Public Private Partnership and Economic Growth in Nigeria, (1971 – 2020)

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Abstract

This study investigated the effect of investment via public private partnership on economic growth and development in Nigeria using data set spanning 1971 – 2020. Using the Ordinary Least Squares (OLS) method, the analysis was carried out on a set of data gotten from the World Bank's Private Participation in Infrastructure (PPI) database and World Bank's WDI. The study analysed the effects of total PPP investment on economic growth. The findings of the study surprisingly suggest that PPP investment negatively contributes to economic growth in Nigeria given the data set and period under study. This result is unexpected and could be attributed to limitations of data as well as poor reporting. This finding points to the importance of data that is adequate and consistently available over a long period. PPPs are becoming a necessary solution for strengthening infrastructure and generating economic growth in developing countries. Thus, understanding the empirical links, through research that exists between infrastructure investment using PPPs and economic growth is essential.

Keywords: Private Public Partnership, Economic Growth, Gross Domestic Product, Gross Capital Formation, Population Growth.

Introduction

A lot of reasons ranging from budgetary constraints, increasing or high national debt, and lack of sufficient funds are often identified as possible reasons why developing countries seek to find alternative methods to finance their infrastructure needs so as to further boost economic growth (Altug & Firat, 2018). Due to this, an alternative source of funding, Public Private Partnership (PPP) model has become increasingly popular in recent decades as a mechanism to support infrastructure related investment activities (Maurya & Srivastava, 2019). In an ever-changing environment where economic and political risk perceptions of firms are high (Jermias & Yigit, 2019), making a robust decision for public and private partners on whether to engage in a PPP project can be challenging. Macroeconomic stability is often cited as a significant factor in

determining/implementing PPP projects (Boyer & Scheller, 2018). These macroeconomic variables when tapped into will increase significantly growth and development in the economy.

When well planned, funded and maintained, a developed infrastructure could support a country's competitiveness, economic growth and improve its population's standard of living. On the flip side, access to affordable services is also important for the welfare of their respective economies. However, the traditional way of the government being the sole provider of the required infrastructure has been woefully inadequate to cater for the rising demand and need for infrastructure facilities especially in less developed countries.

One of the factors that hinder the expansion of public infrastructure is funding. The United Nations (2014) concluded that countries in the Sub-Saharan Africa region needed to invest US$93 billion annually to meet their respective development goals. However, actual investment wanly amounted to US$45 billion. This implies a funding gap of about US$50 billion per year.

For the developing world, an estimated investment of US$836 billion annually or 6.1% of current gross domestic product (GDP) was required from 2014 to 2020 to meet new infrastructure demands and to maintain the current levels of services (World Bank Group, 2017). Therefore, the need for infrastructure far exceeds the financial resources currently available from the traditional ways of funding public infrastructure.

The importance of infrastructure for economic growth is well documented. In fact, the establishment of the link between infrastructure and economic development dates back from the time when Aschauer (1989) was investigating the relationship between public infrastructure and economic growth. By using a cross-sectional state-level data, he found that a statistical relationship between infrastructure and economic growth exits.

A cross country panel study by Ganelli and Tervala (2016) also found that a rise in public infrastructure investment is positively linked with economic output. Moreover, using a traditional Solow growth model, Estache, Veredas, and Speciale (2005) argued that

infrastructure matters for economic growth in Sub-Saharan Africa, mainly infrastructure in the telecoms and road sectors.

Empirically, the involvement of the private sector in providing public infrastructure and its impact on economic growth is not well resourced. Most available studies only analyse factors that determine the success of PPP investments (e.g. Babatunde et al., 2012; Basilio, 2017).

Analysing the involvement of private sector in providing public infrastructure, therefore, is important. While the private sector is regarded to be efficient in the way they provide infrastructure, they are generally more concerned with making profits. This is different from the motive of the public sector which is more to do with promoting efficiency within the economy through the multiplier effect that infrastructure has on the enhancement of economic growth. Combining the expertise of both the public and the private sectors in providing public infrastructure thus makes it necessary to investigate how the outcomes of such a partnership impacts on economic growth.

