UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi

Gordon Institute of Business Science
University of Pretoria

The relationship between infrastructural development and foreign direct investment inflows and economic growth in developing countries

Mandisi Rungqu

13403045

A research proposal submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration.

10 November 2014

i

ABSTRACT

The last decade has seen a tremendous shift in global FDI inflows from developed to developing economies which has greatly benefited these countries to gain access to much needed capital to supplement their typical low domestic savings. The major focus of existing research conducted has been on developed countries and limited empirical work has acknowledged the role of infrastructure development in attracting FDI. Major aim of this is to assess the relationship between ICT, power and transport infrastructure and FDI inflows. Furthermore, the relationship between FDI and economic growth is also explored.

Panel data analysis using the random effects model was utilised to analyse the abovementioned relationship on a panel of 27 developing economies between 2000-2013. The developing countries were categorised into different categories based on income levels and mixed results were found across these levels. Unidirectional testing was performed in assessing these relationships. The direction was from infrastructure development to FDI and the latter to economic growth. When combining the developing countries together, the results show a significant and positive relationship between ICT, power and transport infrastructure and FDI inflows. FDI was also found to have a positive and significant relationship with economic growth.

KEYWORDS

Foreign Direct Investment; Developing countries; Economic growth; Infrastructure development

DECLARATION

I declare that the research report is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other university. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

_____

Mandisi Rungqu

10 November 2014

ACKNOWLEDGEMENTS

I would like to acknowledge the following people for their invaluable contribution to the completion of this research work:

- First and foremost, to the Almighty God for the divine intervention and giving me the wisdom, strength and courage not to give up during the times of adversity.

- To my supervisor, Matthew Birtch, for the guidance, invaluable and prompt feedback in times of need. You gave me space to think and gave me direction to bring my ideas to life. I greatly appreciate your insight and support you provided me right up until the end.

- To my wife Yandisa Rungqu, my deepest gratitude for the sacrifices and unwavering support you provided me during trying times. You held the fort at home and raised our baby boy very well in my absence. To my baby son, Songe, it broke my heart to see you cry whenever I left home on the weekend to do this work but thanks a lot for your patience.

- A special thank you also goes to the Industrial Development Corporation, for not only providing financial support but also allowing me time away from work to ensure completion of my degree.

- Gratitude also goes to my previous and current line manager and the rest of the IDC Agro Industries SBU for the understanding and also standing in for me whenever I required time away from the office.

- To my fellow MBA colleagues with whom I have shared a lot of fun, sleepless nights, pain and sweat over the last two years, thank you very much.

- Last but not least, I would like to thank my friends for the words of encouragement, space and time to ensure completion of my studies.

TABLE OF CONTENTS

iv

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

BRIC	Brazil, Russia, India, China
Coega IDZ	Coega Industrial Development Zone
EU	European Union
FDI	Foreign Direct Investment
FPI	Foreign Portfolio Investment
GDP	Gross Domestic Product
LDCs	Least Developed Countries
kWh	Kilowatt Hours
M&A	Mergers & Acquisitions
MNC	Multinational Corporations
OLI	Ownership, Location and Internationalisation
OLS	Ordinary Least Squares
OECD	Organisation for Economic Co-operation & Development
SSA	Sub Saharan Africa
SEZs	Special Economic Zones
SOEs	State Owned Enterprises
UN	United Nations Conference on Trade & Development
US	United States of America

CHAPTER 1: RESEARCH PROBLEM

1.1 INTRODUCTION TO THE RESEARCH PROBLEM

2013 saw a nine percent year-on-year increase in global in foreign direct investment inflows (FDI) after an 18 percent slump experienced in the previous year (UN, 2014). In 2012, developing economies took the lead for the first time in history by absorbing more FDI inflows than the developed countries (UN, 2013). Developing countries' share of global FDI inflows in 2013 continued to show an upward surge, accounting for 54 percent of global FDI flows compared to 52 percent in 2012 (UN, 2014). Traditionally, the United States (US) and European Union (EU) countries have been known to become major recipients of FDI inflows. The question of why some countries are able to attract FDI better than others is always an interesting debate in economics (Kinda, 2010).

The past few decades have witnessed a change in perception in developing countries regarding the benefits and costs of FDI (Agosin & Machado, 2007). This was due to the belief that attracting FDI meant loss of control over important sectors of the developing economies (Agosin, 2007). As a result, free entry of multinational corporates into these economies was met with a lot of reluctance (Agosin, 2007). Some benefits were derived from this approach in some economies as it encouraged local industrialisation and development (Agosin, 2007). There has been a paradigm shift in this phenomenon from the mid-1980s when developing countries started to understand the benefits of FDI and open their regimes to allow for an increase thereof (Agosin, 2007).

Benefits of FDI have been well researched, ranging from transfer of technology and managerial skills to the host country; access to international markets; increased competitiveness for the host country; job creation; increased economic development; and developing import and export networks (Kinda, 2010). These benefits have not

gone unnoticed by developing countries as most compete with each other to attract FDI through liberalising their policy regimes and offering various incentive packages in the form of tax rebates, trade liberalisation measures, establishment of special economic zones (SEZs) and other forms of incentives (Mottaleb & Kalirajan, 2010).

These benefits of FDI, coupled with the low savings culture in developing economies, makes FDI critically important in efforts to fund their capital expansion programmes (Kinda, 2010). The general consensus is that FDI positively contributes to economic growth through technology transfer (Nouzard, 2014). Most governments believe that FDI contributes to the economic prosperity of host countries (Gholam, Lee & Heshmati, 2005). These arguments justify government policy programmes that are aimed at attracting FDI in many developing countries.

As a result, extensive research has been conducted on the determinants of FDI inflows and the impact thereof on economic growth. As can be seen in the chapter on literature review, there are numerous economic, political and institutional determinants that have an impact on FDI inflows into the host country. Among other factors that affect the location decision of multinational corporations (MNCs), is the existence of infrastructure in the host country (Kinda, 2010). There are only a few empirical studies that have focused on the role played by infrastructure endowment in stimulating FDI (Khadaroo & Seetanah, 2010; Bellak, Leibrecht & Damijan, 2009). Few researchers have acknowledged and explored the importance of the role played by infrastructure in attracting FDI inflows (Bakar, Mat & Harun, 2012). Well-developed infrastructure is, however, important as it improves market access and also promotes economic growth (Kinda, 2010). The focus of the study is only on the relationship between infrastructure development and FDI and therefore not an attempt to prove causality of FDI in its entirety. Additional to this the relationship between FDI inflows and economic growth is also explored.

Developed countries have traditionally been major recipients of global FDI and therefore, the bulk of the empirical literature has focused on developed countries (Asiedu, 2002). As mentioned above, this trend has been reversed over the last few

years with more FDI inflows directed towards developing economies and hence the focus of this study on developing countries. The focus of this study is to contribute to the existing literature that has investigated the relationship between infrastructural development and FDI inflows in developing countries. A lot of literature conducted on the relationship between FDI and infrastructure development in developing countries has focused on China and Malaysia (He, Gai, Wang, 2012, Hong & Chin, 2007, Tang and Tan, 2014, Bakar, Mat, Harun, 2012, Shamar, Nayam & Chung, 2012, Ang, 2008, However, this study focuses on a panel of developing countries.

The relationship between FDI and economic growth has remained inconclusive and a subject of great debate (Kiat, 2008). Most empirical evidence indicates mutual agreement that FDI boost economic growth through transfer of technology, introduction of new processes, managerial skills and know-how to the host country (Battten & Vo, 2009, De Mello, 1999, Nunnekamp, 2001, Lall and Narula, 2004, (Borensztein, Gregorio, Lee, 1998).

Some of the studies argue that the impact of FDI on economic growth is dependent on the level of human capital in the host country (Bornstein, 1998); others argue that it is dependent on functioning of financial markets (Alfaro, Chandra, Kaleli-Ozcan, Sayek (2004). Other country-specific characteristics that affect this relationship such as education levels, trade openness, country risk and population growth, are identified by Batten (2009).

This study aims at contributing to this debate by analysing the relationship between the two variables using a panel of developing countries. Again, the idea is not to obtain an understanding of factors affecting economic growth entirely, but only to understand the role that can be played by FDI in boosting economic growth. Should the relationship between infrastructure development and FDI exist, and also between FDI and economic growth, policy makers in developing countries can perhaps use infrastructure as a tool to attract FDI and thereby increase economic growth.

1.2   RESEARCH QUESTIONS

The main research questions in this study relate to:
- Whether infrastructure development has a positive and significant relationship with FDI inflows in developing countries?
- Whether FDI inflows have a positive and significant relationship with economic growth in developing countries?

1.3   RESEARCH AIM

This study focuses on the relationship between infrastructure development and FDI where the former can be utilised as a policy variable that can be utilised in attracting FDI in developing countries. Furthermore, this study purports to obtain an understanding of the relationship between FDI and economic growth. In studying these relationships, data collected from a panel of developing countries is utilised and analysed to determine whether a relationship exists between infrastructure variables and FDI inflows and the latter's impact on economic growth. This study focuses on three variables of infrastructure development namely, information and technology (ICT); power generation; and investment on roads, railways and ports. A lot of previous studies reviewed have used telephones lines as a proxy for infrastructure, which is not fully representative of all facets of infrastructure.

There are numerous other determinants of FDI but this study aims to shed more light on infrastructure development. Empirical evidence shows that in order for the benefits of FDI to be fully realised, the host country needs to have absorptive capacity in the form of good human capital (Borensztein, 1998). For good human capital to exist, there needs to have good physical infrastructure in place to ensure provision of their basic services, i.e. water, sanitation, electricity, schools, hospitals, telecommunications networks, etc.).

1.4   MOTIVATION FOR RESEARCH

Firstly, the focus of this paper on developing countries has been motivated by the accelerated growth in these economies in the recent past. Developed economies have continued to register steady economic growth rates of 4.6% in 2013 (slightly less than 4.7% in 2012), as opposed to developed countries that experienced a subdued growth of 1% in 2013 (UN, 2014). The steady growth in developing economies is expected to continue with forecasts of 5.1% and 5.3% in 2014 and 2015 respectively, against growth forecasts of 1.9% and 2.4% for 2014 and 2015 in developed economies (UN, 2014).

FDI is critically important to fund the abovementioned expansions in developing economies as domestic savings are generally low and official assistance has been declining over the years (Asiedu, 2002). Growth in FDI inflows into developing countries over the past 10 years has averaged 17% per annum and surpassed FDI inflows into developed economies for the first time in 2012 (UN, 2014). Despite the encouraging progress that has been made above, developing economies continue to face numerous challenges which include amongst others, high unemployment, lack of diversification into higher value products and lack of infrastructure, particularly in the energy sector (UN, 2014). Thus, this study focuses on the impact of infrastructure development to increase the ability of the host country to attract FDI. Limited numbers of researchers have acknowledged and explored the importance of the role played by infrastructure in attracting FDI inflows (Bakar, 2012).

CHAPTER 2:   THEORY AND LITERATURE REVIEW

2.1   INTRODUCTION

Since the early 1990s, there has been a significant shift in FDI inflows towards developing countries. Similarly, discussion among policymakers and academics has shifted from the question whether FDI should be encouraged, to how FDI can be attracted (Asiedu & Lien, 2011). The biggest challenge for policy-makers in developing countries has been to create immobile assets that give the host country a competitive edge in the fierce competition for FDI (Nunnenkamp, 2001).

A lot of attention in this regard has been focused on developed countries and less on the developing countries (Asiedu, 2002). This lack of focus on developing countries, together with the surge of FDI into developing countries in the recent past, has encouraged the focus of this study towards these countries.

This purpose of the literature review has been to gather theory on FDI as a subject matter and conduct an in-depth analysis of the determinants that drive FDI. Infrastructure development is one of the determinants of FDI that has not been well researched and this study also reviews the literature setting out the impact thereof on FDI. The current trends in FDI are also discussed together with benefits and shortcomings of FDI. Lastly, empirical evidence on the relationship between FDI and the economic growth of the host country is also reviewed.

2.2   FOREIGN DIRECT INVESTMENT

2.2.1   Definition

When defining FDI, it is important to distinguish between the two types of patterns of capital flows across countries namely, foreign direct investments (FDI) and foreign portfolio investments (FPI). The World Bank defines foreign direct investment as net inflows injected by an investor to acquire a 10 percent or more lasting management

interest in a company that operates in an economy other than that of the investor (World Bank, 2014, Almfraji & Almsafir, 2014). The lasting interest implies a long-term relationship between the direct investor and the investee company; and the requirement of 10 percent or more necessitates significant influence to be exerted by the direct investor into the enterprise (UN, 1999). Both of these features are key distinguishing attributes of FDI.

Included in FDI inflows is the summation of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments (World Bank, 2014). Equity capital consists of all equity and capital contributions made by the investor in the branches, divisions, subsidiaries and associates, excluding any preference share capital treated as debt (UN, 1999). Re-invested earnings would typically include the investor's entire share of earnings in the branches, divisions, subsidiaries and associates that have not been distributed back to him (UN, 1999). Other long-term capital relates to lending transactions between the direct investor and the branches, divisions, subsidiaries and associate companies of the enterprise (UN, 1999).

Foreign portfolio investments, on the other hand, relate to debt and equity capital invested by an entity resident in one country into an entity resident in another country with a primary goal of obtaining capital gains and not necessarily establishing a long-term relationship (UN, 1999). In other words, foreign portfolio investment is normally associated with the buying of shares, bonds, notes and money market instruments tradable on the stock exchange of the host country (UN, 1999; Sornarahaj, 2010).

From the definitions above, it is clear that FDI does not necessitate control of the enterprise as it only requires 10 percent or more equity. The reference is also on residency and not on nationality or citizenship. In contrast to the other forms of investment, FDI tends to have a longer-term view and is less volatile, particularly in times of crisis (Nunnekamp, 2001). Busse and Hefeker, (2007) confirmed this, pointing out that FDI tends to be the more resilient source of capital and, therefore, more critical during a downswing or crisis in the economy. Most often, debt finance from foreign

investors finances consumption expenditure, as opposed to FDI, which is more inclined to be utilised to create productive capacity (Busse, 2007).

