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The relationship between financial inclusion and economic development in developing countries

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This thesis is submitted in partial fulfilment of the requirements for the degree of Master of Management in Finance and Investments

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ABSTRACT

Financial inclusion in developing countries has not been explored to the same extent as for developed countries, and there is limited knowledge of what drives financial inclusion in developing countries. This paper looks at the relationship between financial inclusion and economic development in developing countries using an Index of Financial Inclusion (IFI) and three economic development parameters; GDP (PPP), GDP Per Capita and the Human Development Index (HDI). The study found a positive relationship between financial inclusion and economic development in developing countries.

This paper analyses a combination of factors associated with the Index of Financial Inclusion by running 20 regression sets of transformed IFIs on two variable sets: aspects of the banking sector and socio-economic variables. The analysis also includes physical infrastructure factors in each regression, namely: transport infrastructure, mobile cellular subscriptions, internet connectivity and fixed telephone infrastructure.

The study found that infrastructure requirements that are critical for enhancing financial inclusion in developing countries include: transport infrastructure, mobile cellular subscriptions and internet connectivity. The study further found that socio-economic factors, such as access to credit, employment opportunities and adult literacy, are also important in ensuring financial inclusion. Certain banking variables hinder financial inclusion, like high-interest rates, while an increase in foreign assets is positively associated with financial inclusion in developing countries. This research ultimately contributes to the body of knowledge regarding financial inclusion in developing countries.

Keywords: financial inclusion; economic development; developing countries; Index of Financial Inclusion (IFI), Human Development Index (HDI)

DECLARATION

I Andile Hlanti, declare that the research conducted and presented in this dissertation is my own work, except where otherwise indicated and referenced accordingly. It is submitted for the degree of Master of Management in Finance and Investments through the University of Witwatersrand, Johannesburg. This research report has not, either in whole or part, been submitted for qualification to any other educational institution.



Signed in ……Cape Town……

On the……25…… day of……October……2020

DEDICATION

I dedicate my dissertation work to my family. A special feeling of gratitude to my brothers Msawenkosi and Sphamandla Hlanti whose encouragement and drive always inspire me to achieve more. My dear parents, for the many hours of prayer and spiritual guidance throughout this process.

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I would also like to thank my work colleagues who have supported me throughout the period of fulltime work and part time studying towards this Masters degree. Thank you to Johan De Kock for helping develop my technical and analytical skills, and Jeana Doubell for carrying the office workload on days I required study leave.

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TABLE OF CONTENTS

ABSTRACT……..…I

DECLARATION……..……..III

DEDICATION…….……...IV

ACKNOWLEDGEMENTS……..…..……...V

CHAPTER 1: INTRODUCTION 1

1.1 Study context 1

1.2 Background of the study 1

1.2.1 Origins of financial inclusion 1

1.2.2 Financial inclusion: Global outlook 2

1.2.3 Financial inclusion initiatives: National initiatives 3

1.2.4 Financial inclusion initiatives: Digital technology 4

1.3 Context and motivation 4

1.3.1 Financial Inclusion 4

1.3.2 Economic Development 14

1.4 Problem statement 16

1.5 Research objectives 17

1.6 Research questions 17

1.7 Research significance 17

CHAPTER 2: LITERATURE REVIEW 19

2.1 Theoretical literature review 19

2.1.1 Defining financial inclusion 19

2.1.2 Defining economic development 22

2.1.3 The importance of financial inclusion 23

2.1.4 Types of financial exclusion 24

2.2 Empirical literature review 24

2.3 Summary, study gap and limitations 31

CHAPTER 3: METHODOLOGY AND DATA 32

3.1 Methodology 32

3.1.1 Measuring financial inclusion 32

3.1.2 Index of Financial Inclusion (IFI) 36

3.1.3 Measuring economic development 39

3.2 Data **41**
3.3 Data analysis **41**
CHAPTER 4: DATA ANALYSIS **43**
4.1 Data Limitations **43**
4.2 IFI, GDP (PPP), GDP Per Capita and HDI **43**
4.3 Determinants of financial inclusion **47**
4.3.1 Banking variables **47**
4.3.2 Socio-economic variables **50**
CHAPTER 5: CONCLUSION **53**
REFERENCES **55**

CHAPTER 1: INTRODUCTION

1.1 Study context

This research falls within the field of development economics. It explores the relationship between financial inclusion and economic development in developing countries. Financial inclusion and economic development have been widely researched for a combination of developed and developing countries (Sarma and Pais, 2011; Sethy 2016; Samudra 2016). More information relating specifically to developing countries is required to gain a better understanding of the relationship between financial inclusion and economic development in these countries (Mathew and Kurian, 2017). The need for more information grows greater as low levels of financial inclusion can cause developing countries to fall behind emerging and developed countries, in terms of economic development (Aduda and Kaluda, 2012; Adeola and Evans, 2017).

1.2 Background of the study

1.2.1 Origins of financial inclusion

The connection between financial inclusion and economic development can be traced back over 150 years. In 1870, Walter Bagehot, a well-known classical economist, suggested that access to finance through loanable funds encouraged economic activity (Sethy, 2016). Bagehot believed that if the loanable funds could be accessed by investors, they would be encouraged to invest in new technology and that the result would be an increase in production processes - ultimately increasing economic activity (Sethy, 2016). Since then, many empirical studies have found a clear positive correlation between financial inclusion and economic development (Samudra, 2016; Raza, Tang, Rubab; Wen, 2019). Studies conducted by Sarma and Pais (2011) found that the more financially inclusive an economy is, the higher its economic development, and Van and Linh (2019) specifically showed that increased financial inclusion can contribute significantly to economic development (Van and Linh, 2019).

A study conducted by Goldsmith in 1975 first brought the Index of Financial Inclusion (IFI) into literature, coined the Financial Interrelation Ratio at the time (Stolbov, 2013; Sethy, 2016). This comprehensive system of financial indicators quantitatively determined whether a financial system led, correlated with or lagged behind a country's economic development (Stolbov, 2013). It used financial indicators to explain the

penetration of the financial system, such as the number of bank branches present (Sethy, 2016). The term 'penetration' suggested by Goldsmith (1975) has been replaced by 'inclusion' in modern literature (Stolbov, 2013), though the sentiment remains constant. The updated index is evident in several studies on empirical financial inclusion work, most notably in Sarma (2008), where an Index of Financial Inclusion (IFI) was created using a more multidimensional approach.

1.2.2 Financial inclusion: Global outlook

Financial Inclusion has become a common phrase over the past decade. It has been discussed and tabled as a key priority by many international policymakers such as: the United Nations, International Monetary Fund, Asian Development Bank, African Development Bank and South African Development Bank (Sethy, 2016). In 2015 the World Bank Group and its public and private sector partners adopted measurable commitments to achieve Universal Financial Access by 2020 (World Bank, 2018). This commitment aims to help one billion people gain access to a financial transaction account through targeted interventions (World Bank, 2018). The initiative focuses on 25 priority countries – home to 70 per cent of the world's most financially excluded people. In addition, the World Bank Group consistently works with more than 100 countries to advance financial access and inclusion (World Bank, 2018).

Financial inclusion has become a global focus and new organisations have been set up to help solve the global financial exclusion problem. The Alliance for Financial Inclusion (AFI) was created in 2008 and aims to make financial services more accessible to those who do not have access to banking and/or that have limited access to financial services (Alliance for Financial Inclusion, 2018). Other global organisations that have been established to alleviate financial exclusion include: Consultative Group to Assist the Poor (CGAP), G20 Global Partnership For Financial Inclusion (GPFI), Better than Cash Alliance and the SME Finance Forum (GPFI, 2017). The need for financial inclusion has not only drawn the attention of policymakers and researchers, but it is also prioritised by well-known foundations such as the Bill and Melinda Gates Foundation, which has contributed over USD 500 million to financial inclusion research and has helped several countries with financial inclusion initiatives (Alliance for Financial Inclusion, 2018).

1.2.3 Financial inclusion initiatives: National initiatives

Many countries have specific initiatives to increase financial inclusion, such as Colombia's National Economic and Financial Education Strategy – focused on improving the Colombians financial literacy (Diaz, 2018) and Mozambique's National Financial Strategy – focused on expanding the country's banking network to rural areas (Bank of Mozambique, 2016). Through legislative measures, these countries have significantly improved their citizens' financial outlook (Chakraborty, 2012). One of the early adopters of financial inclusion legislation was the United States of America. In 1997 it adopted the Community Reinvestment Act, which ensures banks offer credit to all areas which they operate around and not only wealthy neighbourhoods (Chakraborty, 2012).

After the Asian financial crises of 1997-1998, most Asian countries put measures in place to protect their financial systems from destructive volatility in financial markets (World Bank, 2017). Malaysia used this opportunity to put in place reforms and initiatives to modernise, strengthen and expand its financial systems (Moreno, Mihaljek, Villar, and Takáts, 2010). The reforms and initiatives were aimed at: reducing the use of cash, expanding the national payment system, issuing transformative bank guidelines to serve low-income households and limiting the fees that banks charge to customers, leveraging technology to develop new financial products to serve the low-income households (e.g agent banking model) and strengthening consumer protection financial literacy (World Bank, 2017). These reforms and initiatives have helped Malaysia become one of the most financially inclusive countries in Asia (World Bank, 2017).

In 1998, the French government initiated the Law on Exclusion, which promoted the right of all individual's to a bank account (Sarma and Pais, 2011). Similar to this was the United Kingdom's Financial Inclusion Task Force that was formed in 2005, which advocated for financial inclusion development (Yorulmaz, 2016). A common theme is noted across these financial inclusion initiatives; access to banking is deemed more important and has a greater impact on financial inclusion than any other financial service or sector (Yorulmaz, 2016). The theme is further highlighted in country-specific initiatives such as: South Africa's 'Mzansi' account, the 'everyman' account in Germany and 'General Credit Cards' of India (Sarma, 2016). As a result, ownership of a bank

account at a financial institution is considered the best indicator of financial inclusion (Fungáčová and Weill, 2014a).

1.2.4 Financial inclusion initiatives: Digital technology

In recent years, countries have focused on technology to expand financial inclusion. Indias' digital financial inclusion initiative 'Stack' was launched in 2015 as a digital infrastructure that promotes paperless and cashless delivery of services across different sectors for all citizens (GFPI, 2017). Other countries such as India, Bangladesh and Tanzania have digitalised government-to-people payments to increase reach and ensure that those in remote areas can participate in welfare programmes (Baur-Yazbeck, Chen and Roest, 2019). Across Latin America, many governments have supported the expansion of digital insurance, where mobile network operators offer a wide range of insurance, including: personal, accident, agriculture and hospital covers (GFPI, 2017).

In Pakistan, authorities developed the Computerised National Identity Card (CNIC) (GFPI, 2017). Up to 99 per cent of the adult population has been issued with a card and authorities are currently in the process of linking financial services (transaction accounts, social benefit payments and credit information) to the CNIC (GFPI, 2017). In 2016, Peru launch 'Bim' - a nationwide payment platform that increases banking access to all Peruvians while reducing transactional costs. Similarly, Zambian authorities recognised the importance of mobile money and erected 169 mobile towers in the country's rural areas to increase connectivity (GFPI, 2017). Digital financial inclusion also plays a pivotal role in war-stricken regions such as Iraq, and works well in areas that are prone to natural disasters such as Haiti (Demirgüç-Kunt, Klapper, Singer, Ansar and Hess, 2018).

1.3 Context and motivation

1.3.1 Financial Inclusion

1.3.1.1 The state of financial inclusion: Global synopsis

It appears that the collective effort by global organisations and country-specific initiatives on financial inclusion has been successful. According to the 2017 Global Findex data, the number of adults globally who own an account at a financial institution has increased to 69 per cent of the global adult population. The data shows that aggregate financial inclusion, which can be based on the number of people with accounts, has risen 18 per

cent since 2011 (Demirgüç-Kunt *et al.,* 2018). As more people gain access to mobile platforms, digital payments have become common, increasing by 11 per cent between 2014 and 2017. Developing countries in sub-Saharan Africa have been at the forefront of the move towards mobile transacting (Demirgüç-Kunt *et al.,* 2018).

Unfortunately, certain inequality themes still inhibit financial inclusion. In a study performed by Demirgüç-Kunt *et al.* (2018), it was noted that women are seven per cent less likely to experience financial inclusion than men. Similarly, people who reside in urban areas continue to have better access to financial services than people who reside in rural communities (International Labour Organisation, 2019).

1.3.1.2 Regional overviews

The 2017 Global Findex data shows that in **East Asia and the Pacific** digital financial transactions grew significantly, with China seeing the most growth (Felsenthal and Hahn, 2018). The share of account owners using the internet to shop online and pay bills more than doubled between the period 2014 and 2017 – to 57 per cent (Felsenthal and Hahn, 2018). This region had stagnation in account ownership, the only exception was Indonesia, with the percentage of people with an account at a financial institution growing from 13 per cent in 2014 to 49 per cent in 2017 (Rhyne and Kelly, 2018; Felsenthal and Hahn, 2018). The region has made great strides in gender equality relating to financial inclusion; men and women are now equally likely to have an account in Myanmar, Cambodia, Vietnam and Indonesia (Felsenthal and Hahn, 2018).

Sub-Saharan Africa differs somewhat from other developing regions in that the percentage of the adult population with an account at a financial institution has not changed significantly since 2014 (Rhyne and Kelly, 2018). However, the percentage of adults with a mobile money account has increased dramatically (Klapper, Ansar, Hess and Singer, 2019), almost doubling from 2014 to 2017 – to 21 per cent. Eight of the 46 Sub-Saharan Africa countries have a population of 20 per cent or more of adults who use only a mobile money account for transacting, the highest figure amongst all regions (Felsenthal and Hahn, 2018). In this region, mobile money has driven financial inclusion, it is a faster and more efficient method of sending and receiving funds (Klapper *et al.*, 2019).

