibrahim (2023b) found that number of ATMs per 100,000 people, number of commercial bank branches and domestic credit to private sector as proxies for access to finance promote long run human development in developing countries. Of the three proxies, the number of ATMs per 100,000 people had the highest effect on human development. Government spending, institutional quality and foreign direct investment were found to promote human development in the long run. Their work corroborated that of Nambie and Obobi (2022) who also found a strong significant relationship between financial inclusion, human development and institutional quality in Africa.

In their study to examine the joint effects of ICT diffusion (composed of access, usage and skills), and foreign direct investment (FDI) on inclusive growth in sub-Saharan Africa (SSA), Ofori and Asongu (2021) found that FDI and ICT diffusion induce inclusive growth in SSA. The authors also found that compared to access and usage, human skills in using technology are more effective in driving inclusive growth in SSA. In a related study, Omokanmi and Ogunleye (2020) found that all financial inclusion variables have positive and significant effect on the Human Development Index in SSA. However, the study revealed that the direction and significance of the impact of financial inclusion varied from bloc to bloc. This shows that results for Sub Sahara Africa may be different from those of individual member countries.

Examining the effect of financial inclusion on population health as measured by death rate and life expectancy at birth, Xiao and Tao (2022) found that digital financial inclusion increases life expectancy but decreases the death rate in Asia. Similarly, internet users, gross domestic product, and foreign direct investment were found to improve population health by increasing life expectancy and decreasing the death rate. Cicchiello *et al* (2021) investigated the relationship between the financial inclusion index and development variables in the least developed countries in Asia and Africa. Using panel data analysis and pooled regression the empirical findings indicated that economic growth leads to financial inclusion while unemployment and literacy rates negatively affect financial inclusion. On the other hand, the low financial inclusion rate reduces the levels of development in these countries.

Understanding that through developing financial infrastructure financial inclusion accelerates economic activities and creates employment, Biswas (2023) explored the contribution of financial inclusion on economic growth in 4 South Asian countries. Various panel data models, and several measures of financial inclusion were used to reveal the relationship between economic growth and financial inclusion. The study confirmed that financial inclusion had a positive impact on economic growth even though the extent of effect varies depending on the measures of financial inclusion used.

Peria and Shin (2020) examined the link between financial inclusion and human development. The results from using cross-country data showed that there exists a

positive association between financial inclusion and human development. The study also found that expanding access to credit has limited impact on human development. However, expanding access to bank branches and formal saving instruments were found to have promising impact on human development. According to the authors, if the full potential of formal financial services in enriching human lives is to be realized, financial inclusion interventions must be well designed to cater for individuals' specific needs.

Abdelghaffar *et al* (2022) investigated the nexus between financial inclusion and human development for countries belonging to different income groups over the period 2009–2019, and whether this relation differs across these groups. Using panel data and generalized method of moments (GMM) to analyze the relationship between the constructed index of financial inclusion (IFI) and human development index (HDI) the study found that financial inclusion in low and lower-middle-income countries has higher effect on human development than in high and upper-middle income countries. Since this study was based on the aggregate level, it recommended further research to also include the effect of technology in the IFI (hence digital financial inclusion) and regress the new variable on components of the HDI.

Yakubi *et al* (2023) examined the influence of all financial inclusion elements, which included Access, Usage, and Quality on Socio-Economic development in 77 low-income countries. Through multiple regression analysis, the research found that all financial inclusion components have a significant positive impact on socio-economic development, yet at different levels. This was consistent with the findings of Van and Lihn (2019) who found that a correlations exist between the indicators of financial inclusion (namely, large numbers of bank branches, ATMs, domestic credit in the private sector) and the increased rate of development in the economy.

Matekenya *et al* (2020) examined the effect of financial inclusion on human development in Sub-Saharan Africa (SSA). Employing the panel data approach and utilizing the Generalized Method of Moments (GMM) technique, the study found that financial inclusion has a positive effect on human development. A related study by Kelikume (2021), showed that mobile penetration and internet usage (digital inclusion)

have significant positive relationship with both poverty reduction and informal economy.

Yap, Lee and Liew (2023) examined the individual and combined effects of financial inclusion on the finance related SDGs in selected countries. The results show that financial inclusion is positively correlated with the combined finance -related SDGs. Specifically financial inclusion was positively correlated to the 2nd, 5th, and 8th SDGs but not significantly enough to the 1st, 3rd, 9th, and 10th SDGs. Similarly, Ozili (2022) found a significant association between high levels of financial inclusion and industry productivity, adult literacy rate and renewable electricity output. In a Nigerian study, Osagie (2020) found that access to loans and credit facilities lead to poverty reduction while financial literacy is a prerequisite for achieving gender equality (SDG5). This aligns with Soyemi et al (2020) who concluded that financial inclusion has impact on sustainable development in Nigeria.

