

THE ROLE OF INFRASTRUCTURAL DEVELOPMENT IN ATTRACTING FOREIGN DIRECT INVESTMENT IN NIGERIA (1981-2019)

BENUE JOURNAL OF SOCIOLOGY
Volume 9 Issue 2
ISSN: ISSN: 0386
Department of Sociology
Benue State University, Makurdi
Pg: 140 - 153

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Abstracts

The potential of foreign direct investment in a host nation's economic progress and technological advancement is not controversial. Meanwhile, the level of infrastructure sets the pace for foreign direct investment (FDI) flows. The study used a descriptive research design and annual time series data from the Central Bank of Nigeria (CBN) Statistical Bulletin for the years 1981 to 2019. Fully Modified Ordinary Least Squares techniques were used to estimate the econometric model. The result indicates that social infrastructure ($\beta = 0.024313, t = 2.935285, p < 0.05$), has a significant positive influence on foreign direct investment in Nigeria. It was also found that economic infrastructure ($= -0.673199, t = -3.318014, p < 0.05$) showed a negative significant effect on foreign direct investment in Nigeria, while transport infrastructure did not show any effect on foreign direct investment in Nigeria. It was recommended that economic infrastructure that crowds out foreign direct investment should be revitalized by allowing private individuals who are willing to invest in the sector through a public-private partnership agreement.

Keywords: Infrastructural development, foreign direct investment, Social infrastructure Economic infrastructure, Transport infrastructure

Introduction.

Foreign direct investment (FDI) is one of the most essential drivers of a

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country's economic growth (Mfinanga, 2018), because it facilitates the transfer of new technologies while simultaneously enhancing domestic capital formation. FDI benefits developing countries not only by covering their financial needs, but also by bringing advanced technology and management experience to the host country (Can-Ming and Jin-Jun, 2015). FDI comprises not only new investments and mergers and acquisitions, but also reinvested earnings, loans, and other capital transfers between parent companies and their subsidiaries (Ayanwale, 2007).

It refers to long-term participation by one country in another country. It generally comprises participation in management, joint ventures, and the transfer of technology and knowledge. Muraleetharan, Velnamby, and Nimalathasan (2017) FDI is used to measure the number of foreign firms that own productive assets such as factories, land, and mines. Most countries struggle to attract foreign direct investment (FDI) due to its benefits as a tool of economic development (Ayanwale, 2007). However, the level of infrastructure in the host country has been a crucial determinant of FDI inflows (Erdal & Tatoglu, 2002). Infrastructural development can bring down the cost of the whole productive capital in an economy. For example, the development of a well-functioning, wide-ranging telecommunications network reduces the cost for most businesses (Dewit and Leahy, 2018). This is because no amount of development, no matter how large, can lead to a wonderful, healthy life without investments in infrastructure such as telecommunications, transportation, energy, water, health, housing, and education. Infrastructure contributes to improving the quality of growth while lowering economic inequity and poverty. In the same vein, direct infrastructure investment has the ability to generate positive externalities in terms of making industrial facilities available while also lowering trade transaction costs and creating job opportunities (Fatai, Omolara, and Taiwo, 2016).

However, FDI impacts productivity growth, but the level of such growth differs from country to country (Serfraz, 2018). According to Asiedu (2003), Nigeria qualifies to be a key recipient of FDI in Africa due to its natural resource base and enormous market size. This promise could not be fully realized due to the poor state of infrastructural development. One of the biggest hurdles to national economic development is the poor state of infrastructure (Araloyin & Balogun, 2018). Fatai, Omolara and Taiwo (2016)

stated that the appalling state of infrastructure and poor state of repairs and maintenance are apparent on electricity, roads, railways and water facilities.