India has been the biggest contributor to **South Asia's** increase in financial account ownership amongst adults (Felsenthal and Hahn, 2018). Account ownership in South Asia rose by 23 per cent over three years, from 47 per cent in 2014 to 70 per cent in 2017 (Rhyne and Kelly, 2018). India's high level of financial account ownership (80 per cent of the adult population), is a direct result of more women and poorer adults gaining access to mobile money accounts and accounts at financial institutions (Raman, 2018). In Bangladesh, 65 per cent of men have accounts while only 36 per cent of women have accounts, showing that financial inclusion is still higher for men than for women in Bangladesh (Roest, 2018).

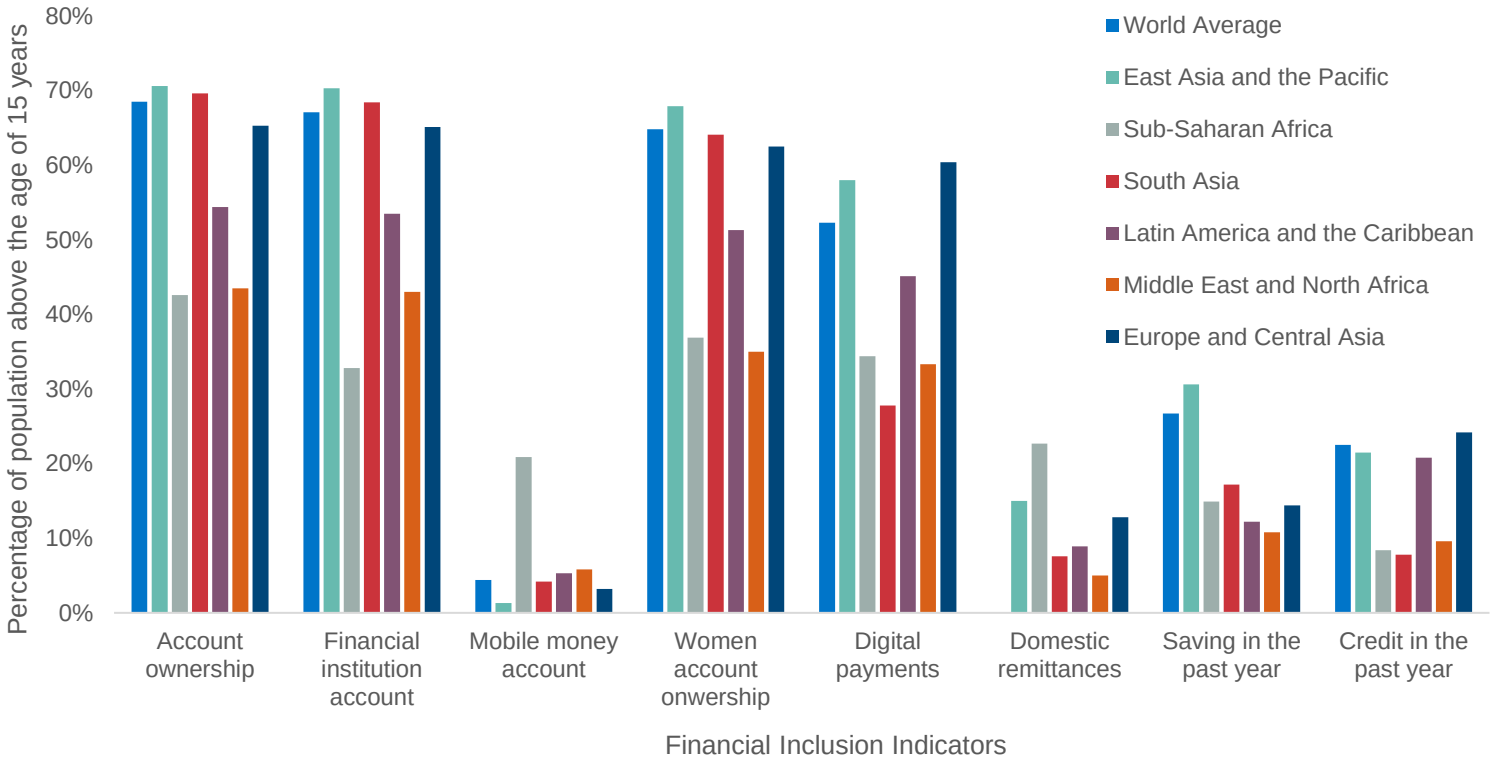
Latin America and the Caribbean are well positioned to improve financial inclusion through the use of digital technology. More than 55 per cent of the adult population own a mobile phone and have access to the internet; 15 per cent more than the average population share of developing countries (Felsenthal and Hahn, 2018; Demirgüç-Kunt *et al.*, 2018). Mobile money services are very popular in the region; by 2017, there were 43 mobile-money products in 26 countries across Latin America and the Caribbean (Alliance for Financial Inclusion, 2019). Six of the 43 mobile-money products have registered over one million customers: Transfer in Mexico, Daviplata and Ahorro a la Mano in Colombia, and Tigo Money in Honduras, Paraguay and El Salvador (Alliance for Financial Inclusion, 2019).

The **Middle East and North Africa** have the largest difference in financial inclusion levels between men and women, 17 percentage points (Rhyne and Kelly, 2018). 80 per cent of the unbanked have a mobile phone (Arezki, Mottaghi, Barone, Fan, Harb, Karasapan, Matsunaga, Nguyen and Soyres, 2018). Thus, if mobile money platforms gain traction in the region, it could lead to a rapid increase in financial inclusion (Noonan, 2019). In an effort to increase financial inclusion in Tunisia, the Tunisian government launched Digital Tunisia 2020 a secure payment system and increased the number of households with access to the internet (Kantor, 2019). Similarly, the largest bank in Morocco launched Jibi, a digital payments app that increased general access to their banking products (Kantor, 2019). In 2011, only 11 per cent of Iraq's adult population had an account at a financial institution; this figure had doubled by 2017 (Cornish, 2019). Initially one of the Middle East's most unbanked regions, the change was largely due to the Iraqi government's initiative to enable seven million Iraqis to receive their welfare

benefits or public sector salaries electronically through debit cards instead of paying them cash – fundamentally changing the financial inclusion band of Iraq (Cornish, 2019).

In **Europe and Central Asia,** account ownership amongst adults increased from 58 per cent in 2014 to 65 per cent in 2017 (Felsenthal and Hahn, 2018). This was largely driven by government's digital wage, pension and social benefit payments (Felsenthal and Hahn, 2018). 17 per cent of adults opened their first account during this time to receive government payments. Account ownership in Europe and Central Asia varies widely by subregion. Western Europe (Austria, Belgium, France, Germany, Ireland, Luxembourg, Netherlands and the United Kingdom), Southern Europe (Cyprus, Greece, Italy, Malta, Portugal and Spain) and Northern Europe (Denmark, Finland and Sweden) typically had account ownership above 90 per cent of the adult population in 2017 (Demirgüç-Kunt, Hu and Klapper 2019). This is 25 per cent higher than Eastern Europe (Belarus, Moldova and Ukraine) which has 65 per cent account ownership (Demirgüç-Kunt *et al*., 2019). In comparison, Central Asia had account ownership of 44 per cent (Demirgüç-Kunt *et al.*, 2019).

Figure 1: Regional overview.



Source: Global Findex database (Demirgüç-Kunt *et al.,* 2018).

Figure 1 represents the different factors of financial inclusion for different regions in 2017.

Account ownership: Ownership of an account at a financial institution or through a mobile money provider; **Financial institution account**: Percentage of the population above the age of 15 years that has an account at a financial institution (bank, microfinance institution, or another type of regulated financial institution); **Mobile money account**: Percentage of the population above the age of 15 years that has an account through a mobile money provider; **Women account ownership**: Percentage of women above the age of 15 years that have an account at a financial institution or through a mobile money provider; **Digital payments**: Percentage of the population above the age of 15 years that made or received digital payments; **Domestic remittances**; Percentage of the population above the age of 15 years that has sent or received domestic remittances through an account; **Saving in the past year**; Percentage of the population above the age of 15 years that has saved money at a financial institution in the preceding year; **Credit in the past year**: Percentage of the population above the age of 15 years that has borrowed from a financial institution or used a credit card in the preceding year.

1.3.1.3 Developing countries: Account ownership

Ownership of an account at a financial institution is considered the best indicator of financial inclusion (Fungáčová and Weill, 2014a). The 2017 Global Findex data defines ownership as a person with an account at a financial institution (bank, credit institution or microfinance institution) or an account on a mobile money platform (Demirgüç-Kunt *et al.,* 2018).

Financial inclusion in developing countries (classified as low or middle-income countries by the World Bank), lags behind developed countries (Demirgüç-Kunt *et al.,* 2018). In developed countries 94 per cent of adults have an account, while only 63 per cent of adults have an account in developing countries (see Figure 2) (Demirgüç-Kunt *et al.,* 2018). It is estimated that 1.7 billion people globally do not have an account at a financial institution or own an account via a mobile money provider, half of these people are from seven developing counties: Mexico, Indonesia, Pakistan, Bangladesh, China and Nigeria (Demirgüç-Kunt *et al.,* 2018).

There are vast differences in account ownership within developing countries, for example, 38 per cent of the Mexican adult population has a bank account (Demirgüç-Kunt *et al.,* 2018). In comparison, the figure is 85 per cent for Malaysia (see Figure 2) (Demirgüç-Kunt *et al.,* 2018). The account ownership varies from about 20 per cent in Pakistan, Mauritania and Cambodia to highs of 93 per cent in Mongolia. (Demirgüç-Kunt *et al.,* 2018). India has experienced the greatest increase in account ownership - over the six years from 2011 to 2017 the figure almost doubled to 80 per cent (see Figure 3) (Demirgüç-Kunt *et al.,* 2018).

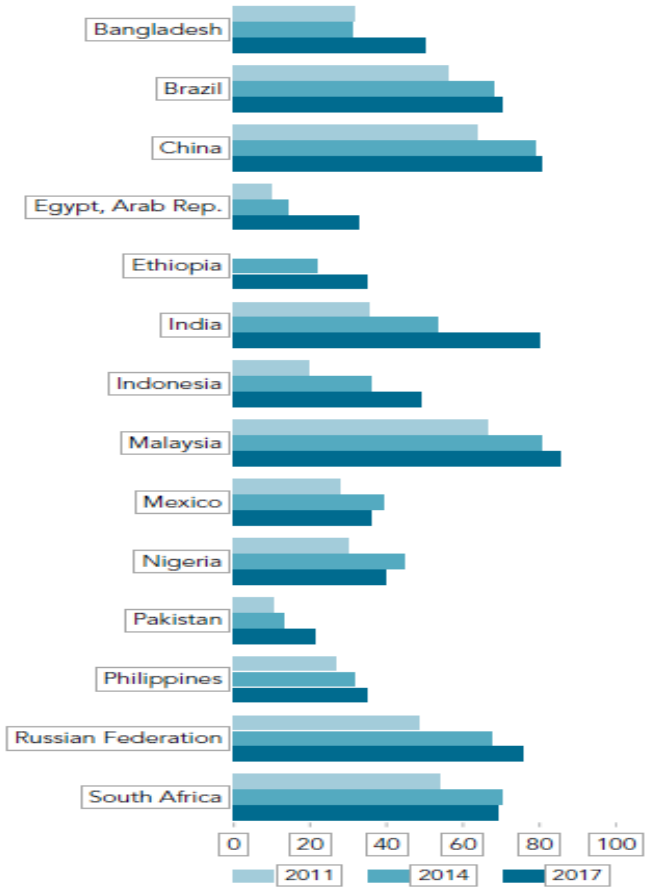
There is a clear gender disparity in account ownership within developing countries. Men usually lead by almost 10 percentage points compared to female ownership figures (Demirgüç-Kunt *et al.*, 2018). Certain developing countries such as India, Argentina, Indonesia and South Africa have made distinct progress toward gender equality of account ownership and have very small differences between male and female ownership of accounts (Demirgüç-Kunt *et al*., 2018).

Figure 2: The gender gap and overall account ownership in developing economies, as a percentage of the adult population.



Source: Global Findex database (Demirgüç-Kunt *et al.,* 2018).

Figure 3: Account ownership in developing countries, as a percentage of the adult population.



Source: Global Findex database (Demirgüç-Kunt *et al.,* 2018).

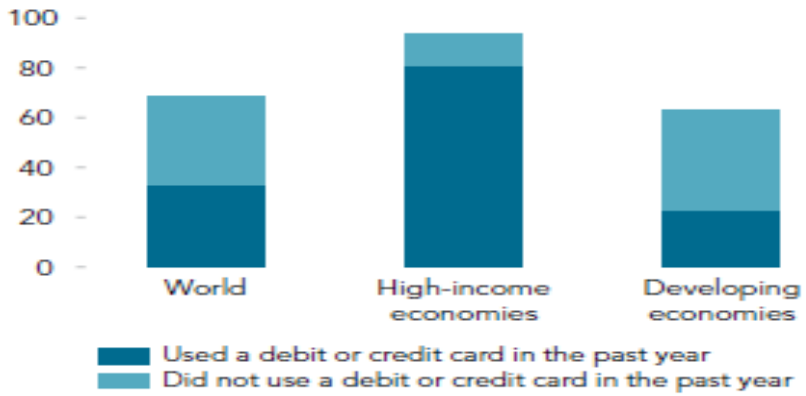
Note: No data available for Ethiopia in 2011

1.3.1.4 Developing countries: Account usage

A study performed by Sama (2016) suggests that having an account at a financial institution is not an accurate measure of financial inclusion and that specific usage of the account should be measured to determine the level of financial inclusion with greater accuracy. The 2017 Global Findex survey noted that 70 per cent of account owners in developing countries made use of their accounts, compared to 97 per cent in developed countries (Demirgüç-Kunt *et al.*, 2018). According to the study, these percentages include people that, "*Reported paying bills, sending or receiving remittances, receiving payments for agricultural products, or receiving wages, government transfers, or a public sector pension directly from or into a financial institution account or through a mobile money account in the past 12 months,*" (Demirgüç-Kunt *et al.*, 2018:55).