Despite Nigeria's position as a major oil producer and exporter for over four decades, and with an expenditure of over 14 trillion naira (ICRC, 2013), Nigeria's stock of basic infrastructure largely falls short of the minimum required to engender sustainable economic growth. Water supply, sewerage, sanitation, drainage, roads, electricity, waste disposal and most urban infrastructure, all suffer from years of neglect and under-funding. Periodic and routine maintenance, which ought to be the most cost-effective infrastructure spending, is negligible. There is limited private sector participation due largely to weak legal, institutional and regulatory framework. Given this condition, it is important to estimate and have the knowledge of the contribution or impact so far of PPP in growth and development of Nigeria. This study will estimate the impact of PPP on economic growth and development in Nigeria looking at the period spanning 1991 to 2010.

Public-Private-Partnership (PPP) became necessary for the government to leverage on to tackle the bottlenecks associated with public funding and provision of infrastructure as well as basic services and to secure or access private sector partnership/funding in the provision of infrastructure in other to cover infrastructure gap and to also meet up the

2030 Sustainable Development Goal. PPP investment in provision of infrastructure is not only important for economic growth, but it is also crucial for the provision of and access to basic services such as electricity, water, sanitation and roads (ICRC, 2013).

In Nigeria, the adoption of the PPP way of funding infrastructure is gaining attention, particularly for the development of both core economic and social infrastructure (ICRC, 2013). More important, because of the new 2030 Agenda for Sustainable Development in developing countries, attention is being given to the role of PPPs in providing essential infrastructure that will be critical in achieving their Sustainable Development Goals (SDGs).

Review of Literature

Public Private Partnership

Public private partnership has been defined as arrangements between governments and private sector entities for the purpose of providing public infrastructure, community facilities and related services. Such partnerships are characterized by the sharing of investment, risk, responsibility and reward between the partners (British Columbia Ministry of Municipal Affairs, 1999).

According to Jose & Jose (2019), the Organisation for Economic Development and Cooperation (OEDC) defines a public-private partnership as an agreement between the government and one or more private partners (which may include the operators and the financers) according to which the private partners deliver the service required in such a manner that the service delivery objectives of the government are aligned with the profit objectives of the private partners and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners. The public partners in a PPP are government entities, including ministries, departments, municipalities, or state-owned enterprises. The private partners can be local or international and may include businesses or investors with technical or financial expertise relevant to the project.

Empirical Review of Literature

Jasiukevicius and Vasiliauskaite (2013) shifts the focus from developing countries and examine the linkages between economic growth and PPP market development in EU countries. The authors use a combination of scientific literature and statistical data analyses to analyse the degree to which economic growth and the PPP market development indicators are related in EU countries. These indicators include the number and the value of PPP projects. The results indicate that GDP growth responded positively to the development of the PPP market, if measured over a period of 20 years. However, the results varied notably across the countries that were analysed. For example, Belgium, Ireland, France and the United Kingdom (UK) were the only countries that showed a strong correlation between GDP growth and PPP market.

Yurdakul, & Kamasak (2020) researched on the topic 'Investment through Public Private Partnership (PPP): the impact of PPP activities on the growth of GDP', the purpose of the study was to investigate the relationship between Public Private Partnership (PPP) activities and their impact on Gross Domestic Product (GDP). The study employed a time series dataset of Turkey that includes the number of PPP activities and GDP between 1990 & 2014. Using a Vector Auto Regression (VAR) method for analysis, the analysis revealed that there is only a weak association between GDP and PPP. The study further suggested that, the reason for the result might be related with the other macroeconomic factors that affect the growth of GDP as a proxy of overall economic development.

Mofokeng (2018) analysed the impact of Public Private Partnership (PPP) investment on economic growth in 39 developing countries, using a traditional growth model. Applying the system Generalised Method of Moments (GMM) estimation technique, the analysis was carried out in two ways. First, the study analysed the effect of total PPP investment on economic growth, measured in GDP per capita. Secondly, PPP investment was disaggregated into the three PPP sectors, namely energy, transport, and water and sanitation. Using the World Bank's Private Participation in Infrastructure (PPI) database covering the period 1997 – 2016. The study found that, PPP investment positively contributes to economic growth. But when disaggregated by sector, the results of the

study suggest that none of PPP investment in the selected sectors positively contribute to economic growth. PPP investment in the energy and transport sectors were found to contribute negatively to economic growth. In contrast, PPP investment in the water and sanitation sector was found to be insignificant when it comes to explaining economic growth in developing countries.

Checherita (2009) analysed the determinants for investment relative to the GDP of developing countries on three levels (private, public and PPP). The study used data from the World Banks's PPI database. By examining the determinants for investment in PPP projects, the study found that countries that are more likely to implement larger PPP programmes were countries who already had experience with such programmes. The study also concluded that the share of PPP investment in GDP depended on the size of the economy which meant that the bigger the size of the economy, the larger the PPP programme is likely to be.

