



*International Journal of Development and Sustainability*

ISSN: 2168-8662 – [www.isdsnet.com/ijds](http://www.isdsnet.com/ijds)

Volume 3 Number 7 (2014): Pages 1488-1495

ISDS Article ID: IJDS14042801



# Sustainable infrastructure development in Nigeria: Challenges of the construction sector

Baba Shehu Waziri \*, Ali Garga Bukar, Nura Mu'azu

*Department of Civil and Water Resources Engineering University of Maiduguri, P.M.B 1069, Maiduguri, Nigeria*

## Abstract

The construction sector which provides physical infrastructures essential for economic development constitutes 40% - 60% of the Gross Fixed Capital Formation in most developing countries. The contribution of the Nigerian Construction Sector to overall GDP dropped from 3.76% achieved in 2008 to 3.16% in 2009 and 2.86% in 2010. This paper examines the challenges facing the performance of the Nigerian Construction Industry. Data for analysis was obtained from professionals in the offices of consultants, contractors and promoters through a questionnaires survey. 150 structured questionnaires were randomly distributed out of which 116 indicating a response rate of 76.67% were successfully retrieved and analyzed. The results revealed that low investment in capital projects; poor business climate and diminished opportunity for indigenous contractors are the factors having significant impacts with Relative Importance Index of 0.86, 0.84 and 0.78 respectively. Therefore, there is the need for the government to invest seriously in capital projects and create enabling environment to attract foreign investors for the sector to be able to provide the much needed infrastructure for economic development.

**Keywords:** Infrastructure development; capital projects; construction industry; Nigeria

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**Cite this article as:** Waziri, B.S., Bukar, A.G. and Mu'azu, N. (2014), "Sustainable infrastructure development in Nigeria: Challenges of the construction sector", *International Journal of Development and Sustainability*, Vol. 3 No. 7, pp. 1488-1495.

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\* Corresponding author. E-mail address: [shehuwaziri@gmail.com](mailto:shehuwaziri@gmail.com)

## 1. Introduction

The infrastructural base of any country constitutes the backbone of its socio-economic development. Ehebha (2011) stated that infrastructural development has in recent time assumed a central importance in Nigeria's flight to attain social and economic stability. Infrastructure is generally referred to as the physical and organizational structures necessary for the functioning of society. World Bank (2002) reported that Nigeria's infrastructures are grossly inferior in terms of quality and quantity to those existing in other parts of the world. This was corroborated by Alabi and Ocholi (2010) who observed that infrastructures in Nigeria are in a state of negligence and disrepair. The infrastructures listed as lacking in Nigeria from the World Bank survey 2002 includes insufficient or lack of provision of pipe borne or portable drinking water, poor road network, poor waste management and inefficient electricity supply. Alabi and Ocholi (2010) reported that these infrastructures are grossly inadequate and inequitably spread where available and in a state of decay which could be attributed to inability of the provided infrastructures to meet the needs of the teeming population as a result of influx of population into the cities due to migration and high birth rate. These phenomenal growths exert a tremendous pressure on the existing infrastructures.

### 1.1. Construction sector and infrastructure development

The Construction industry contributes significantly to infrastructure development in developing countries (Wibowo, 2012). Construction products provide the necessary public infrastructure and private physical structures for quite a number of productive activities thereby having an impact on the economy by employing a large population of the workforce. Nigeria's construction sector accounts for 1.4% of its GDP at the end of the third quarter in the year 2010 (Vetiva Research, 2011). Despite the progression of the construction sector in Nigeria in recent time, its influence on the total GDP has remained appallingly low. Records have shown that in 1981, the Nigerian construction and building sector accounted for 5.8% of GDP and in the last three decades, the countries total GDP has grown to approximately 495 times its size. On the contrary Vetiva research (2011) reported that construction sector GDP has only raised by 125 times its size in 1981. Vetiva Research (2011) further reported that oil wealth has been crucial to construction sector boom in major oil producing economies. In this respect similar less diversified oil producers like United Arab Emirates, Saudi Arabia and more diversified producers like Russia saw considerable boom in construction at various peaks of oil booms in the last three decades. It can therefore be envisaged that the next few decades are important to Nigeria's infrastructural growth.

### 1.2. State of infrastructure development in Nigeria

The Frischmann's theory of infrastructure and commons established that, the state is generally responsible for the provision of infrastructures through diverse revenue sources including state resources and tax from citizens and organizations. It was observed that there is a serious deficiency of infrastructure in Nigeria in terms of both quality and quantity (Oyedele, 2006; Akinwale, 2010; Ajanlekoko, 2011; Oyedele, 2012; Olaseni and Alade 2012). There are quite a number of challenges facing the development of infrastructures in Nigeria

including the issues of finance, technology for development, maintenance design, quality and standards, and sustainability. In recent years, Nigeria has conducted several important infrastructure sector reforms with challenges persisting in most sectors. The state of some of the physical infrastructures which is provided by the construction sector in the country is reported below:

- *Roads*

ACID (2011) states that “The Nigerian roads have been found to be the lowest in density in Africa, where only 31% of the roads are paved as compared to 50% in the middle income countries, and even where roads are provided only 40% of these roads can be said to be in good condition”. The current road transport reform is aimed at maintenance operations and strengthening of investments via public-private partnership. The traffic volumes on the road networks in Nigeria are also relatively high in relation to those of similar countries (ACID, 2011).