The use of debit and credit cards is another indicator of financial inclusion (Demirgüç-Kunt *et al.*, 2018). Card usage is very low in developing economies compared to developed countries. Only 22 per cent of adults in developing countries used a debit or credit card during 2017, compared to 80 per cent in high-income economies (see Figure 4) (Demirgüç-Kunt *et al.*, 2018). Despite this, digital payments are on the rise in developing countries - for example, the percentage of the population making digital payments in China increased from 44 per cent in 2014 to 68 per cent in 2017; in Thailand growth doubled; and in Kenya and South Africa the population share grew by 85 per cent over the same three years (Demirgüç-Kunt *et al.*, 2018).

Figure 4: Debit or credit card usage in 2017: Percentage of the adult population with an account.



Source: Global Findex database (Demirgüç-Kunt *et al.,* 2018).

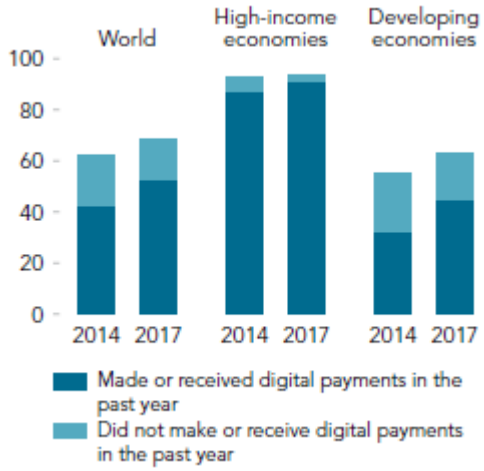
1.3.1.5 Developing countries: Digital financial inclusion

Account usage can be increased by providing people with easier ways to access their accounts – such as mobile phone integration (GFPI, 2017). There are two primary models for using a mobile phone for financial services in developing countries (Demirgüç-Kunt *et al.*, 2018). In the first model, financial services are linked to a third-party smartphone application like WeChat which gives the user access to their account at a financial institution (Demirgüç-Kunt *et al.*, 2018). The application is very common in China and other developing countries (Montag, Becker and Gan, 2018). With the second model, mobile network operators directly offer people financial services without linking them to an account at a financial institution (Demirgüç-Kunt *et al.*, 2018). This model became popular in Kenya with the launch of MPESA and currently, 79 per cent

of the Kenyan adult population has a mobile money account (Central Bank of Kenya, 2019). Developing countries have also seen an increase in digital banking, with some new banks adopting a fully digital model (Noonan, 2019). TymeBank launched in South Africa in 2015; as South Africa's first fully digital bank. It uses artificial intelligence to interact with its customers, both online and via kiosks (Noonan, 2019). The fully digital model is becoming popular in South Africa as well, with the introduction of Discovery Bank in 2019 and Bank Zero in 2020 (Whitehouse, 2020).

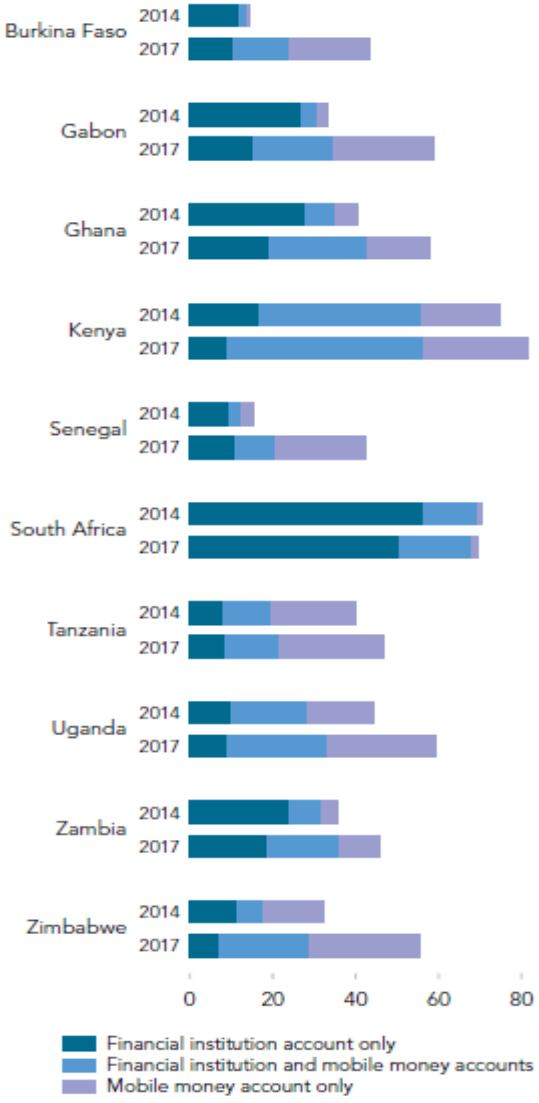
Developing countries are surging ahead of high-income economies in terms of digital payments (Demirgüç-Kunt *et al.*, 2018). Digital payment growth, measured as the population share of adults using digital payments, rose by 12 percentage points to 44 per cent in 2017 from 32 per cent in 2014 (see Figure 5) (Demirgüç-Kunt *et al.*, 2018). The data also shows that Sub-Saharan Africa's growth in financial inclusion has been driven by digital technology - 21 per cent of the adult population have a mobile money account which is the highest percentage by far of any region in the world (Demirgüç-Kunt *et al.*, 2018). Demirgüç-Kunt *et al.* (2018:20) state that "*Sub-Saharan Africa is home to all ten economies worldwide where more adults have a mobile money account than a financial institution account: Burkina Faso, Chad, Côte d'Ivoire, Gabon, Kenya, Mali, Senegal, Tanzania, Uganda, and Zimbabwe,"* (see Figure 6). This is not surprising considering the strategic digital technology initiatives that have been put in place by Sub-Saharan African countries (Klapper *et al.*, 2019).

Figure 5: Digital payments: Adults with an account as percentage of the population.



Source: Global Findex database (Demirgüç-Kunt *et al.,* 2018).

Figure 6: Account at a financial institution vs mobile money account: Adults with an account as a percentage of the population.



Source: Global Findex database (Demirgüç-Kunt *et al.*, 2018).

1.3.1.6 Developing countries: Credit and savings

Having access to credit and savings facilities is key to combating financial exclusion (Joshi and Kohli, 2016). The 2017 Global Findex data highlights a theme relevant to developing countries' credit and savings habits. It is estimated that only 21 per cent of adults in developing countries save using a formal institution, which is very low compared to 55 per cent reported in developed countries (Demirgüç-Kunt *et al.*, 2018).

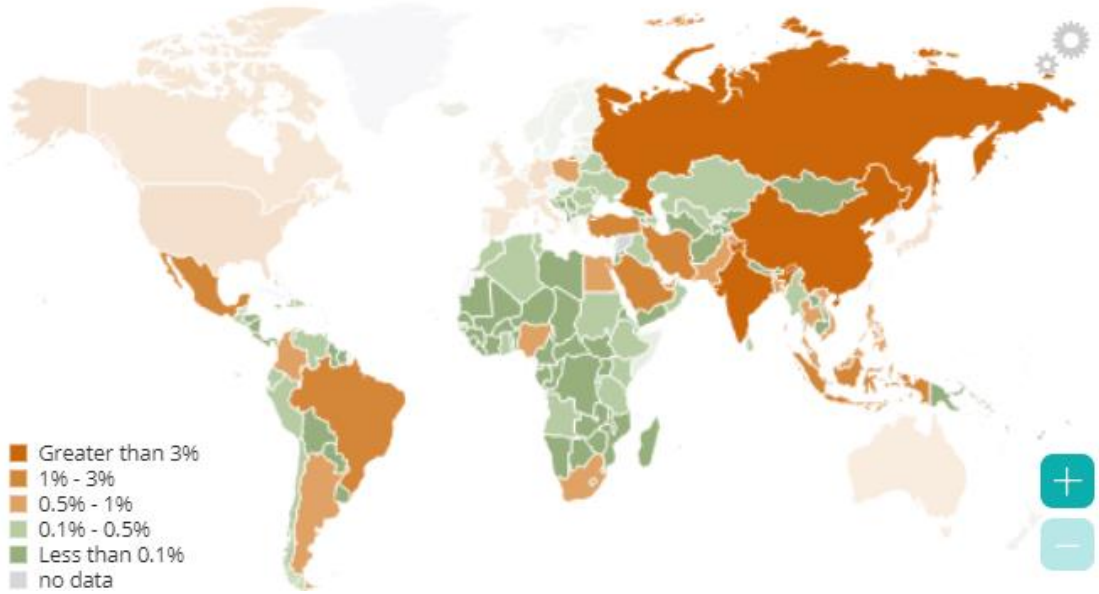
People in developing countries primarily use semi-formal avenues of saving, such as savings clubs like Stokvels in South Africa, which are currently valued at R25 Billion (Booysen, 2018).

In place of saving or investing, it is common for people in developing countries to physically keep cash in their homes; either hiding it ‘under the bed' or by purchasing livestock (Demirgüç-Kunt *et al.*, 2018). It is estimated that 71 per cent of adults in high-income countries saved in the past year, much higher than the 43 per cent in developing countries. Demirgüç-Kunt *et al.* (2018) argue that people in developing countries borrow from those that they know, such as family and friends as opposed to borrowing from financial institutions like most people in developed countries.

1.3.2 Economic Development

This study uses the Gross Domestic Product (GDP) adjusted by current Purchasing Power Parity (PPP) as the primary measure of economic development. Figure 7 below shows GDP (PPP) for emerging and developing countries. As seen in Figure 7, the majority of developing countries, especially those in Africa, have a GDP (PPP) that is below 1 per cent. The majority of countries in Sub-Saharan Africa have a GDP (PPP) of less than 0.1 per cent. There are a few exceptions such as South Africa and Nigeria, with GDP (PPP) of 0.57 per cent and 0.86 per cent respectively (IMF, 2019).

Figure 7: GDP adjusted for PPP for April 2019

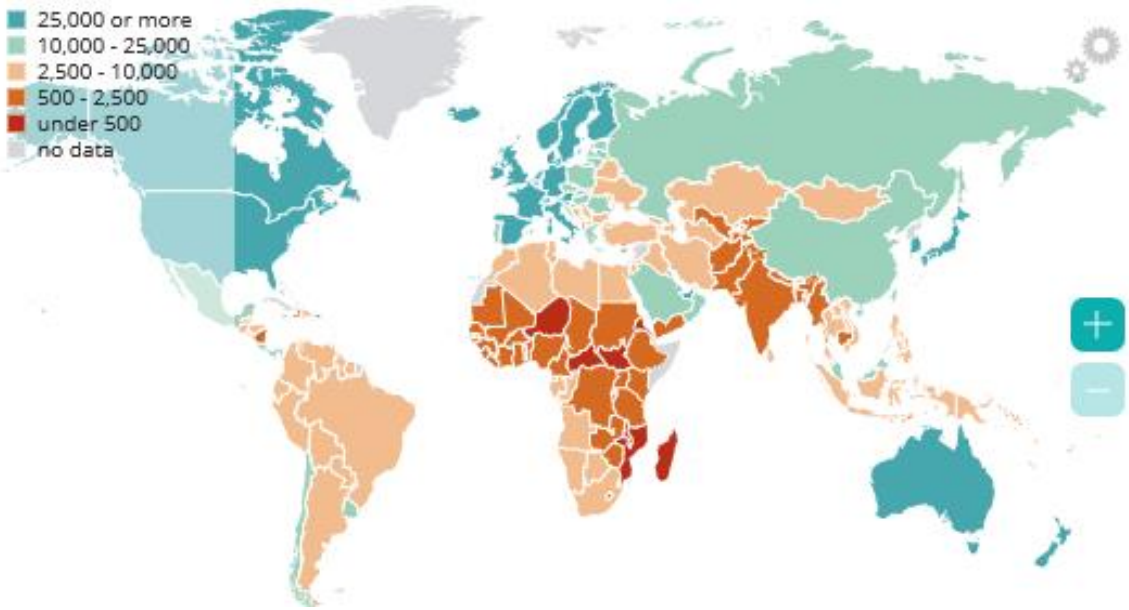


Source: International Monetary Fund (IMF) (2019).

For robustness, this study also uses GDP Per Capita and Human Development Index (HDI) as economic development measurements. Figure 8 below highlights global GDP Per Capita (current USD). GDP Per Capita data follows a similar trend to GDP (PPP). Both heat maps show that developing countries, primarily African countries, score much lower than advanced countries (IMF, 2019). All African countries have a GDP Per Capita of less than 10 000 USD with Botswana the highest at GDP Per Capita of 8258, 64 USD (IMF, 2019).

The average GDP Per Capita in emerging and developing countries is low (5 380 USD), compared to the average GDP Per Capita of developed countries (48 250 USD) (IMF, 2019). Emerging and developing countries average GDP Per Capita is less than half of the world average, which is currently at 11 460 USD. Similar to the GDP (PPP) trend, advanced economies such as the United States, Canada and Australia have moderate to high GDP Per Capita; 65 110 USD, 46 210 USD and 53 830 USD respectively (IMF, 2019).

Figure 8: GDP Per Capita for April 2019



Source: International Monetary Fund (IMF) (2019).

The 2019 Human Development Report published by the United Nations Development Programme (UNDP) states that there are four HDI classifications; very high (0.800 – 1.000), high (0.700-0.799), medium (0.550-0.699) and low (0.350-0549). The report highlights that most countries with a high and very high human development are advanced economies such as the United States and Canada, with an HDI of 0.920 and 0.922, respectively (UNDP, 2019).

