



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

# IJDR

*International Journal of Development Research*  
Vol. 09, Issue, 02, pp.25783-25788, February, 2019



ORIGINAL RESEARCH ARTICLE

OPEN ACCESS

## ANALYSING THE COST OF INFRASTRUTURE FAILURE IN A DEVELOPING ECONOMY

<sup>1</sup>Dr. Cross Ogohi Daniel and <sup>2</sup>Dr. Abbas Umar Ibrahim

<sup>1</sup>Department of Public Administration/ Banking and Finance, Nile University of Nigeria, Abuja

<sup>2</sup>Department of Business Administration, Nile University of Nigeria, Abuja

### ARTICLE INFO

#### Article History:

Received 22<sup>nd</sup> November, 2018  
Received in revised form  
09<sup>th</sup> December, 2018  
Accepted 22<sup>nd</sup> January, 2019  
Published online 27<sup>th</sup> February, 2019

#### Key Words:

Infrastructure failure,  
Infrastructure types,  
Cost analysis and  
Developing economy.

### ABSTRACT

Infrastructure had been known as the key constraint to developing economy. Hence, this research analysed the cost of power outages to the business sector of the Nigerian economy using both a survey technique. One strong outcome of this research is that the poor state of electricity supply in Nigeria has imposed significant costs on the business sector. The size of these costs relate to the firm's procurement of very expensive backup capacity to protect them against the even larger losses coming from frequent and long power fluctuations. Small-scale business owners are more heavily affected by the infrastructure failures as they are incapable to finance the cost of backup power needed to mitigate the impact of frequent outages. The small-scale operators that could afford to back up their tasks have to spend a significant amount of their investment outlay on this. This research campaigns for institutional reforms of the power supply sector in Nigeria.

*Copyright* © 2019, Nsoanya Leonard Ndubuisi. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Citation:** Nsoanya Leonard Ndubuisi. 2019. "Influence of fish pond effluent and poultry manure on soil chemical properties, growth and nutrient status of maize (zea mays) in igbariam, South Eastern Nigeria", *International Journal of Development Research*, 09, (01), 25783-25788.

### INTRODUCTION

It is fairly settled in the literature that infrastructure plays an important and positive role in economic development. Infrastructure interacts with the economy through multiple and complex processes. It represents an intermediate input to production, and thus changes in infrastructure quality and quantity affect the profitability of production, and invariably the levels of income, output and employment. Moreover, infrastructure services raise the productivity of other factors of production (Kessides, 1993). The provision of infrastructure in most developing countries is the responsibility of the government. This is because of the characteristics of infrastructure investment. First, infrastructure supply is characterized by high set-up cost. Its lumpiness and indivisibility precludes the private sector from investment. Second, its indirect way of pay-off, coupled with its long gestation period, makes it generally unattractive to private investors. Moreover, provision also generates externalities that the producer may not be fully able to internalize in the pricing structure.

Thus, in the face of other numerous competing, less risky and more familiar investment opportunities offering the promise of higher and quicker returns, few private investors are willing to embark on infrastructure investment (Ajayi, 1995). Infrastructure can be defined as the physical framework of amenities through which goods and services are provided to the public. Its connections to the economy are multiple and composite, because it influences production and utilization directly, creates positive and negative spillover results and involves significant inflow of expenditure. World Development Report (1994) classifies infrastructure stock into economic or physical infrastructure and social infrastructure. Former contains services such as electricity, transport, roads, water system, communications, irrigation etc., while latter includes education and health facilities. Other forms of infrastructure may be recognized as institutional infrastructure as banking and civil administration. Infrastructure provision is controlled by the public sector. Because infrastructure investments are uneven, it is difficult for planners to match the accessibility of supply of infrastructure with demand at all points. Moreover they are normally non-rival and non-excludable in nature, which suggests that consumption of a service by one consumer does not eliminate other from consuming it and nor does this utilization invokes rivalry on

