

# The Interplay between Digital Financial Inclusion, Bank Stability and Economic Growth in Zimbabwe

Ezekiel Chitombo<sup>1</sup>, Tough Chinoda<sup>2</sup>

<sup>1</sup>Bindura University of Science Education, Zimbabwe

<sup>2</sup>Senior Lecturer, University of Zimbabwe, Department of Accounting and Finance,  
Mount Pleasant, Harare, Zimbabwe

DOI: <https://dx.doi.org/10.47772/IJRISS.2024.802052>

Received: 16 January 2024; Revised: 29 January 2024; Accepted: 02 February 2024; Published: 06 March 2024

## ABSTRACT

The aim of this study is to investigate the digital financial inclusion, bank stability and economic growth nexus in Zimbabwe over the period 2014 to 2022. The results of the Ordinary Least Squares (OLS) estimation model reveals that digital financial inclusion and bank stability significantly affects economic growth in Zimbabwe. The findings also reveals a positive relationship between bank competition and digital financial inclusion and also between bank stability and digital financial inclusion suggesting that digital financial inclusion enhances the soundness of individual banks in Zimbabwe through competition. On the other hand, the study found an inverse relationship between digital financial inclusion and corruption; bank stability and inflation; and also between bank competition and bank stability in support of the competition-fragility view. From the policy perspective, the government should implement policies that eradicate corruption and barriers into the financial system to deepen bank competition which is good for bank stability. Banks should create strategic alliances with Fintech Companies in order to boost digital financial inclusion which is a recipe for bank competition and soundness through stability. Future researchers can cross compare countries conditions using panel data rather than time series data as in this study.

**Keywords/phrases:** digital financial inclusion, bank stability, economic growth, Ordinary Least Square, Zimbabwe.

## INTRODUCTION

Digital financial inclusion (DFI) is one of the widely recognized areas that have of late received global attention from businesses and policy makers (Banna et al, 2022; Ozturk and Ullah, 2022; Chinoda and Kapingura, 2023; Kouladoum et al, 2022; Tay et al, 2022). This is a result of Financial Technology (FinTech) enabled digital financial services which have the potency of reducing barriers in traditional financial systems. The reduction in barriers has an effect of increasing the level of financial inclusion which is also pivotal in the attainment of the 2030 Sustainable Development Goals (SDGs) 8 and 9 which are economic growth, industry innovation and infrastructure.

Unlike other regions, Sub-Saharan Africa has low levels of financial inclusion, where only 43% of adult's population have a bank account. This indication that a large number of adults in the region do not have access to financial services, implying a high level of financial exclusion (Demirgüç-Kunt et al. 2018; Jima and Makoni, 2023), thereby adversely affecting equitable economic growth. However, there seems to be a lot of optimism that FinTech will provide unmatched potential to overcome obstacles to financial inclusion

by utilizing the rising adoption of mobile technologies (AFI 2018). A study by the World Bank in 2016 revealed that digital financial services can improve access to capital, reinforcing the idea that digital banking promotes financial inclusion. Another important study on the digitalization of financial services suggest that in 2025, digital finance might contribute to a \$3.7 trillion rise in economic growth in emerging countries, benefiting individuals, businesses, and governments. This effect could be facilitated through greater capital investment and individual time savings (Mhlanga, 2022). Similar to the global banking industry, banks in Sub-Saharan African nations are considering integrating digital financial services since they result in bank stability, which will ultimately result in the achievement of the 2030 SDGs. (Banna et al. 2020a).

According to Fin Scope (2022), financial inclusion in Zimbabwe has increased from 77% in 2014 to 88% in 2022. The government of Zimbabwe has devised a National Financial Inclusion Strategy (NFIS) that prioritizes increased access to financial products and services for the unbanked population. As displayed in Table 1 below, digital financial inclusion variables such as mobile subscription per 100 people, mobile money agents who are registered per 100 000 adults, mobile money accounts (active) for every 1,000 adults and individuals using the Internet (% of population) have increased over the period 2014 to 2020. This justifies the need for crafting policies that enhances economic growth, digital financial inclusion and bank stability in Zimbabwe. Surprisingly, studies that examines the interplay between bank stability, economic growth, and digital financial inclusion using the finance-growth theory are scant.

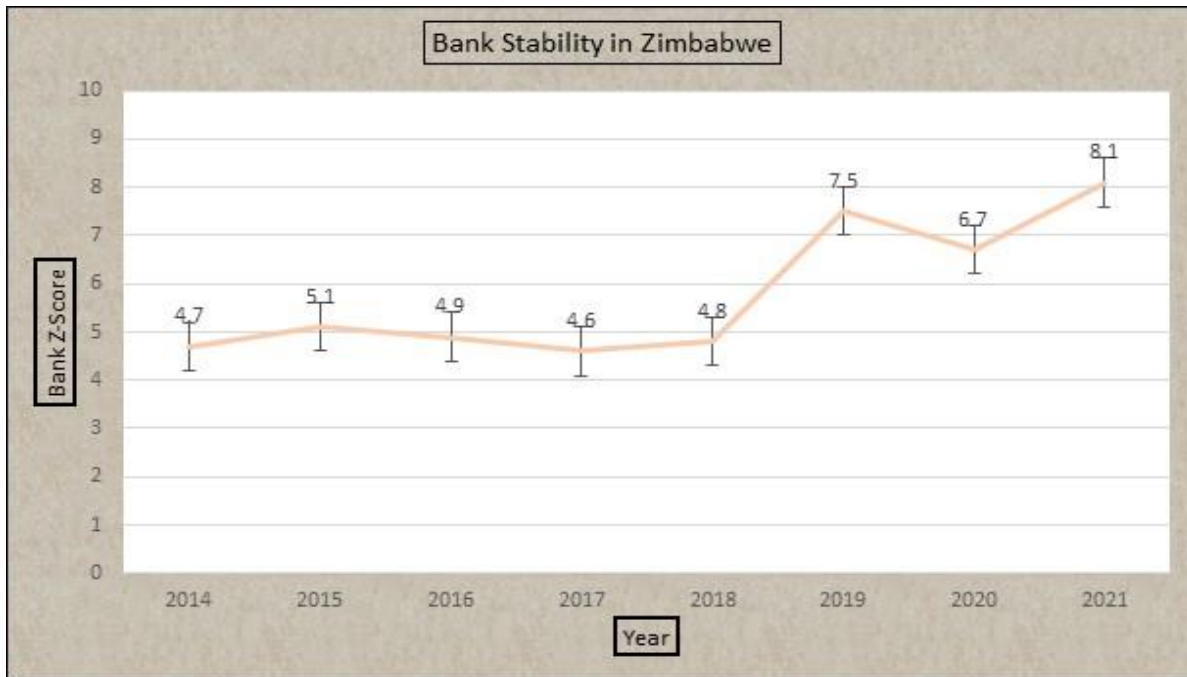
Table 1: Digital Financial Inclusion in Zimbabwe