Asongu (2013) as cited by Matekenya *et al* (2020) reported that mobile money may be a crucial channel through which the informal sector may be able to access finance and enhance human development in Africa. Geng and He (2021) explored the impacts of digital financial inclusion on sustainable employment in the Belt &Road countries. Their results show that digitally inclusive finance significantly drives sustainable employment where sustainable employment is a geometric mean of the Employment, HDI and Ecological Footprint indices. There is also strong evidence that DFS access promotes women's consumption, enables women to shift to higher productivity occupations, and enables women to join the labour force (Bill and Melinda Foundation (2021).

2.7 Synthesis of the literature reviewed and the research gap

From the theory to the empirical evidence reviewed, most of the literature supports the view that financial development which includes digital financial inclusion positively impacts development as maybe measured by economic growth or human development. A few studies have also investigated and found a bi-directional relationship between financial inclusion and human development resulting in mixed results as to whether there exists a unidirectional or bi-directional relationship between the two variables.

Also, there exist very few research on the relationship between financial inclusion and human development. Those studies also focused on sub-regions for example Sub Sahara Africa or other grouping of countries but not specifically Zimbabwe. As was observed by Omokanmi and Ogunleye (2020) the results at a regional level may differ significantly in terms of direction and strength of impact from those at the sub economic region or country. In addition, differences authors used different models, variables and statistical tests which gives different results and may impact the comparison from one research to the other.

Also, the existing few research papers mainly focused on financial inclusion and not digital financial inclusion such that Abdelghaffar *et al*(2021) recommended that future research incorporate the technological advancement in financial inclusion. It is also important to highlight that the various researchers have used different proxies for financial inclusion mostly depending on the availability of data. This has been found to give different conclusions regarding the relationship between financial inclusion and human development. Research on how human development affects digital financial inclusion is also limited in the reviewed literature. The existing literature has also produced different conclusions on the impact of human development factors. With the growth in digital financial inclusion and the acclaimed benefits reducing poverty and human development it is important to carry specific research that focuses on the Zimbabwean context and differentiates digital financial inclusion from the traditional methods. The present study fills the identified research gaps.

2.8 Summary

This chapter looked at the various literatures relating to the nature and direction of the relationship between financial inclusion and human development. It discussed the theories of finance and development as well as the background to both digital financial services and human development before formulating the conceptual framework upon which this study is based. The chapter ends by reviewing the results of various empirical studies. The next chapter looks at research methodology.

CHAPTER III

RESEARCH METHODOLOGY

3.0 Introduction

The chapter gives an overview of the adopted research methodology. It discusses the research design, research method data sources, population and sampling as well as data collection procedures. The chapter ends by describing the data analysis and empirical model that will be the basis of the next chapter.

3.1 Research design

The researcher adopted a descriptive-explanatory design. The descriptive-explanatory design was chosen because it helps to explain relationships either causal or correlational, between independent and dependent variables in the context of the given existing condition (Saunders, Lewis and Thornhill, 2016). Accordingly, the descriptive-explanatory design is best suited to describe the nature and explain the direction of the relationship between digital financial inclusion and human development.

3.2 Research Method

Based on the conceptual framework and the literature reviewed, the researcher established statistical models to estimate each of human development and digital financial inclusion. Population growth, inflation, trade, personal remittances , foreign direct investment, and official development assistance were selected and used as the intermediating and control variables (Azimu, 2022).

While the human development index was available from the UNDP's HDR Office the researcher had to compute, the Index for Digital Financial Inclusion from indicators of digital access and digital usage. In line with Khera *et al* (2021) the researcher selected mobile subscription and internet penetration as proxies for the financial access and

availability dimension while the volume and value of digital transactions was selected as the proxy for usage.

Using the model of Sarma and Pais (2011) the researcher computed an index of digital financial inclusion first for each dimension and then the overall index of digital financial inclusion by computing the geometric mean of the individual dimensions.

The dimension index is determined by using the following formula:

$$Di = \frac{A_i - m_i}{M_i - m_i}$$

Where A_i is the actual value of dimension i;

m_i is the minimum value of dimension i; and

M_i is the maximum value of dimension i.

The value of the dimension (di) varies between 0 and 1 (i.e., $0 \leq di \leq 1$). The higher the value of di, the higher the achievement in the inclusion dimension i.