Castro, Fernandes and Campos (2013) listed the following as key motivators that drive FDI investment decisions;

- *Natural Resource Seeking FDI* – The key driver in this case is the non-existence of natural resources in the home country of the foreign investor. The focus of this form of investment is to gain access to specific natural resources, cheap labour and also skills such as marketing, operational and technology, etc.
- *Market seeking FDI* - This is where the MNC enters a new market in search for new clients and export markets in order to provide goods and services to the host country. Market-seeking foreign investors have preference to invest in large domestic markets that are growing at a fast pace (Kinda, 2010).
- *Efficiency seeking FDI* - In this case, the motive is to reduce production costs using new technologies and cheaper production inputs. The idea is to take advantage of economies of scope, scale and risk management.
- *Strategic asset seeking FDI* - The aim here is to gain access to strategic assets located in the host country to obtain a competitive position and enhance skills in regional and global markets. Examples of these types of assets are brands, distribution channels and new technologies.

2.2.2 Benefits of FDI for the host country

Developing countries have been competing fiercely for FDI inflows as its long-term and more stable nature is important in bridging the gap between domestic savings and investments (Chang Lo, Lin1, Chi & Joseph, 2013). In bridging this gap, importing capital in the form of FDI allows the developing countries to invest capital into priority sectors of their economies and thus achieve faster economic growth (Mottaleb, 2010). Nunnekamp (2001) also highlighted the risk-sharing characteristics of FDI, which renders it an even more suitable form of finance for developing countries as their long term nature protects them against external shock.

In addition to the stable capital, FDI also brings with it other positive spin-offs relating to a transfer of technological skills and knowledge from MNCs (De Mello, 1999). However, Lall (2004) argued that this transfer is crucially dependent on the skills of the transmitter and receiver; the greater the distance between the two the more it will make it difficult for the transfer to occur. In other words, the positive spill-over for FDI is felt if the labour force within the host country is sufficiently educated to absorb the advanced technology transferred (Nunnekamp, 2001). Crespo and Nountura (2007) also added the issue of the technological gap between an MNC and local firm in that the latter stands to benefit most if the technological gap between the two firms is wide enough; otherwise the benefit is minimal. Mode of entry of FDI is also an important factor in transferring technology; for a greenfield investment the transfer of technology happens almost immediately as opposed to a merger and acquisition (M&A) where the speed of transfer could be restricted by resistance from the existing shareholders (Crespo, 2007).

Another important role that has been associated with FDI, is the linkage that MNCs bring in terms of access to international markets that local players would otherwise not have been able to access (Veloso, 2008). In playing this important role, MNCs tend to help transform local players from exporters of goods in raw form into exporters of manufactured, value-added goods (Veloso, 2008). In most cases, these manufactured goods are high technology products (Veloso, 2008).

These value adding activities support evidence indicating a significant positive impact of FDI inflows in the creation of employment for the host country, particularly in developed economies where these countries were found to be more efficient in creating more employment with the same level of FDI compared to developing economies (Hlongwane, 2011).

FDI was found also to enhance the host country's competitiveness, which can be utilised to develop the country's resources and capabilities (Naidoo, 2012). The increased competitiveness is achieved through the operational efficiencies brought by

skills and management philosophies from MNCs into the local firms (Naidoo, 2012). This also filters through to firms that are not affiliated with the MNCs as they learn from increased competitiveness of the local firms that are affiliated with MNCs (Naidoo, 2012). Asiedu (2006) states that the United Nations Millennium Declaration indicated that an increase in FDI will assist greatly in meeting the goal of halving poverty by 2015.

However, having stated some of the benefits of FDI above, there is general realisation that the positive developmental impacts of FDI are not automatic and are conditional on the existence of human capital and good infrastructure in the host country (Yamin & Sinkovics, 2009). Borensztein (1998) supported this view as it concludes that the effect of FDI on economic growth is dependent on the level of human capital available in the host economy. There is a strong positive relationship between FDI and the level of education in the host country (Borensztein, 1998). For countries with low levels of good human capital, the effect of FDI on economic development of the recipient country can even be negative (Nouzard, Greenwold, Yang, 2014).

A study into spillovers of FDI by Hale and Long (2011) also identified some institutional factors that can negatively affect new technology adoption. In this regard, an example is made of many state owned enterprises (SOEs) that face limited competition pressure or lack incentive to maximise profits, thus weakening their incentive to adopt new technologies (Hale, 2011).

2.2.3 Negative implications of FDI

There are some negatives associated with FDI. Fiscal and financial incentives offered to foreign investors must be carefully considered to ensure that they are not harmful to local firms and small investors (Nunnekamp, 2001). These could be in the form of tax incentives that can potentially be introduced to attract FDI (Veloso, 2008). If not carefully managed, these incentives could result in loss of tax revenue that could negatively affect government's ability to provide services to its people (Veloso, 2008). Tax incentives offered to foreign investors can also affect the ability of local industry to

compete (Nunnekamp, 2001), potentially causing closures of businesses and job losses. Another huge criticism for FDI is the remittance of profits and dividends to the country of the foreign investor, which could otherwise be used for capital formation in the host country (Ramirez, 2006).

The establishment of foreign firms can result in increased competition, particularly imperfect competition, and thereby the reduction of market share for domestic firms (Chan, Hou, Li, Mountan, 2013). Entrance of foreign firms can also result in increases in wages and prices for local inputs, leading to a displacement of local firms (Chan, 2013). Better access by MNCs to cheaper credit may also crowd out domestic investment (Chan, 2013).

2.3   DETERMINANTS OF FDI

A lot of empirical research has been conducted on the determinants of FDI inflows and the impact thereof on the economic growth of the host country. A fair amount of research papers have used Dunning's Eclectic paradigm as a framework to analyse why MNC invest abroad (Kinda, 2010). This framework is called the OLI framework and stipulates that firms invest abroad because of ownership, location and internationalisation advantages (Kinda, 2010). There are a number of economic and institutional factors that influence FDI (Chang Lo, 2013). Economic factors include market size, fiscal and monetary policies and natural resources (Chang Lo, 2013). On other hand, institutional factors include good governance, political stability, investment climate and corruption (Chang Lo, 2013). Findings in a study in BRICS countries by Jadhav (2012) found that economic factors are more important than institutional and political factors.

For the purposes of this study, the following determinants of FDI have been identified and discussed (Jadhav, 2012; Luiz & Charalambous, 2009; Chang Lo, 2013; Busse, 2007).

- Governance and political risk

- Market size

- Trade openness

- Natural resources

- Exchange rate considerations

- Trade incentives, barriers and agreements

- Labour considerations

- Geographic proximity

- Macro-economic performance

- Economic agglomeration

- Voice and accountability (cultural considerations)

- Infrastructure considerations

2.3.1   Governance and political risk

Luiz (2009) described the aspects that impact on political stability and country governance as frequent changes in government, methods of electing government, country governance and corruption levels. Busse (2007) concluded that foreign investors are highly sensitive to political stability. Political instability, together with a threat of nationalisation, disrupts the economic process and thereby reduces FDI (Asiedu, 2006, Schneider, 1985). A democratic environment is likely to result in protection of property rights to own property and therefore attract FDI inflow (Busse, 2007).

Al-Sadig (2009) conducted an econometric analysis of 117 countries between 1984 and 2004, and found that corruption had a negative impact on FDI inflows. However, he argued in this study that quality institutions have a direct influence on negating the negative effects of corruption on FDI as the impact of quality institutions is more important than corruption (Al-Sadig, 2009). Asiedu (2006) highlighted the importance of the correct functioning of the legal system in countering the negative impact caused by corruption on FDI.

2.3.2 Market size and demand conditions

This variable relates to the host country's size and depth of the market, taking into account its growth potential (Luiz, 2009). A study by Castro (2013) on the determinants of FDI in Brazil between 1990 and 2010 found that a change in GDP exerted a great influence on FDI. Furthermore, this study found that most foreign investors in Brazil had a market-seeking strategy based on the size of the GDP (Castro, 2013). Chang Lo (2013) further affirmed the positive relationship between market size and FDI as bigger markets allow MNCs to take advantage of economies of scale. Luiz (2009) argued that sometimes size of the market is not sufficient a factor. Some industries require customers with a certain income threshold, regardless of the size of the market (Luiz, 2009). There is a general consensus among most researchers who concluded that the GDP of a country has a significant positive influence on FDI (Tsai, 1994, Asiedu, 2006, Chakrabarti, 2001).

2.3.3 Trade openness

Chang Lo (2013) measured openness as ratio of total trade (summation of imports and exports) to GDP in line with most studies reviewed. Chakrabarti (2001) conducted a cross-country regression analysis on 135 countries which indicated that the country's openness to trade had the most significant correlation to FDI, larger than any of the other economic variables studied in the analysis and showed a positive relationship. In other words, a relatively more open economy to trade is more likely to be attractive to foreign investors (Babatunde, 2011). Babatunde (2011) also explored the relationship between trade and infrastructure and concluded that the effect of trade of FDI improves as infrastructure development increases.

Agosin (2007) also affirmed the positive relationship detected between FDI and trade openness, but pointed out that the explanatory power of the latter is rather low. The author considered the location advantage to be more important. Castro (2013) studied FDI inflows into Brazil and Mexico between 1990 and 2010, and found a positive and significant relationship between trade openness and FDI inflows.

13

2.3.4 Natural resources

Asiedu (2006) concluded that even though endowment with natural resources plays an important role in encouraging FDI for a host country, FDI can still be attracted to countries that lack natural resources if their institutional and political environment has been improved. A study of determinants of FDI into Africa between 1980 and 2007 by Anyanwu (2011) highlighted that the majority of FDI inflows into Africa were natural resource seeking. This study showed that between 1998 and 2009, most of the flows went into oil, gas and mining projects (Anyanwu, 2011).

2.3.5 Exchange rate considerations

Kiat (2008) found the relationship between exchange rates and FDI to be inconclusive. This was qualified with an assertion that experts interviewed in the research saw a problem with the research methodology and that a devaluation of currency should lead to more FDI inflows (Kiat, 2008). Luiz (2009) saw this factor as being insignificant, unless the host country was going through some currency crisis or if the currency is erratically volatile. Insignificance of this determinant was also confirmed by Chakrabarti (2001) who found the exchange rate to be the least significant determinant of FDI inflows in this study. However, Chakrabarti (2001) alluded to the fact that the weaker the currency of the host country, the less likely it was that foreign investors would want to invest in that country. Ramirez (2006) explained that an undervalued currency negatively affects foreign investor's returns, when profits are repatriated back to the country of the foreign investor

2.3.6 Trade incentives, barriers and agreements

Luiz (2009) described trade incentives as favourable corporate rates and other concessions. Legislation of a prohibitive nature, such as import tariffs and laws that prohibit participation by foreign investors, have a negative on FDI inflows (Luiz, 2009). Agreements such as double tax agreements, bilateral investment treaties, bilateral information-sharing arrangements and becoming members of regional economic

14

groupings, increase globalisation and thereby FDI inflows between economies (Luiz (2009).

Governments use various incentive packages to lure foreign investors into their countries such tax rebates, SEZs, trade liberation initiatives and various other incentives (Mottaleb, 2010). For example, various government incentives introduced in the South African automotive industry have worked well in attracting FDI into this sector.

2.3.7   Labour considerations

Regarding labour, labour supply, relative wages cost, productivity, level of skills and ability of labour to receive training and be up skilled impact on considerations for FDI (Luiz, 2009). When making investment decisions, MNCs will consider the quality of human capital in the host country (Chang Lo, 2013). A highly educated workforce will enable MNCs to adapt and transfer the requisite skills and technology much easier (Chang Lo, 2013). Motalleb (2010) also found a statistically significant and positive relationship between abundance of labour and level of FDI inflows in the host country. A higher unemployment rate in a country is a signal for availability of labour and therefore attracts higher FDI (Coughlin, Terza & Arromdee, 1991).

Local labour laws regulate the ability of the employer to hire and fire personnel and also regulate the ability to import scarce skills whenever the need arises (Luiz, 2009). Flexibility of labour laws is a very important factor for MNCs (Luiz, 2009). In many developing countries, cost of labour is an important consideration for labour intensive and efficiency-seeking FDI since labour typically costs less in developing countries (Jadhay, 2012). Low labour cost results in lower production costs for MNCs, which in turn enhances their competitiveness and thereby results in higher FDI (Jadhav, 2012, Mottaleb, 2010, Coughlin, 1991, Hong & Chin, 2007). Surprisingly, higher unionisation rates attract higher FDI, with the reasons given that unionisation is associated with higher productive efficiencies in manufacturing (Coughlin, 1991).

2.3.8 Geographic location

This driver of FDI relates to the proximity of the foreign investor to the location of the host country (Luiz, 2009). Luiz's (2009) study did not consider this factor to have a significant influence on FDI, provided that an efficient telecommunication infrastructure is in place between foreign investor and host country. Asiedu (2002) found in her study that Sub-Saharan countries included in her sample received less FDI because of their geographical location. However, as mentioned above these geographical disadvantages are not insurmountable, they can indeed be offset with an efficient transport and communication infrastructure (Calderon & Serven, 2010).

2.3.9 Macro-economic performance

This factor relates to economic conditions such as inflation, interest rates, GDP growth as well as government's fiscal and monetary policies (Luiz, 2009). Results of Kiat's study (2008) showed that high inflation has a negative impact on FDI inflow, with this relationship being more significant in developing than developed countries.

2.3.10 Economic agglomeration

Agglomeration centres relate to the existence of value-adding activities and other supporting industries (Luiz, 2009). Existence of players that offer these supporting activities positively influences the inflow of FDI (Luiz, 2009).

2.3.11 Cultural considerations

Cultural considerations include values, norms, beliefs, customs, religion and language of the host country (Luiz, 2009). The study conducted by Luiz (2009) highlighted business culture and language spoken by the locals as a key consideration for a foreign investor when making a decision on the destination of the potential investment. Language has a huge bearing on the ability of the MNCs to do business in a certain market (Luiz, 2009). Business culture speaks to the locals' attitudes towards work

16

(general work ethic), relative resistance levels to change and ethical values (Luiz, 2009).

2.3.12   Infrastructure considerations

Infrastructure embodies telecommunication systems, roads, ports, sanitation, water, electricity, railways, airports, which are useful in facilitating trade (Chang Lo, 2013). Good and sustainable infrastructure stimulates FDI inflows as it reduces operating costs for the foreign investor (Chang Lo, 2013). For example, for a foreign investor that operates within the financial services, existence of an up-to-date IT and telecommunications infrastructure is critically important to serve the customers optimally (Luiz, 2009).