Period	2014	2015	2016	2017	2018	2019	2020	2021
Mobile subscription per 100 people	85	90	89	96	86	86	84	89
Registered mobile money agents per 100 000 adults	328	489	505	586	611	700	200	300
Active mobile money accounts per 1000 adults	357	599	408	565	739	773	603	700
Individuals using the Internet (% of population)	16	22	23	24	25	25	29	35

N/B-Source: World Bank Development Indicators Database (2023)

Bank stability, according to Chinoda and Kapingura, (2023), is the distance between a bank’s insolvency and its collapse. The Basel Accord regards CAMELS (adequacy of capital, quality of assets and management, earnings and profitability, liquidity and market risk sensitivity) as pivotal indicators for bank stability. Other indicators of bank stability are the Bank Z-Score and nonperforming loans (NPLs). Following Akande and Kwenda (2017), this study used bank Z-scores as a bank stability measure, and the situation in Zimbabwe is detailed below. The accounting literature has most often used the Z-Score metrics to roughly estimate total bank solvency as it includes equity to asset (leverage), return on asset (performance), and deviation of return on assets (risk). As displayed in Figure 1, Zimbabwe’s Z-scores were largely steady between 2014 and 2021, ranging from 4.7 in 2014 to 8.09 in 2021. Zimbabwe’s stability, however, is less solid than that of other African nations because of the restricted prospects for debt repayment linked with financial institutions.

Figure 1: Z-scores in Zimbabwe



Source: World Bank Development Indicators (2022)

The association between digital financial inclusion and financial stability in Zimbabwe is less well understood. Figure 2 portrays economic growth trajectory in Zimbabwe between the periods 2014 to 2021. The trend suggests fluctuating overall economic growth rates although overall it is decreasing over years. In 2014, economic growth (GDP) stood at 1.48%, before declining to -6.33% and -7.82% in 2019 and 2020 respectively. The economic growth rose to 8.47% in 2021, confirming an oscillatory trend. Economic changes, technological transformation, and the emergence of wireless mobile telecommunications were all major drivers to this expansion (Wainaina, 2012). This justifies the need for investigating whether digital financial inclusion is one of the weapons to drive growth in Zimbabwe. As a result, the main research objective is to investigate the interplay among digital financial inclusion, bank stability and economic growth in Zimbabwe. The sub-objectives are as follows;

1. To investigate the relationship between digital financial inclusion and economic growth in Zimbabwe.
2. To investigate the relationship between bank stability and economic growth in Zimbabwe.
3. To investigate the relationship between digital financial inclusion and bank stability in Zimbabwe.

Based on the objectives, this study seeks to answer the following main research question; what is the relationship among digital financial inclusion, bank stability and economic growth in Zimbabwe? The sub-questions are as follows;

1. What is the impact of digital financial inclusion on economic growth in Zimbabwe?
2. What is the impact of bank stability on economic growth in Zimbabwe?
3. What is the impact of digital financial inclusion on bank stability in Zimbabwe?

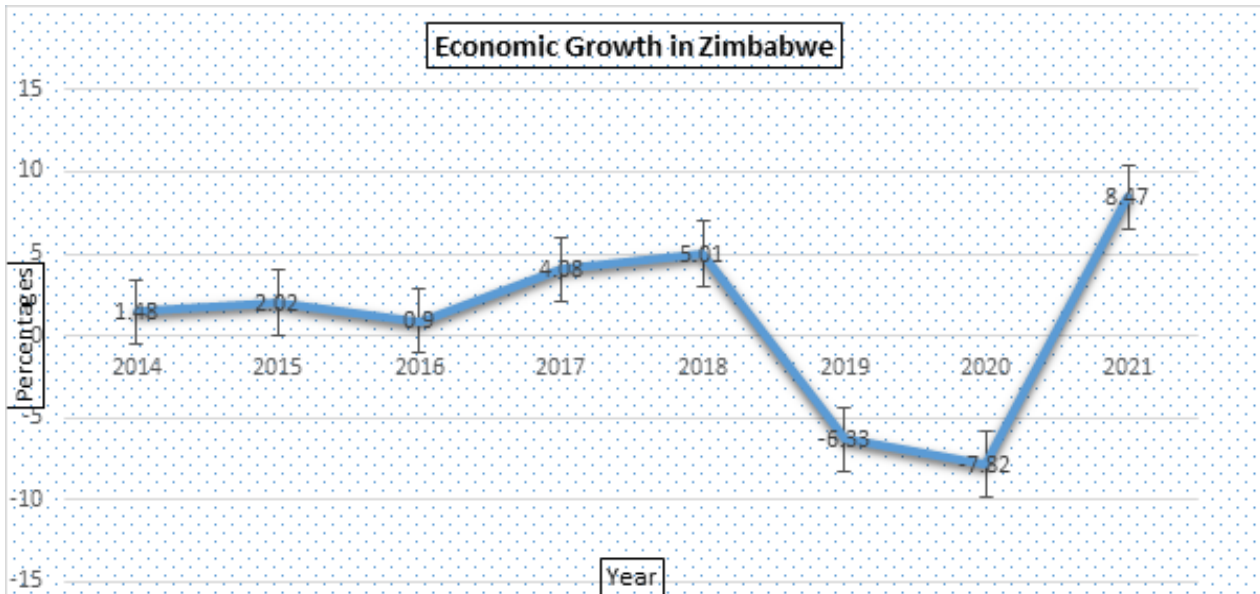
This study engages in hypothesis testing to unravel these complex relationships, thus contributing to a more holistic understanding of the digital financial inclusion, bank stability and economic growth nexus within Zimbabwe. The research hypotheses are formulated as follows:

$H_1$ : Digital financial inclusion is positively associated with economic growth in Zimbabwe.

H<sub>2</sub> Bank stability is positively associated with economic growth in Zimbabwe.

H<sub>3</sub>: Digital financial inclusion is positively associated bank stability in Zimbabwe.

Figure 2: Economic Growth in Zimbabwe



Source: World Bank (2022).

Our study contributes to the literature on economic growth since to the best of our knowledge, no study has yet addressed this relationship in Zimbabwe. Secondly, our study investigates a yet-to-be-examined potential causal relationship between the variables. Finally, the study created a new variable for digital financial inclusion, thus contributing to knowledge. The structure of this study is as follows: Section 2 investigates pertinent theories and empirical literature, Section 3 deals with methodological concerns, Section 4 provides the findings and discusses them, and Section 5 summarizes the study and offers logical recommendations and conclusions.

## LITERATURE REVIEW

### Theories on Digital Financial Inclusion

Gurley and Shaw (1960) were the first to develop the theories of financial intermediation. These ideas attempt to explain how the present theory of financial intermediation and actual practice relate to one another. The theory answers the following questions: Which forces actually drive the financial intermediation process? What is the purpose of actual financial intermediation? What sustains them and what is their indispensable contribution to the well-being of the national economy?