- *Railways*

Nigeria has one of the most extensive national rail networks in Africa, second only to South Africa in length (AICD, 2011). Rail lines run to the northwest, northeast, southwest, and southeast of the country. Historically, Nigeria’s railway was among the best in West Africa, but it has since fallen into neglect. The rail network covers 3,505 km of mainly single track lines. The development plan of the National Railway Corporation seems promising as its purpose is to modernise the existing network, create new east-west routes and connect the border countries.

- *Airports*

ACID (2011) reported that “Nigeria’s air transport market tripled in size between 2004 and 2007, largely due to the rapid expansion of domestic services”. The number of seats serving the Nigerian market was almost stable, at around 4 million a year over the period 2001 to 2004, but mushroomed thereafter to reach over 12 million annually by 2007 (ACID 2011).

- *Water and sanitation*

According to World Bank (2002) 50% of the city dwellers in Nigeria lack access to portable water and sanitation. About forty-four (44) percent of households have their own private boreholes and many rely on water vendors whose high prices amount to more than 30 percent of the household income for the poorest, as a result large proportion of households have resorted to drawing water from unhygienic sources (Alabi and Ocholi, 2010). AICD (2011) reported that only 13% of the population has access to improved latrines and one in three Nigerians continues to practice open defecation. This practice continues to increase with little effort toward improving total sanitation. AICD (2011) reported that in 1998, 24 percent of the population practiced open defecation; within 10 years this had increased to 29 percent Nigeria is said to be generating 80,000 metric tonnes of solid waste daily, but only 30% of this is collected for proper disposal.

- *Housing*

The Nigerian Housing deficit is estimated at over 14 million units. The housing reform efforts by previous and present administrations have the objective of providing the much needed dwelling units. These inadequacies and lack of infrastructures may be attributed to problems such as lack of private sector

participation, negligence of the duty of maintenance officers, misguided policies and corruption among others (Obiegbu, 2005; Alabi and Ocholi, 2010; Ndiyo and Ogar, 2012; Vetiva Research 2011, Swarup, 2013). Addressing Nigeria's infrastructure challenges will require sustained expenditure and investment in the construction sector which is a major player in the provision of physical infrastructure.

## 2. Methodology

The data for the research was obtained from key participants of the construction industry through a questionnaire survey. The respondents were drawn randomly from the offices of the contractors, consultants and promoters. 150 sample questionnaires were distributed randomly to architects, engineers, builders, and estate surveyors in various organizations. 116 questionnaires were successfully obtained for the analysis indicating a response rate of 76.67% which is considered adequate for the study. The respondents were asked to score the factors affecting the performance of the construction industry toward the provision of sustainable infrastructure based on the scale of 1-5 in which 5 indicates extreme importance and 1 indicating least importance. Simple descriptive statistics and importance indices were used to analyze the data.

## 3. Results and discussion

### 3.1. Respondents organization

Profile of the respondents showed that, 32.76% (38) of the respondents were from the contractors' organization, 31.03% (36) were from the consultants' organizations and 36.21% (42) were from the promoters (clients) of infrastructure projects. The general response rate for contractors, owners and consultants was 76.67%% and the total number of respondents for the three parties was 116 out of 150 respondents. The response rate of contractors was 76.00% % (38 out of 50 respondents), for the consultants 72% (36 out of 50 respondents) and 84% (42 out of 50 respondents) for Clients.

### 3.2. Experience of respondents

**Table 1.** Experience of Respondents

		Contractors	Consultants	Promoters	Average
Experience of Respondents	1 – 5 Years	15.78% (6)	16.67% (6)	9.52% (4)	13.79%
	6 – 10 Years	21.05 (8)	25% (9)	23.81% (10)	23.28%
	11 – 15 Years	42.11% (16)	50% (18)	30.95% (13)	40.52%
	Over 15 Years	21.05% (8)	8.3% (3)	35.71% (15)	22.42%
Total	100%	100%	100%	100%	100% (116)

From the study 13.79% of the respondents have 1-5 years of working experience, 23.28% have between 6 to 10 years of working experience, 40.52 % have between 11 to 15 years of experience and 22.42 % have over 15 years of experience. The result is presented in Table 1.