Due to the inability to address the problems created by the globalization process on foreign direct investment in Nigeria, previous efforts made to increase inflows of foreign direct investment had no impact (Onyeiwu and Shrestha, 2004). In Nigeria, the empirical link between FDI and economic growth has yet to be established. Despite various studies on the impact of infrastructure on FDI in Nigeria, the results are mixed. Multi-country studies have dominated previous influential studies on FDI and infrastructure in Sub-Saharan Africa. Recent data reveals that the relationship between FDI and infrastructure may be country and period dependent. It is against this background that the study becomes imperative. The main objective of this study is to investigate the effect of infrastructural development on FDI in Nigeria. This study is crucial because it will provide a better understanding of the current situation of the Nigerian economy for foreign investors, particularly those considering entering the Nigerian market as well as existing foreign investors.

Literature review

Infrastructure can be described as the basic physical and organizational structures that enable a society or business to function, as well as the services and amenities that enable an economy to function. Soneta, Bhutto, Butt, Mahar, and Sheikh (2012) defined infrastructure as a collection of interconnected structural pieces that create the basis for a comprehensive development structure. Sullivan and Sheffrin (2003) state that "infrastructure" is an essential physical and organizational structure required for a society's operation, such as industries, buildings, roads, bridges, health care, governance, and so on. It can also be described as an enterprise, or the products, services, and facilities required for the effective functioning of the economy.

Oshikoya, Jerome, Hussein, and Miambo (1999) stated that infrastructure is divided into two groups, namely: social or "soft-core" infrastructure and physical or "hard-core" infrastructure. Social infrastructure comprises the provision of health care and education, governance, accountability, and property rights. While the physical

infrastructure includes telecommunication, power, transport, water supply, and sewage, foreign direct investment was described by the World Bank in 1996 as an investment made to gain long-term management of approximately 10% of the voting shares in a company operating in a country other than the investor's, as determined by residency.

Similarly, Todaro and Smith (2009) describe FDI as a corporation that undertakes and oversees productive activities in more than one country. Rutherford (1992) also describes FDI as "investment in enterprises of another country, which normally takes the form of setting up a local production plant or the purchase of existing businesses." The Organization of Economic Cooperation and Development (OECD, 1992) defined FDI as a situation in which a single investor holds less than 10% of the ordinary or voting power in order to have a meaningful influence on the organization's management.

The review of existing theories revealed a number of theories explaining the implication of infrastructure development on society. For instance, the vent for surplus theory, developed by NlaMyint in 1958 and first propounded by Adam Smith, affirms that international trade permits the greater use of economic resources that were closed to domestic trade. As a result, closed economies are more likely to have unused surplus resources. In this context, trade brings about direct gains in the form of lower import prices, as well as indirect benefits through resource structure utilization. Looking at the implications of foreign direct investment on society, several theories abound when it comes to the effects of foreign direct investment on society. The eclectic paradigm, on the other hand, was found useful in this study.

Dunning (1979) introduced the eclectic paradigm, which combines the factors that are central to FDI theories, namely ownership-specific (O), location-specific (L), and internalization (I). All three factors are significant in determining the volume and pattern of FDI. Sean-Leigh (2007) stated that ownership advantage must be in existence in a host country for it to be sufficient to counter the difficulty of competing with firms in their home country. He believes that the advantages are efficient production and marketing, as well as having a global competitive advantage over local firms. Natural resource endowments, personnel and capital, technology and information, administrative and marketing abilities, and organizational

systems are all examples of ownership advantages. Shankar (2007), When it comes to locational advantages, Wall and Ress (2004) stated that exploitation of a firm's ownership advantage in regions other than its local market must result in higher profitability, which could be due to economic, market, or cultural prospective benefits. Through internalization, firms allow businesses to fully use the ownership advantage that emanates from the knowledge of marketing a commodity or providing a service. They also provide an opportunity to keep that specific information safe, as they consider it to be the basis of their competitiveness (Sean-Leigh, 2004).