### Unified theory of Acceptance.

Fintech refers to technology based business models and applications for providing financial services effectively. Based on Venkatesh et al., (2003) unified theory of acceptance and use of technology (UTAUT) has been used in exploring users of fin tech related services (Odei-Appiah et al., 2022). The benefits that users can derive from the use of technology on their daily activities and easiness use of technology contribute to financial inclusion. Though social influence and technological infrastructure in the financial system has a bearing in the need to use digital technology (Odei-Appiah et al., 2022).

## Technology Acceptance theory

The model was designed to predict technology acceptance and usage at work place (Venkatesh et al., 2003). This is a framework influencing the adoption of fintech services. The theory emphasizes the role of perceived ease of use and usefulness in shaping users' attitude and intention towards digital financial services (Afjal, 2023). The theory emphasizes on the need of accessible, affordability and quality financial services to promote financial inclusion and economic growth (Wang, 2023). Achieving the goal of financial inclusion the cost of financial services should be affordable so as to expand coverage to financial customer. This is supported by the financial intermediation theory which is built on the notions that intermediaries serve to reduce transaction cost and information asymmetric (Beck, 2007). Though the development of digital technology tend to reduce transaction cost and information asymmetries, making financial intermediaries useless (Scholtens and Wensveen 2003).

## Empirical Literature

### Digital Financial Inclusion and Economic growth

Numerous studies have concluded that digital financial inclusion has a favourable effect on economic growth. Ahmed et al. (2021) used a fixed effect regression model to analyze the effects of human capital and digital financial inclusion on China's economic growth. In contrast to earlier studies, Ahmed et al. (2021) employed a new proxy for digital financial inclusion that was based on the depth, breadth, and level of digitalization of services. The study results revealed that China's economic growth was greatly impacted by both human capital and digital financial inclusion. However, the methodology they employed has been criticised for failing to take into account both the long-run level correlations and the pace of adjustment. Unlike Ahmed et al. (2021) this study used bank stability instead of human capital and maintained the methodology which suits time series data.

Shen, Hu, and Hueng (2021) used a larger sample size and the geographical dependence model to investigate the digital financial inclusion effect on economic growth for a panel of 105 developing and developed nations. The study discovered that digital financial inclusion had a favourable effect on economic growth, but it ignored the spatial dependency's heterogeneity.

Sahay and Iyak (2020) examined the financial inclusion effect on economic growth using a single metric, such as the proportion of people in a country with bank accounts. The study was criticised also for failing to adequately account for the macroeconomic effects of digital financial inclusion. Others, including Loukoianova et al. (2018), employed composite measures in place of individual measures, however they only took into account financial inclusion metrics through conventional banking institutions.

According to Jack and Suri (2014), households in Kenya and Tanzania did not experience any changes in consumption as a result of shocks, whereas those without access to mobile money experienced a reduction in consumption. According to Mbiti and Weil (2016), the use of mobile money and financial inclusion are positively correlated. These studies employed a single measure to represent digital financial inclusion, which can be deceptive. In addition, statistics at the firm or household level don't always represent a nation's overall reaction.

Macro-data has not been extensively used in studies to analyze the effects of digital financial services. To the best of our knowledge, two studies have evaluated how digital financial inclusion has affected macroeconomic growth. The general equilibrium macroeconomic model was used by McKinsey et al. (2016) to make their prediction, which was based on field research, that digital finance may increase the GDP of emerging economies by 6% by 2025. Additionally, using the new financial inclusion indices, Khera et al. (2021) evaluated the factors that drive digital financial inclusion and looked at whether it stimulates

economic growth in 52 developing nations using random effects and fractional logit empirical estimates between 2011 and 2018. The study discovered a beneficial effect of digital financial inclusion on economic growth however it was criticised for not taking endogeneity issues into account.

Using quarterly data for the years 2011 to 2017, Thaddeus, Ngong, and Manasseh (2020) investigated the long-term causal influence of digital financial inclusion on economic growth for 22 Sub-Saharan African nations. They discovered a long-run unidirectional causality connecting economic growth to the introduction of digital financial services using the vector error correction model and the Granger causality test. However, to fully define the notion, this study did not compute a digital financial inclusion index; instead, it used a few specific indicators as a surrogate. Banna and Alam (2021) used panel data of 574 banks from seven rising Asian nations over the period of 2011 to 2018 to assess the digital financial inclusion, banking stability and economic development nexus. The findings imply that stability of banks and economic growth in Asia are brought about by digital financial inclusion. The study did not define financial inclusion broadly, as it did not compute an index of digital financial inclusion. This study seeks to close the gap.

### **Digital Financial Inclusion and Bank Stability**

By taking into account the moderating influence of financial regulation, Jungo, Madaleno, & Botelho, (2022) evaluated the impact of financial inclusion and competition on banks' financial stability. In order to do this, they contrast how these variables have an impact on countries in Latin America and the Caribbean (LAC) and Sub-Saharan Africa (SSA). According to their findings, inclusion improves bank stability in SSA and LAC countries, and financial regulation helps LAC countries have more stable financial systems. This study however did not include digital financial inclusion in computing the index of financial inclusion.

Banna et al. (2020a) investigate the contribution of digital financial inclusion in fostering economic growth that is sustainable through Islamic banking stability using corrected panel standard errors and least squares two-stage instrumental variables. According to the study, financial inclusion was crucial in increasing banking efficiency, and it is recommended that the banking industry use digital financial inclusion to keep up with the competitive globe and to promote sustainable economic growth. In a different study, Banna and Alam (2021) used a sample of 283 banks from six countries between 2011 and 2019 to assess the linkage between digital financial inclusion and bank risk-taking levels. The study discovered that, for conventional and commercial banks as opposed to Islamic ones, an increase in digital financial inclusion reduces the ultimate bank risk-taking level and enhances banking stability. It did this by using least squares-instrumental variables in two stages, corrected panel standard errors, and dynamic panel generalized method of moment's estimators (two-step).

Banna and Alam (2021) also used unbalanced data on a panel of 574 banks from seven rising Asian nations between 2011 and 2018 to assess the digital financial inclusion and stability of banks impact through the promotion of economic development that is sustainable. The results show that digital financial inclusion enhances bank stability among the emerging Asian banks. This is revealed using the corrected standard errors and two stage least squares-instrumental variable of the panel data. To assess the association between digital financial inclusion and bank stability in ASEAN nations, Banna and Alam (2021) also used principal component analysis, two-step based dynamic system generalized method of moment's analysis, ordinary least square, and corrected standard panel errors approaches. Using a panel of 213 banks from 4 countries in ASEAN, the empirical study shows that digital financial inclusion accelerates stability of banks in ASEAN. Using a panel of 65 Islamic banks from six countries between 2011 and 2020, Banna et al. (2021) used the Panel-Standard Corrected Errors, Panel Two-Stage Least Squares-Instrumental Variables, and System Two-Step Generalized Method of Moments dynamic panel estimation method to examine the association between digital financial inclusion and stability of banks. The outcome implies that digital financial inclusion speeds up the stability of Islamic banking.