Hyun, Park and TIan (2018), researched on Determinants of Public–Private Partnerships in Infrastructure in Asia: Implications for Capital Market Development. The aim of the paper was to understand the role of greater access to finance, i.e., stocks, bonds, and bank loans, in public–private partnership (PPP) investment in developing countries, since most developing countries still depend heavily on fiscal financing for infrastructure projects. Using the WB PPI dataset from selected 12 LMICs from 1995 to 2015, their findings reconfirmed the fact that banks remain the major source of finance for infrastructure projects. They suggested that the domestic bond market should be further developed to have depth and liquidity enough to provide long-term funding for private sector investors. Interestingly, the study found a negative impact of bond market development on PPP investment; a possible interpretation they provided for this is that, financing through government bonds, which dominates bond markets in developing countries, discourages private sector participation by reducing financing access to the corporate bond market.

Chikaza & Simatele, (2021) researched on 'Private Financing for Infrastructural Development: A Search for Determinants in Public–Private Partnerships in SSA'. Their

study applied the Extreme Bounds Analysis and Logit regressions to identify critical determinants of public-private partnerships using unbalanced panel data covering 40 sub-Saharan African countries from 1995 to 2020. Their study identified five key variables (i.e. Regulatory Quality, Population, Gross Domestic Product, Foreign Direct Investment, and Government Spending) as positive significant determinants of infrastructure investments flows in sub-Saharan Africa. The implications of these results according to them, indicates ardent need for sub-Saharan African countries to promote prudent policies around these key drivers to promote private sector investments in the region.

Yurdakul, Kamasak, & Ozturk, (2021), researched on the 'Macroeconomic drivers of Public Private Partnership (PPP) projects in low income and developing countries: A panel data analysis' using a comprehensive panel data of 137 low income and developing countries. The aim of the study was to investigate the macro-economic drivers of Public Private Partnership (PPP) in these countries. Using data set from WB PPI and the Ordinary Least Square s method of analysis, the findings of the study suggest that general government balance, population size, money supply and the share of investments in GDP are significant determinants of PPP activity.

Oluwaseun, O. & Odun, O. (2014) researched on the topic 'Public Private Partnership and Nigerian Economic Growth: Problems and Prospects' The paper aimed providing answers to the soaring demand for infrastructure in Nigeria, which is increasing geometrically and its satisfaction not duly met by existing contracting methods. The paper also analyzed the challenges militating against the implementation of Public Private Partnership (PPP) agreements in the country viz a viz the underlying prospects waiting to be tapped. The paper finally recommended that stakeholders in the areas of PPP should be adequately trained and enabling laws be domesticated in each state of the federation in order to take advantage of the sensitive nature of public properties and ensure continuity in governance. This study was a qualitative survey.

Egbewole (2011) in a long essay titled "Examining Public Private Partnership in Nigeria: Potentials and Challenges, whose study was qualitative, aimed at enlightening and or educating persons ignorant of what PPP is actually about and its mode of operation. After

series of literature reviewed, the study highlighted several concepts related to PPP practice, the study essentially focused on potentials and challenges of public private partnership placing its search light on its nature and types, it went further to talk on the benefits and challenges facing PPP within and without Nigeria, including among others regulatory, legal, political funding and cultural issues. He concluded by believing that it is understood what exactly public private partnership is all about, that it is not just a process of siphoning money or for controlling of the government by particular set of people but is a very essential tool in community development.

Methodology

This study proposes to estimate the desired models to capture the stated objectives numerically using time series secondary data for the period 1971 - 2020 as given by WB PPI data base.

A multiple linear regression with the application of Ordinary Least Squares (OLS) technique will be employed to estimate the parameters of the model numerically

To evaluate the impact of PPP investment on growth and development, this study will adopt a multiple linear regression model.

Based on this approach, the specific functional form of the model is given as;

$$GDP = f(PPP, INF, EXRT, GCF, POP, DCREDIT, M3) \quad - \quad - \quad (1)$$

Variables are described in table 1 below.

The choice of the variables used in model (1) above is justified by the subject matter of the research, knowledge of a priori, theoretical and other literature reviewed.

The linear form of equation (1) is justified by the use of OLS estimation method and to help determine the responsiveness of the parameter estimates to the dependent variable.