In the literature, there appears to be a consensus on the impact of infrastructure on foreign investment. The majority of the studies show that infrastructure has a favorable impact on foreign investment. Various infrastructure components, on the other hand, have been identified as infrastructure constituents with a specific effect on foreign investment in the literature. For example, Nwogwugwu, Ajayi, and Iyanda (2015) studied the political economy of infrastructure development in Ogun State, Nigeria, from 2003 to 2011. The study revealed that the construction sector experienced tremendous human capacity development as well as economic growth through a boost to the local economy as income and profits were invested back into the economy rather than being repatriated by foreign construction companies. Soneta, Bhutto, Butt, Mahar, and Sheikh (2012) investigated the impact of public infrastructure on the growth of the manufacturing sector in Pakistan. The findings show that public infrastructure investment in Pakistan has an insignificant impact on the manufacturing sector.

In another study, Ocharo, Wawire, Tabitha, and Kosimbei (2014) examined the causality of foreign direct investment, portfolio investment, and cross-border interbank borrowing on economic growth in Kenya. The study revealed a unidirectional causality between foreign direct investment and economic growth, as well as between economic growth and cross-border interbank borrowing. The coefficients of portfolio investment as a ratio of gross domestic product and cross-border interbank borrowing as a ratio of domestic product were both positive and statistically significant. While the coefficients of foreign direct investment as a ratio of gross domestic product were both positive and statistically insignificant. In the same vein, Ogunjobi (2015) investigated the relationship between energy usage and Nigerian industrial growth. The findings show that there is a significant positive relationship between industrial growth and electricity

consumption, electricity generation, labor employment, and the foreign exchange rate in the long run, but a negative relationship between industrial growth and capital input in the short run (proxied by gross capital formation).

Methodology

This study employed the ex post facto research design. This research method was chosen because it is a quasi-experimental research design that is mostly useful in assessing how an independent variable that was present in the participants prior to the study influences a dependent variable. In line with Kolawole (2016), given that a strong country-specific combination of growth and distribution policies supports infrastructural development, Given that strong country-specific combinations of growth and distribution policies promote infrastructural development and reduce poverty (Bourguignon, 2004), this study captured the effect of infrastructure on foreign direct investment using Barro's (1990) theoretical endogenous growth models as specified in equations. (1) and (2). That is,

$$y=f(k, g) = Ak^\alpha g^{1-\alpha} \quad (1)$$

$$y=f(k, g_1, g_2) = [\alpha k^{-\rho} + \beta g_1^{-\rho} + \gamma g_2^{-\rho}]^{-1/\rho} \quad (2)$$

$$\alpha > \beta, \gamma > 0; \alpha + \beta + \gamma = 1 \text{ and } \rho < -1$$

Where g is infrastructure g_1 and g_2 represent social infrastructure and capital infrastructure respectively. The study adapted the model employed in the study conducted by Edun, Akinde, Olaleye and Idowu (2013) on infrastructural development and its impacts on economic growth, in which they used a simple model with foreign investment and public infrastructure and in the augmented Solow's growth model as adapted by Mankiw, Romer and Weil (1992), the functional relationship between foreign investment and the respective infrastructure components can be modelled as:

$$FDI = f(SCI, ECI, TRS) \dots\dots\dots (3)$$

$$FDI = \beta_0 + \beta_1 SCI + \beta_2 ECI + \beta_3 TRS + e \dots\dots\dots (4)$$

Where FDI = foreign direct investment, SCI = social infrastructure, ECI = economic infrastructure and TRS =transport infrastructure. The magnitude and size of the parameter estimate were examined using the a priori test. This examination is guided by theory to determine if the parameter estimate follows theoretical postulates. The estimates of social

infrastructure, economic infrastructure, and transport infrastructure are all expected to be positive.

Sources of data, measurement and estimation

The secondary data collected from the CBN Statistical Bulletin, Annual Report, and Statement of Accounts was used for this study. Time series data covers the years 1986–2017. In the study, foreign direct investment was defined as direct investment in the reporting economy, social infrastructure was described as investment in social and community services, economic infrastructure was defined as capital investment in economic services, and transport infrastructure was proxied by transport and communication output. In the analysis of the data, the study employed multiple regression analysis techniques using the Fully Modified Ordinary Least Squares (FMOLS) approach in the estimation. The choice of FMOLS is because its estimates have all the same desirable characteristics as in OLS. They also account for the possibility of cointegration in the model.