\*Corresponding author: Dr. Cross Ogohi Daniel  
Department of Public Administration/ Banking and Finance, Nile University  
of Nigeria, Abuja

the basis of acquiring power or any other feature. However, the nearly exclusive concentration of infrastructure provision in the hands of the public sector, especially in developing countries, has led to failures in the supply of these services. Faced with declining economic fortunes and dwindling revenue, most governments in developing countries found it increasingly difficult to keep pace with adequate provision and maintenance of infrastructure. Moreover, the perception of government that economic infrastructure is a social service affected the pricing of its products and consequently the effectiveness of their provision. Besides these, the traditional inefficiency associated with public monopolies affects the quality and reliability of their services. There are five main approaches used in the literature to infer the welfare losses from power outages. These are the production function approach, self-assessment analysis, economic welfare analysis, contingent valuation and, finally, the revealed preference approach. These methods have their relative strengths and weaknesses. They have been used widely in both developed and developing countries, especially the former, to infer outage costs. Infrastructure development is accorded great importance in developed and developing countries and forms major thrust in public policy framework. This is because infrastructure is considered as a major facilitator of economic growth, however, when considering the impact of infrastructure countries where weak governance, distorted public investment choices, and corruption are a reality, the benefits of infrastructural expansion that result in higher growth are not necessarily equally shared and could result in interregional or interpersonal income inequality.

**Statement of the Problem:** In Nigeria, poor electricity supply is perhaps the greatest infrastructural problems confronting the business sector. The typical Nigerian firm experiences power failure or voltage fluctuations about seven times per week, each lasting for about two hours, without the benefit of prior warning. This imposes a huge cost on the firm arising from idle workers, spoiled materials, lost output, damaged equipment and restart costs. The overall impact is to increase business uncertainty and lower returns on investment. For the aggregate economy, this has seriously undermined Nigeria's growth potential and the attractiveness of the economy to external investors. The Abuja Electricity Distribution Company (AEDC) is the public utility vested with the responsibility of electricity supply in Abuja and its environs. However, the failure of AEDC to provide adequate and reliable electricity to consumers despite billions of naira of investment expenditure has generated a confidence crisis in the industry. Public confidence in AEDC's ability to supply uninterrupted and stable electric power is so low that consumers have coined a term for the organization's acronym AEDC as "Never Expect Power Always". The inefficiency of AEDC imposes a huge cost on the economy. In 1990, the World Bank estimated the economic loss to the country from AEDC's inefficiency at about N1 billion.

There are essentially five ways by which firms may respond to unreliable electricity supply. These are choice of location, factor substitution, private provision, choice of business and output reduction. While all these elements are presently observed among Nigerian firms, the most common approach has been through private provision. Electricity consumers have responded to AEDC's inefficiency through self-generation. Electricity users, both firms and households, now find it necessary to provide their own electricity in part or in whole

to substitute or complement AEDC supply by factoring generator costs into the overall investment cost, thus raising significantly the set-up cost for manufacturing firms operating in the country.

### Objectives of the Study

The specific objectives of the study are to

- To find out the significance relationships between infrastructure failure and developing economy.
- Characterize electricity outages in Nigeria and the impact on the Nigerian business sector.

### Research Hypotheses

**H<sub>1</sub>:** There are significance relationships between infrastructure failure and developing economy

**H<sub>2</sub>:** There are characteristics of electricity outages and impact of business sector in Nigeria.

### MATERIALS AND METHODS

This research therefore covers one selected organisation in Abuja, Abuja Electricity Distributed Company AEDC. Secondary data were obtained through books, journals, and internet. Empirical works of other scholars were consulted. A simple size of 133 was obtained from the population of 200 at 5% error tolerance and 95% degree of freedom using Yamane's statistical formula 133(100%) of the questionnaires distributed 110(83%) were returned and 23(17%) were not returned. The questionnaire was designed in Likert scale format. The researchers conducted a pre-test on the questionnaire to ensure the validity of the instrument. Pearson moment product co-efficient and regression analysis were used to test the hypotheses.

### LITERATURE REVIEW

**Concept of Infrastructure Failure:** The poor state of infrastructure supply in developing countries has a negative impact on their economic performance. For example, Lee and Anas (1992) report that manufacturing establishments in Nigeria spend on average 9% of their variable costs on infrastructure, with electric power accounting for half of this share. Elhance and Lakshamanan (1988) show that changes in the stock of economic infrastructure have important implications for the cost structure of manufacturing firms in India. Even in the informal sector, infrastructure can be a major share of business expenses (e.g., in Zimbabwe, transport accounted for 26%, the largest single item, according to Kranton, 1991). Similarly, a 1987 study focusing on the effects of power outages in Pakistan estimated that the direct costs of load shedding to industry during a year, coupled with the indirect multiplier effects on other sectors, resulted in a 1.8% reduction in GDP and a 4.2% reduction in the volume of manufactured exports. In India, a 1985 study concluded that power outages were a major factor in low capacity utilization in industry, and estimated the total production losses in 1983/84 at 1.5% of GDP (USAID, 1988). Similarly, power rationing in Colombia was estimated to reduce overall economic output by almost 1% of GDP in 1992 (Kessides, 1993). Usually small firms bear a relatively higher cost of infrastructure failures. Lee and Anas (1992) in a 1988 study of