## Conceptual Framework

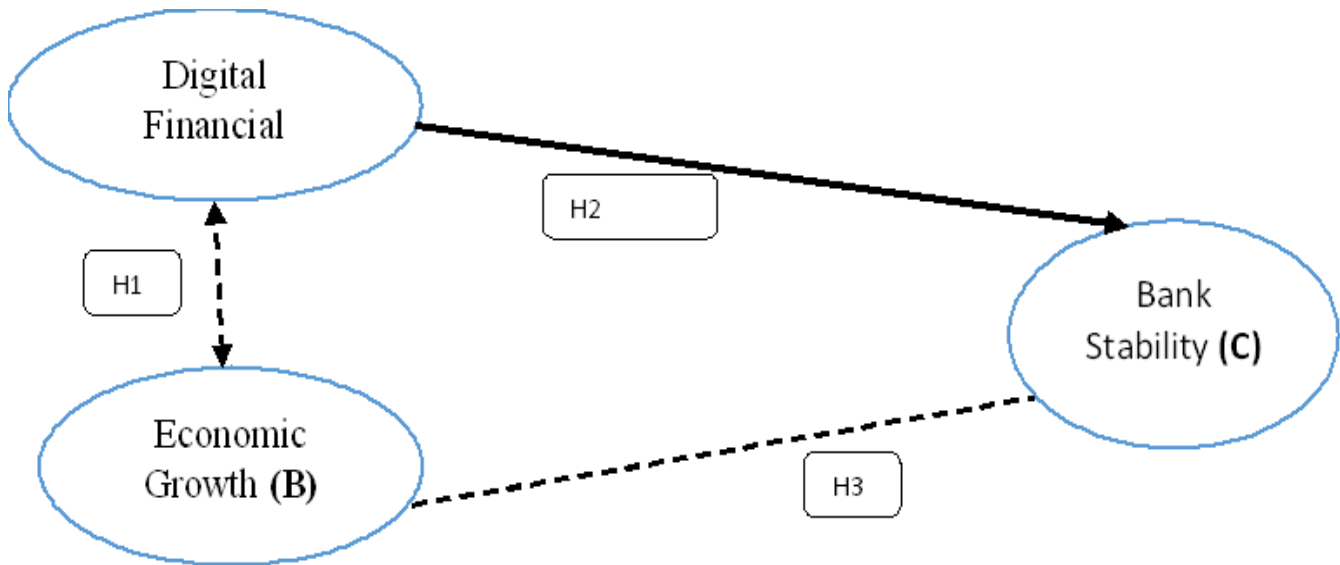


Figure 3: The Research Model (own source)

The conceptual framework in Figure 3 offers a hypothetical illustration on how bank stability, economic growth and digital financial inclusion relates. It is expected that the three variables relates to each other in a tri-variate manner. In a bid to determine the interplay among digital financial inclusion, bank stability and economic growth in Zimbabwe, the above model has been used. For model 1 and 3, economic growth was the dependent variable whilst digital financial inclusion and bank stability were independent variables. Digital financial inclusion and bank stability are anticipated to have a positive effect on economic growth in Zimbabwe. The interplay between digital financial inclusion and economic growth is anticipated to be bi-directional. For model 2, digital financial inclusion is the independent variable whilst bank stability is the dependent variable.

## RESEARCH METHODOLOGY

### Estimation Technique

The study adopted a descriptive philosophy where quantitative data was used to achieve the study objectives. It was used because it considered production of descriptive statistics, and regression relationships as portrayed by the objectives of this study. This study used the Ordinary Least Squares regression model, as did Akande, Kwenda, and Ehalaiye (2018), to investigate the nexus between digital financial inclusion, bank stability, and economic growth in Zimbabwe. The choice of this strategy was supported by a number of factors, including the growing use of the technique in time series data, which allows for individual cross-section behaviour in economic and financial investigations. Additionally, the Ordinary Least Squares approach is a regression methodology without the need for normality, with excellent flexibility and data generation process assumptions where dependent variables are instrumented by their delayed variables. The Ordinary Least Squares method addresses multi collinearity problems among variables, allows for the development and analysis of more challenging behavioral models (Baltagi, 2008), and aids in the study of Zimbabwe, a nation that had not previously been examined due to a lack of data. This study also utilized the Hansen J statistics in a reliable estimation to test the validity of the Ordinary Least Squares approach (Hansen, 2007). The study also conducted Pearson correlation analysis to determine the level of association among the variables of study.

## Model Specification

### The impact of digital financial inclusion and bank stability on economic growth

This study used the following broad set of assumptions about the linear dynamic panel model in order to analyse the effects of digital financial inclusion and bank stability on economic growth:

$$\mathfrak{N}_{i,t} = \omega_i + \rho_i \mathfrak{N}_{i,t-1} + X_{i,t} \rho + \varepsilon_{i,t} \dots \dots \dots (1)$$

Where: (i,t) is considered to be serially uncorrelated and t= r+1...T. Equation (1) is the source of the estimating regression model, which is expressed as follows:

$$\mathfrak{N}_{i,t} = \omega_i + \beta_{k,it} \varphi_{k,it} + \mathfrak{Z}_{k,it} + \Omega_{k,it} + \varepsilon_{i,t} \dots \dots \dots (2)$$

where:  $\mathfrak{N}$  represents economic growth denoted by GDP growth per capita, k indicates the regressions number, it represents country i in time t,  $\beta$  stands for digital financial inclusion;  $\mathfrak{Z}$  stands for bank stability proxied bank Z-Score,  $\Omega_{k,it}$  is a vector of control variables and  $\varepsilon_{i,t}$  the error term. Following the finance growth literature this study used the following variables in investigating the determinants of economic growth in Zimbabwe.

1. Economic development measured by the logarithm of GDP per capita
2. Population growth rate
3. Financial depth measured using logarithm of private credit as a percentage of share of GDP.
4. Foreign direct investment to GDP
5. Government consumption to GDP
6. Institutional quality (corruption).