Access indicators internet penetration and mobile subscription were weighted in the ratio 3:5. respectively mainly because the number of mobile transactions exceeded those digital transaction that were generated through other channels. Usage indicators transaction volume and transaction value were equally weighted in the ratio of 5:3 respectively because the number of transactions is a more persuasive measure of usage when compared to value which may come from a few transactions by a few people.

As literature has already indicated that access and availability are not adequate measures of inclusion without considering the willingness and capability to use the digital financial services, the overall DFI index is given by the formula:

$$IDFI = 1 - \frac{\sqrt{(1-d1)^2 + (1+d2)^2}}{\sqrt{n}}$$

Where d1, is the access dimension index, d2 is the usage dimension index and n is the number of dimensions, in this case 2.

Based on Sarma and Pais (2011) the level of digital financial inclusion of a country can be categorized into the following groups:

$0.5 \leq \text{IDFI} \leq 1 \rightarrow$ High financial inclusion,
$0.3 \leq \text{IDFI} < 0.5 \rightarrow$ Medium financial inclusion,
$0 \leq \text{IDFI} < 0.3 \rightarrow$ Low financial inclusion

This methodology is in line with the methodology adopted by UNDP in the construction of HDI and other similar indices.

The researcher then used Eviews data analysis tool to perform correlation and least squares regression analyses. Descriptive and inferential statistics were then generated from the data before they presentation, analysis, and discussion.

3.3 Data Sources

Secondary data sources were used in this study. The indicators of digital financial inclusion were collected from the IMF Financial Access Survey while data for human development has been collected from the United Nations Development Program's Human Development Reports. The data for the intermediating control variables such as Inflation, Population, Trade, Foreign Direct Investment, Personal remittances and Official Development Assistance which were selected because of their potential to impact to improve the development of the country have been collected from the World Bank's World Development Indicators. The data period ranges from 2011 to 2021 based on the availability of data on financial inclusion.

3.4 Population

The target population of this study comprises of the adult population of Zimbabwe as covered in the IMF Financial Access Survey. The estimated models are about the financial inclusion or development of all the adult people in Zimbabwe.

3.5 Sampling

The researched period is from 2011 to 2021. Since financial inclusion became prominent from around 2010, it means that the data set is not large enough to warrant sampling. The total population was used in the analysis.

3.6 Research Instruments

The researcher used secondary sources of data. As such no other instrument was used except data extraction from the respective source's website and analyzing it. . The secondary sources of data that were employed were from the IMF Financial Access Survey, World Bank's World Development Indicators, UNDP Human Development Reports.

3.7 Data Collection procedures

Since the researcher used secondary data, data collection simply involved downloading the Zimbabwe country specific reports from the IMF, World Bank and UNDP websites.

This data collection method was chosen because it guaranteed access to all the data required for the study. It also saved time of trying to perform primary research as it would not have been possible to cover the entire population as was enabled by these secondary reports. The selected data collection procedures also had the advantage that it did not require prior authorization as would have been the case with the later method (Saunders, Lewis and Thornhill, 2016)

3.8 Specification of models

From the literature reviewed and the conceptual framework, the following least squares model was used to regress human development (HD) against digital financial inclusion (DFI). The model was chosen because the population of 11 years was too small and was therefore not compatible with the other models which required at least 15 samples.

$$HDI = \alpha + \beta 1DFI + \beta 2TRADE + \beta 3REMITTANCES + \beta 4ODA + \beta 7INFLATION + \varepsilon$$

where the explanatory variables are:

α is the Y intercept (Constant)

β1, B2, B3… are coefficients of the variables

HD is Human Development measured by the HDI developed by the UNDP's HDR Office.

DFI -representing Digital Financial Inclusion, it the access to and usage of financial services through digital technology. It is measured by the Index of DFI.

TRADE - Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.

REMMITTANCES - Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households.

ODA stands for Official development assistance (ODA). It consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare of those countries.

INFLATION - Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole.

ε =error term

To test the impact of human development factors on digital financial inclusion, the following least squares models was developed and tested.

$$DFI = \alpha + \beta 1EDUCATION + \beta 2INCOME + \beta 3POPULATION + \beta 4REMITTANCES$$

The meanings for the human development factors are as follows:

EDUCATION-the mean years of schooling which increases financial literacy and informs participation in the digital financial activities.

INCOME. measured by Gross National Income, it is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad.

POPULATION GROWTH -used as a proxy for a good health and life it is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage.

REMITTANCES has the same meaning as given under the human development model.

3.9 Summary

This chapter was focused on the overall research methodology. It highlighted the research design, methodology as well as the applicable sources of data for the study. The total population was identified followed by a discussion of the method used for selecting the data sample. The chapter ends by discussing the procedures on how the data was collected and analyzed using the specified model. The next chapter presents the findings from the data as described in this chapter and interprets its meaning.