In line with the analysis of GDP (PPP) and GDP Per Capita, developing countries are ranked much lower than advanced countries for human development, with most ranked in the medium and low bands (UNDP, 2019). Chad, Central African Republic and Niger have the lowest human development scores at 0.401, 0.381 and 0.377 respectively (UNDP, 2019).

HDI data alines with GDP Per Capita data, also highlighting that Botswana is ranked as one of the highest countries in terms of economic development on the African continent, with an HDI of 0.728 and GDP Per Capita of 7 860 USD; however these figures are still low compared to advanced economies (UNDP, 2019; IMF 2019).

1.4 Problem statement

Literature on the nature of financial inclusion in developing countries is not as thorough as in developed countries and the understanding of what drives financial inclusion in developing countries, especially Sub-Saharan Africa, has not been extensively explored (Chikalipah, 2017). Given the importance of financial inclusion and the relatively low levels of it in developing countries, it is important that more studies focus on financial inclusion in developing countries. This study explores two main avenues. Firstly, it examines the relationship between financial inclusion and economic development across developing countries. Secondly, it determines the level of financial inclusion in developing countries using a multidimensional financial inclusion index. The financial inclusion values are also used as a tool to measure the relationship between financial inclusion and other macroeconomic variables; socio-economic and banking variables.

Studies performed by Sarma and Pais (2011), Sethy (2016) and Samudra (2016) have explored the relationship between financial inclusion and economic development for several different countries, but have not specifically explored developing countries overall for consistent trends. Several studies have also focused on financial inclusion within specific developing countries. Adeola and Evans (2017) investigated financial

inclusion and economic diversification in Nigeria, while Fungáčová and Weill, (2014b) sought to understand financial inclusion in China. At the time of writing, not many studies have investigated financial inclusion in developing countries as a whole. This study therefore, seeks to explore the relationship between financial inclusion and economic development in developing countries overall in an effort to contribute to a greater understanding of financial inclusion and to help build the body of knowledge available on developing countries.

1.5 Research objectives

The study's objectives are as follows:

I. Identify crucial financial inclusion dimensions to include in the construction of a Financial Inclusion Index (IFI) for developing countries.
II. Examine the relationship between financial inclusion and economic development in developing countries.

1.6 Research questions

The research questions are consistent with the objectives of this study. They are as follows:

I. Does financial inclusion encourage economic development in developing economies?
II. Which financial inclusion factors significantly impact financial inclusion in developing countries?

1.7 Research significance

Research has shown that there is a positive relationship between financial inclusion and economic development, such that an increase in financial inclusion should lead to an increase in the economic development of a country (Sarma and Pais, 2011; Sethy, 2016; Samudra, 2016). Unfortunately, research also shows that financial inclusion in developing countries has not improved as much as in developed countries (Demirgüç-Kunt *et al.* 2018). Therefore further in-depth research on financial inclusion needs to be conducted regarding these counties, examing the factors that contribute to financial inclusion. This study is significant in that the knowledge gained from the analysis could be used to boost economic development across developing countries through relevant initiatives that tackle the key factors highlighted by the study results.

This study is an attempt to empirically analyse and explain the link between financial inclusion and economic development for developing economies, providing relevant knowledge for the current gap in published literature (Chikalipah, 2017).

CHAPTER 2: LITERATURE REVIEW

2.1 Theoretical literature review

This section considers the various ways that financial inclusion and economic development have been defined. In so doing, the chapter highlights the issue of financial exclusion and looks at the different ways that financial exclusion can take place and its relation to social exclusion. The chapter considers the importance of financial inclusion and finally, it explores some of the widely used measurements of financial inclusion and economic development.

2.1.1 Defining financial inclusion

Developing countries are prone to excluding marginalised groups or communities from the financial sector (Sarma, 2008; Mathew and Kurian, 2017). Many people in these groups have no access to essential financial services, hence most definitions in literature view financial exclusion as a broader issue of social exclusion (Sarma, 2008; Mathew and Kurian, 2017). These financial services include savings, insurance, payment, remittance and investment services (Joshi and Kohli, 2016). Peachey and Roe (2004) state that access to financial services must be considered and included in the wider debate regarding access to basic needs such as water, health care, employment and education, emphasising that these need to be accessible, usable and affordable to everyone in an economy for the economy to grow sustainably.

Kempson, Whyley, Caskey and Collard (2000) suggest that social exclusion is much broader than just poverty, disadvantage and deprivation, as earlier debates suggested. The study suggests that financial inclusion should be tackled in conjunction with other problem areas such as unemployment, bad health, poor housing, redundant skills, low incomes, high crime environments and poverty.[1]

In recent year's policymakers, think tanks and various organisations such as the World Bank, United Nations, International Labour Organisation and World Health Organisation have emphasised the importance of including marginalised groups as active

[1] Kempson *et al. (*2000) link financial exclusion to social exclusion by mentioning that there are three key core elements of social exclusion: 1. Poor environment (housing, deprived neigbourhood and poor family life), 2. Low income related to employment status and finally lack of access to services (educational, training, health care and financial services). Hence financial exclusion links to social exclusion because it is a lack of access to services (Kempson *et al.,* 2000).

participants in the formal financial sector through the process of financial inclusion (Sarma 2008; Jain, Naz and Mathur, 2017). Sharma, Bose, Shekhar and Pathania (2019), in reference to the United Nations Capital Development Fund (UNCDF) (2017), state that financial inclusion is a crucial feature of the Sustainable Development Goals (SDGs) emphasised in the UNCDF.

Financial inclusion is referred to in eight of the 17 UN SDGs. The UNCDF describe financial inclusion as a point when the majority of individuals and enterprises across the globe can access and use a range of appropriate financial services offered in a well-regulated environment (UNCDF, 2017).

1. *Poverty eradication;*
2. *Ending hunger by achieving food security and promoting sustainable agriculture;*
3. *Health and well-being;*
4. *Gender equality and economic empowerment of women;*
5. *Economic growth and jobs;*
6. *Supporting industry, innovation, and infrastructure;*
7. *Reducing inequality; and*
8. *Strengthening the means of implementation by encouraging greater savings for investment and consumption.*

   Source: Sharma *et al.* (2019:1)

The term financial inclusion is generally well understood but can have slight nuances in the definition, depending on context; these definitions usually have similarities and a common thread (Arora, 2012). Significant variations have been noted periodically and as a result, there is no distinct universal definition (Arora, 2012). Herrero and Turégano (2017) define financial inclusion as access to financial services by the poor and Small Medium Enterprises (SMEs) of the relevant area. Simply put, financial inclusion can be defined as the process whereby all people of an economy have access, availability and usage of the financial system (Sarma and Pais, 2011).

Several researchers have found it essential to expand the definition of financial inclusion. Aduda and Kalunda (2012) describe financial inclusion as ensuring all financial services of an economy are made available at a fair price, at the right place, form and time to all members of the society without any kind of discrimination. Chakrabarty (2012) argue that the process of financial inclusion should ensure that the

appropriate financial services and products needed by all members of society, including the vulnerable and low-income members, are made available at affordable prices. Jain *et al.* (2017) suggested that financial inclusion is fundamentally about providing financial services in a manner that is fair, transparent and equitable to the entire society.

Lenka and Sharma (2017) believe that the intent of financial inclusion should not only be to provide financial services but to provide affordable financial services to all sections of society to improve their standard of living. This was reiterated in a recent study by Van and Linh (2019) who emphasise that financial services must be effective to be considered inclusive. They make the point that while financial services should be available to all members of the economy, the services should also be relevant to them. Consequently, Van and Linh (2019) argue that financial awareness and financial education are essential components of financial inclusion.

For the purpose of this study, the definition of financial inclusion is "*a process that ensures the ease of access, usage, and availability of the formal financial system for all members of an economy*." – as stated by Sarma (2016:18). Andotra and Manhas (2017:36) support this definition by similarly stating that, "*financial inclusion is access, usage and availability of financial services from formal financial institutions*." Andotra and Manhas (2017) further break down access, usage and availability as follows:

- **Access** - The ability of the entire population of an economy to use financial services and products that are available in the market. Access relates to the cost, proximity of the financial service or product, and other barriers (Andotra and Manhas, 2017).

- **Usage** – The frequency that financial services are used and how often financial products are purchased (Andotra and Manhas, 2017).

- **Availability** – The types of financial products and services which formal financial institutions are offering to the entire population of the economy (Andotra and Manhas, 2017).

2.1.2 Defining economic development

A critical motivation for financial inclusion, particularly in developing countries, has been economic development to reduce poverty (Sarma and Pais, 2011). In literature, economic development and economic growth are often referred to as equivalents. Likewise, literature often positions the relationship between financial inclusion and economic growth as similar to the relationship between financial inclusion and economic development (Sethy, 2016; Unnikrishnan and Jagannathan, 2015). However, more recently Van and Linh (2019) have emphasised the distinction between economic development and economic growth and suggest that the terms should not be used interchangeably. Van and Linh (2019) clearly define economic growth as a variable measured by the percentage increase of gross domestic product (GDP) after inflation adjustments, also known as nominal GDP.

Yorulmaz (2012) notes that research interests tend to alternate between arguing for a relationship between financial inclusion and economic growth or a relationship between financial inclusion and economic development depending on the economic trends or issues of a particular period. According to Van and Linh (2019), there are some significant limitations of looking at the relationship between economic growth and financial inclusion instead of considering the relationship between economic development and financial inclusion. These include the fact that economic growth refers to the quantity rather than the quality of goods and services in an economy, and it cannot reflect negative externalities such as pollution, resulting in a skewed or limited picture of a country's economy (Van and Linh 2019).

Economic development, according to Sen (1983) refers to sustainable efforts to improve the living standards and economic well-being of the population, particularly the marginalised or poverty-stricken percentage of the population. Van and Linh (2019) further develop the definition to include three primary themes: inflation control, job creation and sustainable growth that increases welfare for all in the economy. Andotra and Manhas (2017) add that economic development must lead to self-sustaining growth.

2.1.3 The importance of financial inclusion

The importance of financial inclusion is emphasised consistently throughout literature. It is clear that efficient allocation of productive resources reduces inequality in society (Lenka and Sharma, 2017). Financial inclusion is therefore of high importance to policymakers in many countries (Sarma, 2008; Jain *et al*., 2017). Chibba (2008) suggests that increasing financial inclusion will help address: inequality, poverty and the United Nations Millennium Development Goals. Sarma and Pais (2011) argue that opening the formal financial system in a manner that allows for easy access to appropriate financial services results in improved day-to-day management of finances as it provides safer and efficient avenues of saving or spending money.

In a study by Adeola and Evans (2017), an increase in financial inclusion is shown to reduce poverty. This is because it allows all members of an economy, particularly the poor, to borrow and save money safely, and gives people access to various investment opportunities ranging from business investments to education investments (Adeola and Evans, 2017).

While it is evident that financial inclusion improves the lives and standard of living of all members of a country's economy, especially the poor, it can also help with the economic growth of a country (Aduda and Kalunda, 2012). Finance-growth theories stipulate that financial development leads to growth through a 'supply leading' or 'demand-following' effect (Aduda and Kalunda, 2012). Adeola and Evans (2017) note that because almost 40% of Nigeria's adult population has no access to the formal financial system, billions of Nigerian Nairas circulate unmonitored through the informal financial system, thus affecting the economic growth of the country. This is echoed by Klapper, Laeven and Rajan (2006) who show that increasing financial inclusion (by decreasing costs and easing regulations) makes it easier for people, who were previously excluded, to start businesses which ultimately boost economic growth. Financial inclusion also ensures that firms receive a bigger customer base, which leads to dynamic and high-growth markets and thus to economic growth (Aduda and Kalunda, 2012).

Financial inclusion reduces the growth of informal sources of credit that tend to be exploitative (Sarma and Pais 2011). Hence financial inclusion gives people access to credit for consumption and production purposes (Van and Linh 2019). Galor and Zeira (1993) show that for economies with credit market imperfections (such as economies

suffering from credit constraints to the poor because of asymmetric information flow - financial exclusion) there is reduced efficiency of resource allocation which can impede economic growth. Other benefits of increased financial inclusion lead to innovative technology, larger target markets and more entrepreneurship (Beck, Demirguc-Kunt and Peria, 2006).

2.1.4 Types of financial exclusion

There are two main types of financial exclusion: voluntary financial exclusion and involuntary financial exclusion (Fungáčová and Weill, 2014b). Voluntary financial exclusion refers to a group of people who choose not to be active members of a country's formal financial system because of religious, cultural or other beliefs (Fungáčová and Weill, 2014b). Involuntary financial exclusion refers to when a group of people is discriminated against and directly or indirectly excluded from the benefits of the formal financial system (Fungáčová and Weill, 2014b). This distinction is vital to make and both types warrant further research. This study focuses on involuntary financial exclusion. Involuntary financial exclusion can be defined as the denial of financial services to a group of people (Sarma and Pais 2011; Aduda and Kaluda 2012). According to Wang'oo (2013), barriers to financial inclusion include lack of education, awareness, illiteracy, high charges and geographical difficulties. Sarma (2008) supports this by stating that the obstacles of financial inclusion can come about as a result of the inability to access the financial services due to physical geography, cost or lack of awareness of financial services.

2.2 Empirical literature review

This section reviews empirical studies that have been carried out in the area of financial inclusion and economic development. The section focuses on studies that have attempted to find a relationship between financial inclusion and economic development.

Empirical studies have provided supporting evidence on the positive relationship between financial inclusion and economic development by using available data. In a study by Sarma (2008), a financial inclusion measurement was constructed using an index to measure financial inclusion in different countries. She computed a three-dimensional Index of Financial Inclusion (IFI) (considering penetration, availability and usage) for 55 countries and a two-dimensional IFI (considering availability and usage) for 100 countries. Countries were categorised into three categories:

1. $0.5 < IFI \leq 1$ → high financial inclusion

2. $0.3 \leq IFI < 0.5$ → medium financial inclusion

3. $0 \leq IFI < 0.3$ → low financial inclusion

Sarma (2008) concluded that for both the three and two-dimensional IFIs, most of the countries that have a medium-to-high financial inclusion index are from the Organisation for Economic Co-operation and Development countries (OECD countries). The index had limitations because of the lack of availability of data. The study states that for a more accurate index to be constructed, data for a large number of counties must be available to researchers to ensure the results incorporate important aspects of an inclusive financial system.