An interesting finding emerged from a study of determinants of FDI in Sub-Saharan Africa by Asiedu (2002); the results showed that infrastructure development had no impact on FDI into Sub-Saharan countries, which was contrary to the conclusion on the non-Sub-Saharan countries included in the sample tested.

A lot of literature exists on the relationship between FDI and market size, natural resources, political factors and trade openness. Limited empirical evidence exists that set out the impact of infrastructure development on FDI, so this study aims at making a contribution to this debate.

2.4   INFRASTRUCTURE DEVELOPMENT

There are different views on the exact definition of infrastructure. Bhattacharyay (2009) defined infrastructure as technical structures and facilities that are necessary for the functioning of society and economy. Similarly, Mayfield and Mayfield (2012) defined it as any nation's structural and physical structure built to meet societal demands and allowing for trade to be conducted. There is always an interesting debate on the

responsibility (between private sector and government) on whose shoulders the building of infrastructure should lay, which had been resolved through public and private partnerships seen in many countries (Mayfield, 2012). A study by Patel and Bhattacharya (2010) saw a refashioning of infrastructure provision in India, where it moved steadily from the realm of government to the private sector. Understandably, with this trend came an increased economic regulation (Patel, 2010)

Straub and Hagiwara (2011) viewed infrastructure from two angles, the supply side and demand side. On the supply side, it serves as a production factor which promotes technological progress when improved and thereby increasing its effect on the productivity of other factors (Straub, 2011). On the demand side, infrastructure is seen as delivery of services such as water, sanitation, power, roads, and telephone lines, transport and internet access, which people need and want (Straub, 2011).

Taking the above into account, Bhattacharyay (2009) categorised infrastructure into two groups, hard and soft infrastructure. Hard infrastructure refers mainly to physical structure that supports society and economic activities (Bhattacharya, 2009). Typically, hard infrastructure involves transport (ports, railways and roads); energy (electricity generation, gas and oil pipelines); telecommunications (telephone and internet); and basic utilities (water supply/irrigation systems, hospitals, clinics and schools) (Bhattacharya, 2009). Soft infrastructure relates to non-tangible infrastructure that is meant to provide support to the hard infrastructure such as policy, institutional and regulatory frameworks, governance structures, social networks, systems and procedures (Bhattacharya, 2009).

Infrastructure deficit is a universal issue, but is found to be more prevalent in developing countries as these economies compete for scarce resources, making infrastructure development increasingly difficult (Badu, Owusu-Manu, Edwards & Holt, 2013). Infrastructure development in developed countries focuses on upgrades, whereas developing countries still need new infrastructure to underpin economic growth (Badu, 2013).

2.5 INFRASTRUCTURE DEVELOPMENT AND ECONOMIC GROWTH

A study conducted by Straub (2011) on 102 developing countries concluded that infrastructure has a significant and positive impact on economic growth.

Where infrastructure facilities are developed, it is easier for entrepreneurs to adopt new technologies and improve productivity of all inputs of the production process and thereby long-term sustainable economic growth (Demurger, 2001). Canning and Pedro (2004) introduced a slightly different view in that there is an optimal level of infrastructure investment at which growth is maximised. Infrastructure investment is an input into aggregate production, so it comes at the expense of reduced investment into other types of investment (Canning, 2004). Should investment into infrastructure be made at a level above the optimum point, this diverts investment into other types of capital to such an extent that income growth is reduced, and the opposite is true (Canning, 2004).

Interestingly, Canning and Pedro (2008) found in their study that some countries actually have invested too much capital in their infrastructure, resulting in reduced growth of income. Canning (2008) looked at different types of infrastructure variables and concluded that for telephone lines, Latin America is over-invested; Africa is over invested on roads in contrast to OECD countries, which were found to be under-invested in paved roads as a group.

Esfahani and Ramirez (2003) concluded that infrastructure development affects GDP growth substantially. However, the empirical results of this study show that even better outcomes are obtained when institutional reforms are functioning well (Esfahani, 2003). Institutional capabilities lend credibility and effectiveness to government policy, allowing for improved growth through infrastructure development (Esfahani, 2003).

2.6 FDI AND INFRASTRUCTURE DEVELOPMENT

Infrastructure should improve the investment climate for FDI by reducing the cost of investment required from foreign investors and thereby increasing their rate of return (Khadaroo, 2010). Infrastructure is a bigger motivator for FDI into developing countries than it is in developed countries (Rehman & IIyas, 2011). A study by Bellak (2009) into Central and Eastern European countries concluded that infrastructure is a relevant location factor for FDI into these countries. Investors are always on the look-out for markets where they can maximise benefits and will be able to lower their cost of production, which can be achieved if the infrastructure is in a good condition (Bakar, 2012).

Babatunde (2011) conducted a study of 42 Sub-Saharan developing countries during the period between 1980 and 2003, which found a significant and positive relationship between FDI and infrastructure development, emphasising that the absence of infrastructure may lead to unattractiveness to FDI inflows, as more investment will be required from the foreign investor to first set up the infrastructure. Reducing the total cost of investment for the foreign investors increases their potential rate of return (Khadaroo, 2010). Asiedu (2004) explained the deterioration of the Sub-Saharan countries' share of FDI in developing countries, using infrastructure development variables namely ICT, power and transport infrastructure for the period between 1970 and 1999. This study found that relative bigger declines in power and transport infrastructure and lesser increase in ICT infrastructure resulted in the decline of Sub-Saharan countries' share of FDI into developing countries.

Bellak (2009) concluded that ICT is a more significant factor than transport and electricity-generation capacity in Central Eastern European countries. (Bakar, 2012) conducted a study into the determinants of FDI in Malaysia between 1970 and 2010, and found a significant and positive impact of infrastructure into FDI inflows. Good infrastructure of the host country is attractive to MNCs as it allows for lower entry and set-up costs (Chan, 2013).

Most often, the condition of transport infrastructure is seen as some sort of proxy for the overall state of infrastructure for economic activity in economies (Robbins &

Perkins, 2012). As a result, foreign investors associate level of a country's economic development with the development of modernised transport systems (Robbins, 2012). For other public infrastructure such as electricity, MNCs can make investments to supplement deficient public infrastructure for their own private use (Tanaka & Tsubota, 2013). However, the public nature of road networks prohibits the foreign investors from excluding other users from freely utilising these roads, which makes private investments into road infrastructure unattractive (Tanaka, 2013). Infrastructure in transport systems provides foreign investors with lower logistical costs; reliability, punctuality and security in order to better access their inputs and serve their output markets (Khadaroo, 2010). Good transport infrastructure can reduce construction costs of a new factory, transportation of heavy equipment, costs of raw material, start-up costs, etc. (Khadaroo, 2010).

Transport infrastructure of a state has a statistically significant positive relationship with FDI (Coughlin, 1991). This is consistent with a study conducted in Mauritius between 1960 and 2004 that found that foreign direct investors were sensitive to the transport infrastructure of this country, particularly in sectors that crucially depend on it (Khadaroo, 2010). Results of the study show that a 1 percent increase in transport infrastructure capital led to a 0.54 percent increase in FDI inflows.

Results of a study by Hong (2007) into the impact of transport infrastructure on the location behaviour of foreign investors within the Chinese logistics industry illustrated that even though the hardware and logistics infrastructure (roadway and logistics parks) played a pivotal role in their location decisions, availability of software infrastructure such as labour quality was also important. Results of this study also showed significance of the availability of transport network capacity (seaway, roadway and railway) in order to attract FDI in general (Hong, 2007).

Khan, Khan, Zaman and Arif (2014) described energy as the oxygen of the economy and life-blood of growth, particularly in developing countries that are going through the industrialisation phase. As FDI allows MNCs cheaper and easier access to capital that can be utilised to expand or build new factories, all of this results in increased demand

for energy (Omri & Kahouli, 2014; Sardosky, 2010). This was confirmed by Khan (2014) who concluded that FDI increases the demand for energy, resulting in pressures on supply, which in turn increased the prices of energy. Understanding of the relationship between FDI and energy infrastructure (measured as energy consumption) is important as it has significant implications on that country's development policy (Tang, 2009). Should electricity infrastructure be significantly linked to growth in FDI and GDP, then the development policy should encourage electricity infrastructure (Tang, 2009).

Sardosky (2010) conducted a study assessing the relationship between financial development, using FDI, stock market capitalisation and bank deposits as variables, and energy consumption in 22 emerging countries between 1990 and 2006. This study found a statistically significant and positive relationship between stock market capitalisation and energy consumption, and a statistically insignificant relationship between FDI and bank deposits (Sardosky, 2010).

While FDI is expected to stimulate economic growth through transfer of technology, better managerial skills, introduction of new processes and improved productivity, these effects do not impact on the relationship between FDI and energy consumption in a statistically meaningful way (Sardosky, 2010). However, a case study by Bekhet and Osman (2011) in Malaysia between 1971 and 2009 analysed the causality relationship between electricity consumption and FDI inflows. This study showed a unidirectional causality relationship from electricity consumption to FDI and found that there was a significant and positive relationship between the two variable in that country (Bekhet, 2011).

Another study into the relationship between energy consumption and FDI in Shanghai, conducted between 1985 and 2010, also found that an increase in energy consumption causes growth in FDI in Shanghai (He, 2012), while an energy consumption and FDI relationship was found to be strong and bidirectional in the BRIC countries, (Pao, Tsai, 2011).

FDI and technological choices may be impacted by poor quality of electricity networks in the form of frequent power outages resulting in an increase in production costs as companies have to commit resources to obtain back-up power supply or experience machine breakdowns due to inconsistency of power supply (Straub ,2011). The negative impact of power outages has been felt particularly in South Africa, which negatively affected the country's ability to attract FDI as numerous plans to build a multi-billion rand project had to be suspended due to an insufficient power supply. For example, plans to build a high developmental smelter facility at the Coega Industrial Development Zone (Coega IDZ) had to be halted due to insufficient power supply. The growing gap between demand for energy and production thereof retards economic growth (Khan, Zaman, Irfan & Khatab, 2014). Nouzard (2014) conducted a study in 46 countries between 1980 and 2000 and found that power-generating capital made a statistically positive contribution to the effect of FDI on growth to GDP per capita. Tang (2009) also found a statistically significant relationship between electricity consumption and FDI both in the short and long term equilibrium.

ICT infrastructure is critically important in connecting local producers with international business-to-business networks (Addison & Heshmati, 2003). It is widely believed that that telecommunications technology plays an integral role in enhancing economic growth and development in the increasingly integrated global economy (Chakraborty & Nandi, 2011).

The physical distance between MNCs and the host country has a negatively impact on the latter's ability to attract FDI, as greater distance results in higher logistical costs for the foreign investor (Ko, 2007, Choi, 2003). Development of the internet appears to reduce the perceived distance between the host country and the MNCs and therefore significantly induces FDI (Choi, 2003).

Alexander (2010) also found that there is a link between ICT and FDI, indicating that ICT plays a more significant role as a country moves and progresses through the stages in a country's development path. In the initial stages of development in a country's economic life, the study concluded that there was no significant relationship

between ICT and FDI, as countries are focused on natural resources (Alexander, 2010). This finding was also confirmed by a study into 23 countries of differing levels of development which was undertaken by Gholam (2005). Results of this study showed that a higher level of ICT investment attracted higher FDI inflows in developed countries, whereas in developing countries FDI led to more ICT capacity being built (Gholam, 2005). In other words, the causality relationship between the two variables was affected by a country's level of development (Gholam, 2005).

In assessing the impact of ICT on FDI in developing countries, Ko (2007) distinguished between positive network externalities and negative externalities, where the former relates to increased internet usage that led to lower connectivity costs and the latter depicts that increased internet usage results in internet congestion. Positive network externalities encourage FDI, whereas the negative externalities have the opposite effect thereon (Ko, 2007). Increasing internet usage results in positive network externalities and reduces the distance between MNCs and the host country, which attracts more FDI (Ko, 2007). Positive network externalities are more prevalent in developed countries (Ko, 2007).

2.7 FDI TRENDS IN DEVELOPING COUNTRIES

Even though global FDI has continued to see significant increases in the past two decades from, it has historically been destined for developed countries (UN, 2013). In 2000, the developed countries made up of EU, United States and Japan accounted for 71 percent of world inflows. In 2012, FDI to developing countries surpassed FDI inflows to developed countries for the first time ever, accounting for approximately 52 percent (UN, 2013). FDI inflows to developing countries exceeded FDI inflows to developed countries by US$ 212 billion.

Figure 1: FDI by region 2011 - 2013

Table 1. FDI flows, by region, 2011–2013 (Billions of dollars and per cent)			
Region	**FDI inflows**		
	2011	**2012**	**2013**
World	**1 700**	**1 330**	**1 452**
Developed economies	880	517	566
European Union	490	216	246
North America	263	204	250
Developing economies	725	729	778
Africa	48	55	57
Asia	431	415	426
East and South-East Asia	333	334	347
South Asia	44	32	36
West Asia	53	48	44
Latin America and the Caribbean	244	256	292
Oceania	2	3	3
Transition economies	95	84	108
Structurally weak, vulnerable and small economies[a]	**58**	**58**	**57**
LDCs	22	24	28
LLDCs	36	34	30
SIDS	6	7	6
Memorandum: percentage share in world FDI flows			
Developed economies	51.8	38.8	39.0
European Union	28.8	16.2	17.0
North America	15.5	15.3	17.2
Developing economies	42.6	54.8	53.6
Africa	2.8	4.1	3.9
Asia	25.3	31.2	29.4
East and South-East Asia	19.6	25.1	23.9
South Asia	2.6	2.4	2.4
West Asia	3.1	3.6	3.0
Latin America and the Caribbean	14.3	19.2	20.1
Oceania	0.1	0.2	0.2
Transition economies	5.6	6.3	7.4
Structurally weak, vulnerable and small economies[a]	**3.4**	**4.4**	**3.9**
LDCs	1.3	1.8	1.9
LLDCs	2.1	2.5	2.0
SIDS	0.4	0.5	0.4

Source: UNCTAD World Investment Report 2014

Ten of the top 20 countries attracting the highest FDI were developing countries (UN, 2014). Many of these countries are in Asia and Latin America. Even though the developing economies in Africa have also seen increases in FDI this year, there were still marked differences between the former and the developing economies from Latin America and Asia. In 2013, developing economies from Africa accounted for only 3.9 per cent, Latin America and Carribean 20.1 per cent and 29.4 per cent from Asian developing economies (UN, 2014).