### The impact of bank stability and economic growth on digital financial inclusion

To determine the impact of bank stability and economic growth on digital financial inclusion this study assumed the following estimating regression model:

$$\beta_{i,t} = \omega_i + \mathfrak{N}_{k,it} \varphi_{k,it} + \mathfrak{Z}_{k,it} + \Omega_{k,it} + \varepsilon_{i,t} \dots \dots \dots (3)$$

Where:  $\beta$  stands for digital financial inclusion;  $\mathfrak{N}$  represents economic growth denoted by GDP growth per capita, k indicates the regressions number, it represents country i in time t;  $\mathfrak{Z}$  stands for bank stability proxied bank Z-Score,  $\Omega_{k,it}$  is a vector of control variables and  $\varepsilon_{i,t}$  is the error term. The study used the following control variables;

1. Level of macroeconomic development (log GDP per capita)
2. Financial sector efficiency (overhead cost to assets)
3. Competition (Boone indicator)
4. Socio economic factors using urban population
5. Institutional quality (corruption)

### The impact of economic growth and digital financial inclusion on bank stability

To determine the impact of economic growth and digital financial inclusion on bank stability this study assumed the following estimating regression model:

$$\mathfrak{Z}_{i,t} = \omega_i + \mathfrak{N}_{k,it} \varphi_{k,it} + \beta_{k,it} + \Omega_{k,it} + \varepsilon_{i,t} \dots \dots \dots (4)$$



Where:  $\alpha$  denotes bank stability  $\beta$  stands for digital financial inclusion;  $\gamma$  represents economic growth denoted by GDP growth per capita,  $k$  indicates the regressions number,  $i$  represents country  $i$  in time  $\Omega_{k,it}$  is a vector of control variables and  $\varepsilon_{i,t}$  is the error term. The study used the following control variables;

1. Level of macroeconomic development (log GDP per capita)
2. Competition using Boone Indicator
3. Institutional quality (corruption)

## Data Source and Measures of Variables

In terms of sampling, the study adopted the purposive sampling technique. The study considers time series data on Zimbabwe over the period 2014 to 2021, whose main agenda is to perform their financial transactions in a cashless manner, enhancing digital financial inclusion. The selection of this country and period under study was also based on data availability. Data was extracted from the International Monetary Fund and World Bank Global Financial Development Indicators Database.

## Bank Stability

Literature has widely used the Z-Score as an unbiased bank riskiness indicator (Fang et al., 2014; Banna, Hassan and Allam, 2020; Nguyen and Thi Du, 2022). The Z-Score reflects the probability of bank failure by portraying a banking system buffer (return and capitalisation) to the standard deviation in returns (Klapper and Lusardi, 2020). The higher the banks Z-Score the lower the chances of bank insolvency. This study used bank Z-Score following Banna, Hassan and Allam, 2020. To reduce data skewness, this study used the natural logarithm of Z- Score.

## Digital Financial Inclusion

The study considered both the digital financial usage and outreach penetrations in computing digital financial based in line with Ahamed and Mallick 2019; Banna et al. 2020a; Banna, Hassan, and Alam 2020b, Banna and Alam 2020; Khera et al. 2021). This study constructed an enhanced digital financial inclusion index which is different from the traditional financial inclusion index. The indexes are made up of access and usage statistics provided by providers of digital financial services, such as fintech firms, mobile money providers, and other recent financial industry newcomers. In order to capture the supply and demand sides of financial inclusion, the study created “use” and “access” sub-indices using a principal component analysis (PCA) in three-stages. To represent financial inclusion made possible by technology, the PCA is used to integrate the access and usage sub-indices into one index for digital financial inclusion. The study took into account the proportion of persons with active mobile money accounts as a measure of usage. Indicators of access to digital infrastructure used in this study were the proportion of the population with a mobile subscription per 100 persons and the availability of registered mobile money agents per 100,000 adult users.

## Economic growth

The gross domestic product per capita growth (GDPPCG) was sourced from the World Bank’s Database on Global Development Indicators to proxy economic growth in line with Khera et al (2021). GDP per capita growth captures income distribution effects and also permits comparisons.

## Summary Statistics

The summary statistics of digital financial inclusion, stability of banks and economic growth data used over 7 periods (2014 to 2020) in Zimbabwe are illustrated in Table 3. The summary statistics provide a picture on the nature of data employed. Considering mobile phones subscriptions, Zimbabwe had on average 92

mobile phones for every 100 adults which is a high figure, thus increasing the chances of bringing on board a large portion of unbanked populations in Zimbabwe. The number ranges between 87 and 99 per every 100 people as reflected by the minimum and maximum values. Despite the existence of people who possess dual mobile phones, the figures reflects that mobile phones subscriptions have spread like veld fire in Zimbabwe. 24 % of the adult population in Zimbabwe used internet as reflected in Table 3. This number is low compared to other developed countries. In addition, the descriptive statistics portrays that Zimbabwe had 489 registered mobile money agents per every 100 000 adults and 578 active mobile money accounts per every 1000 adults. In addition, because some of these facilities are frequently shared throughout Zimbabwe, more adults may be using them than proposed by these rates of penetration. The trend highlights that Zimbabwe is in a good position to benefit greatly from a digital transformation. Figures 4 below reflects the digital financial inclusion trend between the periods 2014 to 2020. The digital financial inclusion in Zimbabwe has a mean of 46% with minimum and maximum values of 4% and 52% respectively which implies low level of digital financial inclusion.

Table 2 Selected Variables for Digital Financial Inclusion Index

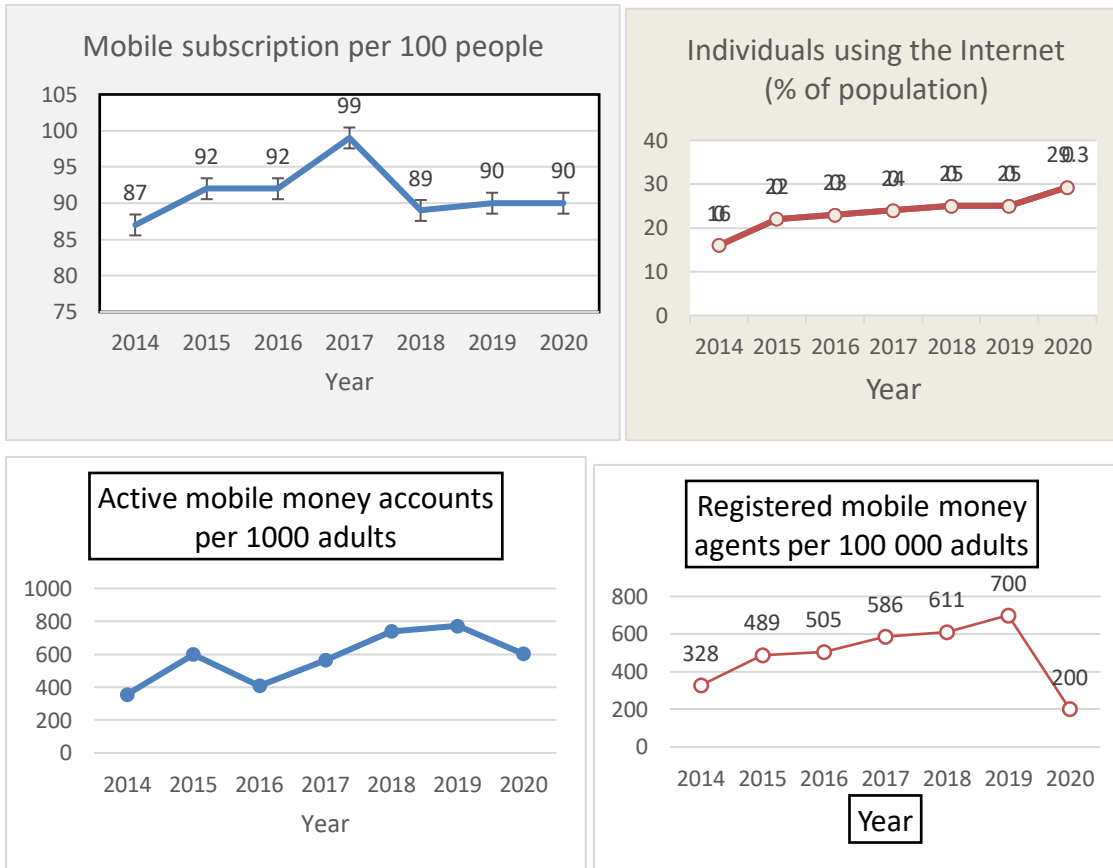
Digital Financial Inclusion Index	Data Source	Weight
<b>Access</b>		
<b>Access to Digital Infrastructure</b>		<b>0.5</b>
% population with access to internet	ITU	
Mobile subscription per 100 people		
<b>Number of registered mobile money agents per 100 000 adults</b>	FAS, IMF, GSMA	<b>0.25</b>
<b>Usage</b>		
Number of active mobile money accounts per 1 000 adults	WB Findex	<b>0.25</b>