Park and Mercado (2017) conducted a similar study to Sarma (2008). Using Sarmas' (2008) methodology to create their financial inclusion indicator, they analysed the factors that affect financial inclusion and its impact on poverty and income inequality. Park and Mercado (2017) analysed 176 countries, including 37 Asian countries – 76 more countries than those analysed by Sarma (2008). The study showed a country ranking order that was similar to that of Sarma, for those countries that overlapped both studies (2008). Park and Mercados' (2017) study concluded that, per capita income, the rule of law and demographic factors are essential for financial inclusion. The study by Park and Mercados in 2017 reinforced the importance of increasing financial inclusion as a way to reduce poverty, emphasising the significant relationship between an increase in financial inclusion and lower poverty rates.

Sarma and Pais published a paper titled '*Financial Inclusion and Develop*ment' which critically reviewed the relationship between financial inclusion and economic development. The study used a multidimensional index, the Index of Financial Inclusion (IFI) taken from Samra's 2008 paper, to examine the relationship. They compared this index with the Human Development Index (HDI), as a measure of economic development amongst 49 countries. The cross-country study found that a country's level of human development and level of financial inclusion is strongly and positively correlated. The empirical study found that per capita GDP, income inequality, adult literacy and urbanisation are important factors for determining the level of financial inclusion in an economy. The study also found that connectivity, both physical (road

network) and electronic (fixed telephone and internet usage) contribute towards financial inclusion.

The study by Sarma and Pais (2011) further found that countries with low GDP per capita, low levels of literacy, low urbanisation and poor connectivity exhibit low financial inclusion. This reinforces the fact that financial inclusion forms part of a broader topic of social exclusion (Sarma and Pais, 2011; Aduda and Kaluda, 2012). The study concluded that the proportion of non-performing assets to a banking system's total assets is negatively associated with financial inclusion, such that the proportion of performing assets increases as the level of financial inclusion increases. This result was in complete contrast with a widely held view at the time - that the higher the non-performing assets in a banking system, the higher the financial inclusion in the economy; because it was believed that increased non-performing assets were a result of increased provision of credit to low-income groups (Sarma and Pais, 2011). The study also showed that the capital asset ratio of a country is negatively correlated to financial inclusion - when the capital asset ratio is high, the banking sector becomes highly risk-averse to low-income groups (Sarma and Pais, 2011).

In a study by Samudra (2016), the association between financial inclusion and human development was explored. The study analysed 35 districts of Maharashtra, a west-central state in India. Where Sarma and Pais had used the HDI, Samudra (2016) used CRISILS' Inclusix, a financial inclusion index that uses a 0 – 100 scale that combines three crucial dimensions: branch penetration, credit penetration and deposit penetration. Samudra (2016) used the Inequality-adjusted Human Development Index of India and a Maharashtra Human Development report to measure human development. The study showed a statistically significant, strong positive relationship between financial inclusion and human development in the Maharashtra districts.

A study by Lenka and Sharma (2017) found that financial inclusion has an impact on India's economic growth, using data from 1980 to 2014. The study used Principal Component Analysis (PCA) to construct a multi-dimensional financial inclusion index, using macroeconomic variables such as inflation, total secondary school enrollment, trade figures and government spending to compute economic growth. The study showed that an increase in financial inclusion had a positive impact on economic

growth. It concluded that over the short and long term, these two phenomena move in the same direction.

A 2017 study by Adeola and Evans explored the impact of financial development and financial inclusion on economic diversification in Nigeria. The study used fully modified least square (FMOLS) analysis on 1981 to 2014 data, to determine optimal estimates of cointegrating regressions. The study found that factors regarding usage of and access to financial inclusion have a positive and significant effect on economic diversification, such that financial inclusion contributes positively to the diversification of the Nigerian economy and the benefits thereof.

Chibba (2008) did thorough field research coupled with vigorous consultation of the empirical literature and concluded that four key pillars are required to strengthen the Financial Inclusion – Poverty Reduction and Millennium Development Goals (MDG) nexus. These were stipulated as; public sector support, financial literacy, private sector development (both financial and non-financial) and microfinance. Chibba (2008) also mentions five explanatory models that are important for financial inclusion and address the poverty reduction and gender equality themes of the MDGs.

A study by Chibba (2008) conducted a thorough review of the empirical literature available on financial inclusion at the time, and concluded that four key themes are required to strengthen the Financial Inclusion – Poverty Reduction and United Nations Millennium Development Goals (MDG). These were stipulated as: public sector support, financial literacy, private sector development (both financial and non-financial) and microfinance. The study discusses five explanatory models that are important for financial inclusion and that address the poverty reduction and gender equality themes of the MDGs.

(1) Formal financial sector agreement - Chibba (2018) argues that if there is a favourable political climate in a country, the financial sector can contribute significantly to the reduction of financial exclusion via a consensus-driven approach.

(2) Private sector development – Chibba (2008) suggests that if the private sector designs and executes market-based approaches, e.g. offer credit from non-financial firms or technology-based options such as e-banking, it can drive financial inclusion.

(3) Public sector leadership – Chibba (2008) argues that if the public sector develops financial inclusion strategies and action plans that call on other sectors of the economy to participate, it could lead to reducing financial exclusion.

(4) Civil society and non-profit organisations – Chibba (2008) shows that civil society research and policy institutions impact financial inclusion.

(5) Catalytic model – Chibba (2008) notes that financial inclusion in every economy is supported by catalytic channels such as research, advisory services, advocacy and partnerships.

A study by Michael and Sharon (2014) analysed the importance of financial inclusion and its effect on Nigeria's economic development. The study used correlation and regression analysis to explore relationships among several variables. It concluded that financial inclusion has a positive impact on economic growth and development. It also highlighted that in Nigeria financial inclusion can be amplified through bank branch expansion in rural areas, the introduction of government regulation to allow commercial banks to require less documentation for opening a new account, affordable interest rates and rapid turnaround time for processing a loan (Michael and Sharon, 2014). The study emphasised the importance of financial education in helping Nigeria achieve its financial inclusion goals.

In a more recent study, Van and Linh (2019) unpacked the impact of financial inclusion on economic development by looking at 23 Asia-Pacific countries over a six year period from 2010 to 2016. The study used a quantitative method to determine the impact of financial inclusion on economic development. The model had one dependent variable, the Human Development Index, which represented economic development and four independent variables, which represented financial inclusion. The independent variables were: the number of bank branches per 100,000 adults (branches), the number of ATMs per 100,000 adults (atm), the share of domestic credit to the private sector as a percentage of GDP (credit) and broad money per GDP (M2). Van and Lihn (2019) highlight critical statistical observations from the analysis. The P-value model was pinned at 0.00000 < 0.05, showing that the model is statistically significant. It had an R^2 value of 0.6054; which shows that the model can explain 60.54 per cent of economic development is a result of the impact of financial inclusion. This shows that

while other factors are also relevant to economic development, financial inclusion is critical for economic development.

The results of the study from Van and Linh (2019) were as follows:

> *"A 1% increase in the number of bank branches per 100,000 adults results in economic development rising by an average of 0.017%; with a 1% increase in the number of ATMs per 100,000 adults, economic development will rise by an average of 0.006% and with a 1% increase in domestic credit to the private sector, economic development will rise by an average of 0.00045%."*

Van and Linh (2019) conclude the study with four broad recommendations for increasing financial inclusion in developing countries. The recommendations relate to an increase in access to bank branches, ATMs and credit opportunities.

(1) Governments should increase the number of bank branches and ATMs in rural areas and drive financial literacy initiatives for all age groups in rural areas.

(2) Governments should promote the use of online transactions instead of cash so that e-commerce and start-ups can thrive in the market.

(3) Governments should consolidate the ownership, operation and maintenance of ATMs in a country to ensure that ATMs are accessible to everyone including the rural population.

(4) Governments should promote mobile money throughout the country by easing regulations and partnering with mobile network companies. It is inexpensive, easy to access for the rural population and provides convenient access to saving, insurance and credit platforms (Van and Linh, 2019).

Raza, Tang, Rubab and Wen (2019) explored the nexus between financial inclusion and economic development in Pakistan, for the period 2010-2015, using a descriptive statistical approach; regression and correlation analysis. The study found a positive relationship between financial inclusion and economic development - the number of bank branches (per 100 000 people) and the number of bank accounts (per 1000 adult population) have a positive impact on the HDI (a measure of economic development) (Raza *et al.,* 2019).

Tu, Phi Tuan, Yoshino, Sarker and Taghizadeh-Hesary (2019) conducted a study using a comprehensive dataset covering most of the world's countries, over a 13 year period from 2004 to 2017. They investigated the relationship between remittance inflows, financial inclusion and economic development, and considered whether inward remittances help build an inclusive financial system. The study found that remittance inflows have a positive impact on economic development. The study also found that if a country has high financial inclusion, remittances inflow have a greater effect on promoting economic development (Tu *et al.,* 2019).

One of the few studies found in the empirical literature that dismisses the notion that there is a relationship between financial inclusion and economic development was done by Mader (2017). The study sought to answer three critical questions.

1. *Does financial inclusion promote economic development?*

2. *Do poor people meaningfully benefit from using financial services?*

3. *Does financial inclusion make good business sense?*

Mader (2017) sought to answer these questions by drawing upon a structured review of evidence using empirical studies and theoretical frameworks. Mader (2017) answers the first question by arguing that financial inclusion does not necessarily result in economic development, nor does it result in economic growth as some empirical studies show. Mader (2017) further comments that the causal connection is unclear and points out that the relationship could be the other way around, in that economic growth or development results in financial inclusion. Mader (2017) answers the second question by disregarding literature that supports the belief that financial inclusion directly benefits the poor, stating that financial inclusion improves money management and increases the financial choices that the poor have, but these are not meaningful benefits nor are they transformative benefits.

The third question posed by Mader (2017) is whether the business-approach to tackling financial inclusion has been effective. Mader (2017) responds to this question by stating that there are better alternatives to financial inclusion that trumps using business as a financial inclusion method, such as; government lending programmes and cooperatives. While the study challenges the findings of other researchers on the relationship between financial inclusion and economic development, the majority of

existing literature provides effective evidence that there is a strong positive relationship between financial inclusion and economic development, and strongly suggests that an increase in financial inclusion should lead to an increase in economic development.

2.3 Summary, study gap and limitations

A common thread in financial inclusion literature is that it is a subset of a more significant issue of social exclusion (Aduda and Kaluda, 2012). Another prominent theme in the literature is that financial inclusion is a multi-dimensional concept and using one dimension as a measurement of financial inclusion results in misleading conclusions (Sarma, 2008). Literature also highlights that financial inclusion has three main dimensions; access, accessibility and usage, these three features the most in the empirical studies (Andotra and Manhas 2017).

Literature also shows us that developed countries such as Norway and Sweden have higher financial inclusion than developing countries such as India and South Africa (Sarma and Pais, 2011). This leads us to the final and most important conclusion which empirical studies have highlighted, which is the fact that there is a relationship between financial inclusion and economic development. The more financially inclusive a country is the higher its economic development and subsequently, the higher the economic growth. (Sarma and Pais, 2011; Van and Linh 2019).

Research on financial inclusion has been thoroughly explored globally, but existing financial inclusion studies have not exclusively focused on the relationship between financial inclusion and economic development in developing countries (Chikalipah, 2017). Previous empirical studies have focused on developed countries or a group of developed and developing countries. Therefore, this leaves a study gap for researchers to research this topic concerning developing countries in particular African counties, as literature concludes that financial exclusion is more prevalent in developing countries of which a majority are African counties (Sarma, 2008; Aduda and Kaluda, 2012; Mathew and Kurian, 2017; Adeola and Evans, 2017). The limitation of this study is the availability of accurate data on developing countries.

CHAPTER 3: METHODOLOGY AND DATA

3.1 Methodology

3.1.1 Measuring financial inclusion

Literature currently lacks an overarching and inclusive measurement of financial inclusion (Sama, 2008). Before a measure of any social or economic variable can be made, it is prudent that researchers know the purpose of the measurement (Porteous, 2009). Porteous (2009) emphasise that there are two purposes for measuring financial inclusion. (1) To measure and monitor financial inclusion in an economy (Yorulmaz, 2016). (2) To expand understanding of the factors that are correlated to financial inclusion (Yorulmaz, 2016). Measurement and monitoring are related to identifying priorities, incentivising reform and measuring progress over time (Yorulmaz, 2016). On the other hand, deepening our understanding of financial inclusion has to do with testing hypotheses about relationships between financial inclusion and other variables and, measuring the impact of particular policies and programmes on financial inclusion (Yorulmaz, 2016).

As seen in the empirical review section, financial inclusion studies use different and varying measures of financial inclusion. The chosen measure depends on how each study defines financial inclusion (Sarma, 2016). The most common of these indicators are; number of bank accounts (per 1000 adult people), number of bank branches (per million people), number of ATMs (per million people), amount of bank credit and amount of bank deposits (Sarma, 2008).

Even though financial inclusion has been measured by many variables, Fungáčová and Weill (2014b) believe that ownership of an account at a financial institution is the most reliable indicator of financial inclusion. However, Chattopadhyay (2011) argues against this type of one-dimensional measure of financial inclusion. Chattopadhyay (2011) believes that such a measure incorporates only one aspect of financial inclusion and ignores other important aspects of a comprehensive financial system such as usage, availability and quality of the financial services. This belief is supported by Sarma (2016) arguing that people may have ownership of an account in a financial institution, but they may not use it because there might be barriers to use, e.g. remoteness of bank

branches in proximity to where they live, hence using a one-dimensional measure could ignore the usage dimension of financial inclusion.