179 manufacturing establishments in Nigeria found that the impact of infrastructure deficiencies of all types was consistently higher for small firms. Private infrastructure provision (for generators, boreholes, vehicles for personnel and freight transport, and radio communications equipment) constituted 15% of total machinery and equipment costs for large firms (over 50 employees), but 25% for small firms. Small firms were found to generate a larger percentage of their power needs privately than larger firms and to pay a higher premium for doing so, as measured by the excess costs of privately generated power over that of publicly provided. Other enterprise level surveys conducted in several countries have found that infrastructure costs and problems of unreliability rank high among issues in the business environment.

A 1991 survey of small enterprises in Nigeria cited power outages, transportation costs and other infrastructure problems among the top four problems of operations (behind taxes), with this response strongest among “micro” and small firms. Electricity outage was ranked by very small firms among their top four constraints to expansion. Thus, the issue of infrastructure supply – its adequacy and reliability – is very important for the overall performance of the business sector and deserves policy attention. The theoretical basis for estimating electricity outages is that there is a consumer welfare loss when there is electric power failure. Quite a number of studies have examined the cost of outages using the various approaches noted earlier. However, until recently many of these studies focused on the developed countries, which have less actual experience of outage failures. Moreover, there are significant differences in the methodologies used, leading to highly disparate results regarding the cost of service interruptions. Finally, fewer studies have focused on the impact of the characteristics of outage cost such as the warning time, outage frequency and partial outages.

### **Type of Infrastructure**

This section reviews the main lessons available on each subsector on the growth impact of each infrastructure subsector.

**Energy:** The importance of access to electricity to human development has been documented in a large number of case studies and cross-country econometric studies across regions. It is a recurring item in all studies on the impediments to the business environment. Among these studies, those focusing on developing countries all find a positive impact of energy infrastructure on output/growth. In fact, in his survey, Garsous (2012) finds that, *ceteris paribus*, studies focusing on the energy sector are more likely to find a robust positive impact than any other infrastructure sector. Energy is indeed an input into any of the other infrastructure subsectors for instance, water is often pumped thanks to electric pumps.

**Water and Sanitation:** The water and sanitation sector may be the infrastructure subsector for which the econometric evidence of an impact is the less well documented. This reflects the fact that the link with growth is a lot more indirect than for the other subsectors. Although water drives health which in turn drives labor productivity and labor productivity, itself, drives growth, the link between water and growth does not seem to spring to mind to most researchers or at least not as strongly as for the other sectors. It is noteworthy that

Calderon and Serven, the World Bank based researchers who may have spent the most time on assessing the impact of infrastructure on growth have left out the water sector of their analysis. Among the few studies to have analyzed this contribution in developing countries, the evidence is mixed. Binswanger et al. (1992) for instance find that the contribution of canal irrigation infrastructure to crop output is null from a panel districts in India. Estache et al. (2005) find the contribution of water and sanitary infrastructure to be positive from a panel of sub-Saharan countries.

**Telecommunications:** The impact of telecoms for growth may be the best documented impact. To a large extent, it is because telecoms data is relatively easy to access, including for developing countries, more recently, survey this literature. Most studies find a positive impact of telecommunication infrastructure on GDP, on growth and also on labor productivity. As with other infrastructures, there is a debate on the precise magnitude of its contribution. But this is quite normal, the interdependency between fixed and mobile telephony for instance still requires a significant amount of regulation of access. Its effectiveness strongly drives the social return of return for the sector.

**Transports:** For developed countries, the estimated growth effects of transport investments have not been very strong. For developing countries, the picture looks quite different. Whatever the GDP growth related focus, most cross-country studies find a positive impact. For instance, roads are needed for Africa to catch with the rest of the world (Buys et al. (2006). Roads are essential to reduce differences across regions within countries (Estache–Fay (2010)). Port quality is central to the evidence collected on the gains from trade facilitation.