CHAPTER IV

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter presents the results of data analysis as set out in the research methodology. The study sought to establish the nature and direction of the relationship between digital financial inclusion and human development. The chapter begins by presenting the descriptive statistics of the study variables which is basically a description of the data over the study period. This is followed by a presentation of the inferential statistics in the form of correlation and regression analysis. The findings are interpreted by comparison to reviewed literature for consistency with or contrast to past empirical findings and theoretical arguments.

4.1 Data Presentation

Table 1 below shows the description and distribution of the dependent and independent variables over the study period.

Table 4.1: Descriptive Statistics

	Mean	Maximum	Minimum	Std. Dev.
REMITTANCES	0.093644	0.136115	0.041799	0.025389
DFI INDEX	0.501943	0.755933	0.210058	0.198836
ODA	0.04438	0.065696	0.023759	0.011212
MEAN SCHOOLING YEARS	8.317696	8.710909	7.767883	0.348862
INTERNET	0.22	0.35	0.08	0.08
MOBILE PENETRATION	0.882955	1.005735	0.706291	0.077772
HDI	0.581364	0.602	0.535	0.021158
GNI_PER_CAPITA	3638.812	3864.012	3154.376	180.5032
FDI INFLOWS	0.017369	0.024415	0.00699	0.0059

Source: Author creation

4.2 Discussion of descriptive statistics

The total study focused on data for 11 years indicating the period from when digital financial services through mobile phones started to build and rise noticeably. Incidentally, human development was showing signs of recovering from its lowest in 2003 Each variable as shown in Table 1 is now described in detail below.

4.2.1 Human Development

Zimbabwe's human development index rose from a minim of 0.535 and once reached a maximum of 0.602 which is indicative of good progress towards an upper middle-income country. This is supported by the Gross National Income per Capita which averaged US$3638.812 during the 11-year period under study. Mean years of schooling were lowest at 7.76 which increases the chances of people lacking financial literacy as it is learnt in higher levels of education.

4.2.2 Digital Financial Inclusion

Internet penetration rose from 8% to 35% while mobile penetration rose from 76% to an average of 88% coverage. Both account for the increase in digital financial inclusion from 0,21 in 2011 to the average of 0,51 with a maximum of 0,75 having been recorded in one of the years. This shows a high growth rate in both access to and usage of digital technology in promoting financial inclusion.

4.2.3 Control Variables

Official development assistance and Personal remittances, ranged from minimums of 2% and 4 % of GDP to 6% and 13% showing the potential for growth in the economy from these two activities. On the other hand, foreign direct investment (FDI) remained low with a maximum of 2% recorded over the study period. This could indicate that the level of financial development is not persuasive enough to attract foreign investors hence indirectly limiting human development.

4.3 Data Analysis

Inferential statistics were used to analyze the relationship among the variables. Correlation and regression analyses are the two methods that were used to analyze the data. These are discussed below.

4.3.1 Correlation Analysis

A correlation analysis was run with all the variables in the study. This was done to show whether the independent variables were significantly correlated, hence the problem of multi collinearity. When this happens, a regression analysis produces unstable parameter estimates which make it very difficult to assess the effect of independent variables on dependent variables.

The correlation matrix also shows the strength and direction of a linear relationship if it exists between the independent and the dependent variables. The correlation matrix is presented in Table 4.2.

Table 4.2: Variable correlation matrix

	POP	DFI	REMIT	ODA	EDUC	INF	HDI	GNI	FDI
POP	1.000								
DFI	0.353	1.000							
REMIT	- 0.516	- 0.837	1.000						
ODA	- 0.509	- 0.692	0.873	1.000					
EDUC	0.442	0.950	- 0.781	- 0.719	1.000				
INF	0.075	0.609	- 0.467	- 0.225	0.645	1.000			
HDI	0.664	0.905	- 0.852	- 0.760	0.939	0.530	1.000		
GNI	-0.764	0.718	- 0.742	- 0.634	0.693	0.241	0.827	1.000	
FDI	- 0.250	-0.677	0.368	0.272	- 0.798	-0.710	-0.645	-0.416	1.000

NOTE: POP=Population growth; REMIT=Remittances; ODA=Official Development Assistance; EDUC=Education (mean years of schooling); INF=Inflation; FDI= Foreign Direct Investment. HDI=Human Development Index; DFI =Digital Financial Inclusion

Components such as Internet, Volume and Value of digital and mobile payments as indicators of usage were highly correlated with Digital Financial Inclusion and as such were removed from the model for predicting human development. Equally, education and Gross Nation Income per capita are incorporated in the computation of HDI and as such were excluded from the model for predicting HDI to manage the problem of multi-collinearity. However, they are retained for testing correlation with Digital Financial

Inclusion. Also, Foreign Direct Investment which has a strong and negative correlation with Inflation has been taken out of the model.