Individual dimensions provide useful information and insights on financial inclusion but individually, they provide incomplete information on how inclusive an economy is and can result in misleading conclusions (Sarma, 2016). Table 1 highlights different indicators for a select group of countries and highlights how looking at individual financial inclusion indicators can be misleading.

Table 1: Indicators of financial inclusion for select developing countries (2017)

Country	No. of deposit accounts with commercial banks (per 1000 adults)	No. of commercial bank branches (per 100,000 adults)	Outstanding deposits with commercial banks (% of GDP)	Outstanding loans from commercial banks (% of GDP)
Botswana	849.4	7.7	25.8	28.9
Cambodia	316.5	7.5	77.6	72.2
Ghana	766.6	8.6	28.3	18.3
India	1888.8	14.7	64.1	47.3
Kenya	1604.6	5.3	39.1	33.2
Rwanda	234.5	6.1	18.8	17.0
South Africa	1686.7	10.4	44.1	61.4
Zimbabwe	392.4	4.4	46.6	20.8

Source: International Monetary Fund (IMF) (2019).

Table 1 shows that India has the highest number of deposit accounts with commercial banks (per 1000 adults) followed by South Africa and Kenya. Using this indicator alone, one could conclude that India is the most financially inclusive country amongst the other countries. However, when looking at outstanding loans from commercial banks (% of GDP) South Africa and Cambodia (the country with the second-lowest number of deposit accounts with commercial banks per 1000 adults) rank higher than India. Kenya has the third-highest number of deposit accounts with commercial banks (per 1000 adults), but has the second-lowest number of commercial bank branches (per 100,000

adults). When considering outstanding loans from commercial banks (% of GDP), Ghana has one of the lowest rankings amongst the selected countries, but it fairs considerably well in the number of deposit accounts with commercial banks (per 1000 adults) dimension.

Table 1 explicitly shows that using a single dimension measurement fails to holistically show the extent of financial inclusion in a country (Sarma, 2008). Following the above findings, Sarma (2008) proposed a multi-dimensional approach to measuring financial inclusion, preferably in the form of an index (Sarma, 2008). Aggregating all the important financial inclusion dimensions gives a more reliable and more precise view of financial inclusion (Sarma, 2008). An index can efficiently compare the levels of financial inclusion in different countries at a particular point in time, and show whether a specific policy initiative for financial inclusion is successful in a country at a point in time (Sarma, 2008). Finally, an index-based approach can also help answer academic questions relating to financial inclusion and help researchers understand some of the factors that are closely correlated with financial inclusion (Sarma, 2008).

Sarma (2016) emphasised essential properties that need to be satisfied by the financial inclusion index for it to be easily interpreted and used as a measure across economies over time. These properties include: (a) making the index a unit free measure; (b) constructing it with well-defined bounds, e.g. (0, 1). (c) Ensuring that the index is monotonic, i.e., making sure that higher results in any dimension, all other factors remaining the same, should result in a higher degree of financial inclusion (Sarma, 2016). Literature mentions three dominant composite indexes for measuring financial inclusion (Sarma, 2016), which are described hereafter.

1. Average based index (arithmetic or geometric)

This index is constructed by taking the geometric or arithmetic average of the identified financial inclusion indicators (Sarma, 2016). According to Sarma (2016), this average based index has a ‘perfect substitutability’ flaw, meaning that an increase in one dimension can be completely annulled by an equivalent (in the case of arithmetic average) or proportionate (in the case of the geometric average) decrease in another dimension.

2. Principal component analysis (PCA)

This data-driven statistical method computes an index by calculating the weighted average of the dimensions. Sarma (2016: 19) mentions that "*the weights are empirically determined by developing the variance-covariance structure of the data and by picking up the weights such that the variance of the weighted average is largest."* Sarma (2016) cites several issues with using the PCA to measure financial inclusion. Firstly, when measuring financial inclusion, researchers are concerned with the level of financial inclusion which means they are worried about the mean of the dimension (Sarma, 2016). However, the PCA is concerned with the variance-covariance of the dimensions seeking to measure how the dimensions move together (Sarma, 2016). This information is irrelevant when the index attempts to understand the extent of the various dimensions (Sarma, 2016). Secondly, Sarma (2016) highlights that this index cannot be responsive to changes over time and across countries. The third issue Samra (2016) mentions regarding PCA is that it does not meet the fundamental properties of a financial inclusion index, i.e., the PCA is not monotonic nor does it have well-defined boundaries.

3. Distance-based approach

This approach was coined in the work of Sarma (2015 and 2016). Sarma (2016) proposed that an Index of Financial Inclusion (IFI) must be calculated by looking at the average distance from an ideal and the worst outcome (Sarma, 2016). The distance-based approach uses geometry to change financial inclusion dimensions into a point that can be plotted in the coordinate plane. A researcher would then plot two points on this coordinate plane, an ideal (maximum) level and worst (minimum) level of financial inclusion. An economy's degree of financial inclusion would be plotted using co-ordinate geometry in relation to the ideal and worst level of financial inclusion (Sarma, 2016). This approach meets all the essential properties that need to be satisfied by a financial inclusion index and it is ideal for use in research related to policy development (Sarma, 2016). This study uses the distance-based approach to measure financial inclusion.

3.1.2 Index of Financial Inclusion (IFI)

The methodology used to create the Index of Financial Inclusion (IFI) in this study is mainly drawn from work developed in Sarma, (2008, 2015, and 2016) regarding the distance-based approach to construct a multidimensional index. The multidimensional index includes several different areas of financial inclusion, such as: banking penetration, availability of banking services and usage of financial services. The index compiles this information into one number between zero and one; zero indicates no financial exclusion and one represent complete financial inclusion (Sarma, 2016). Therefore the index is also monotonic, the higher the result the higher the level of financial inclusion (Sarma, 2016).

Sarma (2016:23) identified four key steps to creating the Index of Financial Inclusion (IFI) which have also been used in this study:

1. *Identification of the dimensions of financial inclusion.*
2. *Calculation of the different dimensions' indexes; these measure a country's achievement in each respective dimension.*
3. *Identification of the reference points Mi, mi and weightings wi.*
4. *The IFI is computed as the average of the inverse distance from a country's achievement point from the ideal and its distance from the worst point.*

1. Identification of the dimensions of financial inclusion

This study based its IFI on three dimensions: banking penetration (P), availability of banking services (A) and usage of the banking system (U) (Sarma, 2016). These dimensions have appropriate data available for developing countries to construct comparable IFI (Sarma, 2016). These dimensions are discussed in detail below. [2]

i. Dimension 1: Banking penetration (P)

For a financial system to be considered inclusive, it should have as many participants as possible (Sarma, 2016). Sarma (2016) mentions that a financial system should penetrate the eligible population as broadly as possible. The number of people with a bank account (i.e. banked population) is considered to be used as a primary measure

[2] This discussion is drawn from the work of Sarma (2015 and 2016).

of banking penetration (Sarma, 2016). [3] Hence perfect financial inclusion would occur if a country's entire population had a bank account (Sarma, 2016). This study uses the number of deposit bank accounts per 1 000 people of the adult population as a dimension for the banking penetration (Sarma, 2016). There is a positive correlation between the number of people with a bank account and the number of deposit bank accounts per 1 000 people of the adult population (Sarma, 2016). This study looked at the following institutional deposit accounts: commercial banks and credit unions/credit cooperatives.

ii. Dimension 2: Availability of banking services (A)

Financial services must be accessible for them to be considered inclusive; availability also refers to the types of financial products and services offered to people (Andotra and Manhas, 2017). The most common indicators of availability are the number of bank branches and ATMs per 1 000 people (Sarma, 2016). ATMs and Bank branches remain an essential aspect of availability, as well as mobile money service providers which provide critical avenue for people to access financial services, especially in developing countries (Sarma, 2016). Sarma (2016) goes as far as putting mobile money providers on par with bank branches in terms of providing financial services.[4] In this dimension, this study used the number of bank branches per 100 000 adults, the number of registered mobile money agent outlets per 100 000 adults and the number of ATMs per 100 000 adults to create an index. Two indexes are computed to calculate this dimension; 2/3rd weight for bank branch (mobile money agent outlet and bank branch) index, and 1/3rd weight for ATM index (Sarma, 2016). [5]

[3] It is very important to note that there might be an overestimation with this dimension as there might be people with multiple accounts while others may have no account. For example, data shows that in 2017 there were 1799 bank accounts per 1 000 people in Argentina, 1605 in Kenya and 1564 in Indonesia despite that there are a number of people in each of these countries without a bank account (Sarma, 2016).

[4] Internet banking is also an important access point of financial services for a number of people but due to a lack of available data this indicator is not considered in this study (Sarma, 2016).

[5] Using 2004-2010 ATM-to-Bank branch ratios it has been empirically observed by Sarma (2016: 25) that, "*on average there are two ATMs per bank branch, this hypothetically means that on average a bank branch (mobile money agent outlet and bank branch) is equivalent to two ATMs*."

iii. Dimension 3: Usage (U)

A key indicator of financial inclusion is whether people use the services and products that formal institutions have made available (Sarma, 2016). The usage dimension considers many forms; such as payments, transfers, credit and remittances (Sarma, 2015). For this dimension, this study considered the following indicators: the value of mobile money transactions, outstanding deposits and outstanding loans (Sarma, 2016).

2. Calculation of the different dimension indexes

Once the study identified dimensions, it measured each developing country's achievement in each respective dimension of financial inclusion. The dimension index di, see formula (1) measures a country's achievement point in the ith dimension (i) specifies either banking penetration, availability of banking services or usage of the banking system (Sarma, 2016).

$$d_i = wi\frac{A_i - m_i}{M_i - m_i} \quad (1)$$

Where

wi = weight attached to the dimension i, 0 ≤ wi ≤ 1

Ai = actual value of dimension i

mi = lower bound on dimension i, fixed by some pre-specified rule.

Mi = upper bound on dimension i, fixed by some pre-specified rule.

Source: Sarma (2015)

3. Identification of the reference points Mi, mi and weightings wi

The lower bound (mi), worst achievement point possible by a country, is taken as zero for all dimensions (Sarma 2016). However, to fix the upper bound (Mi), the maximum desirable achievement point is difficult as there is no theoretical level of achievement considered 'optimum' (Sarma, 2016).[6] Therefore, similar to Sarma (2016), this study uses the 90th percentile of the distribution of values of each dimension as the upper

[6] Sarma (2016) argues against the United Nations Development Programme HDI which uses the highest empirically observed value as its upper bound, mentioning that it could be an outlier or different for different years making it difficult to compare across time.

bound (Mi). If a country had a dimension higher than the upper bound, its dimension index was made to be one (Sarma, 2016).

When choosing the weights for the different dimensions, the followings weights are used:

W1 = 1 (P dimension)

W2 = 0.5 (A dimension)

W3 = 0.5 (U dimension)

Source: Sarma (2016).

Similar to Sarma (2016), the data available for the *availability of banking services* and *usage of banking services* is minimal for developing countries, hence these dimensions are given a lower weighting than banking penetration.

4. Computation of Index of Financial Inclusion (IFI)

After the study identified **Mi, mi and wi** it represented a country by a point (dp, da, du) in the three-dimensional space, where dp, da, du represent the dimension indexes for the country computed using formula (1) (Sarma, 2016). The dimensions gave figures between **0 ≤ dp ≤1**, **0 ≤ da ≤0.5**, **0 ≤ du ≤0.5**. Point (0, 0, 0) indicates financial exclusion and (1, 0.5, 0.5) indicates complete financial inclusion (Sarma, 2016). Sarma (2016:29) mentions that "*the IFI for a country is measured by the simple average of normalised Euclidean distance of the point (dp, da, du) from the point (0, 0, 0) and its normalised inverse Euclidian distance the ideal point (1, 0.5, 0.5)*." This research used formula (2) to measure IFI for developing countries.

Algebraically:

$$IFI = \frac{1}{2}\left[\frac{\sqrt{d_p^2+d_a^2+d_u^2}}{\sqrt{1.5}} + \left(1 - \frac{\sqrt{(1-d_p)^2+(0.5-d_a)^2+(0.5-d_u)^2}}{\sqrt{1.5}}\right)\right] \quad (2)$$

3.1.3 Measuring economic development

The study uses Purchasing Power Parity (PPP) adjusted - Gross Domestic Product (GDP) as a measure of economic development. McLenaghan (2005) reports that for most inter-country comparisons, GDP adjusted by PPP is the most appropriate

measure. McLenghan (2005) further highlights that PPPs are used by several United Nations agencies and the World Bank for measuring poverty reduction in the context of the UN's Millennium Development Goals. Wagner (1995) supports this by stating that market exchange rates do not fully reflect fundamentals and can show inconsistent and inaccurate comparisons of real economic activity, and therefore advocates for the use of PPP rates.

McLenaghan (2005) analysed the differences in GDP weights when converted at market exchange rates and PPPs for the 2000 World Economic Outlook data. McLenaghan (2005:14) concluded as follows:

> *'For the major industrial economies, like the United States and Japan, the PPP weights for the year 2000 were substantially below the weights derived from market exchange rates. For the regional groupings of developing countries, on the other hand, PPP weights were appreciably above those derived from market rates. For China and India, there was more than a twofold increase in weights, from 3.3 per cent and 1.5 per cent to 11.6 per cent and 4.6 per cent, respectively*.'

This further reinforces the choice of using PPP adjusted GDP as a measure of economic development (McLenaghan, 2005).

For robustness, this study uses two other measures of economic development; the Human Development Index (HDI) and GDP Per Capita. The latter is globally known as the most basic summary indicator of economic development (Anders, Crabtree, Fariss, Jones, Linder, and Markowitz, 2017). It indicates the economic output created in a country per person in a year (Anders *et al.,* 2017).