On the other hand, developed economies saw huge declines in FDI inflows with 32 percent decline from 2011 to 2012, with the European Union being hardest hit (UN, 2013). Europe, which was historically the largest recipient of FDI, currently stood at levels that were less than one third of its FDI inflows in 2007 (UN, 2014). Taken together, US and Europe made up of 56% of global FDI inflows pre-financial crisis and have declined to 30% in 2013 (UN, 2014). FDI into poor developing countries is known to rely heavily on extractive industries (UN, 2014). This trend has been on the decline with about 90% of total value of green field projects into Africa and Least developed countries going into manufacturing and services (UN, 2014).

The figure below shows some of the developing economies that were ranked in the top 20 most FDI attracting economies in 2013.

Figure 2: Top 20 FDI attracting economies in 2013

Figure 2. FDI inflows: top 20 host economies, 2012 and 2013 (Billions of dollars)

2.8   FDI AND ECONOMIC GROWTH

The relationship between FDI and economic growth has been a subject of great debate and is one is most controversial topics in development economics (Tsai, 1994). An agreement has not been reached in terms of whether and how FDI can promote economic growth in the recipient country (Almfraji, Almsafir, Yao, 2014). It is similar to the chicken-and-egg question (Kiat, 2008). Chowdry and Mavrotas (2006) tested the direction of the causality between three developing countries, namely Chile, Malaysia

and Thailand over the period 1969 to 2000. The findings from this study indicated growth in GDP causes FDI in Chile and not vice versa (Chowdry, 2006). For Malaysia and Thailand, the results showed a bi-directional causality between GDP growth and FDI (Chowdry, 2006).

Empirical literature has, in the main, used neoclassical and endogenous growth models to assess the benefits of FDI with varying results being shown (Almfraji, 2014). These results were often caused by sample selection (developing vs developed countries), selected estimation techniques (OLS, Granger Causality, Cointegration, Error Correction Models), selected time period, estimation methodology (time series vs cross section) (Almfraji, 2014).

Using the Granger Causality technique, a study by Almfraji (2014) on the relationship between FDI inflows and economic growth in Qatar between 1990 and 2010 concluded that inward FDI is positively affected by economic growth, but is more sensitive to its own performance than economic growth. Conversely, the result of this study showed that economic growth is negatively affected by inward FDI and more sensitive to change in inward FDI itself than to the economic growth.

Borensztein (1998) used an endogenous growth model using cross-country regression analysis in developing countries and concluded that the effect of FDI to economic growth is mainly through the transfer of advanced management skills and modern technology and is dependent on the level of human capital in the host country.

Gui- Diby (2014) took a different view on dependability of FDI on the level of human capital in the host country. Empirical evidence from 50 African states showed insignificance of the impact of human capital, as it appeared that FDI inflows between 1980 – 2009 was injected to companies that were involved in the primary sector and therefore did not require high level of human capital (Gui-Diby, 2014). MNCs involved in the extraction and exportation of commodities in raw format generally do not require high level of absorptive capacity (Gui-Diby, 2014).

De Mello (1999) concluded in his study of OECD and non-OECD countries over the period between 1970 and1990 that FDI is expected to boost long-term economic growth of the host country through (i) capital accumulation that incorporates new inputs and foreign technologies; and (ii) knowledge transfers that are expected to supplement the existing stock of knowledge in the host economy.

The extent of the impact of FDI on economic growth is also seen to depend on the technological gap between the foreign investor (leader) and the recipient (follower) (De Mello, 1999). Country-specific factors such as institutions, trade regime, political risk and policy together with absorptive capacity seem to have an effect on the success of knowledge and technology transfers. Alfaro (2004) seemed to agree with this notion, citing that benefits of FDI can only be realised if the financial markets of the host country are functioning well. This study took the view that FDI is an important contributor to economic growth (Alfaro, 2004).

In its study into the relationship between FDI and economic growth in least developed countries (LDCs), Tsai (1994) distinguished two hypotheses, namely dependency and the modernisation hypothesis. The modernisation hypothesis stipulates that FDI is an engine for growth in LDCs by providing external capital with advanced technology, better management and organisation (Tsai, (1994). The dependency hypothesis states that FDI only positively affects economic growth in the short term and reduces it in the long term (Tsai, (1994). The empirical evidence from the study agreed with neither of the hypotheses as it concluded that the impact of FDI on economic growth was overstated (Tsai, (1994). The study pointed out differences among geographical regions with regard to the impact of FDI on economic growth (Tsai, (1994).

Results of a study conducted in Haiti by Chang Lo (2013) revealed that economic growth had no impact on FDI, with the latter not exerting influence on economic growth. Kiat (2008) concluded that FDI follows economic growth and the relationship between the two is found to be significant.

One of the other key questions emerging when faced with the challenge of whether FDI has an impact on economic growth or not is to understand the interaction between FDI and private investment (Maaki & Somwari, 2004). In other words, does FDI complement or substitute domestic investment (Maaki, 2004)? Borensztein (1998) found that FDI complements domestic investment. Borensztein (1998) argued that a foreign investor is most likely to invest in another country if it offers lower production costs and better efficiencies than domestic competitors. The higher efficiencies are most likely to result from more advanced management skills and modern technologies, which would then cause a transfer of these skills into the host country (Borensztein, 1998).

CHAPTER 3:   RESEARCH HYPOTHESIS

As indicated in Chapter 1, the main aim of this study is to obtain an understanding of the relationship between infrastructure development and FDI inflows. This relationship is tested using three components of infrastructure development namely, Information and Communication Technology (ICT), energy supply and transport infrastructure. These infrastructure components are treated as independent variables and FDI is treated as the dependent variable. Furthermore, the study also aims at testing the relationship between FDI and economic growth. For this test, FDI is treated as the independent variable while economic growth is dependent variable.

In order to understand the relationship between the variables as explained above, the following hypotheses to be tested are set as follows: will be tested:

3.1   HYPOTHESIS 1

Null hypothesis (H_{o1}) : There is no significant and positive relationship with FDI inflows onto the host country

Alternative hypothesis (H_{A1}) : ICT has a significant and positive impact on FDI inflows onto the host country

H_{01}: $\mu_{ICT} - \mu_{FDI} \leq 0$

H_{A1}: $\mu_{pi} - \mu_u > 0$

3.2 HYPOTHESIS 2

Null hypothesis (H_{o2}) There is no significant and positive relationship between power supply and FDI inflows.

Alternative hypothesis (H_{A2}) : Power supply has a significant and positive relationship with FDI inflows onto the host country

H_{02}: μ_{power} - μ_{FDI} $\leq$ 0

H_{A2}: μ_{power} - μ_{u} > 0

3.3 HYPOTHESIS 3

Null hypothesis (H_{o3}) : Transport infrastructure has no significant and positive relationship with FDI inflows onto the host country

Alternative hypothesis (H_{A3}) : Transport infrastructure has a significant and positive relationship with FDI inflows onto the host country.

H_{03}: μ_{trans} - μ_{FDI} $\leq$ 0

H_{A3}: μ_{trans} - μ_{u} > 0

3.4 HYPOTHESIS 4

Null hypothesis (H_{o4})   FDI does not have a significant and positive impact on economic growth

Alternative hypothesis (H_{A4})   : FDI has a significant and positive impact on economic growth

H_{04}: $\mu_{FDI} - \mu\Delta_{GDP} \leq 0$

H_{A4}: $\mu_{trans} - \mu_{\Delta GDP} > 0$

CHAPTER 4: RESEARCH METHODOLOGY

4.1 RESEARCH DESIGN

In trying to understand the relationship between infrastructure development and FDI inflows and the latter's relationship with economic growth, this study adopted an experimental research approach. The purpose of an experimental study is to study causal links between variables in order to establish whether a change in one independent variable results in a change in another dependent variable (Saunders & Lewis, 2012). Experimental study is most appropriate in studying cause and effect relationships (Yin, 2009). However, this study does not attempt to test the causality of FDI in its entirety.

Understanding the relationship between two variables is important in order to allow for governments in this context to change the value of the independent variable (infrastructure) so that the desired effect to the dependent variable (FDI inflows) comes about (Zikmund, Babin, Carr & Griffin, 2012). In order to avoid any country-specific effects, panel data analysis was utilised for this study over a period of time, i.e. applying the longitudinal study.

This study used already existing quantitative secondary data which was obtained predominantly from the World Bank data sources, which is considered a credible source of information. Secondary data is defined as existing data used in the research project that was collected for another use (Saunders, 2012). Secondary data can take the form of quantitative data or qualitative data (Saunders, 2012). Quantitative data is data that consists of numbers that normally come in the form of table of figures, whereas qualitative data includes text materials such as minutes of meetings, video and voice recordings and images (Saunders, 2012).

In testing the relationship between FDI and infrastructure development, the dependent variable will be the FDI inflows which will be tested against the independent variables

that are ICT, power and transport infrastructure. In determining the relationship between FDI and economic growth, the former is the independent variable while the latter is the dependent variable. Panel data analysis was the preferred method used to test the relationships mentioned above as can referred below in the data analysis section below.

4.2   SCOPE AND REASONING

This research will follow the trends in infrastructure and FDI inflows in 27 developing countries between 2000 and 2013. This period was chosen as empirical work reviewed covered different periods of time. This period covered sufficient number of years pre-financial crisis in 2008 crisis and the number of years post this period might not be sufficient to exclude its effects. This is one of the limitations of this study. An additional test was also performed to assess the relationship between FDI inflows and economic growth. Because the study will track events over a period of time, this research will take the form of a longitudinal study (Saunders, 2012).

This study is confined only to developing countries, because a lot of empirical research on FDI has been conducted on developed countries as these countries have traditionally been the main recipients of FDI (Asiedu, 2002). Since 2012, this trend has changed when more than 50% of global FDI inflows were injected into developing countries for the first time. This specific period has been chosen because none of the literature reviewed covers this period and also because the global economy has experienced both upswing and downswing during this period.

4.3   POPULATION

Population represents a complete set of items (Saunders, 2012). For the purposes of this research, the population of relevance relates to all developing economies as defined by the World Bank.

4.4   UNIT OF ANALYSIS

In order to test the stated hypothesis, the units of analysis relate to the FDI inflows and infrastructure development variables, i.e. ICT, power supply and road, rail, sea and water infrastructure in developing countries between the periods of 2000 and 2013.

All the variables have been quantified and measured as follows:

Dependent Variable

FDI inflows - has been measured as a percentage of FDI inflows to the GDP of each country. This was calculated using FDI inflows and GDP figures provided by the World Bank data for each country.

Economic Growth

Economic growth - this variable was measured as the annual percentage growth of GDP at market prices using a constant local currency.

Independent Variables

ICT infrastructure – was measured as mobile cellular subscriptions per 100 people. The World Bank defines these variables as subscriptions to public mobile services using cellular technology through the public switched telephone network and includes both post and pre-paid subscriptions.

Power infrastructure – was measured using the electric power consumption (kWh per capita). The World Bank defines this variable as the electricity production of power plants and combined heat less any transmission losses.

Road, rail, water infrastructure – was measured gross capital formation as percentage of GDP. The World Bank defines the gross capital formation as including additions to fixed assets in an economy and net inventory. Fixed assets include roads, railways, schools, offices, hospitals, commercial and industrial buildings, etc.).

The developing countries in this study are categorised into low income, low middle and upper higher income in line with the World Bank standards.

4.5 SAMPLING TECHNIQUE AND SAMPLE SIZE

Firstly, a purposive sampling technique was applied in selecting the first members of the sample. Purposive sampling is a non-probability sampling technique where judgement is used by the researcher to select the sample members (Saunders, 2012). Judgement was used in selecting all of the ten developing countries that are in the top 20 most FDI attracting countries as per the UNCTAD's 2014 World Investment Report.

Secondly, a probability sampling technique called the stratified random sampling was used when selecting an additional sample of countries to be tested. Stratified random sampling is a sampling technique that divides the data into relevant strata groups that have similar characteristics and thereafter selected the sample randomly from each strata or group (Saunders, 2012). The World Bank categorises developing countries into low income, low middle income and upper middle income groups, and these categories were used to stratify the countries into groups for sampling purposes. Random sampling was applied from each of the groups and a sample of 34 countries was chosen.

From the sample chosen above, some observations were dropped due to missing data. In a case where a country had a missing a data point for any of the variables, that country had to be removed from the chosen sample. This was the only reason for deviation from the original sample. The total observations amounted to 324, which were deemed acceptable.

4.6 DATA COLLECTION

Data collected for this research was in the form of quantitative secondary data collected from the World Bank data bank. FDI inflows which were expressed as FDI inflows were derived from dividing FDI inflows by GDP from each country as obtained from the World Bank Data Bank. Measures for the independent variables were gross capital formation (expressed as percentage of GDP), mobile cellular subscription per 100 people and electric power consumption (kWh per capita) were also obtained and are world development indicators, was also available from the World Bank . The World Bank provides credible information that is readily available within the public domain.

The developing countries that are in the top 20 most FDI attracting economies were purposely included in the sample for testing and were obtained from the 2014 UNCTAD World Investment Report.

4.7   DATA ANALYSIS

The nature of data that was used for this study is called panel data. Panel data is data that contains multiple observations for several entities or panels over time (Hsiao, 2003). The entities or panels could be individuals, companies or countries contained in a sample to be tested (Hsiao, 2003). In this instance, "country" represents the panels (i) and "year" represents the time variable (t).

Some of the reasons for choosing panel data and which have been highlighted as advantages over conventional time series and cross sectional studies are the following (Hsiao, 2003):

- It gives a larger number of data points and thereby increases the degrees of freedom and reduces co-linearity among explanatory variables
- Results in improved efficiencies of econometric estimates
- Allows the researcher to analyse a number of economic questions that cannot be addressed using conventional time series and cross-sectional data sets

- Panel data analysis enables the researcher to control for variables that are missing or those that cannot be observed or measured, such as cultural factors or variables that change over time but not across countries.