**Economics of Infrastructure and its Requirement:** Economics is a very developing social, which have many branches and sub-branches. Economic of Infrastructure should be treated as a separate modern branch of economics. It directly concerns with development. It consists with all the modern development sectors. Development process is based on infrastructure. In contemporary scenario, not only industrial development but development of primary sector and service sector also based on infrastructure, therefore, there is an urgent need of separate study of economics of infrastructure. The economics of infrastructure has two schools of thought, namely, Economic and Social Infrastructure. The former have important segment like energy, road, transportation, communication, water-supply, sewerage, banking, insurance, etc. The latter consisting of services and amenities like education, medical and health services, housing etc. The functions of economic sectors are to generate employment, income and output. The economics of infrastructure is provided environment for this. It is not to analyse for only physical development but also human development. Because Human Resource Development is based on social infrastructure. Thus, economics of infrastructure deals with economic, social and human development. It is connected with any sectorial development.

**Economic and Social Infrastructure:** Given the overall scarcity of resources, the very first choice arises as to which items to select for investment. Normally, the planners show a preference for economic infrastructure covering the hard-core of power, transport and irrigation. There is normally an acute

**Table 1. Table of correlation between There are significance relationship between infrastructure failure and developing economy****Correlations**

		Effective infrastructure failure	Developing economy
Effective infrastructure failure	Pearson Correlation	1	.536 **
	Sig. (2-tailed)	.110	.000
	N	110	110
Developing economy	Pearson Correlation	.536 **	1
	Sig. (2-tailed)	.000	.110
	N	110	110

\*\*Correlation is significant at the 0.01 level (2-tailed).

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.965 <sup>a</sup>	.716	.586	3.79952

a. Predictors: (Constant), developing economy

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant) effective infrastructure failure	12.310	.901		13.656	.002
	1.056	.085	.536	12.426	.000

a. Dependent Variable: level of developing economy

scarcity of these facilities and they are regarded as directly linked to development of productive activities. However, there is now a growing realization that the social services, like health and education, are not merely to be treated as welfare activities but are essentially in the form of investment in human capital. Hence, investment in social infrastructure is also directly related to the aims of increasing productivity and promoting growth. Thus, investment in human capital is as important as investment in material or physical capital. Recognizing the complementarity of the two types of infrastructure, it is important that development of social infrastructure is planned with similar priority.

**Economics of Planning:** Planning is considered as a panacea for all economic ills. Economic development of country is closely linked with economic planning. Although the idea of planning is over 2400 years and old having its first reference and formulation by Plato in his, Republic". But the same idea attained a systematic shape and support after the end of world war second for the rehabilitation and reconstruction of war divested economics as well as for the rapid economic development of under developed economies then. Planning is sine qua non of progress. Planning consists of totality of arrangement decided upon so as to carry out project related economic activity, planning is definable by two elements:

- It is a project that is an end with one proposed to achieve, and.
- The arrangements decided upon in order so that end may be achieved which indicates the determination of means.

According to Lewis, W. Arthur (1966), "Economic planning, securing a better balance between demand and supply by a conscious and thoughtful control either on production or distribution or of both, rather than leaving this balance to affected by automatically working, invisible and uncontrollable forces".

**Test of Hypotheses****Hypotheses One**

**H<sub>1</sub>:** There are significance relationships between infrastructure failure and developing economy

**H<sub>0</sub>:** There are no significance relationships between infrastructure failure and developing economy.

According to above calculations it is observed that amount of correlation coefficient between levels of infrastructure failure is equal to 53.6 per cent and considering that a significant level is less than 5%. Then we can say that there is a positive relationship between infrastructure failures on developing economy. This implies that one per cent increase in effective developing economy will lead to 53.6% increase in level of infrastructure failure.

**Regression analysis test of level of infrastructure failure and economy**

Regression coefficient of  $R = .965$  or 96.5% indicate that relationship exist between independent variables and dependent variable. The coefficient of determination  $R^2 = 0.716$  which show that 71.6% of variation in level of employee's m explained by effective developing economy. The development adjusted R-square in the table shows that the dependent variable, (level developing economy) is affected by 58.6% by independent variable (effective infrastructure failure). It shows that effective infrastructure failure is responsible for developing economy. The coefficient of determination for effective infrastructure failure is positive (1.056) and is highly significant (0.001) in ensuring level of development. The p-value of 0.000 is less than the t-statistic value of 12.426 and the standard error value of 0.085. This implies that a unit increase in effective infrastructure failure will lead to 1.056 increases in level of developing economy Therefore, the null hypothesis is rejected and alternative hypothesis accepted that there is a relationship between the effective infrastructure failure and developing economy.