Table 3: Summary Statistics

Variables	Obs.	Mean	Std. Dev	Min	Max
Mobile subscription per 100 people	8	92	3.8	87	99
Registered mobile money agents per 100 000 adults	8	489	172.5	200	700
Active mobile money accounts per 1000 adults	8	578	154.3	357	773
Individuals using the Internet (% of population)	8	23.5	4.02	16	29.3
DFI	8	0.46	0.04	0.4	0.52
GDP Per Capita Growth	8	-1.23	4.58	-7.62	3.36
Z-score	8	5.52	1.12	4.6	7.5
Corruption	8	-1.28	0.07	-1.43	-1.23
Trade	8	60.2	9.76	50.03	76.0
Population	8	1.42e+07	433345	1.36e+06	1.48e+07
Urban	8	32.30	0.11	32.21	32.51
Inflation	8	152	240.88	-0.252	558.56
GDP per capita	8	1337.95	108.09	1214.51	1464.59
Competition	8	-0.07	0.01	-0.07	-0.06

The average bank stability measure between 2014 and 2021 period hovers around 6 percent, which denotes a less stable banking system in Zimbabwe. The descriptive statistics also reflects that on average economic growth in Zimbabwe is -1.28 % and ranges between -1.43 and -1.23 % indicating economic recession. The descriptive statistics also reflects control of corruption indicator of -1.28 on average, implying that

institutional quality is still low in Zimbabwe. Trade and urban population in Zimbabwe stands at 60.2% and 30.3% on average implying fairly higher levels of trade and that population in Zimbabwe is more concentrated in rural areas compared to urban centres. The adult population in rural areas are faced with barriers such as distance and low income which impedes them from being financially included. Such barriers can be countered through digital means. Average inflation in Zimbabwe stands at 152%, the maximum and minimum values being 558.56% and -0.25% respectively. GDP per capita stood at \$1337 whereas competition stood at -0.07 on average.



Source: Author’s computation based on The World Development Indicators Database (2022)

**Correlation Analysis**

The Pearson Product correlation coefficient was employed in this study to examine critically the degree, amplitude, and kind of co-movements between bank stability, digital financial inclusion, and economic growth determinants in Zimbabwe. Table 4 displays the empirical matrix of correlations between the variables being studied.

Table 4: Pearson Correlation Test Results on Main Variables

	DFI	GDPPCGR	Ln (ZSCORE)
DFI	1.0000	-0.1626	0.1242
GDPPCGR	-0.1626	1.0000	-0.9467*
Ln (ZSCORE)	0.1242	-0.9467*	1.0000

The study’s ZSCORE results, which show a strong positive relationship between digital financial inclusion and bank stability in Zimbabwe, provide proof that this relationship exists. The lack of a positive correlation between digital financial inclusion and growth of economies suggests that it may actually slow it down. In addition, the findings show a significant inverse relationship between Zimbabwean economic growth and

bank stability (NPLs). Overall, the findings imply that the estimation variables’ multi-collinearity is unproblematic.

**Digital Financial Inclusion, Economic Growth and Bank Stability**

Table 5 Bank Stability Determinants

	Ln (Z-Score)	
	Constant	Probability
DFI	3.98	0.389
GDPPCGR	0.21	0.050*
CORRUPTION	-1.22	0.063*
BOONE	-0.19	0.018*
LN(GDPPC)	7.86	0.267
INFLATION	-0.48	0.04*
CONSTANT	-63.49	0.286
MSS=7.533	MMS=1.52	R2=0.9983
RSS=0.029	RMS=0.0299	Prob>F=0.0693

The results in Table 5 show a positive relationship between digital financial inclusion and Zimbabwean bank soundness. The results imply that higher levels of digital financial inclusion enhances bank stability or reduces risk-taking. These results are consistent with Ahamed and Mallick’s (2019) and Banna, Hassan, and Alam’s (2020b) findings, which show that a financial system with inclusive digital financial services tends to strengthen bank stability and that a greater adoption of digital financial inclusion reduces a specific bank’s propensity for excessive risk taking. As seen by the insignificant positive impact of digital financial inclusion, people in Zimbabwe are still trailing behind in adopting it, despite banks and other Fintech companies having properly facilitated access to digital financial services.

The study also shows that in Zimbabwe, bank stability and economic growth are positively correlated. This suggests that a growth in the economy improves bank stability by 0.21 units. On the other hand, the relationship between Zimbabwe’s bank stability and bank competition is negative. This suggests that Zimbabwean bank stability is hampered by bank competitiveness. This result is in line with research by Albaity, Mallek, and Noman (2019) and Tandelilin, and Hanafi’s (2021) who examined the effect of competition on bank stability in MENA and ASIA nations. They concluded that banks with more competition have a tendency to take on more credit risk, which lowers profitability and supports the idea that competition makes businesses more brittle. These findings contradicts Cobbinah, Zhongming, and Ntarmahs (2020) whose findings in West Africa were in accordance with the “competition-stability view,” of a positive effect of banking competition on bank stability.

The study also reveal that inflation reduces bank stability in Zimbabwe. A 1% increase in inflation significantly reduces bank stability by 48%. Also the relationship between economic development and bank stability is positive. The effect is however not significant since the economy in Zimbabwe is not very well developed to such a large extent of boosting bank stability.