There are two methods of panel data analysis, namely; fixed effects and random effects models (Hsiao, 2003). When using the fixed effects model, it is assumed that something within a country (such as political system or policies) may impact or bias the FDI or outcome variables and we need to control for this (Hsiao, 2003). Thus, it is assumed that the time-invariant characteristics are unique to the country and should not be correlated with other country characteristics.

Contrary to the fixed effects model, the variations across entities within the random effects model are assumed to be random and uncorrelated with the predictor or independent variables (Hsiao, 2003).

In deciding whether to apply the fixed effects or the random effects model, the Hausman test was conducted. Hausman test was preferred to the pooled ordinary least square as the latter does not account for unobservable country specific effects and becomes a less appropriate estimator for the variables in this FDI model (Addison, 2003). Hausman test shows the correlation of the country specific effects with the explanatory variables (Addison, 2003).

The Hausman test was utilised to test the null hypothesis that the preferred model is the random effects model against the alternative hypothesis that the fixed effects model is the preferred model. The null hypothesis is rejected if the P-value of the Hausman test is less than 0.05 and thus the fixed effects model is applied.

4.8   RESEARCH LIMITATIONS

The following have been identified as limitations to this study:

- The study only focuses on infrastructure development and does not consider other variables that might influence FDI inflows.
- The study only considers the availability of infrastructure and not its reliability. This is due to lack of information and variables to which can be measured reliably.
- The focus of this study is solely on developing countries. The hypothesis tested could produce different results for developed countries.
- This study only limited to unidirectional testing from infrastructure to FDI and does not consider the possible impact of FDI on infrastructure development which could exist. The same applies for testing the relationship between FDI and economic growth.
- Determinants of FDI into in the services industry, a lot of empirical work has focused on FDI into manufacturing.
- Results of this study could be affected by the impact of the financial crisis in 2008. The period post 2008 might not be sufficient to exclude this effect.

CHAPTER 5:   RESEARCH RESULTS

5.1   INTRODUCTION

This chapter relates to the documentation of the results following the quantitative, panel data analysis methodology adopted as explained in chapter 4. Firstly, the results for the descriptive statistics are outlined, based on the categories of developing countries mentioned above namely, low income economies, low-middle income economies, upper-middle income economies, and the developing countries that are in the top 20 most FDI attracting economies. A model was fitted for each of the groups of countries. The results presented cover all of the hypotheses being tested.

Each country data had 14 data points (that is 2000 up to 2013). The data points for all the countries in each category were combined to produce sizable sample sizes. In cases where at least one variable was missing, the data point was removed from the sample. The resultant samples are shown in Table 1:

Table 1: Number of observations for the chosen sample

Group	Country	Sample
Low income Countries	Bangladesh	12
	Ethiopia	12
	Haiti	12
	Kenya	12
	Mozambique	12
	Total	60
Low-middle Income Countries	Ghana	12
	Honduras	12
	Morocco	12
	Nigeria	12
	Pakistan	12
	Philippines	12
	Ukraine	12
	Vietnam	12
	Zambia	12
	Total	108
Upper-middle income countries	Argentina	12
	Malaysia	12
	South Africa	12
	Thailand	12
	Tunisia	12
	Turkey	12
	Total	72
	Brazil	12
	Chile	12
	China	12
	Colombia	12
	Hong Kong SAR, China	12
	India	12
	Singapore	12
	Total	84
Grand Total		**324**

5.2   DESCRIPTIVE STATISTICS

5.2.1   Hausman test

Hausman test was preferred to the pooled ordinary least square as the latter does not account for unobservable country specific effects and becomes a less appropriate estimator for the variables in this FDI model (Addison, 2003). Hausman test shows the correlation of the country specific effects with the explanatory variables (Addison, 2003). As explained in the data analysis section in Chapter 4, the Hausman test was conducted for all the developing countries in determining whether to use the random effects or the fixed effects model.

The figure below shows the Hausman test that was run for the test to determine the relationship between infrastructure development variables and FDI.

Figure 3: Hausman test for ICT, power, GCP and FDI

Hausman fixed vs random			
		-Coefficients-	
(b)	(B)	(b-B)	sqrt (diag(v_b-V_B))
fixed	random	Difference	S.E
Power -0.000000585	1.25E-05	-0.0000131	0.000007720
GCP 0.0013517	0.001168	0.000184	0.000233100
Mobile_cel ≈r 0.0002186	0.00017	0.0000486	0.000034400
b= consistent under Ho and Ha; obtained from xtreg			
B= inconsistent under Ha; efficient under Ho; obtained from xtreg			
Test: Ho difference in coefficients not systematic			
chi2(3) = (b-B) '[(V_b-v_B)^(-1)](b-B)			
= **4.15**			
Prob>chi2 = **0.2456**			

The results showed that the P-value for the Hausman test was 0.2456 which is greater than the significance level of 0.05. This means that the null hypothesis could not be

rejected and thus the random effects model is the preferred model for the panel data analysis (refer to data analysis section in Chapter 4). The random effects model was used applied to analyse the relationship between the infrastructure development variables and FDI across the different categories of developing countries.

In assessing the relationship between FDI inflows and economic growth, the same tests were performed to determine whether to use the random effects or the fixed effects model. The results for this test are shown in Figure 4:

Figure 4: Hausman test for FDI and economic growth

Hausman fixed vs random			
-Coefficients-			
(b)	(B)	(b-B)	sqrt (diag(v_b-V_B))
fixed	random	Difference	S.E
FDI 0.167170600	0.1184198	0.0487508	0.348636000
b= consistent under Ho and Ha; obtained from xtreg			
B= inconsistent under Ha; efficient under Ho; obtained from xtreg			
Test: Ho difference in coefficients not systematic			
chi2(3) = (b-B) '[(V_b-v_B)^(-1)](b-B)			
= **1.96**			
Prob>chi2 = **0.162**			

The results showed that the P-value for the Hausman test was 0.1620, which is greater than the significance level of 0.05. This means that the null hypothesis could not be rejected and thus the random effects model is the preferred model for the panel data analysis. Similarly, the random effects model was applied across the different income levels in performing this test.

5.2.2 Low income economies

The random effects model was applied to establish whether there was a relationship between electric power consumption, gross capital formation, mobile cellular subscriptions (independent variables) and foreign direct investment (dependent variable). The results are shown in the figure below:

Figure 5: ICT, Power and Transport vs FDI for low income countries

. Xtreg FDI Power GCP Mobile_Cellular, re						
Random -effects GLS Regression			Number of obs		=	60
Group Variable: **Country**			Number of groups		=	5
R- sq : within	=	0.4665	Obs per group : min		=	12
betwee	=	0.7171		avg	=	12.0
overall	=	0.5776		max	=	12
Random effects u_i Gaussian				wald chi2(3)	=	**51.82**
corr(u_i,X)	=	0 (assumed)		Prob > chi2	=	**0.0000**

FDI	Coef.	Std.Err.	z	P>[z]	[95% conf. Interval]	
Power	0.000252	0.0000508	4.96	0.000	0.0001525	0.0003516
GCP	0.0057298	0.0008955	6.4	0.000	0.0039747	0.0074848
Mobile_Cel	-0.0001042	0.0001852	-0.56	0.574	-0.000467	0.0002588
_cons	-0.1474118	0.2638120	-5.59	0.000	-0.1991179	-0.0957057
sigma_u	0.1914651					
sigma_e	0.02077896					
rho	0.4591808 (fraction of variance due to u_i)					

The results shows that the P-value of the F test was 0.000 (Wald Chi2 (3) =51.82, Prob > Chi2 = 0.0000). The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least one coefficient is not equal to zero. Since the P-value is less than 0.05, this implies that not all the coefficients are equal to zero and thus the model is good.

The values P>|z| are the two-tail P-values testing the null hypothesis that each coefficient is equal to zero against the alternative hypothesis that each coefficient is different from

zero. The null hypothesis is rejected if the P-value is less than 0.05. If the null hypothesis is rejected then it means that the independent variable has a significant influence on FDI (the dependent variable).

The random effects model was also applied to establish the relationship between FDI inflows and economic growth in low income countries. The dependent variable was annual GDP growth percentage and the FDI inflows were the independent variable as mentioned above. The results are shown in the figure below:

Figure 6: FDI vs GDP growth in low income countries

. Xtreg GDP_Growth FDI, re							
Random -effects GLS Regression				obs		=	60
Group Variable: **Country**				groups		=	5
R- sq : within	=	0.0000		group : min		=	12
betweer	=	0.9253		avg		=	12.0
overall	=	0.0845		max		=	12
Random effects u_i ·Gaussian				wald chi2(3)		=	**5.35**
corr(u_i,X)	=	0 (assumed)		Prob > chi2		=	**0.0207**

GDP_Growth	Coef.	Std.Err.	z	P>[z]	[95% conf. Interval]	
FDI	0.000252	0.1029239	2.31	0.021	0.036398	0.4398522
_cons	0.0069834	0.0046113	1.51	0.130	-0.0020545	0.0160213
sigma_u	0					
sigma_e	0.2899636					
rho	0 (fraction of variance due to u_i)					

The results shows that the P-value of the F test was 0.0207 (Wald Chi2 (1) =5.35, Prob > Chi2 = 0.0207). The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least one coefficient is not equal to zero. Since the P-value is less than 0.05, this implies that not all the coefficients are equal to zero and thus the model is good.

The values P>|z| are the two-tail P-values testing the null hypothesis that each coefficient is equal to zero against the alternative hypothesis that that each coefficient is different

46

from zero. The null hypothesis is rejected if the P-value is less than 0.05. If the null hypothesis is rejected then it means that FDI has a significant influence on economic growth (the dependent variable).

5.2.3   Low-middle income countries

The random effects model was also applied to establish whether there was a relationship between electric power consumption, gross capital formation, mobile cellular subscriptions and foreign direct investment for low-middle income countries. The dependent variable was FDI inflows and the other three variables were the independent variables. The results are shown below:

Figure 7: ICT, Power and Transport vs FDI for low middle income countries

. Xtreg FDI Power GCP Mobile_Cellular, re						
Random -effects GLS Regression				Number of obs	=	108
Group Variable: **Country**				Number of groups	=	9
R- sq : within	=	0.2267		Obs per group : min	=	12
between	=	0.00553		avg	=	12.0
overall	=	0.1181		max	=	12
Random effects u_i -Gaussian				wald chi2(3)	=	**26.32**
corr(u_i,X)	=	0 (assumed)		Prob > chi2	=	**0.0000**

FDI	Coef.	Std.Err.	z	P>[z]	[95% conf. Interval]	
Power	0.00000172	0.0000062	0.28	0.782	-0.000105	0.0000139
GCP	0.0011847	0.0004692	2.52	0.012	0.0002651	0.0021044
Mobile_Cel	0.0001778	0.0000540	3.29	0.001	0.0000719	0.0002838
_cons	0.0026267	0.0121856	0.22	0.830	-0.0212606	0.0265060
sigma_u	0.01530869					
sigma_e	0.01773754					
rho	0.42689631 (fraction of variance due to u_i)					

The results shows that the P-value of the F test was 0.000 (Wald Chi2 (3) =26.32, Prob > Chi2 = 0.0000). The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least

one coefficient is not equal to zero. All the coefficients are not equal to zero and thus the model is good.

The random effects model was also applied to establish whether there was a relationship between FDI inflows and FDI inflows for low-middle income countries. The dependent variable was foreign direct investment and economic growth was the independent variables. The results are shown below:

Figure 8: FDI vs GDP growth in low middle income countries

```
. Xtreg GDP_Growth FDI, re

Random -effects GLS Regression              Number of obs      =      108
Group Variable: Country                     Number of groups   =        9

R- sq : within      =      0.0503            group : min       =       12
        between     =      0.3398                    avg        =     12.0
        overall     =      0.0034                    max        =       12

Random effects u_i -Gaussian                        wald chi2(3)  =     1.24
corr(u_i,X)         =           0 (assumed)          Prob > chi2   =   0.2656
```

GDP_Growth	Coef.	Std.Err.	z	P>[z]	[95% conf.	Interval]
FDI	0.2307077	0.2072257	1.11	0.266	-0.1754471	0.6368626
_cons	0.0694498	0.0112997	6.15	0.000	0.0473027	0.0915969
sigma_u	0.01947836					
sigma_e	0.0449026					
rho	0.15837317 (fraction of variance due to u_i)					

The results shows that the p-value of the F test was 0.2656 (Wald Chi2 (3) =1.24, Prob > Chi2 = 0.2656). The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least one coefficient is not equal to zero. All the coefficients are not equal to zero and thus the model is good.

5.2.4   Upper-middle income countries

The random effects model was also applied to establish whether there was a relationship between electric power consumption, gross capital formation as percentage of GDP, mobile cellular subscriptions and foreign direct investment for upper-middle income countries. The dependent variable was foreign direct investment and the other three variables were the independent variables. The results are shown below:

Figure 9: ICT, Power and Transport vs FDI for upper middle income countries

. Xtreg FDI Power GCP Mobile_Cellular, re							
Random -effects GLS Regression				Number of obs	=		72
Group Variable: **Country**				Number of groups	=		6
R- sq : within	=	0.0542		Obs per group : min	=		12
between	=	0.8623		avg	=		12.0
overall	=	0.2227		max	=		12
Random effects u_i ‑Gaussian				wald chi2(3)	=		**19.48**
corr(u_i,X)	=	0 (assumed)		Prob > chi2	=		**0.0002**
FDI	Coef.	Std.Err.	z	P>[z]	[95% conf. Interval]		
Power	-0.00000019	0.0000017	-0.11	0.911	-0.000004	0.00000321	
GCP	0.0018379	0.0004590	4.00	0.000	0.0009383	0.0027375	
Mobile_Cel	-0.0000152	0.0000505	-0.3	0.763	-0.000114	0.0000837	
_cons	-0.0120522	0.0116913	-1.03	0.303	-0.3496670	0.0108624	
sigma_u	0						
sigma_e	0.01504653						
rho	0 (fraction of variance due to u_i)						

The results shows that the P-value of the F test was 0.000 (Wald Chi2 (3) =19.48, Prob > Chi2 = 0.0002. The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least one coefficient is not equal to zero. Since the P-value is less than 0.05, this implies that not all the coefficients are equal to zero and thus the model is good.