Results

I. Trend analysis

I. Trend of infrastructure

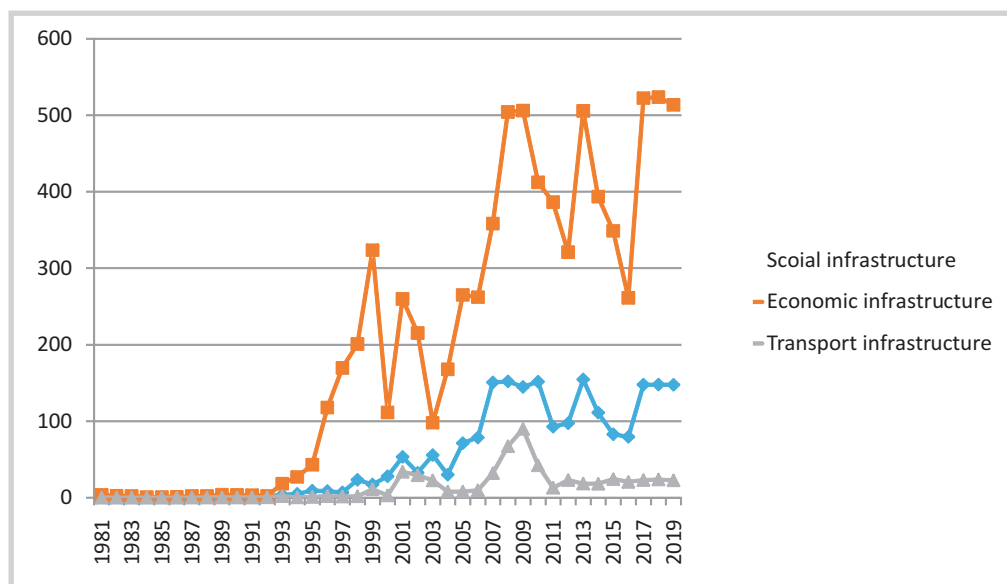
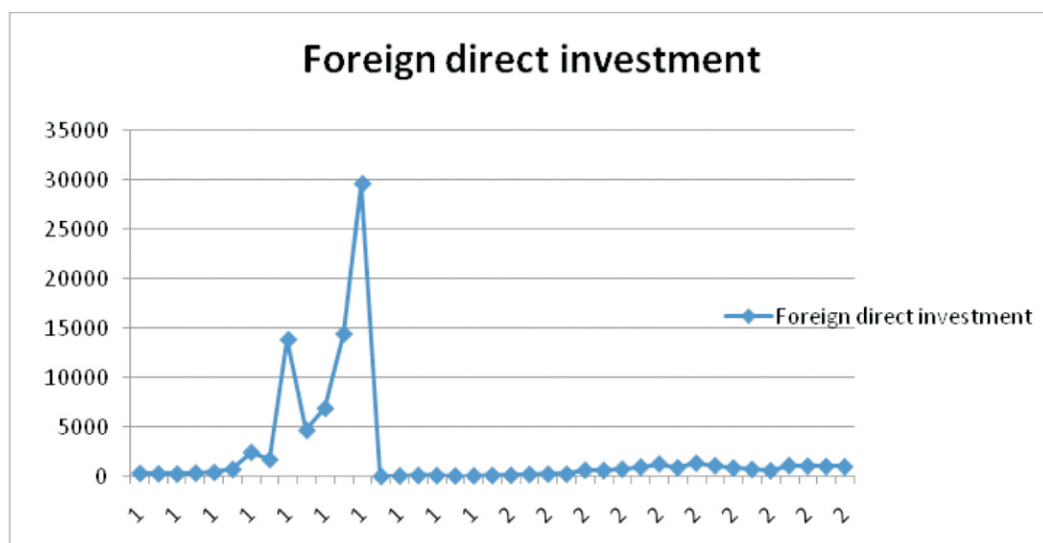