Table 6 Digital Financial Inclusion Determinants

	Digital Financial Inclusion (DFI)	
	Constant	Probability
LN(Z-SCORE)	1.24	0.621

GDPPCGR	0.18	0.089*
CORRUPTION	-1.08	0.041*
BOONE	0.36	0.027*
LN(GDPPC)	7.86	0.267
INFLATION	-0.48	0.04*
CONSTANT	-63.49	0.286
MSS=0.0096	MMS=1.51	R2=0.872
RSS=0.0299	RMS=0.03	Prob>F=0.0486

The study found a strong positive correlation between bank competitiveness and digital financial inclusion. Digital financial inclusion increases by 36% with every 1% rise in bank competition. This suggests that the dominance of banks in Zimbabwe may limit the accessibility and use of formal financial services delivered through digital channels. A competitively friendly climate would offer valuable entry points for Fintech businesses. On the other side, Zimbabwe’s digital financial inclusion is decreased by 108% for every 1% increase in corruption. This indicates how better institutional quality has a positive impact on financial inclusion in the digital world. Economic growth has a beneficial, albeit small, impact on digital financial inclusion as well. This study also discovered that bank stability has an insignificant beneficial effect on digital financial inclusion contradicting Banna et al. (2021) whose results were significant.

Table 7 Economic Growth Determinants

	GDPPCGR	
	Constant	Probability
LN(Z-SCORE)	3.98	0.389
DFI	0.29	0.063*
CORRUPTION	-0.93	0.086*
LNPOP	0.14	0.007*
LN(GDPPC)	5.46	0.365
INFLATION	-0.36	0.034*
CONSTANT	-63.49	0.286
MSS=125.43	MMS=25.087	R2=0.9983
RSS=0.210	RMS=0.210	Prob>F=0.0693

The findings regarding the effects of bank stability and digital financial inclusion on growth of economies are presented in Table 5. The findings indicate that bank stability and digital financial inclusion have a favorable impact on Zimbabwe’s economic growth. While the impact of bank stability is little, that of digital financial inclusion is enormous. Ceteris paribus, it is anticipated that a 1% rise in digital financial inclusion will, on average, accelerate economic growth by 43%. Additionally, there is a favorable correlation between population expansion and economic growth. Economic growth typically accelerates by 14% for every 1% rise in population size. Though not significantly, economic development has a favorable impact on economic growth

## CONCLUSION AND RECOMMENDATIONS

The study concluded that digital financial inclusion condition in Zimbabwe is low. Banks and Fintech companies are failing to implement strategies that enhances digital financial inclusion condition. This could be a result of inconsistent policies in Zimbabwe, which saw the majority of mobile money operators and agencies being forced to cease operations by the central bank in a bid to counter inflation and parallel

markets. The study also concluded that economic growth and digital financial inclusion have varying positive contributions towards bank stability in Zimbabwe. This position means that digital financial inclusion and economic growth factors contributes highly towards the successful implementation of stability strategies in Zimbabwean banking sector. The study also suggest that digital financial inclusion enhances the soundness of individual banks in Zimbabwe. This is maybe explained by the technology sensitivity of banking operations that require the flexibility of information and communication technology, even in strategy implementation. The study also concluded a significant positive effect of economic growth and bank competition on digital financial inclusion. This implies that the presence of dominant banks in Zimbabwe could hamper digital financial inclusion. Enabling environment for competition would provide profitable opportunities for Fintech companies to enter. On the other hand, corruption reduces digital financial inclusion in Zimbabwe demonstrating that higher institutional quality positively affects digital financial inclusion. The study concluded a positive effect of digital financial inclusion and bank stability on economic growth in Zimbabwe. The effect of digital financial inclusion is significant whereas that of bank stability is not significant. Also the relationship between population growth and economic growth is positive. The effect of economic development on economic growth is also positive though not significant.

### Recommendations

The study recommends policy makers to craft policies that can effectively eradicate corruption in Zimbabwe which is hampering the level of economic growth and digital financial inclusion. Policy makers should also craft policies that enhances ICT, and also removes barriers to new entrants in the financial system as competition is healthy. Researchers in future can do a cross comparison of performance between countries for example South Africa and Zimbabwe.

### REFERENCES

1. Ahamed, M. M., & Mallick, S. K. (2019). Is financial inclusion good for bank stability? *International evidence. Journal of Economic Behavior & Organization*, 157, 403-427.
2. Akande, J. O., & Kwenda, F. (2017). Competition and stability of sub-Saharan African commercial banks; a GMM analysis. *Acta Universitatis Danubius. Œconomica*, 13(2).
3. Akande, J. O., Kwenda, F., & Ehalaiye, D. (2018). Competition and commercial banks risk-taking: Evidence from Sub-Saharan Africa region. *Applied Economics*, 50(44), 4774-4787.
4. Albaity, M., Mallek, R. S., & Noman, A. H. M. (2019). Competition and bank stability in the MENA region: The moderating effect of Islamic versus conventional banks. *Emerging Markets Review*, 38, 310-325.
5. Afjal, M. (2023). Bridging the financial divide: a bibliometric analysis on the role of digital financial services within FinTech in enhancing financial inclusion and economic development. *Humanities and Social Sciences Communications*, 10(1), 1-27.
6. AFI. (2018). *Fintech for financial inclusion: A framework for digital financial transformation.* Alliance for Financial Inclusion special Report. <https://www.afi-global.org>
7. Baltagi, B. H., & Baltagi, B. H. (2008). *Econometric analysis of panel data (Vol. 4).* Chichester: John Wiley & Sons.
8. Banna, H., Hassan, M. K., & Alam, M. R. (2020). Digital financial inclusion, Islamic banking stability and sustainable economic growth. *Islamic perspective for sustainable financial system*, 131-152.
9. Banna, H., & Alam, M. R. (2021). Is digital financial inclusion good for bank stability and sustainable economic development? Evidence from emerging Asia (No. 1242). *ADB Working Paper Series*.
10. Banna, H., Hassan, M. K., Ahmad, R., & Alam, M. R. (2022). Islamic banking stability amidst the COVID-19 pandemic: the role of digital financial inclusion. *International Journal of Islamic and Middle Eastern Finance and Management*, 15(2), 310-330.
11. Beck, T. (2007). *Efficiency in financial intermediation: Theory and empirical measurement.*