The random effects model was also applied to establish whether there was a relationship between FDI and economic growth in upper-middle income countries. The dependent

49

variable was FDI and economic growth was the independent variable. The results are shown in the figure below:

Figure 10: FDI vs GDP growth for upper middle income countries

```
. Xtreg GDP_Growth FDI, re

Random -effects GLS Regression              Number of  obs        =        72
Group Variable: Country                     Number of  groups     =         6

R- sq : within      =      0.0342           group : min   =        12
        between     =      0.0565                   avg   =      12.0
        overall     =      0.0308                   max   =        12

Random effects u_i -Gaussian                         wald chi2(3)  =      2.23
corr(u_i,X)         =          0 (assumed)           Prob > chi2   =    0.1355

GDP_Growth  | Coef.        Std.Err.      z        P>[z]      Interval ]
FDI         | 0.4120252   0.2760287     1.49      0.136  -0.1289811   0.9530315
    _cons   | 0.0317558   0.0084302     3.77      0.000   0.0152329   0.0482787
sigma_u     |          0
sigma_e     | 0.03949695
       rho  |          0 (fraction of variance due to u_i)
```

The results shows that the P-value of the F test was 0.1355 (Wald Chi2 (3) =2.23, Prob > Chi2 = 0.1355. The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least one coefficient is not equal to zero. All the coefficients are not equal to zero and thus the model is good.

5.2.5   Developing countries in the top 20 FDI attracting countries

The random effects model was also applied to establish whether there was a relationship between electric power consumption, gross capital formation as percentage of GDP, mobile cellular subscriptions and FDI for the developing countries that are in the top 20 most FDI attracting countries in the world. The dependent variable was FDI and the other three variables were the independent variables. The results are shown in Figure 11:

Figure 11: ICT, Power and Transport vs FDI for top 20 developing countries

. Xtreg FDI Power GCP Mobile_Cellular, re							
Random -effects GLS Regression				Number of obs		=	84
Group Variable: **Country**				Number of groups		=	7
R- sq : within	=	0.1301		Obs per group : min		=	12
between	=	0.8606		avg		=	12.0
overall	=	0.6595		max		=	12
Random effects u_i Gaussian				wald chi2(3)		=	**112.08**
corr(u_i,X)	=	0 (assumed)		Prob > chi2		=	**0.0000**
FDI	Coef.	Std.Err.	z	P>[z]	[95% conf. Interval]		
Power	0.00001640	0.0000036	4.51	0.000	0.000009	0.00002350	
GCP	-0.00023	0.0008046	-0.29	0.775	-0.0018069	0.0013469	
Mobile_Cel	0.0007159	0.0001716	4.17	0.000	0.0003795	0.0010523	
_cons	-0.0116086	0.0253760	-0.46	0.647	-0.0613447	0.0381275	
sigma_u	0.0102039						
sigma_e	0.04580958						
rho	0.04727042 (fraction of variance due to u_i)						

The results shows that the P-value of the F test was 0.000 (Wald Chi2 (3) =112.08, Prob > Chi2 = 0.0000. The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least one coefficient is not equal to zero. Since the P-value is less than 0.05, this implies that not all the coefficients are equal to zero and thus the model is good.

The random effects model was also applied to establish whether there was a relationship between electric power consumption, gross capital formation, mobile cellular subscriptions and economic growth for the developing countries that are top 20 most FDI attracting countries in the world. The dependent variable was the economic growth and the other three variables were the independent variables. The results are shown in the figure below:

Figure 12: FDI vs GDP growth for top 20 developing countries

```
. Xtreg GDP_Growth FDI, re

Random -effects GLS Regression              Number of obs           =         84
Group Variable: Country                     Number of groups        =          7

R- sq : within       =        0.0442        group : min             =         12
      between        =        0.2515                avg             =       12.0
      overall        =        0.0283                max             =         12

Random effects u_i -Gaussian                          wald chi2(3)  =       0.64
corr(u_i,X)          =           0 (assumed)          Prob > chi2   =     0.4228

GDP_Growth │ Coef.      Std.Err.    z        P>[z]     [95% conf.  Interval ]
FDI        │ 0.0369057  0.0460460   0.8      0.423    -0.0533427   0.1271542
    _cons  │ 0.0499918  0.0007554   6.62     0.000     0.0351872   0.0647963
sigma_u    │ 0.01539121
sigma_e    │ 0.0232232
       rho │ 0.30518884 (fraction of variance due to u_i)
```

The results shows that the P-value of the F test was 0.4228 (Wald Chi2 (3) =0.64, Prob > Chi2 = 0.4228. The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least one coefficient is not equal to zero. All the coefficients are not equal to zero and thus the model is good.

5.2.6   All Developing Countries Combined

The random effects model was also applied to establish whether there was a relationship between electric power consumption, gross capital formation, mobile cellular subscriptions and foreign direct investment for all developing countries combined. The dependent variable was foreign direct investment and the other three variables were the independent variables. The results are shown in Figure 13:

Figure 13: ICT, Power and Transport vs FDI for all developing countries

. Xtreg FDI Power GCP Mobile_Cellular, re						
Random -effects GLS Regression				Number of obs	=	324
Group Variable: **Country**				Number of groups	=	27
R- sq : within	=	0.0908		Obs per group : min	=	12
between	=	0.4887		avg	=	12.0
overall	=	0.3838		max	=	12
Random effects u_i Gaussian				wald chi2(3)	=	**51.52**
corr(u_i,X)	=	0 (assumed)		Prob > chi2	=	**0.0000**

FDI	Coef.	Std.Err.	z	P>[z]	[95% conf. Interval]	
Power	0.00001250	0.0000037	3.41	0.001	0.000005	0.00001980
GCP	0.001167	0.0004894	2.39	0.017	0.0002085	0.0021268
Mobile_Cel	0.0001700	0.0000571	2.98	0.003	0.0000581	0.0002819
_cons	-0.0121512	0.0143063	-0.85	0.396	-0.0401910	0.0158887
sigma_u	0.03662372					
sigma_e	0.02918361					
rho	0.61163214 (fraction of variance due to u_i)					

The results shows that the P-value of the F test was 0.000 (Wald Chi2 (3) =51.52, Prob > Chi2 = 0.0000. The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least one coefficient is not equal to zero. Since the P-value is less than 0.05, this implies that not all the coefficients are equal to zero and thus the model is good.

The random effects model was also applied to establish whether there was a relationship between electric power consumption, gross capital formation, mobile cellular subscriptions and GDP for all developing countries combined. The dependent variable was foreign direct investment and the other three variables were the independent variables. The results are shown in Figure 14:

Figure 14: FDI vs GDP growth for all developing countries

```
. Xtreg GDP_Growth FDI, re

Random -effects GLS Regression              Number of  obs           =       324
Group Variable: Country                     Number of  groups        =        27

R- sq : within      =          0.0193           group : min      =        12
        between     =          0.0016                   avg      =      12.0
        overall     =          0.0011                   max      =        12

Random effects u_i -Gaussian                            wald chi2(3)  =      3.92
corr(u_i,X)         =            0 (assumed)             Prob > chi2   =    0.0477
```

GDP_Growth	Coef.	Std.Err.	z	P>[z]	[95% conf.	Interval]
FDI	0.1184198	0.0598066	1.98	0.048	0.0012010	0.2356386
_cons	0.0463519	0.0064390	7.2	0.000	0.0337317	0.0589722
sigma_u	0.02846694					
sigma_e	0.03646487					
rho	0.37866655 (fraction of variance due to u_i)					

The results shows that the P-value of the F test was 0.0477 (Wald Chi2 (3) =3.92, Prob > Chi2 = 0.0477. The F tests measure the null hypothesis that all the coefficients of the independent variables are equal to zero against the alternative hypothesis that at least one coefficient is not equal to zero. All the coefficients are not equal to zero and thus the model is good.

CHAPTER 6:   DISCUSSION OF RESULTS

This chapter aims to discuss in detail the results presented in Chapter 5 in relation to four hypotheses being tested in this study. The panel data analysis was used to assess the relationship between infrastructure variables and FDI and also the tests on the relationship between FDI and economic growth. The testing performed was done at a macro level. The results are discussed in relation to the literature reviewed and also the questions raised by the hypotheses.

6.1   DISCUSSION OF RESULTS FOR HYPOTHESIS 1

Null hypothesis (H_{o1})   :   There is no significant and positive relationship with FDI inflows onto the host country

Alternative hypothesis (H_{A1})   : ICT has a significant and positive impact on FDI inflows onto the host country

Table 2: Summary of results for Hypothesis 1

Type of developing country	Accept H_{01}	Reject H_{01}
Low Income	X	
Low-middle income		X
Upper-middle income	X	
Top 20 FDI attracting countries		X
Developing countries combined		X

The coefficients for ICT (measured by mobile cellular per 100 people) (Coef=-0.0001042; P-value = 0.574) have an insignificant contribution to the variance of FDI. This is because the P-value is greater than 0.05 (the significance level). Thus, the null hypothesis cannot be rejected, implying that ICT (measured by mobile cellular per 100 people) does not have

any impact on the FDI for developing countries that are categorised as low income countries.

For low-middle income countries, the results showed that ICT (Coef = 0.0001778; P-value = 0.001) has a significant contribution to the variance of FDI. This is because the P-value is less than 0.05 (the significance level). Thus, the null hypothesis is rejected, indicating that ICT has a significant and positive impact on FDI inflows into the host country in this category.

With respect to the upper-middle income economies, the results showed that ICT (Coefficient equalled to -0.0000152 and P-value equalled to 0.763) has an insignificant contribution to the variance of FDI inflows. This is because the P-value is greater than 0.05 (the significance level). Thus, the null hypothesis for ICT cannot be rejected, which implies that ICT (measured by mobile cellular per 100 people) does not have any impact on the FDI in this group of countries.

For the developing countries that are in the top 20 FDI attracting economies, the results showed that ICT (Coefficient =0.0007159; P-value = 0.000) has a significant relationship with FDI. This is because the P-value is less than 0.05 (the significance level). Thus, the null hypothesis for H1 is rejected, implying that ICT (measured by mobile cellular per 100 people) has a significant and positive impact on FDI inflows into the host country.

When combining all of the developing countries, the results showed that ICT (Coefficient=0.00017; P-value = 0.000) has a significant contribution to the variance in FDI. This is because the P-value is less than the significance level of 0.05. Thus, the null hypothesis is rejected, implying that ICT has a significant and positive impact on FDI inflows into the host country for the combined group of developing countries.

The results depict differences of the impact of ICT on FDI at different stages of the countries' level of development. Results on the low income economies show no significant and positive relationship between FDI and ICT infrastructure. Study conducted by (Alexander, 2010) confirmed that the impact of ICT on FDI is affected by the country level

of development. This is due to the fact that the main determinant of FDI into less developed countries is the endowment of natural resources (Alexander, 2010). Exploitation of these natural resources does not require a significant amount of ICT infrastructure (Alexander, 2010). (Asiedu, 2002) also confirmed insignificant relationship between FDI and existence telecommunications infrastructure in SSA countries.

Poorer countries find it difficult to develop their own ICT infrastructure due to insufficient public and private resources and therefore find themselves in a low ICT trap (Addison, 2003). More FDI is needed in these countries to ensure development of their ICT capacity (Gholam, 2005). Existence of ICT infrastructure in developed countries result in increased FDI inflows flowing to these countries (Gholam, 2005). There is a more significant relationship between ICT infrastructure and FDI as countries progress through the development path (Alexander, 2010). Significant and positive relationship between ICT and FDI shown by the results for low middle income economies is therefore in line with this with this assertion.

The results of this study show a lack of significance between the two variables for the upper middle income countries, which is not aligned to the findings of the literature reviewed. This relationship is expected to be more significant and positive as the country progresses through the development path. ICT infrastructure is a country specific variable as some countries have much better conditions for the introduction of ICT infrastructure than others (Addison, 2003). The suspicion in this study is that the impact of ICT might have been impacted by the country specific effects.

At the aggregate level (when all countries are combined), the results of this study show that a significant and positive relationship between ICT and FDI inflows. Ko (2007) identifies distance between MNC and the host country as a barrier to FDI. The positive network externalities mentioned in Chapter 2 reduce this distance and thereby result in less travelling costs, monitoring costs and information costs to be incurred by the MNC (Ko, 2007).

6.2 DISCUSSION OF RESULTS FOR HYPOTHESIS 2

Null hypothesis (H_{o1}) : Energy consumption does not have any impact on the FDI inflows into the host country

Alternate hypothesis (H_{A1}) Energy consumption has a significant and positive impact on FDI inflows into the host country

Table 3: Summary of results for Hypothesis 2

Type of developing country	Accept H_{01}	Reject H_{01}
Low Income		X
Low-middle income	X	
Upper-middle income	X	
Top 20 FDI attracting countries		X
Developing countries combined		X

For the low income group, the results show that the electric power consumption (kWh per capita) (Coef = 0.000252; Sig= 0.000) has a significant contribution to the variance of FDI. This is because the p-value is less than 0.05 (the significance level). Thus, the null hypothesis for H2 is rejected in favour of the alternative hypothesis, implying that there is a significant and positive relationship between power supply and FDI inflows.

In terms of low-middle income countries, the results illustrate that electric power consumption (kWh per capita) (Coef = 0.00000172; Sig= 0.782) has an insignificant contribution to the variance of FDI. This is because the P-value is greater than 0.05 (the significance level). Thus, the null hypothesis for H2 cannot be rejected, implying that there is no relationship between power supply and FDI inflows for low-middle income countries.

For upper-middle income group of countries, the results showed that the electric power consumption (kWh per capita) (Coef = -0.000000193; Sig= 0.911) has an insignificant contribution to the variance of FDI. This is because the P-value is greater than 0.05 (the

significance level). Thus, the null hypothesis for H2 cannot be rejected, implying that there is no relationship between power supply and FDI inflows for upper-middle income countries.

For the countries that are in the top 20 most FDI attracting economies, the results show that the electric power consumption (kWh per capita) (Coef = 0.0000164; P-value= 0.000) has a significant contribution to the variance of FDI. This is because the p-value is less than 0.05 (the significance level). Thus, the null hypothesis for H2 is rejected in favour of the alternative hypothesis, implying that there is a significant and positive relationship between power supply and FDI inflows for the top 20 developing countries.