The mathematical form of equation (1) above is given as:

$$GDP = \alpha_0 + \alpha_1 PPP_t + \alpha_2 INF_t + \alpha_3 EXRT_t + \alpha_4 GCF_t + \alpha_5 POP_t + \alpha_6 DCREDIT_t + \alpha_7 M3_t + \varepsilon_t ---------- (2)$$

$$GDP = \alpha_0 + \alpha_1 PPP_t + \alpha_2 INF_t + \alpha_3 EXRT_t + \alpha_4 GCF_t + \alpha_5 POP_t + \alpha_6 DCREDIT_t + \alpha_7 M3_t ---------- (3)$$

The Econometric form of the model to capture objective one is stated as:

$$GDP = \alpha_0 + \alpha_1 PPP_t + \alpha_2 INF_t + \alpha_3 EXRT_t + \alpha_4 GCF_t + \alpha_5 POP_t + \alpha_6 DCREDIT_t + \alpha_7 M3_t + \varepsilon_t ---------- (4)$$

Explanation of Variables

Table 1: Description of Variables

S/N	Variable Name	Abbreviation	Variable Description	Data Source
1	Gross Domestic Product	GDP	GDP current LCU.	World Bank's World Development Indicator Database
2	PPP Investment	PPP	Investment on contractual arrangements for public infrastructure projects that have reached financial closure. Private sector assumes operating risks.	World Bank's Private Participation in Infrastructure database
3	Gross Capital Formation	GCF	This was previously known as gross domestic investment. It includes expenditure	World Bank's World Development Indicators database

			on fixed assets of the economy plus net changes in inventory levels. Fixed assets include land improvements, plant machinery and equipment purchases.	
4	Population Growth	PoP	Annual population growth rate. Population includes all residents regardless of legal status or citizenship.	World Bank's World Development Indicators database
5	Broad Money Supply	M3	Broad money is currency found outside banks and demand deposits but not central government deposits.	World Bank's World Development Indicators database
6	Inflation Rate	INF	Annual percentages of average consumer prices, based on year-on-year changes.	International Monetary Fund's World Economic Outlook data base
7	Exchange Rate	EXRT		International Monetary Fund's World Economic Outlook data base
8	Credit Extension to Private Sector	DCREDIT	This refers to credit provided to the private sector such as financial resources	World Bank's World Development Indicators database

			provided by financial corporations.	

ADF Unit Root Stationarity Test

Table 2 below shall present result for the Augmented Dickey – Fuller (ADF) unit root test of stationarity on the variables.

Table 2 ADF Unit Root Test.

Variables	**ADF Statistics**			**Test Statistics**		**Order of Integration**
	Level	**First Difference**	**2nd Difference**	**5%**	**10%**	
Exchange Rate (EXRT)	2.8952	-4.4417**		-2.9237	-2.5999	I(1)
Gross Capital Formation (GCF)	-3.7402**			-2.9390	-2.6079	I(0)
Gross Domestic Product (GDP3)	6.2435**	-3.4448*		-3.5063	-3.1830	I(1)
Inflation (INF)	-2.1184**			-1.9478	-1.6124	I(0)
Money Supply (M3)	6.2152**			-2.9224	-2.5992	I(0)
Population (POP)	1.6691	-3.8205**		-3.5331	-3.1983	I(1)
PPP	-6.0140**			-1.9477	-1.6126	I(0)
Domestic Credit (DCREDIT)	-3.4218*	-5.7830**		-3.5107	-3.1855	I(1)

***** Indicates Stationarity at both 5% and 10% critical values.***
D = Differencing Non stationary variables to make them stationary

As shown in Table 2 above, exchange rate (EXRT), Gross Domestic Product (GDP), population (POP) and domestic credit to the private sector (DCREDIT) are all integrated of order one (i.e. they are I(1) processes). This implies that, at their level forms, they are not mean reverting (they are spurious) but became mean reverting after first difference. It is in the first difference form that they will be applied in the model.

While other variables likes Gross Capital Formation (GCF), inflation (INF), Money Supply (M3), data on gross Public Private Partnership (PPP) where stationary at their level form implying that they were mean reverting at their level form and does not need to be differenced to make them ready for analysis (i.e. they are I(0) processes; stationary at level).

The order of integration shown on table 2 above does not give room to suspect a long run relationship or cointegration among the variables so, the test for cointegration or long run relationship will not be performed.