In literature states the most common and frequently used measure of economic development is the United Nations Human Development Index (HDI) (Sarma and Pais, 2011; Van and Lihn, 2019). Stanton (2007) supports this by stating that the HDI is used by researchers, governments, NGOs, policy-makers, development professionals and many scholars of economic development. Some scholars believe that the HDI is a better alternative to evaluating a country's progress in development based on per capita national income (Stanton, 2007). There are two key roles it plays in the field of developmental economics, (1) as a vehicle to promote human development as a new

understanding of well-being, and (2) it is an alternative to measure GDP per capita and can easily compare economic development across countries and time (Stanton, 2007).

3.2 Data

The primary data source of this study is the Financial Access Survey (FAS) database from the International Monetary Fund (IMF). This study uses 2017 data as it is the most thorough data available for developing countries concerning the three dimensions that make up the IFI. Other sources of data, such as the World Bank's World Development Indicators (WDI) database, were also used. The study used the IMFs' World Economic Outlook (2019) to source GDP (PPP), GDP Per Capita and HDI data for developing countries.

3.3 Data analysis

The IFI is computed using formula (2), for 20 developing countries and presented with each country's corresponding GDP (PPP), GPD Per Capita and HDI along with their rankings. The study lists countries in alphabetical order. A comparison of the IFI and GDP (PPP), GDP Per Capita and HDI are conducted to analyse if these four measurements move in the same direction. Countries with IFI values between 0.5 and 1 are categorised as high IFI countries, countries with IFI values between 0.3 and 0.5 are referred to as medium IFI countries and countries with IFI values below 0.3 are deemed low IFI countries (Sarma and Pais, 2011).

Similar to Sarma and Pais (2011), the study analysed factors that are significantly associated with IFI. The study ran 20 sets of regressions of the IFI on two sets of variables; banking and socio-economic variables. The study also included important physical infrastructure factors into the 20 regressions. These are transport infrastructure, mobile cellular subscriptions, internet connectivity and fixed telephone infrastructure. The banking sector was analysed as there is a greater reliance on the banking sector than other financial sectors to bring about financial inclusion (Yorulmaz, 2016). Literature has highlighted that financial exclusion is part of a broader concept of social exclusion, hence the need to analyse socio-economic factors as they relate to financial inclusion (Aduda and Kaluda, 2012). With the increase in digitalisation of financial services, physical infrastructure that enables digital financial inclusion plays an essential role in financial inclusion, hence the need to analyse these factors. (Global Partnership for Financial Inclusion, 2017)

The study's estimation technique is adopted from Sarma and Pais (2011). In all 20 regression equations, the dependent variable is the logit transformation of the IFI. Sarma and Pais (2011) mention that transformed variables of this nature will lie between - ∞ and ∞, which enables researchers to conduct a classical OLS regression.[7] The transformed variable is a logit transformation of the IFI:

$$Y = \ln\left(\frac{IFI}{1 - IFI}\right)$$

OLS regression is as follows:

$$Y = a_0 + a_1X_1 + a_2X_2 + \cdots + a_nX_n + \varepsilon \quad (3)$$

X_1, X_2 … = Regression variables

a1, a2 … = Parameters to be estimated from the WDI data

Ɛ = Error term

To measure the rate of change of Y with respect to a unit change in variable X_i is shown by the derivative of y with respect to X_i:

$$\frac{dy}{dx} = \frac{a_i \exp(a_i X_i)}{1 + \exp(a_i X_i)^2}$$

The change in Y corresponding to a unit change in X_i, is determined by the sign of a_i, the magnitude of change depends on the value of a_i, as well as X_i (Sarma and Pais, 2011).

[7] Sarma and Pais (2011: 621) mention that "*the transformed variable is a monotonically increasing function of IFI, hence it preserves the same ordering as IFI*."

CHAPTER 4: DATA ANALYSIS

4.1 Data Limitations

Adequate, appropriate and comparable data for many different countries is essential for a robust IFI and accurate set of regressions (Sarma and Pais, 2011). The lack of data for specific dimensions of the IFI can result in underestimates of the IFI, which leads to inconsistencies in country rankings (Sarma and Pais, 2011). A study by Sarma and Pais (2011), looked at all the countries in the world, but could only analyse 49 countries because of a lack of data needed in the construction of the IFI[8]. Samra and Pais' (2011) study had even fewer countries to analyse when they ran three separate sets of regressions on the IFI on three different sets of variables relating to; the baking sector, socio-economic factors and physical infrastructure.

The few countries in the Sarma and Pais' (2011) study, which covered a worldwide population, and the lack of accurate data for developing countries explains and justifies why this research, with a focus on developing countries, analysed only 20 countries. This study accounts for potential multicollinearity amongst the physical infrastructure variables by entering them alternately in the regressions. The study limits each regression to four variables in order to preserve degrees of freedom and to attain greater validity. This approach is akin to Sarma and Pais (2011) who regress specific groups of variables separately on the IFI construct.

4.2 IFI, GDP (PPP), GDP Per Capita and HDI

Table 2 below presents the IFI computed using formula (2) from Chapter 3, for 20 developing countries and their corresponding GDP (PPP), GDP Per Capita and HDI along with their respective rankings. Given the robust nature of the study, only 20 developing countries had data for GDP (PPP), GDP Per Capita and HDI. 2017 data is used for these measures as it is the most accurate data for all 20 countries. Amongst the analysed developing countries, the data shows that Nigeria, with an IFI of 0.818, ranks the highest in terms of financial inclusion. Central African Republic with an IFI of 0.003 ranks the lowest. According to Sarma (2008), high IFI countries are those with 0.5 or more, while medium IFI countries are those with an IFI between 0.3 and 0.5 and

[8] A research by Sarma (2008) increased the number of analysed countries to 100 by only using two dimensions of the IFI; availability and usage (Sarma and Pais, 2011). Sarma and Pais (2011) argues against this, mentioning that accessibility is a critical dimension in the study of financial inclusion.

finally low IFI countries have IFI values lying between 0.01 and 0.3. Following Sarma (2008) classification, only five countries out of the 20 can be classified as high IFI countries. These include: one high-income country, Qatar; two upper-middle-income countries Albania and Botswana and finally two lower-middle-income countries, Bangladesh and Nigeria.[9] The list has five countries which are classified as medium IFI; Ghana, Myanmar, Pakistan, Kingdom of Eswatini and Uganda. Out of these five countries, four (Ghana, Myanmar, Pakistan, Kingdom of Eswatini) are lower-middle-income, while Uganda is the only low-income country classified as medium IFI on the list.

The majority of the list, a group of 10 countries (Afghanistan, Burkina Faso, Central African Republic, Guinea, Lesotho, Madagascar, Rwanda, Togo, Zambia and Zimbabwe) are classified as low IFI countries. This aligns to Sarma and Pais' 2011 study which had most developing countries classified as low IFI. This study also shows that the majority of countries classified as low IFI (seven countries), are also low-income countries. There are only three countries, Lesotho, Zambia and Zimbabwe, that are classified as low IFI while falling in the lower-middle-income group.

When comparing IFI with developmental economic indicators; GDP (PPP), GDP Per Capita and HDI, the study found that most countries (Albania, Bangladesh and Qatar) with high IFI have a very high HDI. There are exceptions like Botswana and Nigeria, which are high IFI countries with a low HDI. The data also shows us that most (four out of five) countries with medium IFI also have a medium HDI. There is one exception in the data, Uganda, which has a medium IFI with a low HDI. A majority of six out of the 10 low IFI countries are also classified as low HDI countries.

The study also shows that there are countries like Burkina Faso, Central African Republic, Zambia and Zimbabwe that have better economic development compared to their levels of financial inclusion. The data shows they have medium HDI while having a low IFI classification. On the other hand, there are two countries; Nigeria and

[9] The World Bank divides economies into four income groups high, upper-middle, lower-middle, and low. The income classification is based on GNI per capita. These groupings were first introduced in the 1978 Wordd Development Report. In 2019 the thresholds to distinguish between income groups changed as follows: low income $1,025 or less; lower middle-income between $1,026 and $3,995; upper middle-income between $3,996 and $12,375 and high-income $12,376 or more (Prydz and Wadwa, 2019).

Botswana, which show better financial inclusion performance than their levels of economic development with high IFI ranking while classified as having low HDI.

The data in Table 2 of the 20 developing countries clearly shows that IFI and HDI move in the same direction. The correlation coefficient between IFI and HDI values is 0.498 at a 5% significance level with a p-value of 0.026 which is smaller than 0.05 and therefore statistically significant. With this, we can conclude that countries with high economic development generally have high financial inclusion. It can then be said that there is a correlation between a country's financial inclusion levels and the country's level of economic development.

GDP (PPP) supports this, with three out of five high IFI ranked countries in the top 10 according to GDP (PPP). Nigeria ranked 2nd, Bangladesh 3rd and Qatar 5th. Botswana and Albania are the only high IFI outliers with GDP (PPP) rankings of 12 and 14 respectively. When we look at the correlation coefficient between IFI and GDP (PPP) values and their respective ranks, we find it to be 0.507 at a 5% significance level with a p-value of 0.023 which is smaller than 0.05 and therefore statistically significant. The analysis between IFI and GDP per capita shows the correlation to be 0.354 at 5% significance level with a p-value of 0.125, which is larger than 0.05 and therefore, statistically not very significant. With two out of the three regressions being statically significant, the study concludes that countries with high financial inclusion also have relatively high economic development.

The data also shows that there are countries like Qatar that rank very high in all indicators; ranked 3rd in terms of IFI and HDI, 1st in GDP Per Capita and 5th in GDP (PPP). On the other hand, there are countries like Togo, which rank low in all indicators. There are also countries with mixed rankings in the data; for example, Pakistan ranked 10th in terms of IFI, 11 for HDI and GDP Per Capita while being ranked 1st in terms of GDP (PPP).

Table 2: IFI, GDP (PPP), GDP Per Capita and HD

			IFI		GDP (PPP) (USD Millions)		GDP Per Capita (current USD)		HDI	
	Country	Income Group	Value	Country Rank	Value	Country Rank	Value	Country Rank	Value	Country Rank
1	Afghanistan	Low income	0.084	19	72 672.25	9	520.90	20	0.50	18
2	Albania	Upper middle income	0.771	2	38 306.69	14	5268.85	4	0.97	1
3	Bangladesh	Lower middle income	0.594	4	705 409.07	3	1698.26	9	0.90	2
4	Botswana	Upper middle income	0.552	5	41 962.34	12	8258.64	2	0.46	20
5	Burkina Faso	Low income	0.142	18	39 204.51	13	715.12	16	0.61	5
6	Central African Republic	Low income	0.003	20	4 012.78	20	8258.64	2	0.68	4
7	Ghana	Lower middle income	0.436	8	141 295.08	6	2202.31	6	0.60	7
8	Guinea	Low income	0.236	14	31 096.25	15	878.60	14	0.47	19
9	Lesotho	Lower middle income	0.291	11	6 787.04	19	1299.15	13	0.52	16
10	Madagascar	Low income	0.156	15	49 670.56	10	527.50	19	0.52	15
11	Myanmar	Lower middle income	0.464	6	358 451.37	4	1325.95	12	0.58	9
12	Nigeria	Lower middle income	0.818	1	1 173 456.27	2	2028.18	8	0.53	13
13	Pakistan	Lower middle income	0.376	10	1 181 412.87	1	1482.40	11	0.56	11
14	Qatar	High income	0.689	3	352 990.43	5	68793.78	1	0.85	3
15	Rwanda	Low income	0.142	17	27 698.51	16	772.94	15	0.54	12
16	Kingdom of Eswatini	Lower middle income	0.458	7	12 086.62	18	4145.97	5	0.61	6
17	Togo	Low income	0.150	16	13 994.44	17	679.26	17	0.51	17
18	Uganda	Low income	0.432	9	87 072.91	7	642.78	18	0.53	14
19	Zambia	Lower middle income	0.242	13	73 292.48	8	1539.90	10	0.59	8
20	Zimbabwe	Lower middle income	0.256	12	43 747.24	11	2147.00	7	0.56	10

IFI: 0.5 or more = High IFI, 0.3 – 0.5 = Medium IFI and 0.01 – 0.3 = Low IFI.
HDI: 0.800 – 1.000 = Very High HDI, 0.700-0.799 = High HDI, 0.550 – 0.699 = Medium HDI and 0.350 – 0.549 = Low HDI

4.3 Determinants of financial inclusion

There are many factors which affect financial inclusion in a country (Sarma and Pais, 2011). This study investigated a combination of factors associated with some degree of significance to the Index of Financial Inclusion (IFI) by running 20 sets of regressions (using formula (3) from Chapter 3) of the transformed IFI on the factors of two sets of variables, the banking sector and socio-economic variables. These are independent of each other. The study also included important physical infrastructure factors in each of the 20 regressions. These are transport infrastructure, mobile cellular subscriptions, internet connectivity and fixed telephone infrastructure (Sarma and Pais, 2011). The two sets of variables and physical infrastructure factors were analysed based on empirical evidence which concludes that they are closely related to financial inclusion. Lyons, Grable and Zeng (2017) emphasise the importance of reliable physical infrastructure in creating financial inclusion. Yorulmaz (2012) analysed financial inclusion and economic development in Turkey and the European Union and concluded that socio-economic factors such as unemployment and the Gini Coefficient are significantly correlated to financial inclusion. The banking sector factors are studied because in most countries, the banking sector contributes more to financial inclusion than other factors (Yorulmaz, 2016).

Financial inclusion data for developing countries is difficult to source. The more variables or regressors the study incorporated in the regression equation for each variable, the fewer observations (countries) were available for analysis. The number of regressors is a factor of the data available. The study used two main data sources: The World Bank's World Development Indicators (WDI)[10] and the International Monetary Fund's Financial Soundness Indicators.

4.3.1 Banking variables

There is a global reliance on the banking sector to bring about financial inclusion (Yorulmaz, 2016). In this set of regressions, the study looked at how the health of the banking sector links to financial inclusion. Table 3 shows the results of 12 regression analyses of the IFI variable over banking factors with one physical infrastructure factor per regression.