The correlation analysis results show that Digital Financial Inclusion, Population Growth, Trade and Inflation have a strong positive correlation with Human Development while personal remittances, official development assistance and foreign direct investment have a strong negative impact on human development.

Population growth has a weak positive correlation with Digital Financial Inclusion while inflation and Income level (GNI per capita) have a strong positive impact on the level of digital financial inclusion. As with Human Development, remittances, Official Development Assistance and Foreign Direct Investment have a strong negative correlation with Digital Financial Inclusion (DFI).

4.3.2 Regression analyses.

While the correlation analysis has shown the direction and strength of the relationship among the independent and dependent variances, regression analysis goes further to validate the appropriateness of the model as well as the statistical significance of each of the variables.

4.3.3 Digital Financial Inclusion as a predictor of Human Development

Table 4.3 presents the model summary of the multiple regression analysis using least squares method. The results estimate the fitness of the model used in the study.

Table 4.3: Human Development Model Regression Statistics

Dependent Variable: HUMAN DEVELOPMENT INDEX				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.618	0.017	35.795	-
DFI	0.047	0.013	3.582	0.0158
TRADE	- 0.095	0.012	-7.610	0.0006
INFLATION	0.001	0.000	3.365	0.0200
ODA	- 0.168	0.249	- 0.674	0.5302
REMITTANCES	0.024	0.113	0.208	0.8436
R-squared	0.981	Mean dependent var		0.581
Adjusted R-squared	0.962	S.D. dependent var		0.021
S.E. of regression	0.004	Akaike info criterion		- 7.846
Sum squared resid	0.000	Schwarz criterion		- 7.629
Log likelihood	49.155	Hannan-Quinn criterion.		- 7.983
F-statistic	51.892	Durbin-Watson stat		2.374
Prob(F-statistic)	0.000262	Wald F-statistic		180.920
Prob(WaldF-statistic)	0.000012			

Source: Eviews Data Analysis Output

4.3.4 Analysis of the human development model

Table 4.3 shows that the strong positive impact of Digital Financial Inclusion and Inflation on Human Development is statistically significant ($p<5\%$). The negative impact of trade on human development is also confirmed to be statistically significant ($p=0.0006$) at the 99% significance level.

Meanwhile, although Official Development Assistance and Personal remittances have shown a strong negative relationship with Human Development, the impact is not statistically significant ($p>10\%$).

The standard error of the regression was found to be 0.004% which means that the average distance of the data points from the fitted line is about 0.004% of HDI. Since the coefficient of determination (R-squared) is 0.981, this means that the model predicts 98.1% of the variations in the HDI. The adjusted R-square which is slightly below R-square after adjusting for errors in the model shows that 96.2% of variations in human

development (HDI) are explained by the variations in the independent variables included in the model.

Based on the F-Statistics and its p value of 0.00262 which is less than 0.01, it shows that the human development model was a perfect predictor HDI at the 99% significance level and therefore valid.

4.3.5 Human Development as a predictor of Digital Financial Inclusion

The model DFI= α + β1EDUCATION+ β2INCOME+ β3POPULATION+ β4REMITTANCES was developed to predict the level of Digital Financial Inclusion based on the human development factor or indicators.

Table 4.4 presents the model summary of the multiple regression analysis using least squares method. The results estimate the fitness of the model used in the study.

Table 4. 4: Digital Financial Inclusion Model Regression Statistics

Dependent Variable: DIGITAL FINANCIAL INCLUSION				
Method: Least Squares				
White heteroskedasticity-consistent standard errors & covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.270991	0.92138	-3.550098	0.0121
EDUCATION (Mean Years)	0.401938	0.05998	6.701077	0.0005
INCOME (GNI per Capita)	0.000316	0.00016	1.928722	0.102
POPULATION (Growth)	-27.78782	8.31474	-3.341995	0.0156
REMITTANCES	-1.760603	1.15813	-1.520215	0.1793
R-squared	0.960011	Mean dependent var		0.50194
Adjusted R-squared	0.933351	S.D. dependent var		0.19884
S.E. of regression	0.051332	Akaike info criterion		-2.798
Sum squared resid	0.01581	Schwarz criterion		-2.6172
Log likelihood	20.38919	Hannan-Quinn criterion		-2.912
F-statistic	36.01011	Durbin-Watson stat		2.59837
Prob(F-statistic)	0.000248	Wald F-statistic		279.211
Prob(Wald F-statistic)	0.000001			

4.3.6 Analysis of the Digital Financial Inclusion predictive model

Table 4.4 shows that mean years of schooling (education) and Income (GNI per capita) which have strong and positive impacts on Digital Financial Inclusion are statistically significant. Although population has a weak negative impact on digital financial inclusion it is statistically significant. A 1% increase in population growth would result in a 27% decrease in the level of financial inclusion. Although remittances are negatively correlated with Digital Financial Inclusion, the relationship seems not statistically significant at the 90% significance level. However, at the 80% significance level, the variable becomes significant (p=0.17).