Presentation and Interpretation of OLS result

Table 3 below will present the result for this research based on the analysis from the data gathered during the course of conducting this study.

Table 3: Result from Regression Analysis.
Dependent Variable is Gross Domestic Product (DLog(GDP)) 1971 - 2020

Variables	**Coefficients**	**Standard Errors**	**T-Statistics**	**Probability of T-Statistics**	
C (constant)	-3.5801	2.5879	-1.3833	0.1771	*Not Significant*
PPP	-5.4600	1.8500	-2.9565	0.0061	***Significant***
LOG(INF)	0.0974	0.0367	2.6527	0.0128	***Significant***
D(EXRT)	-0.02627	0.0644	-0.851670	0.4077	*Not Significant*
LOG(GCF)	0.2930	0.1739	1.6856	0.1026	*Not Significant*
DLOG(POP)	56.8585	57.5029	0.9887	0.3309	*Not Significant*
DLOG(DCREDIT)	-0.0271	0.0178	-1.5243	0.1383	*Not Significant*
Log(M3)	0.0380	0.0298	1.2740	0.2128	*Not Significant*

D = Differencing Non stationary variables to make them stationary
Log = Logging of variables. **** Table 3 is Authors computation.***

R-Squared	= 0.5019	**F-Statistics**	= 4.1749
Adjusted R-Squared	= 0.3817	**Prob. (F-Statistics)**	= 0.0027

The table above presents result for the regression showing the effect of public private partnership, inflation, population, domestic credit, gross capital formation and exchange rate on growth and development (GDP) in Nigeria.

Evaluation Based on Economics Criteria

The estimated parameters will be subject to test based on theory to ascertain whether or not the estimated parameters are well behaved. This test will further tell us whether or not

and to what extent the coefficients derived from the result of our regression conforms to a'priori expectations in terms of sign, magnitude and level of significance.

Following the 2-t Rule of Thumb, a variable is statistically significantly different from zero if the t-value corresponding to the variable is greater than 2 in absolute terms at a given % level of significance (5% for this current study) and with a given sample size of at least 30. Similarly, a variable is not statistically significant if its t-value is less than 2 in absolute terms at a given % level of significance and with a sample size of at least 30. The evaluation of the result in table 3 with respect to economic criteria will be made based on this condition.

The constant in the model which stands for the value that growth and development will assume if all other variables are statistically significantly not different from zero has a negative coefficient implying that if all other explanatory variables in the model are statistically and significantly not different from zero, growth and development will reduce by 3.5801 units which is a very large reduction.

Public private partnership which captures the investment collaboration between the public and private sector in growth and development also has a negative sign implying that there exist a negative relationship between investment through public private partnership and growth and development. This negative relationship and the corresponding magnitude of the coefficient is considered statistically significantly different from zero since the t-statistics corresponding to PPP is greater than 2 in absolute terms at 5% level of significance. This implies that, if PPP investment increases by one unit, growth and development in Nigeria will decrease by 5.46 units.

Inflation rate has a positive sign in this model and this does not conform to a'priori expectation. The effect of inflation rate in this model is statistically significantly different from zero since the t-statistics corresponding to the coefficient of inflation in this model is greater than 2 in absolute terms. What this implies is than, a unit increase in the rate of inflation in Nigeria will cause growth and development to increase by (0.097) that is 9.7%.

Exchange rate has a negative sign implying a negative relationship with the dependent variable. This implies that a unit increase in exchange rate will cause growth and development to decrease by an amount corresponding to the coefficient of exchange rate in the model and vice versa. The effect of exchange rate in this model is not statistically significantly greater than zero since the t-statistics corresponding to exchange rate 0.4077 is less than 2 in absolute terms. This variable therefore does not have an individual effect on growth and development in this model.

Gross Capital Formation (GCF) has a positive sign which conforms to a'priori expectation implying that an increase in GCF will increase growth and development. This variable is also not statistically significantly different from zero given a t-statistical value of 0.1026 which is less than 2 in absolute terms.

The population variable has a positive sign in this model implying a positive relationship with growth and development. This implies that if the population of the country increases by one unit, growth and development should also increase. The effect of population on growth and development is not statistically significantly different from zero as shown by the t-statistics value of 0.9887 which is less than 2 in absolute terms. The interpretation therefore is that, if population of the country increases by one unit, growth and development should increase by a value corresponding to the coefficient of population in the model i.e. 56.86 units which is a very large increment.