[10] WDI collates data from the world's governments and international organisations such as the International Labour Organization.

Looking at the 12 banking regressions, it is clear that domestic credit is positively correlated with financial inclusion. This can be seen in nine out of the 12 regressions. Having access to credit and savings facilities is key to combating financial exclusion (Joshi and Kohli, 2016). The interest rate is unambiguously negatively and significantly correlated to financial inclusion, indicating that an increase in interest rates leads to financial exclusion of people in developing countries. This can be seen in all 12 regressions. Interest rates are often too high for people and businesses without sufficient collateral to access loans, and those that do access loans are often unable to pay back the principal and interest, suffering further financial exclusion (Herbert and Hopwood- Road, 2006).

Foreign assets in developing countries appear to be strongly and positively associated with financial inclusion. This can be seen in regressions 9 to 12. This is supported by Gopalan and Rajans' 2015 work that suggested that foreign banks have a positive impact in furthering financial inclusion in emerging and developing economies. Gopalan and Rajan (2015) further state that this relationship turns negative when foreign entry is followed by higher banking concentration. Regressions 5 to 8 show that bank non-performing loans to total gross loans are negatively associated with financial inclusion. This is contrary to the widely held view that the high non-performing loans are a result of providing credit to low-income groups (who are more likely to default) (Sarma and Pais, 2011). Reddy (2002) argues against this widely held view by stating that in some countries like India, the largest contributors to non-performing loans are large industries.

A strongly capitalised banking system, such as one with a high capital asset ratio (CAR) is often very cautious in lending; this should then result in the CAR having a negatively correlated coefficient to financial inclusion, as in the case in Sarma and Pais' (2011) findings. This study does not have a definite conclusion on the CAR. Two of the four regressions with a CAR factor show the CAR to be negatively associated with financial inclusion. This can be seen in regression 2 and 3. The other two regressions (regression 1 and 4) with a CAR factor show the CAR having a positive relationship with financial inclusion. The 'direct lending' initiatives can explain a positive relationship between the CAR and financial inclusion in developing countries (Sarma, 2016). For example, South Africa's 'Mzansi' account and the 'General Credit Cards' of India, which are more aggressive in their lending strategies (Sarma, 2016).

Table 3: Banking Regressions

	1	2	3	4	5	6	7	8	9	10	11	12
TRAN	0.095 (0.36)				-0.088 (0.40)				-0.139 (0.34)			
MOB		0.489 (0.33)				0.444 (0.33)				0.403 (0.30)		
INET			0.822** (0.29)				0.743** (0.30)				0.706** (0.26)	
TEL				-0.062 (0.28)				-0.065 (0.27)				-0.005 (0.25)
CAR	0.000 (0.27)	-0.008 (0.25)	-0.151 (0.22)	0.000 (0.27)								
NPL					-0.277 (0.31)	-0.176 (0.25)	-0.099 (0.23)	-0.244 (0.26)				
FOR									0.521* (0.26)	0.434* (0.24)	0.408* (0.21)	0.482* (0.25)
INT	-0.965*** (0.29)	-0.786** (0.29)	-0.854*** (0.23)	-0.993*** (0.29)	-1.044*** (0.29)	-0.836** (0.30)	-0.871*** (0.24)	-1.039*** (0.28)	-1.146*** (0.27)	-0.941** (0.28)	-0.973*** (0.22)	-1.115*** (0.26)
CRED	0.258 (0.36)	0.106 (0.30)	-0.209 (0.30)	0.330 (0.30)	0.291 (0.35)	0.077 (0.30)	-0.15 (0.29)	0.262 (0.29)	0.469 (0.33)	0.201 (0.27)	-0.048 (0.26)	0.380 (0.26)
CONS	-0.830 (0.26)	-0.830 (0.24)	-0.830 (0.21)	-0.830 (0.26)	-0.830 (0.25)	-0.830 (0.24)	-0.830 (0.21)	-0.830 (0.253)	-0.830 (0.23)	-0.830 (0.22)	-0.830 (0.19)	-0.830 (0.23)
# Obs.	20	20	20	20	20	20	20	20	20	20	20	20
R^2	0.558	0.613	0.708	0.558	0.581	0.625	0.703	0.582	0.649	0.683	0.762	0.645
F	4.742	5.928	9.105	4.729	5.206	6.236	8.884	5.212	6.942	8.067	12.001	6.823
P-value	0.011	0.005	0.0006	0.011	0.008	0.0037	0.000	0.008	0.0023	0.001	0.000	0.003

*, **, *** Significance at the 10%, 5% and 1% levels respectively.

The dependent variable is the logit transformation of the IFI. CRED = Domestic credit to private sector by banks (% of GDP). INT = Real interest rate (%). FOR = Net foreign assets. CAR = Bank capital to assets ratio (%). NPL = Bank non-performing loans to total gross loans (%). TRAN = Logistics performance index-quality of trade and transport-related infrastructure (1=low to 5=high). MOB = Mobile cellular subscriptions (per 100 people). INET = Individuals using the internet (% of population). TEL = Fixed telephone subscriptions (per 100 people).

4.3.2 Socio-economic variables

Regressions 13 to 20 in Table 4 show the results of eight regression analyses of the IFI variable over socio-economic factors with one physical infrastructure factor per regression. The Gini coefficient is an important socio-economic variable which would be an important indicator of the level of financial inclusion in a country, as it indicates income inequality (Sarma and Pias, 2011). The study has not found sufficient cross-country data of Gini coefficient for developing countries; hence this variable is not included in the regression.[11]

The four regressions (regression 17, 18, 19 and 20) with GDP per capita show it to be strongly and positively associated with financial inclusion, highlighting that income plays an important role in determining a country's financial inclusion levels. Sarma and Pais (2011: 622) mention that, "*the higher the income level, both at the individual and for a country, the higher is the financial inclusion*." The unemployment rate has a negative correlation to the IFI, indicating that the higher the unemployment rate the lower a country's financial inclusion, see regressions 14, 15 and 16. In all regressions where adult literacy is included (regressions 13 to 20), it shows a strong and positive association with financial inclusion, indicating that a country can combat financial exclusion by improving its levels of adult literacy (education system).

It is interesting to note the results for the rural population factor in the study. Six out of the eight regressions that contain this factor show it as having a positive relationship to financial inclusion, see regressions 14, 15, 17, 18, 19 and 20. This suggests that rural populations tend to be financially included. This result contradicts several studies that have found that people who live in rural areas are mostly financially excluded (Chibba 2008; Chattopadhyay, 2011; Sarma and Pais, 2011). This anomaly might be explained by the gains made in digital technology in the rural populations of developing countries (Demirgüç-Kunt *et al.,* 2018). Digital technology has enabled a lot of people in rural areas to access financial services and increase the number of financially included people in rural areas (Demirgüç-Kunt *et al.,* 2018).

Quality of physical infrastructure is a crucial variable that allows people to access financial institutions, especially those that live in rural communities, far from financial institutions (Demirgüç-Kunt *et al.,* 2018). Fixed telephones, the internet and mobile

[11] WDI has insufficient 2017 data on developing countries Gini coefficient.

cellular phones are vital factors which indicate connectivity and sound digital infrastructure (Sarma and Pais, 2011). Digital infrastructure is key to this study's analysis as developing countries have increased their efforts to use technology to expand financial inclusion, primarily through mobile cellular phones (GFPI, 2017).

Regression 1, 13 and 17 show that transport infrastructure is positively associated with financial inclusion. Transport infrastructure allows people to have access to financial institutions, e.g. bank branches and ATMs, which in developing countries are centralised in towns, with the majority of citizens only able to access these by travelling long distances (Sarma and Pais, 2011). Similarly, mobile cellular phones are positively correlated with financial inclusion. This can be seen in all the regressions with a mobile cellular factor (regression 2, 6, 10, 14 and 18). Mobile cellular phones have been instrumental in providing people with financial services, particularly in developing and African countries (Demirgüç-Kunt *et al*., 2018). The most notable African country to advance financial inclusion via mobile cellular applications is Kenya with the launch of MPESA (Demirgüç-Kunt *et al*., 2018). Currently, 79 per cent of the Kenyan adult population has a mobile money account (Central Bank of Kenya, 2019).

Internet connectivity is highly and positively correlated with financial inclusion in developing countries. This is shown in all five regressions (regression 3, 7, 11, 15 and 19) that have an internet connectivity factor. This indicates that information plays a crucial role in financial inclusion and that the internet combats involuntary financial exclusion (Sarma and Pais, 2011). The fixed telephone factor is an outlier in this study. It is negatively associated with financial inclusion in all regressions, see regression 4, 8, 12, 16 and 20. This contradicts several studies such as Beck *et al*. (2007) and Sarma and Pias (2011) which conclude that fixed telephone subscriptions are positively associated with financial inclusion. This could be because the adoption of mobile phones has overtaken fixed telephones in developing countries over the last decade (Demirgüç-Kunt *et al*., 2018). The limited ability to provide financial services via fixed telephones compared to mobile phones can explain the anomaly in the regressions mentioned above (Kefela, 2011). This, coupled with the fact that fixed telephone line networks take longer to be built and are slow compared to mobile cellular networks could explain the results observed (Kefela, 2011).

Table 4: Socio-economic Regressions

	13	14	15	16	17	18	19	20
TRAN	0.271 (0.37)				0.109 (0.35)			
MOB		0.836 (0.39)				0.494 (0.42)		
INET			1.168 (0.57)				0.481 (0.89)	
TEL				-0.336 (0.37)				-0.372 (0.33)
UNEM	0.003 (0.34)	-0.289 (0.32)	-0.310 (0.33)	-0.013 (0.34)				
GDP					0.978 (0.59)	0.641 (0.64)	0.624 (0.94)	1.062* (0.55)
ADLT	0.786** (0.37)	0.664*** (0.33)	0.444 (0.40)	0.955** (0.37)	0.419 (0.38)	0.400 (0.36)	0.365 (0.39)	0.535 (0.38)
RUR	-0.119 (0.40)	0.260 (0.39)	0.558 (0.50)	-0.369 (0.39)	0.418 (0.47)	0.379 (0.45)	0.418 (0.46)	0.281 (0.46)
CONS	-0.830 (0.30)	-0.830 (0.26)	-0.830 (0.27)	-0.830 (0.29)	-0.830 (0.27)	-0.830 (0.26)	-0.830 (0.27)	-0.830 (0.26)
#Obs	20	20	20	20	20	20	20	20
R^2	0.423	0.545	0.532	0.434	0.513	0.551	0.519	0.548
F	2.752	4.499	4.266	2.870	3.946	4.604	4.044	4.538
P-Value	0.067	0.014	0.017	0.060	0.022	0.013	0.020	0.013

*, **, *** Significance at the 10%, 5% and 1% levels respectively

The dependent variable is the logit transformation of the IFI. TRAN = Logistics performance index - quality of trade and transport-related infrastructure (1=low to 5=high). MOB = Mobile cellular subscriptions (per 100 people). INET = Individuals using the internet (% of population). TEL = Fixed telephone subscriptions (per 100 people). UNEM = Unemployment people (% of total labor force). GDP = logarithm of GDP per capita (constant 2010 USD). ADLT = Literacy rate (% of people ages 15 and above). RUR = Rural population (% of total population).

CHAPTER 5: CONCLUSION

There are many definitions of financial inclusion. Common themes in these definitions are: access, usage and availability (Peachey and Roe, 2004; Sarma, 2016; Andotra and Manha, 2017). Therefore financial inclusion can be defined as a process that ensures the ease of access, usage, and availability of the formal financial system for all members of an economy (Sarma, 2016). Literature highlights that financial inclusion is part of a broader problem of social exclusion. Therefore it must be tackled with other social exclusion problems such as: unemployment, bad health, poor housing, redundant skills, low incomes, high crime environments and poverty (Kempson *et al.,* 2000).

This study used the Index of Financial Inclusion (IFI) developed by Sarma (2008) to measure the relationship between financial inclusion and economic development for developing countries. For robustness, the study used three different measures of economic development: GDP (PPP), GDP Per Capita and HDI. The study finds that the level of GDP (PPP) and the level of financial inclusion are strongly and positively correlated. The study also finds that the Human Development Index (HDI) and financial inclusion are positively correlated. In contrast, GDP Per Capita and financial inclusion are not strongly correlated for developing countries; this could be because of the high inequality in developing countries.

This study investigated a combination of factors associated with some degree of significance to the Index of Financial Inclusion (IFI) by running several regressions of the transformed IFI on the factors of two sets of variables: banking sector variables and socio-economic variables. The study also included important physical infrastructure factors into the 20 regressions. These are: transport infrastructure, mobile cellular subscriptions, internet connectivity and fixed telephone infrastructure. The study's findings support the widely held view that transport infrastructure plays a pivotal role in promoting financial inclusion in developing and African countries. Transport infrastructure allows people physical access to financial institutions, e.g. bank branches and ATMs, which in developing countries are centralised in towns, with the majority of citizens only able to access these by travelling long distances (Sarma and Pais, 2011). The study also finds that mobile cellular and internet connectivity are critical in enhancing financial inclusion in developing countries, particularly on the African continent. A great case study of this is Kenyas' MPESA mobile money application.

The study clearly showed that unemployment is an inhibitor of financial inclusion, while adult literacy supports financial inclusion. The study also showed that access to credit is key to improving financial inclusion both at individual and business levels. High-interest rates hinder financial inclusion because people and businesses without sufficient collateral cannot access loans and those that do access them are often unable to pay back the principal and interest, suffering further financial exclusion. Foreign assets are seen to be positively associated with financial inclusion in developing countries.

To conclude, this study has provided evidence that financial inclusion is highly correlated to economic development. It provides evidence to policymakers that three dimensions of financial inclusion (access, usage and availability) should be considered and supported to increase financial inclusion in developing countries overall.

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