The standard error of the regression was found to be 0.05% which means represents the average distance of the data points from fitted line. The coefficient of determination (R-squared) is 0.966, thus implying that the model predicts 96% of the variations in the

DFI model. The adjusted R-square also show that human development variable account for 93% of variations in the Digital Financial Inclusion.

The F-Statistics is 36 and its p value of 0.00248. Since the p-value is less than 0.01, it shows that the human model is valid and a perfect predictor of Digital Financial Inclusion at the 99% significance level.

4.4 Discussion of findings

4.4.1 Relationship between Digital Financial Inclusion and Human Development

The Correlation Analysis in Table 4.2 showed a strong and positive relationship between digital financial inclusion and human development. This relationship is bi-directional as confirmed by Tables 4.3 and 4.4 which show a strong statistical significance of the bi-directional relationship. This finding shows that an investment in digital financial inclusion will create opportunities and choices to support human development.

The result is consistent with the works of Kamalu and Ibrahim (2023a) and Abdelgaffar *et al* (2022) who found higher financial inclusion being associated with higher human development index in countries with low to medium human development. It also supports Kanga *et al* (2022) and Azimu (2022) who found that digital technology diffusion with financial inclusion has a long run positive impact of human development as measured by GDP. This means that digital financial inclusion is an effective tool for fostering human development. The finding reinforces the potential of financial inclusion to promote education, health, entrepreneurship as well as to reduce poverty and inequality (Lyons *et al*,2022, Samak and Abdelghaffar, 2023). Given that the results at a regional level may differ significantly in terms of direction and strength of impact from those at the country, the results of this study also confirm the Sub Sahara Africa position as revealed by Matekenya *et al* (2020) and others (Omokanmi and Ogunleye , 2020).

The bi-directional relationship between digital financial inclusion and human development is consistent with the results of Ababio et al (2019) and Tekin (2020).

Their studies found that in developing countries , higher human development drives high financial inclusion and vice versa. This calls for interventions to promote digital financial inclusion to be well designed and interlinked with intervention to increase the level of human development to realize the full potential of formal financial services and increasing human development over time (Peria and Shin, 2020).

However, the result conflicts with the findings of Soro and Senou (2023) who found that in the long run there will be a negative and significant relationship between digital financial inclusion and human development. Helmy(2023) also found that human development and financial inclusion move in opposite directions in Egypt although the two variables showed that they were interrelated in the BRICS countries. Also, it is important to note that although digital financial inclusion is positively related to human development and a bi-directional relationship has been established, the extent of the effect depends on the measures of digital financial inclusion used (Biswas, 2023).

Although the study found that the control variables such as foreign direct investment(FDI), official development assistance and remittances had significant negative impact on human development, the position contradicts the works of Kamalu and Ibrahim (2023b) who found that FDI has a long run positive impact on human development. It also contradicts Ofori and Asongu (2021) who revealed that FDI and the diffusion of digital technology with financial inclusion, induce economic growth and hence human development in Sub Sahara Africa. This means that there is an opportunity for the government of Zimbabwe to transform, attract and increase the contribution of foreign direct investment , official development assistance and remittances towards human development.

4.4.2 Impact of human development factors on digital financial inclusion

The regression of human development indicators against digital financial inclusion and the model developed show that human development can drive and determine the level of digital financial inclusion. In particular, the significantly positive impact of education and higher income on digital financial inclusion implies that with increased financial literacy and financially capacity, people are able to knowingly choose to participate and

make use of digital financial services. Population growth as a proxy for good health widens the base of people who should be digitally included.

These findings are consistent with Ababio et al (2019) who found that higher income, financial literacy, and health were decisive factors in embracing financial inclusion. Yakubi *et al* (2023) also found a positive association between levels of education and the real income on financial inclusion. The correlation of income to digital financial inclusion also supports findings by Yap et al (2023) who found positive correlation between financial inclusion and Sustainable Development Goal 8: Decent Work and Economic Growth. Ozili (2022) also found a significant association between higher levels of financial inclusion and adult literacy.