Next explanatory variable is domestic credit to private sector. This variable has a negative sign which does not follow a'priori expectation. This is because if credit is made available to the private sector, they should increase their investment in PPP. This variable is also considered not to be statistically significantly different from zero since it has a t-statistics of 0.1383 which is less than 2 in absolute terms. Therefore, its significant impact is not necessary.

Evaluation Based on Statistical Criteria

The Coefficient of Determination R^2

The R^2 is a test statistic that ranges between 0 and 1 (i.e. $0 \leq R^2 \leq 1$) and it measures the goodness of fit of a particular model. The closer it is to 1, the better the fit. The R^2 value of this research is 0.5019 which means that, the variations (changes) in the explanatory variables explain about 50.19% of the variation (change) in the dependent variable i.e. (growth and development). This is an average fit since the various variables combined together explains approximately 50% of the variation in the dependent variable.

The F-Statistics Test

The F-test measures the overall significance of the model and it follows an F-distribution. It measures the collective impact of the explanatory variables on the dependent variable. The test procedure is as follow,

Null hypothesis

H_0: $\alpha_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$ (jointly i.e. the model is not significant)
H_1: $\alpha_0 \neq \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq 0$ (jointly i.e. the model is significant)

At ά=5% with k-1(v_1) and n-k (v_2) degrees of freedom. N=number of observations (36) and k= number of regressors used in model (7).

Decision rule

Reject H_0 if $F_{cal} > F_{tab}$ accept if otherwise.
$F_{cal} = 4.1749$
$F_{tab} = F_{0.05(k-1,n-k)} = F_{0.05(7,37)} = 3.34$

Conclusion

Since F_{cal} (4.1749) at 5% level of significance is greater than F_{tab} (3.34), we reject the null hypothesis and conclude that the variables in the model are jointly statistically significant.

Evaluation of Research Question

What is the effect of total PPP investment on growth and development in Nigeria?

To answer this research question, we shall refer to table 3 above. The variable PPP in table 3 captures the total PPP investment on growth and development in Nigeria. The

coefficient of the variable has a negative sign which is not expected; this is because investment in PPP is supposed to have a positive relationship with growth and development. The applicability of this variable to improve growth and development of infrastructure depend on whether or not the variable is statistically significantly different from zero. Applying the 2-t Rule of Thumb help conclude that total PPP investment variable in the model is statistically significantly different from zero and so can be used to estimate the effect of total PPP investment on growth and development in Nigeria given the period under study. Therefore, the effect of total PPP investment on growth and development can be explained as follow. A one unit increase in total PPP investment in Nigeria will decrease growth and development by 5.46 units i.e. 546% holding all other variables constant. This effect is very significant, strong and negative which is not expected. The possible reasons for this may be due to poor reporting data, missing data values etc.

Findings and Implications

Economic Implications

The major implication from the above result is that, given the data set available, this study has shown that the effect of Public Private Partnership investment on economic growth and development can be estimated empirically using available data set. Policy and recommendations can also be made appropriately.

The results in this study shows that PPP investment in Nigeria is negatively related and highly significant in affecting growth and development in Nigeria as can be seen from the value of t-statistics and the probability of t-statistics. This finding is not consistent with a studiy like Mofokeng, (2018) who found that PPP investments are indeed associated with a higher rate of economic growth.

Limitations of the Study

The major limitation of this study was to obtain adequate PPP investment data. In some years, data was not recorded which resulted in producing some unexpected results and caused the dropping of some variables. Furthermore, the frequency of data was found to be inconsistent, particularly when it came to determining the value of PPP investment.

Finally, and as the World Bank had reported, data is provided by public sources such as local or small-scale operators. Therefore, such data may not always be accurate in order to provide the information required by researchers who wish to conduct certain kinds of research.

The implication here is that the results could have been influenced by the challenges facing the data collection process.

Recommendations

PPPs has become a necessary solution for strengthening infrastructure and generating economic growth in Nigeria. As the case is with other key sectors of the economy, understanding the empirical links that exist between investment through PPPs and economic growth/development is becoming essential. However, the only way that studies of such nature will succeed, depends on the availability and credibility of data used to carry out empirical studies. In other words, complete data needs to be made available over a long period of time. How these data is reported is also important as it affects the credibility of the model and the results produced by it. When the model and the results are credible, studies such as this could enhance debate in Nigeria as well as other developing countries on how best to use PPP models as propellers for economic growth.

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