When combining all the developing countries, the results showed that electric power consumption (kWh per capita) (Coef = 0.0000125; P-value= 0.001) has a significant contribution to the variance of FDI. This is because the P-value is less than 0.05 (the significance level). Thus, the null hypothesis for H2 is rejected in favour of the alternative hypothesis, implying that there is a significant and positive relationship between power supply and FDI inflows for all developing countries combined.

The results of this study show a mixed relationship between energy consumption and FDI inflows in the different categories of the developing countries, which is in line with some of the literature reviewed.

The results of the relationship between power and FDI inflows in low income economies show a positive and significant relationship between the two variables, which further reaffirms the results discussed for hypothesis 1. The type of FDI attracted in lower income economies largely goes towards extractive industries and hence more basic infrastructure like water and electricity supply has a statistically significant relationship with FDI for these countries (Asiedu, 2002). A study by Tanaka (2013) into Cambodia (least developed country) also found a significant and positive role played by electricity access in attracting investment by foreign firms into this economy These industries have high electricity

consumption levels and foreign investors would therefore require infrastructure to be in place before transferring FDI.

On the other hand, there was a statistically insignificant and positive relationship between energy and FDI inflows for low middle and upper income economies. This study is consistent with Omri (2014) that found that energy consumption has a statistically insignificant effect on FDI inflows in middle income economies. Low and middle income economies could have relatively more diversified FDI inflows into value adding activities that require less amount of energy.

The results for developing countries that are in the top 20 most FDI economies showed significant and positive relationship between the two variables. This could be because an increase in electricity consumption results call for rapid improvement in the efficient use of energy resources and a reduction in CO_2 emissions and thereby more demand for the technological progress that comes with FDI inflow (Omri, 2014) For the high income countries, energy consumption was found to have positive and statistically significant effect on FDI inflows (Omri, 2014). High income countries are not covered in this study. These countries also manage to attract technological progress that comes with FDI (Omri.2014).

The results for the combined group of developing countries, the results show a significant and positive relationship between electricity consumption and FDI. These results are confirmed by a study done by Bekhet (2011) into Malaysia (developing country), which tested the relationship between electricity consumption and FDI. The results of this study confirmed unidirectional long-run causality from electricity consumption to growth in FDI. Nouzard (2014) conducted a similar study to this research paper and tested infrastructure development, using power, telecommunication and transport infrastructure in 46 developing countries. Power-generating infrastructure was the only variable that was found to have a statistically-positive relationship with FDI inflows (Nouzard, 2014).

6.3 DISCUSSION OF RESULTS FOR HYPOTHESIS 3

Null hypothesis (H_{o1}) : There is no relationship between road, seaway and rail infrastructure and FDI inflows into the host country

Alternate hypothesis (H_{A1})   Road, seaway and rail infrastructure have a significant and positive impact on FDI inflows into the host country

Table 4: Summary of results for Hypothesis 3

Type of developing country	Accept H_{01}	Reject H_{01}
Low income		X
Low middle income		X
Upper middle income		X
Top 20 FDI attracting countries	X	
Developing countries combined		X

The results showed that gross capital formation expressed as percentage of GDP (Coef= 0.0057298; P-value= 0.000) has a significant contribution to the variance of FDI as the P-value is less than 0.05 (the significance level). Thus, the null hypothesis for H3 is rejected, implying that there is a significant and positive relationship between road, seaway and rail infrastructure and FDI inflows for the countries in this category.

With respect to low-middle income economies, the results showed that gross capital formation (as percentage of GDP) (Coef= 0.0011847; P-value= 0.001) has a significant contribution to the variance of FDI as the P-value is less than 0.05 (the significance level). Thus, the null hypothesis for H3 is rejected, which implies that there is a significant and positive relationship between road, seaway and rail infrastructure and FDI inflows for low-middle income countries.

Results for the upper-middle income economies showed that the gross capital formation (percentage of GDP) (Coef= 0.0018379; P-value= 0.000) has a significant contribution to the variance of FDI as the P-value is less than 0.05 (the significance level). Thus, the null hypothesis for H3 is rejected, implying that there is a significant and positive relationship

between road, seaway and rail infrastructure and FDI inflows for upper-middle income countries.

For the countries that are listed in the top 20 most FDI attracting economies in the world, the results showed that the gross capital formation (percentage of GDP) (Coef= -0.00023; P-value= 0.775) has an insignificant contribution to the variance of FDI. This is because the P-value is greater than 0.05 (the significance level). Thus, the null hypothesis for H3 cannot be rejected, implying that there is no relationship between road, seaway and rail infrastructure and FDI inflows to the top 20 developing countries that attract most FDI.

For the developing countries combined, the results showed that gross capital formation as percentage of GDP (Coef= 0.0011677; P-value= 0.017) has a significant contribution to the variance of FDI as the P-value is less than the significance level 0.05. Thus, the null hypothesis for H3 is rejected, which implies that there is a significant and positive relationship between gross capital formation expenditure and FDI inflows.

As can be seen from the findings in this study, transport infrastructure has consistently seen a significant and positive relationship with FDI inflows across all the categories, except for the developing countries that are in the top 20 most FDI attracting economies. Significant and positive relationship found is consistent with Khadaroo (2010) who concluded that foreign investors in Mauritius are very sensitive to the existence of transport infrastructure in the country. Transport infrastructure was found to be an important ingredient to attracting foreign capital in both the long and short run (Khadaroo, 2010).

The existence of good transport infrastructure is particularly pertinent in low income countries that attract FDI into extractive industries and are often located in fairly remote areas (Khadaroo, 2012). This was also confirmed by a study into Mozambique and Tanzania that saw an increase of FDI into their mining industry due to increased investment into transport infrastructure to ensure functioning of their export channels (Robbins, 2012).

Coughlin (1991) also found a statistically significant and positive relationship between transportation infrastructure and foreign direct investment. This study concluded that a country that has a more developed infrastructure tends to attract relatively higher FDI (Coughlin, 1991).

6.4 DISCUSSION OF RESULTS FOR HYPOTHESIS 4

Table 5: Summary of results for Hypothesis 4

Type of developing country	Accept H_{01}	Reject H_{01}
Low income		X
Low-middle income	X	
Upper-middle income	X	
Top 20 FDI attracting countries	X	
Developing countries combined		X

For low income developing economies, the results showed that FDI expressed as percentage of GDP (Coef= 0.2381251, P-value= 0.021) has a significant contribution to the variance of economic growth as the P-value is less than 0.05 (the significance level). Thus, the null hypothesis for H4 is rejected, implying that there is a significant and positive relationship between FDI inflows and economic growth for the countries with this level of development.

The results for low-middle income economies showed that FDI inflow (expressed as percentage of GDP) (Coef= 0.2307077, P-value= 0.266) does not contribute significantly to the variance of economic growth as the P-value is more than 0.05 (the significance level). Thus, the null hypothesis for H4 cannot be rejected, which implies that there is no significant and positive relationship between FDI inflows and economic growth for the low-middle income economies.

For the upper-middle income economies, the results showed that FDI inflow (expressed as percentage of GDP) (Coef= 0.41202052, P-value= 0.136) does not contribute significantly to the variance of economic growth as the P-value is more than 0.05 (the significance level). The null hypothesis for H4 can therefore not be rejected, which implies that there is no significant and positive relationship between FDI inflows and economic growth for the upper-middle income economies.

Analysing the group of developing countries that are in the top 20 most FDI attracting economies, the results show that FDI inflow (expressed as percentage of GDP) (Coef= 0.369057, P-value= 0.423) does not contribute significantly to the variance of economic growth as the P-value is more than 0.05 (the significance level). The null hypothesis for H4 cannot be rejected, which implies that there is no significant and positive relationship between FDI inflows and economic growth for this group of countries.

When combining all the developing countries together, the results showed that FDI inflow (expressed as percentage of GDP) (Coef= 0.1184198, P-value= 0.048) contributes significantly to the variance of economic growth as the P-value is less than 0.05 (the significance level). The null hypothesis for H4 cannot be accepted, which implies that there is a significant and positive relationship between FDI inflows and economic growth when taking into account all of the developing economies with the different levels of development.

Empirical literature depicts inconclusive results of the impact of FDI on economic growth, as can also be seen with the results in this study. Results of a study into this relationship by Kiat (2008) also showed mixed results among the different countries. Tsai (1994) also picked up differences in the impact on FDI on economic growth amongst different geographical regions. As the effect of FDI on economic growth is through the transfer of technology and better managerial skills, this impact is dependent on the host country's absorptive capacity demonstrated by its human capital (Borensztein, 1998). Overall, FDI has a positive effect on economic and the magnitude is dependent on the stock of the human capital available in a particular economy (Borensztein, 1998). A country that has a

very low level of human can result in FDI having a negative effect on economic growth (Borensztein, 1998).

Interestingly, the results of this study show that low income economies reject the null hypothesis and therefore show a positive and significant relationship between FDI and economic growth. Results for low-middle and upper-middle income economies show that FDI does not have a significant and positive relationship with economic growth. This is contrary to the expectation in that a country with a better level of development should have a relatively higher level of human capital and thus attract more FDI.

The unexpected results seen in the low-middle, upper-middle income and countries in the top 20 FDI attracting economies could possibly be due to FDI crowding local markets. De Mello (1999) alluded that the effect of FDI on economic growth is also affected by substitution or complementarity between the former and domestic investment. Should FDI crowd domestic investment, this will have a negative impact on economic growth of the host country (De Mello, 1999). To add to this, Kiat (2008) explained in his study that more developed economies often have saturated markets and therefore more FDI tends to create additional competition that can reduce profitability for local players. These foreign would then repatriate their profits back to their country of origin and thus destroy value for the host country.

Maaki (2004) also highlighted other country-specific factors that affect this relationship in that the technological gap that exist between the foreign investor and the host country must also be taken into consideration. The bigger the gap between the foreign investor and the host country, the better the impact of FDI on economic growth (Maaki, 2004). This benefit of the big gap could the reason for the significance and positive relationship FDI and economic growth in low income countries found in this study.

When all the developing countries are combined, the results show a positive relationship between FDI and economic growth. This is consistent with De Mello (1999) that FDI boosts long-term economic growth through imparting new knowledge and foreign

65

technologies that complement existing knowledge. Added capital from foreign investors also results in the procurement of new inputs (De Mello, 1999).

CHAPTER 7: CONCLUSION

7.1 INTRODUCTION

This research was conducted on developing countries between the periods of 2000-2013. This period was chosen as no empirical work was identified covering this period. This period covered a sufficient number of years pre-financial crisis in 2008 but post this period the number of years was possibly not long enough to exclude the impact of the financial crisis.

The research was essentially designed to answer two questions, (i) whether infrastructure variables had a positive and significant relationship with FDI inflows (ii) whether FDI inflows had a positive and significant relationship with economic growth. In answering the first question, the infrastructural development was categorised into three variables namely ICT, energy and transport infrastructure. The relationship between each of the aforementioned variables and FDI was tested.

Panel data analysis using the random effects method was the preferred method for all tests performed to assess all the above mentioned relationships. The developing countries were categorised in accordance to income levels as determined by World Bank standards as follows, low income countries, low and upper middle income countries. In addition to this, all of the ten developing countries that are in the top 20 most FDI attracting economies in the world were purposely included in the sample to be tested. Countries falling under each income level category were grouped together and assessment of each of the groups was conducted. A combined view of all of the countries was also tested.

7.1 FINDINGS AND RECOMMENDATIONS

With respect to the relationship between ICT infrastructure and FDI inflows, the findings in this research paper illustrated that the significance of the relationship between these

variables differs across the different income levels. The income level of a country has an effect on this relationship. FDI into countries with a lower level of income is predominantly injected into extractive industries which often do not require huge amounts of ICT infrastructure to be in place. The results also show that this relationship can be affected by other country specific effects such as better conditions for the introduction or expansion of ICT infrastructure relative to other countries.

More basic infrastructure such as water, electricity and roads are considered more important in the low income countries. This further is affirmed by the positive and significant relationship that was found between FDI inflows and power and transport infrastructure variables in the low income countries. In order to attract much needed FDI inflows into these economies, governments need to invest resources ensure that adequate basic infrastructure is in place. This is a challenge as these economies often do not have enough resources to invest into infrastructure and therefore remain in this low infrastructure trap.

As countries become more developed they become more diversified and dependence on extractive industries becomes less. Hence the more basic infrastructure like power and ICT becomes insignificant as you move through the development path. Results show significance and positive of transport infrastructure and FDI for all the groups of the countries except the developing economies in the top 20 most FDI attracting economies. When all the developing economies have been combined as a group, a significant and positive relationship is found between infrastructure development variables, which is consistent with the literature reviewed.

With regards to the relationship between FDI and economic growth, the main take away point from the literature reviewed was that FDI contributes positively to economic growth through the transfer of technology and managerial skills from the foreign investor to the host country. As a result, this positive FDI impact is dependent on the ability to absorb the transferred technology and managerial skills. Absorptive capacity of the host country is determined by its level of human capital. The expectation was that the countries with higher income levels have a higher level of human capital and therefore find a more

68

significant relationship between FDI inflows and economic growth. Contrary to this expectation, FDI showed a significant and positive relationship between FDI inflows and economic growth in low income economies and an insignificant relationship between the two variables in low middle and upper middle economies. Unexpected results found in low middle and higher middle economies could be resulting from crowding of domestic investment by FDI into these economies which can negatively economic growth in these countries. Governments in these economies will therefore play a pivotal role to ensure equitable distribution of capital and resources to the different sectors of the economy.

7.2 SUGGESTIONS FOR FUTURE RESEARCH

With respect to the work that has been conducted in this research and Suggestions for future research:

- A lot of literature exists on the impact of FDI on economic growth at country level. The positive impact of FDI on economic growth of a country is found to occur through the transfer of technology, new processes and managerial skills from MNCs to the host country. This impact is not only on the entities with which MNCs are affiliated with, but could be also be found on other local entities as they also need to increase their competitiveness to remain relevant. Future research is recommended to assess the impact of FDI inflows on the performance of companies in the host country, as opposed to conducting the assessment of the impact of FDI inflows on economic growth at a macro level. This can be done on industry or sectorial basis, where, for example impact of FDI inflows on the performance of listed companies within the financial services industry of a certain country can be tested.

- This study only assessed the impact of availability of infrastructure development on FDI inflows. It is recommended that future research work on

this variable also incorporates the reliability of infrastructure. Availability of infrastructure is meaningless if it is unreliable.