The study confirms the positive and powerful impact of education on status of financial inclusion as revealed by Helmy(2023) in BRICS countries. In agreement with this position, Kamalu and Ibrahim (2023) go further to single out that human skills in using technology are more effective than having access and usage in promoting inclusive growth. However, the findings contradicts with Helmy(2023) findings' of on Egypt where due to inequity, education had a negative impact on financial inclusion. Cicchiello *et al* (2021) also found literacy rate which is a proxy for education, to negatively impact financial inclusion. This shows that to realise the full impact of digital financial inclusion, government should address the inequalities in human development factors such as education.

The impact of income on digital financial inclusion corroborates the findings of Le *et al* (2020) who found that economic growth and higher income cause significantly higher financial inclusion as people have more income and better chances to use financial resources. However, unemployment, which deprives people of incomes has a negative impact on financial inclusion (Cicchiello *et al* ,2021). Helmy(2023) also found that per capita income and life expectancy do not have significant impacts on financial inclusion. It is imperative therefore for the government to increase employment and promote economic activities both of which should be geared towards promoting digital financial inclusion for human development.

4.4.3 Insights from the data analysis

The study identifying that mobile subscription and internet penetration as the main drivers of access to digital financial services implies that they also have a significant impact on human development. Consistent with Kalikume (2021) findings that higher mobile and internet penetration drive digital financial inclusion it is important that access to mobile or fixed internet be affordable if the promising gains of digital financial inclusion are to be realized.

Although trade, personal remittances, foreign direct investment, and official development assistance all showed a negative relationship with human development and digital financial services, it is indicative of the country's potential to turn around these factors and design use case of digital financial inclusion. A well-developed digital financial system could attract foreign investors to participate as they will be assured that their capital is secure and will yield suitable returns. There is also potential to widen the range of digital financial services to allow digital savings, digital access to credit and the accumulation of capital for allocation to productive sectors of the economy as propounded by Schumpeter (1911) and Levine (2005).

Apart from adequately regulating digital financial services to inspire confidence and protect the users, government could also set deliberate policies to integrate official development assistance, trade, FDI and personal remittances with the digital economy. Personal remittances, also present a potential to be fully digitized such that funds received do not necessarily need to be cashed out at local agents but rather used to pay for goods or be saved in a digital wallet to earn interest. Development assistance that is delivered to the underprivileged beneficiaries could also be made through digital payment systems as recommended by Tamburi and Yusheng (2019).

Since education has been found positively related to digital financial inclusion and is an indicator of human development, it is important to increase the mean years of schooling for the country to widen the knowledge base of the population. Also, financial literacy education should be introduced early and deliberately rather than only as part of formal education. This has the potential to widen the choices and use cases of digital financial inclusion.

4.5 Summary

This chapter presented and discussed the descriptive statistics of both the dependent and independent variables tested. A correlation analysis of all variables in the regression model was presented and it was treated of the problem of multi-collinearity by removing internet penetration, mobile subscription, foreign direct invest and trade from the model. The results of the regression analysis were then presented before being discussed and interpreted more so in the context of reviewed literature. The next chapter being the last chapter summarizes the findings gives the conclusion and recommendations emanating from this study.

CHAPTERT IV
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter gives a summary of the whole research and major findings of the study. It also highlights the conclusions arrived at based on the findings and ends by providing recommendations on the way forward.

5.1 Summary of findings

The objective of the study was to examine the nature and direction of the relationship between digital financial inclusion and human development in Zimbabwe. The study also sought to investigate if human development factors had an impact on the level of digital financial inclusion. Based on the findings, the study also sought to make recommendations to enhance the adoption and usage of digital financial inclusion as well as recommendations promote human development through digital financial inclusion.

The review of theory and empirical evidence from previous studies helped to develop a conceptual framework where digital financial inclusion through access, availability usage and quality of digital financial services promotes the achievement of specific sustainable development goals and ultimately achieve human development. The drive to promote SDGs for example education, health result in innovation of digital financial services use cases which leads to widening of people accessing those platforms to improve themselves. As a result, a bi-directional relationship was anticipated.