Figure 1: Trend of Infrastructure in Nigeria 1981-2019

Source: Author, 2020

Figure 1 shows that between 1981 and 1994, all the components of infrastructure were very low or nearly zero. However, between 1995 and 1997, there was a rapid increase in economic infrastructure, but the growth in social and transport infrastructure was low. Also, since 1998 up till 2019, there have been ups and downs in economic, social, and transport infrastructure, but economic infrastructure rose faster than social infrastructure, while social infrastructure also rose faster than transport infrastructure.



ii. Trend of foreign direct investment

Figure 2: Trend of foreign Direct Investment in Nigeria 1981-2020

Source: Author, 2020

Figure 2 shows that between 1981 and 1986, the growth in foreign direct investment was very low, or nearly zero in Nigeria. It rose slightly in 1987 but later dropped in 1988. It later rose sharply in 1989 but dropped sharply in 1990. Between 1990 and 1992, it rose very fast to the peak, but it later slipped-down totally near to the origin and thereafter it has been very low, or nearly zero, from 1995 to 2019. This can be attributed to the rising level of insecurity, corruption, militancy, poor infrastructure, and unfavourable government policies prevailing in the country during the last few years.

iii. Descriptive analysis

Table 1: Descriptive statistics

	FDI	SCI	ECI	TRS
Mean	2425.368	48.79324	184.5446	13.80027
Median	654.2000	23.37000	167.7200	3.030000
Maximum	29660.30	154.7100	522.4000	90.03000
Minimum	22.20000	0.240000	0.660000	0.030000
Std. Dev.	5666.522	55.89967	180.1234	19.92164
Skewness	3.609200	0.827223	0.473832	2.134234
Kurtosis	16.31787	2.193103	1.862422	7.907968
Jarque-Bera	353.7677	5.223590	3.379563	65.22478
Probability	0.000000	0.073403	0.184560	0.000000
Sum	89738.60	1805.350	6828.150	510.6100
Sum Sq. Dev.	1.16E+09	112491.8	1167999.	14287.38
Observations	39	39	39	39

Source: Author, 2020

The result of the descriptive analysis shows that all the variables are positively skewed with their means above their medians. While both foreign direct investment and transport infrastructure are symmetric because their skewness coefficients are greater than one, social infrastructure and economic infrastructure are not. The positive values of the kurtosis of all the variables show that all the variables are leptokurtic in nature. The values of the Jarque-Bera statistic show that foreign direct investment and transport infrastructure are generally shared since their p-values are statistically significant at 5% level of significance, while economic infrastructure and social infrastructure are not normally distributed.

1. Correlations matrix

Table 2 presents the results of the multicollinearity tests using a correlation matrix to determine whether the variables are multicorrelated.

Table 2: Correlation Analysis Matrix

	FDI	SCI		ECI	TRS
FDI	1.000000	-0.237973		-0.294936	-0.184704
SCI	-0.237973	1.000000		0.929255	0.776911
ECI	-0.294936	0.929255		1.000000	0.756871
TRS	-0.184704	0.776911		0.756871	1.000000

Source: Authors, 2020

Based on 0.95 huddles for multicorrelation, the results of the correlation analysis as presented in Table 2 show that the correlation coefficients for the relationship among all the variables are below 0.95, indicating the absence of the problem of multicollinearity among the independent variables. The result also shows that the relationships between social infrastructure and foreign direct investment, economic infrastructure and foreign direct investment, and transport infrastructure and foreign direct investment were all negative. To change

4.2 Empirical findings

The following is the result of the econometric model estimation, which was facilitated by the usage of Econometric View:

Table 3: FMOLS Outcome

SCI	0.024313	0.008283	2.935285	0.0062
LOG(ECI)	-0.673199	0.202892	-3.318014	0.0023
DLOG(TRS)	0.352563	0.379365	0.929349	0.3599
C	7.873797	0.655161	12.01811	0.0000
R-squared	0.805575			
Adjusted R-squared	0.738372			
S.E. of regression	1.405493			
Long-run variance	0.022861			

Source: Author, 2020

The result as presented in Table 3 shows that social infrastructure (= 0.024313, $t = 2.935285$, $p 0.05$) exerts a substantial positive effect on foreign

direct investment in Nigeria. The result also revealed that economic infrastructure ($\beta = -0.673199$, $t = -3.318014$, $p < 0.05$) exhibited a negative significant influence on foreign direct investment in Nigeria, while transport infrastructure does not show any effect on foreign direct investment in Nigeria. The effect of social infrastructure and transportation infrastructure on foreign direct investment in Nigeria is positive and in line with a priori expectations, implying that a unit increase in social infrastructure and transport infrastructure will result in increases of about 2% and 35% in foreign direct investment in Nigeria, respectively. The effect of economic infrastructure was negative, contrary to expectations. A unit increase in economic infrastructure resulted in a 6% decline in foreign direct investment in Nigeria.

Discussion, conclusion and recommendations

The result of the **FMOLS estimates** indicates that social infrastructure ($\beta = 0.024313$, $t = 2.935285$, $p < 0.05$) exert a major positive effect on foreign direct investment in Nigeria. The findings was also revealed that economic infrastructure ($\beta = -0.673199$, $t = -3.318014$, $p < 0.05$) showed a negative significant effect on foreign direct investment in Nigeria while transport infrastructure does not show any effect on foreign direct investment in Nigeria. The high value of adjusted R^2 0.738372 shows that even as the sample size grows infinitesimally, the explanatory variables will still jointly explain for at least 74% of the variation in the rate of foreign direct investment in Nigeria.

The implication of this result is that infrastructure has a substantial effect on foreign direct investment in Nigeria because two of the three components of infrastructure tested, economic infrastructure and social infrastructure, have a major effect on foreign direct investment in Nigeria. While social infrastructure contributes positively to foreign direct investment, the contribution of economic infrastructure to foreign direct investment is not significant in Nigeria. This result is in line with the study by Soneta, Bhutto, Butt, Mahar, and Sheikh (2012) on the impact of public infrastructure on the growth of the manufacturing sector of Pakistan. The result indicated that in Pakistan, investment in public infrastructure has a negligible impact on the manufacturing sector. It was also consistent with Ocharo, Wawire, Tabitha, and Kosimbei's (2014) study on the causality

between foreign direct investment, portfolio investment, and cross-border interbank borrowing and economic growth, which studied the impact of foreign direct investment, portfolio investment, and cross-border interbank borrowing on Kenyan economic growth. Foreign direct investment as a percentage of gross domestic product had a positive and statistically significant coefficient. Portfolio investment as a percentage of GDP and cross-border interbank borrowing both had positive coefficients that were statistically insignificant.

This study found that infrastructure has a major effect on foreign direct investment in Nigeria because, of the three components of infrastructure evaluated, two of the components, economic and social infrastructure, have a significant effect on foreign direct investment in Nigeria. While social infrastructure contributes positively to foreign direct investment in Nigeria, the contribution of economic infrastructure to foreign direct investment is insignificant in Nigeria.

Following the empirical findings, the following suggestions are made for policy formulations.

- There is a need for the government to improve the provision and maintenance of infrastructure in schools, hospitals, rehabilitation centres, and other core social infrastructure that has been shown to impact foreign direct investment positively.
- The economic infrastructure, which is in a deplorable state and under-provided, should be revitalized by allowing private individuals who are willing to undertake investment in these areas to operate through a partnership agreement that favours the general public.
- Nigerian policymakers should concentrate on promotional resources to encourage some types of foreign direct investment while regulating others.

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