- In Microfinance and public policy: Outreach, performance and efficiency (pp. 111-125). London: Palgrave Macmillan UK.
12. Chinoda, T., & Kapingura, F. M. (2023). The impact of digital financial inclusion and bank competition on bank stability in sub-Saharan Africa. *Economies*, 11(1), 15.
  13. Cobbinah, J., Zhongming, T., & Ntarmah, A. H. (2020). Banking competition and stability: evidence from West Africa. *National Accounting Review*, 2(3), 263-284.
  14. Demirgüç-Kunt, A., L. Klapper, D. Singer, S. Ansar, and J. Hess. 2018. *The Global Findex Database 2017: Measuring Financial Inclusion and the FinTech Revolution*. Washington, DC: The World Bank.
  15. Gurley, J. G., & Shaw, E. S. (1960). *Money in a theory of finance*. Washington, DC: Brookings Institution.
  16. Fang, V. W., Tian, X., & Tice, S. (2014). Does stock liquidity enhance or impede firm innovation? *The Journal of finance*, 69(5), 2085-2125.
  17. FinScope Consumer Survey-Zimbabwe Report (2022). Surveys conducted by FinMark Trust and other Development Partners. Full Detail can be obtained from [www.finmark.org.za](http://www.finmark.org.za).
  18. Hansen, C. B. (2007). Generalized least squares inference in panel and multilevel models with serial correlation and fixed effects. *Journal of econometrics*, 140(2), 670-694.
  19. Ismael, D. M., & Ali, S. S. (2021). Measuring digital and traditional financial inclusion in Egypt: a new index. *International Journal of Applied Research in Management and Economics*, 4(2), 13-34.
  20. Jack, W., & Suri, T. (2014). Risk sharing and transactions costs: Evidence from Kenya's mobile money revolution. *American Economic Review*, 104(1), 183-223.
  21. Jima, M. D., & Makoni, P. L. (2023). Causality between financial inclusion, financial stability and economic growth in sub-Saharan Africa. *Sustainability*, 15(2), 1152.
  22. Jungo, J., Madaleno, M., & Botelho, A. (2022). The Effect of Financial Inclusion and Competitiveness on Financial Stability: Why Financial Regulation Matters in Developing Countries?. *Journal of Risk and Financial Management*, 15(3), 122.
  23. Khera, P., S. Ng, S. Ogawa, and R. Sahay (2021). "Measuring Digital Financial Inclusion in Emerging Market and Developing Economies: A New Index." IMF Working Paper No. 21/xx, International Monetary Fund, Washington, D.C.
  24. Khera, P., Ng, M. S. Y., Ogawa, M. S., & Sahay, M. R. (2021). Is digital financial inclusion unlocking growth?. International Monetary Fund.
  25. Klapper, L., & Lusardi, A. (2020). Financial literacy and financial resilience: Evidence from around the world. *Financial Management*, 49(3), 589-614.
  26. Kihombo, S., Ahmed, Z., Chen, S., Adebayo, T. S., & Kirikkaleli, D. (2021). Linking financial development, economic growth, and ecological footprint: what is the role of technological innovation? *Environmental Science and Pollution Research*, 28(43), 61235-61245.
  27. Kouladoum, J. C., Wirajing, M. A. K., & Nchofoung, T. N. (2022). Digital technologies and financial inclusion in Sub-Saharan Africa. *Telecommunications Policy*, 46(9), 102387.
  28. Loukoianova, M. E., Yang, Y., Guo, M. S., Hunter, M. L., Jahan, M. S., Jamaludin, M. F., & Wu, M. Y. (2018). *Financial Inclusion in Asia-Pacific*. International Monetary Fund.
  29. Mbiti, I., & Weil, D. N. (2015). Mobile banking: The impact of M-Pesa in Kenya. In *African successes, Volume III: Modernization and development* (pp. 247-293). University of Chicago Press.
  30. Mhlanga, D. (2022). An analysis of the influence of socioeconomic and demographic factors on financial inclusion in underdeveloped regions: A case study of rural Zimbabwe. *International Journal of Research in Business and Social Science* (2147-4478), 11(6), 341-349.
  31. Nguyen, T. D., & Du, Q. L. T. (2022). The effect of financial inclusion on bank stability: Evidence from ASEAN. *Cogent Economics & Finance*, 10(1), 2040126.
  32. Ozturk, I., & Ullah, S. (2022). Does digital financial inclusion matter for economic growth and environmental sustainability in OBRI economies? An empirical analysis. *Resources, Conservation and Recycling*, 185, 106489.
  33. Odei-Appiah, S., Wiredu, G., & Adjei, J. K. (2022). Fintech use, digital divide and financial inclusion. *Digital Policy, Regulation and Governance*, 24(5), 435-448.

34. Rabbani, M. R. (2022). Fintech innovations, scope, challenges, and implications in Islamic Finance: A systematic analysis. *International Journal of Computing and Digital Systems*, 11(1), 1-28.
35. Shen, Y., Hu, W., & Hueng, C. J. (2021). Digital financial inclusion and economic growth: a cross-country study. *Procedia computer science*, 187, 218-223.
36. Scholtens, B., & Van Wensveen, D. (2003). The theory of financial intermediation: an essay on what it does (not) explain (No. 2003/1). *SUERF Studies*.
37. Tandelilin, E., & Hanafi, M. M. (2021). Does institutional quality matter in the relationship between competition and bank stability? Evidence from Asia. *Journal of Indonesian Economy & Business*, 36(3).
38. Tay, L. Y., Tai, H. T., & Tan, G. S. (2022). Digital financial inclusion: A gateway to sustainable development. *Heliyon*.
39. Thaddeus, K., Ngong, C., & Manasseh, C. (2020). Digital financial inclusion and economic growth: evidence from Sub-Saharan Africa (2011–2017). *International Journal of Business and Management*, 8(4), 212-217.
40. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.
41. Wainaina, M. C. (2012). *Telecommunication Infrastructure and Economic Growth: A Case of Sub-Saharan Africa (1988-2010)* (Doctoral dissertation, Kenyatta University).
42. Xi, W., & Wang, Y. (2023). Digital financial inclusion and quality of economic growth. *Heliyon*, 9(9).



## APPENDIX 1

### Data Used

Year	Mobile subscription per 100 adults	Mobile money agents per 100 000 adults	Mobile money accounts per 1000 adults	Internet use (% pop)
2014	85	328	357	16
2015	90	489	599	22
2016	89	505	408	23
2017	96	586	565	24
2018	86	611	739	25
2019	86	700	773	25
2020	84	200	603	29.3
2021	89	300	700	35

Year	gdppcgr(%)	zscore	dfi	Corruption	gdppc	lngdppc	trade	pop	lnpop	urban	inflation	boone
2014	0.60	5	0.4	-1.43	1434.90	7.27	54.67	13586681	16.42	32.504	-0.25	-0.06
2015	0.10	5.1	0.42	-1.31	1445.07	7.28	56.75	13814629	16.44	32.385	0.61	-0.06
2016	-0.79	4.9	0.48	-1.26	1464.59	7.29	51.22	14030390	16.46	32.296	2.16	-0.06
2017	3.19	4.6	0.52	-1.27	1235.19	7.12	50.03	14236745	16.47	32.237	2.44	-0.07
2018	3.36	4.8	0.45	-1.23	1254.64	7.13	69.45	14439018	16.49	32.209	59.80	-0.07
2019	-7.47	7.5	0.46	-1.24	1316.74	7.18	63.28	14645468	16.50	32.21	440.83	-0.07
2020	-7.62	6.72	0.5	-1.25	1214.51	7.10	76.00	14764205	16.51	32.242	558.56	-0.07
2021	8.1	8.47	0.52	-1.26	1282.83	7.20	76.82	14783291	16.83	32.25	98.55	-0.07