**Hypothesis two**

**H<sub>2</sub>** There are characteristics of electricity outages and impact of business sector in Nigeria.

**H<sub>0</sub>:** There are no characteristics of electricity outages and impact of business sector in Nigeria.

**Table 2. Table of correlation between the characteristics of electricity and impact of business sector in Nigeria****Correlations**

		Infrastructure failure	Improving developing economy
Infrastructure failure	Pearson Correlation	1	.473**
	Sig. (2-tailed)	.110	.000
	N	110	110
Improving developing economy	Pearson Correlation	.473 **	1
	Sig. (2-tailed)	.000	.110
	N	110	110

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.773 <sup>a</sup>	.624	.722	3.96426

Predictors: (Constant), infrastructure failure

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
1(Constant)	15.036	.806		18.644	.000
developing economy	1.319	.125	.473	10.520	.000

a. Dependent Variable: improving the developing economy.

According to above calculations is observed that amount of correlation coefficient between infrastructure failure and improving in the developing economy is equal to 47.3 per cent and considering that a significant level is less than 5%. Then we can say that there is a positive relationship between infrastructure failure and improving in the developing economy. This implies that one per cent increase in infrastructure failure will lead to 47.3% increase in improving in the developing economy.

**Regression analysis test of information infrastructure failure and developing economy**

Regression coefficient of  $R = .773$  or 77.3% indicate that relationship exist between independent variables and dependent variable. The coefficient of determination  $R^2 = 0.624$  which show that 62.4% of variation in improving the developing economy is explained by infrastructure failure. The adjusted R-square in the table shows that the dependent variable, (improving the developing economy) is affected by 72.2% by independent variable (infrastructure failure). It shows that there are positive impacts of infrastructure failure on improving the developing economy. The coefficient of determination for infrastructure failure is positive (1.319) and is highly significant (0.000) in improving in the developing economy. The p-value of 0.000 is less than the t-statistic value of 10.520 and the standard error value of 0.125. This implies that a unit increase in infrastructure failure will lead to 1.319 increases in improving in the developing economy. Therefore, the null hypothesis is rejected and alternative hypothesis that there are positive impacts of infrastructure failure on improving in the developing economy.

**Conclusion**

One strong outcome of the study is that the poor state of electricity supply in Nigeria has imposed significant costs on the business sector of the Nigerian economy. The bulk of these costs come in the form of acquisition of very expensive backup power.

However, the decision to acquire a backup is actually a rational decision on the part of the firm in order to insure it from larger losses arising from frequent and long power fluctuations. The continuation of the existing state of power supply will no doubt continue to have a negative impact on the attempt by the government to diversify the production and export base of the economy away from oil. A situation where firms spend as much as 20% to 30% of initial investment on the acquisition of facilities to enhance electricity supply reliability has a significant negative impact on the cost competitiveness of the manufacturing sector.

**Recommendations**

From the conclusion ahead, there is a need for significant developments in the management of Africa's infrastructure, but the choice is no longer simply a dichotomous affiliation between the public and private sectors but mutual partnership. The public sector is expected to retain a much more important role in financing than admitted during much of the last two and a half decades, while the private sector will help in meeting the significant needs associated with infrastructure construction, operation, and to some extent financing. The role of the private sector in financing will most likely is limited to sectors such as telecommunications, energy generation, and transport services in which commercial and political risks are lower.

**REFERENCES**

- Ajayi, G.A. 1995. Cost-Benefit Analysis of Captive Power Generation by Manufacturing Industries in Nigeria. Unpublished PhD thesis, Department of Economics, University of Ibadan, Ibadan.
- Biehl, D. 1986. The Contribution of Infrastructure to Regional Development. Office for Official Publications of the European Communities. Luxembourg
- Elhance, A.P. and T.R. Lakshamanan. 1988. "Infrastructure-production system dynamics in national and regional systems: An economic study of the Indian Economy". Regional Science and Urban Economics, 18, North-Holland

- Estache, A. 2010. 'A Survey of Impact Evaluations of Infrastructure Projects, Programs and Policies', Working Papers ECARES No. 2010\_005, Université Libre de Bruxelles
- Kessides, C. 1993. The Contributions of Infrastructure to Economic Development: A Review of Experience and Policy Implications. World Bank Discussion Papers No. 213. The World Bank.
- Kranton, R.E. 1991. Transport and the Mobility Needs of the Urban Poor. Infrastructure and Urban Report No. INU 86. World Bank, Infrastructure and Urban and Development Department, Washington, D.C.
- Lee, K.S and A. Anas. 1992. Impacts of Infrastructure Deficiencies on Nigerian Manufacturing: Private Alternatives and Policy Options. Infrastructure and Urban Development Department Report No. 98. World Bank, Infrastructure and Urban Development Department, Washington, D.C.

\*\*\*\*\*