- Vast amounts of literature exist on the determinants of foreign direct investments. A lot of the literature is concentrated on the impact of these variables on FDI into the manufacturing and extractive industries. Only a limited amount of literature exists on determinants of FDI into services industries such as banking, logistics and telecommunication services, which could be an area of focus for future research. Services industries have continued to make up a significant percentage of GDP in many economies.

- Borensztein (1998) concluded that the positive impact of FDI on economic growth is dependent level of human capital in the host country. A study by Gui-Diby (2014) had a slightly different view that the positive impact of FDI on economic growth was not significantly affected by the level of human capital in the host country. This is because FDI inflows into the host countries (included in the sample of this study) were going towards extractive industries, which did not require high levels of human capital. Future research can be done to ascertain whether the dependence of the impact of FDI on economic growth on the level of human capital differs based on the industry into which FDI is injected in the host country.

REFERENCES

Addison, T., & Heshmati, A. (2003). *The new global determinants of FDI flows to developing countries: The importance of ICT and democratization* (No. 2003/45). WIDER Discussion Papers//World Institute for Development Economics (UNU-WIDER).

Agosin, M. R., & Machado, R. (2007). Openness and the international allocation of foreign direct investment. *The Journal of Development Studies*, *43*(7), 1234-1247.

Alexander, D 2010, *The relationship between information and communication technologies and foreign direct investment at the different stages of investment development path*, MBA dissertation, University of Pretoria, Pretoria, viewed *2014 July 10* < http://upetd.up.ac.za/thesis/available/etd-04042011-142446/ >

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). FDI and economic growth: the role of local financial markets. *Journal of international economics*, *64*(1), 89-112.

Almfraji, M. A., Almsafir, M. K., & Yao, L. (2014). Economic Growth and Foreign Direct Investment Inflows: The Case of Qatar. *Procedia-Social and Behavioral Sciences*, *109*, 1040-1045

Almfraji, M. A., & Almsafir, M. K. (2014). Foreign Direct Investment and Economic Growth Literature Review from 1994 to 2012. *Procedia-Social and Behavioral Sciences*, *129*, 206-213.

Al-Sadig, A. (2009). The effects of corruption on FDI inflows. *CATO Journal, 29(2)*, 267-294.

Ang, J. B. (2008). Determinants of foreign direct investment in Malaysia. *Journal of policy modeling*, *30*(1), 185-189.

Anyanwu, J. C. (2011), Determinants of Foreign Direct Investment Inflows to Africa, 1980-2007, Working Paper Series N° 136, African Development Bank, Tunis, Tunisia.

Asiedu, E. (2002). Policy Reform and Foreign Direct Investment in Africa: Absolute Progress but Relative Decline. *World development*, *30*(1), 107-119.

Asiedu, E. (2004). On the determinants of foreign direct investment to developing countries: is Africa different? *Development Policy Review*, *22*(1), 41- 48.

Asiedu, E. (2006). Foreign direct investment in Africa: The role of natural resources, market size, government policy, institutions and political instability. *The World Economy*, *29*(1), 63-77.

Asiedu, E., & Lien, D. (2011). Democracy, foreign direct investment and natural resources. *Journal of International Economics*, *84*(1), 99-111.

Badu, E., Owusu-Manu, D., Edwards, D. J., & Holt, G. D. (2013). Analysis of Strategic Issues Underpinning the Innovative Financing of Infrastructure within Developing Countries. *Journal Of Construction Engineering & Management, 139(6),* 726-737. doi:10.1061/(ASCE)CO.1943-7862.0000641

Bakar, N. A. A., Mat, S. H. C., & Harun, M. (2012). The Impact of Infrastructure on Foreign Direct Investment: The Case of Malaysia. *Procedia-Social and Behavioral Sciences*, *65*, 205-211.

Batten, J. A., & Vo, X. V. (2009). An analysis of the relationship between foreign direct investment and economic growth. *Applied Economics*, *41*(13), 1621-1641.

Bellak, C., Leibrecht, M., & Damijan, J. P. (2009). Infrastructure endowment and corporate income taxes as determinants of Foreign Direct Investment in Central and Eastern European Countries. *The World Economy*, *32*(2), 267-290.

Bekhet, H. A., & Othman, N. S. (2011). Causality analysis among electricity consumption, consumer expenditure, gross domestic product (GDP) and foreign direct investment (FDI): Case study of Malaysia. *Journal of Economics and International Finance*, *3*(4), 228-235.

Bhattacharyay, B. N. 2009. Infrastructure Development for ASEAN Economic Integration. ADBI Working Paper 138. Tokyo: Asian Development Bank Institute.

Busse, M., & Hefeker, C. (2007). Political risk, institutions and foreign direct investment. *European journal of political economy*, *23* (2), 397-415.

Borensztein, E., De Gregorio, J., & Lee, J. W. (1998). How does foreign direct investment affect economic growth? *Journal of international Economics*, *45(1),* 115-135.

Calderón, C., & Servén, L. (2010). Infrastructure and economic development in Sub-Saharan Africa. *Journal of African Economies*, *19(1)*, 13-87.

Canning, D., & Pedroni, P. (2004). The effect of infrastructure on long run economic growth. *Harvard University*, 1-30.

Canning, D., & Pedroni, P. (2008). Infrastructure, long-run economic growth and causality tests for cointegrated panels. *The Manchester School*, *76(5),* 504-527.

Castro, P. G. D., Fernandes, E. A., & Campos, A. C. (2013). The determinants of foreign direct investment in Brazil and Mexico: an empirical analysis. *Procedia Economics and Finance*, *5*, 231-240.

Chakrabarti, A. (2001). The determinants of foreign direct investments: Sensitivity analyses of cross-country regressions. *Kyklos*, *54*(1), 89-114.

Chakraborty, C., & Nandi, B. (2011). 'Mainline' telecommunications infrastructure, levels of development and economic growth: Evidence from a panel of developing countries. *Telecommunications Policy*, *35*(5), 441-449.

Chan, M. W., Hou, K., Li, X., & Mountain, D. C. (2013). Foreign direct investment and its determinants: A regional panel causality analysis. *The Quarterly Review of Economics and Finance, 54(4),* 579-589.

Chang Lo, C., Lin, Y., Chi, T., Joseph, D. (2013). Foreign Direct Investment Inflows in Haiti: Its Determinants and Impact on Economic Growth. *Business Management Dynamics*, *9*(2), 36-50.

Chowdhury, A., & Mavrotas, G. (2006). FDI and growth: what causes what? *The World Economy*, *29*(1), 9-19.

Coughlin, C. C., Terza, J. V., & Arromdee, V. (1991). State characteristics and the location of foreign direct investment within the United States. *The Review of Economics and Statistics*, 675-683.

Crespo, N., & Fontoura, M. P. (2007). Determinant factors of FDI spillovers–what do we really know? *World development*, *35*(3), 410-425.

De Mello, L. R. (1999). Foreign direct investment-led growth: evidence from time series and panel data. *Oxford economic papers*, *51*(1), 133-151.

Demurger, S. (2001). Infrastructure development and economic growth: an explanation for regional disparities in China? *Journal of Comparative economics*, *29*(1), 95-117.

Gholami, R., Lee, S.T., Heshmati, A. (2005). The causal relationship between ICT and FDI, Research Paper, UNU-WIDER, United Nations University (UNU), No. 2005/26, ISBN 9291907057.

Hale, G., & Long, C. (2011). Are there productivity spillovers from foreign direct investment in China? *Pacific Economic Review*, *16*(2), 135-153.

He, W., Gao, G., & Wang, Y. (2012). The relationship of energy consumption, economic growth and foreign direct investment in Shanghai. *Advances in Applied Economics and Finance*, *3*(1), 507-512.

Hlongwane, X. J. (2011). *The employment spill over of foreign direct investment and host country productivity*, MBA dissertation, University of Pretoria, Pretoria, viewed *2014 April 27* < http://upetd.up.ac.za/thesis/available/etd-07012012-151652/

Hong, J., & Chin, A. T. (2007). Modelling the location choices of foreign investments in Chinese logistics industry. *China Economic Review*, *18*(4), 425-437.

Hsiao, C. (2003). *Analysis of panel data*. Cambridge University press.

Jadhav, P. (2012). Determinants of foreign direct investment in BRICS economies: Analysis of economic, institutional and political factor. *Procedia-Social and Behavioral Sciences, 37*, 5-14.

Khadaroo, A. J., & Seetanah, B. (2010). Transport infrastructure and foreign direct investment. *Journal of International Development*, *22*(1), 103-123.

Khan, M. A., Khan, M. Z., Zaman, K., & Arif, M. (2014). Global estimates of energy-growth nexus: Application of seemingly unrelated regressions. *Renewable and Sustainable Energy Reviews*, *29*, 63-71.

Kiat, J. (2008). *The effect of exchange rate and inflation on foreign direct investment and its relationship with economic growth in South Africa*, MBA dissertation, University of Pretoria, Pretoria, viewed *20140422* < http://upetd.up.ac.za/thesis/available/etd-03172010-140315/ >

Kinda, T. (2010). On the Drivers of FDI and Portfolio Investment: A Simultaneous Equations Approach. *International Economic Journal*, *26*(1), 1-22

Ko, K. W. (2007). Internet externalities and location of foreign direct investment: A comparison between developed and developing countries. *Information Economics and Policy*, *19*(1), 1-23.

Lall, S., & Narula, R. (2004). Foreign Direct Investment and its Role in Economic Development: Do we need a new agenda? *European Journal of Development Research, 16(3), 447-464.*

Luiz, J. M., & Charalambous, H. (2009). Factors influencing foreign direct investment of South African financial services firms in Sub-Saharan Africa. *International Business Review*, *18*(3), 305-317.

Makki, S. S., & Somwaru, A. (2004). Impact of foreign direct investment and trade on economic growth, *American Journal of Agricultural economics*, *3 (8),* 795-801.

Mayfield, J., & Mayfield, M., (2012). National culture and infrastructure development: A comparison among four typologies, *Competitiveness Review, 22 (5),* 396-410

Mottaleb, K. A., & Kalirajan, K. (2010). Determinants of foreign direct investment in developing countries a comparative analysis. *Margin: The Journal of Applied Economic Research*, *4*(4), 369-404.

Naidoo, R. (2012). *The impact of inward FDI on the performance of local firms*, MBA dissertation, University of Pretoria, Pretoria, viewed *2014 April 27* < http://upetd.up.ac.za/thesis/available/etd-02242013-103250/ >

Nourzad, F., Greenwold, D. N., & Yang, R. (2014). The Interaction Between FDI and Infrastructure Capital in The Development Process. *International Advances in Economic Research*, *20*(2), 203-212.

Nunnenkamp, P. (2001). *Foreign direct investment in developing countries: What policymakers should not do and what economists don't know* (No. 380). Kieler Diskussionsbeiträge.

Omri, A., & Kahouli, B. (2014). Causal relationships between energy consumption, foreign direct investment and economic growth: Fresh evidence from dynamic simultaneous-equations models. *Energy Policy*, *67*, 913-922.

Pao, H. T., & Tsai, C. M. (2011). Multivariate Granger causality between CO< sub> 2</sub> emissions, energy consumption, FDI (foreign direct investment) and GDP (gross domestic product): Evidence from a panel of BRIC (Brazil, Russian Federation, India, and China) countries. *Energy*, *36*(1), 685-693.

Patel, U. R., & Bhattacharya, S. (2010). Infrastructure in India: The economics of transition from public to private provision. *Journal of Comparative Economics*, *38*(1), 52-70.

Ramirez, M. (2006). Economic and institutional determinants of foreign direct investments in Chile: time series analysis, 1960-2001:1960–2001. *Contemprary Economic Policy, 3*(24), 459-471.

Rehman, C. A., Ilyas, M., Alam, H. M., & Akram, M. (2011). The impact of infrastructure on foreign direct investment: The case of Pakistan. *International Journal of Business and Management*, *6(5),* 268- 276.

Robbins, G., & Perkins, D. (2012). Mining FDI and infrastructure development on Africa's East Coast: examining the recent experience of Tanzania and Mozambique. *Journal of International Development*, *24*(2), 220-236

Sadorsky, P. (2010). The impact of financial development on energy consumption in emerging economies. *Energy Policy*, *38*(5), 2528-2535.

Sharma, K., Nayagam, J., & Chung, H. H. (2012). Determinants of foreign direct investment in Malaysia: New evidence from cointegration and error correction model. *The Journal of Developing Areas, 46*(1), 71-89.

Sornarajah, M. (2010). *The international law on foreign investment*. Cambridge University Press.

Straub, S., & Hagiwara, A. T. (2011). Infrastructure and Growth in Developing Asia. *Asian Development Review, 28(1),* 119−156.

Tanaka, K., & Tsubota, K. (2013). Does Aid for Roads Attract Foreign or Domestic Firms? Evidence from Cambodia. *The Developing Economies*, *51*(4), 388-401.

Tang, C. F. (2009). Electricity consumption, income, foreign direct investment, and population in Malaysia: new evidence from multivariate framework analysis. *Journal of Economic Studies*, *36*(4), 371-382.

Tsai, P. (1994). Determinants of foreign direct investment and its impact on economic growth. *Journal of economic development*, *13*(2), 137 - 163.

UN (1999). Comprehensive study of the interrelationship between foreign direct investment (FDI) and foreign portfolio investment (FPI). UN: USA. Available from http://UN.org/en/Docs/pogdsdfsbd5.pdf (accessed on 2014 April 20)

UN (2014). World Investment Report (2014): Global Value Chains: Investment and trade for development. UN: USA. Available from http://www.UN.org (accessed on 2014 April 23)

Veloso, V. V (2008). *The impact of broad-based black economic empowerment on foreign direct investment inflows into South Africa*, MBA dissertation, University of Pretoria, Pretoria, viewed *20140420* < http://upetd.up.ac.za/thesis/available/etd-03172010-132714/

World Bank (2009) Policy Research Working Paper 4912: Making Sense of Africa's Infrastructure Endowment,   World Bank, Washington DC.

Yin, R. (2009). How to do better case studies. *The SAGE handbook of applied social research methods*, 254-282.

Zikmund, W., Babin, B., Carr, J., & Griffin, M. (2012). *Business research methods*. Cengage Learning.