The study used secondary data collected from the IMF's Financial Access Survey, World Banks, World Development Indicators, UNDP's Human Development Reports as well as the triennial Finscope Survey and Global Findex reports covering the period 2011 to 2021. The data was then organized and analyzed using the excel spreadsheet and Eviews data analysis tools. Digital Financial Inclusion was computed using principal component analysis developed by Sarma and Pais (2011). Descriptive statistics, correlation analysis and multiple regression analysis were performed to determine the

impact of the variables on human development as well as on digital financial inclusion. The findings are summarized below:

The descriptive statistics showed the human development for the period 2011 to 2021 averaged 0.58 with a high of 0.602 putting the country into a middle human development group. Digital Financial Inclusion also grew significantly from a low of 0.21 to a high of 0.75 putting the country into a high financial inclusion category. The average schooling years increased from a low of 7.7 to a maximum of 8.7 over the 11-year period. Mobile subscription has saturated the market (full inclusion) which has resulted in increased internet penetration from 8% in 2011 to 35% in 2021. Official development, remittances and foreign direct investment have low contribution to GDP with the three contributing 4%, 9% and 1% respectively.

The correlation matrix showed digital financial inclusion was highly and positively correlated with Human Development. Variables such as official development, remittances and foreign direct investment had high negative correlation with both human development and digital financial inclusion while population growth and inflation had a positive relationship with both human development and digital financial inclusion. Some variables such as trade and foreign direct investment were eventually removed from the predictive models for both human development and digital financial services.

The human development model which used digital financial inclusion, inflation, remittances, and trade to predict human development was valid and 96% of the variation in human development. The model for predicting digital financial inclusion from human development factors was also statistically significant at the 99% significance level. Education, Income, Population and Remittances can predict 93% of the variations in Digital Financial Inclusion.

The findings from the correlation and regression analysis are thus presented.

- Digital Financial Inclusion is highly positively correlated with Human Development.
- Human Development Factors such as Education and Income have a strong positive impact on Digital Financial Inclusion while Population growth

negatively impacts digital financial inclusion by expanding the base which should be served with digital technology.

- The control variables of official development assistance, foreign direct investment, and personal remittances are all negatively correlated with both Digital Financial Inclusion and Human Development.
- These findings are significant in that they contribute to the existing body of empirical evidence by focusing on digital financial inclusion in Zimbabwe. There is an opportunity to integrate digital financial inclusion into these variables to realize human development.

5.2 Conclusion

- This study concludes that digital financial inclusion, population growth and inflation have a significantly strong positive relationship with human development in Zimbabwe.
- Human development factors such as education level, income and population growth have a significant impact on financial inclusion decisions. Personal remittances have a negative correlation with digital financial inclusion at the 80% significance level.
- Mobile subscription and internet penetration have greater potential to increase financial inclusion and thus human development.
- The controlling variables of official development assistance, remittances and foreign direct investment are an opportunity for expanding use cases of digital financial inclusion to promote human development.

5.3 Recommendations

These are categorized into three sub sections as follows:

5.3.1 Recommendations from the research findings

- The study a bi-directional relationship between digital financial inclusion and human development. It is thus recommended that stakeholders consider developing the human development factors such as education (financial and digital literacy) and

decent jobs and incomes which will in turn increase the willingness and ability to use digital financial services which in turn expands choices for human development.

- Government departments, foreign investors, local traders, and citizens involved in remittances and the financial services providers should explore use cases to integrate and promote digital financial inclusion for human development.
- Since mobile subscription and internet penetration are critical for digital financial services, service providers should ensure they are available and affordable to ensure convenience and usage respectively.
- Since the study used transaction volume and value without regard to the dimension of usage, it is recommended that financial service providers widen the range of digital financial services to allow credit, insurance, health, agriculture, savings use cases among others, all of which will have a positive contribution to the economy and human development.

5.3.2 Recommendations for practice or policy

- With the growing importance and rate of digital financial inclusion, the regulators are recommended to establish market conduct regulations, monitor and protect users of digital financial services from the whims of the services providers.
- Government should lead in inspiring confidence in the digital financial services to attract foreign investors. The currency issue is one such major issue which can make or break the gains of financial inclusion as people revert to using cash.
- Government should promote a cashless economy to expand the usage of digital financial services.
- Infrastructure to support digital technology should be supported through reduced or exempt taxes to allow the operators to reach far and wide and hence increase mobile and internet penetration.
- Development assistance to beneficiaries should move away from cash models to digital finance for example using mobile wallets.
- Regulations should also be liberalized to allow remittances service providers to integrate or expand into digital finance so that there will not be need to collect the funds in cash.

5.3.3 Recommendations for further work/research

- This work is an attempt to predict human development from digital financial inclusion as well as digital financial inclusion from human development. With the focus on Agenda 2030, leaving no one behind and the attainment of SDGs, future research should focus on the quality of digital financial services as well as the efficient utilization of potential use cases to achieve human development.

- Future research should also investigate how digital financial inclusion supports other aspects or measures of human development apart from the HDI. As examples, research could focus on how digital financial inclusion impacts the multidimensional poverty index or local development.

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