### 3.3. Academic qualification and positions

Majority of the respondents (64.24%) in the three different organisations possess a high level of academic qualification, i.e. Master Degree, First Degree or H.N.D holders. Majority (58.5%) cover a wide spectrum of high ranking personnel in which 43% belong to those at the management level including directors and other principal officers.

### 3.4. Factors affecting the performance of the construction industry toward infrastructure provision

The importance indices of the factors challenging the performance of the construction sector of the Nigerian economy towards providing the much need infrastructure for development is presented in Table 2.

**Table 2.** Relative Importance indices of factors

S/No	Factor	Promoters		Consultants		Contractors	
		RII	Rank	RII	Rank	RII	Rank
1.	Low investment in infrastructure Development and poor financing of projects.	0.7947	1	0.7988	4	0.6814	9
2.	High cost of construction due to imported materials	0.6846	9	0.6314	14	0.6732	10
3.	Poor state of technological development for construction	0.6982	8	0.6832	10	0.7324	5
4.	Inadequate maintenance consideration of existing infrastructures	0.5483	15	0.5163	16	0.6543	12
5.	Meeting the sustainability requirement.	0.6326	13	0.612	12	0.7224	8
6.	Scarcity of skilled human resources in the industry	0.6825	10	0.7221	9	0.6324	14
7.	Low involvement of private sector in realizing infrastructure projects.	0.7423	6	0.7982	5	0.8326	1
8.	Corruption and fraudulent practice in the industry	0.7546	4	0.8312	1	0.8052	2
9.	Instability discouraging foreign direct investment in infrastructure development.	0.6342	12	0.7436	7	0.7240	7
10.	Low allocation of capital expenditures in the previous budgets	0.7121	7	0.7386	8	0.7482	4
11.	Poor business climate for the construction industry	0.7684	2	0.7643	6	0.7880	3
12.	Unavailability of the state-of-art equipment.	0.6452	11	0.6253	13	0.6572	11
13.	Uncoordinated physical development plan	0.5417	16	0.5734	15	0.6321	16
14.	Poor participation of indigenous contractors in infrastructure development.	0.7631	3	0.8124	2	0.7254	6
15.	Decayed and ineffective technical and vocational education	0.7483	5	0.8032	3	0.6324	15
16.	Loose regulations relating to business in the sector	0.6132	14	0.6471	11	0.6435	13

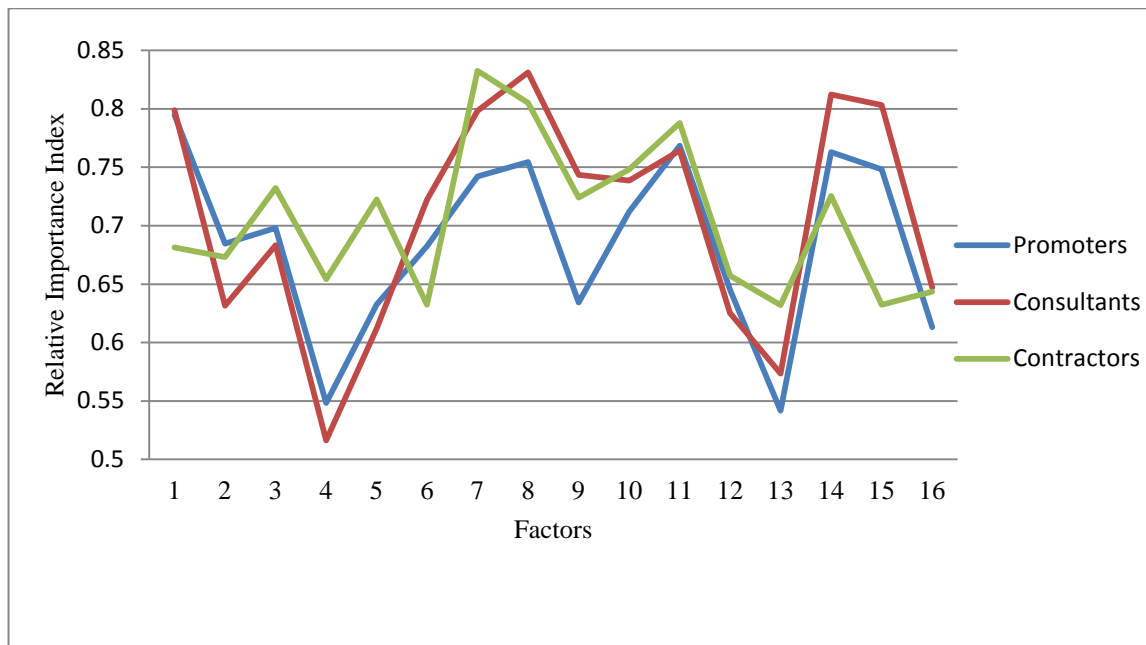
From the results project clients ranked the factor low investment in infrastructure development and poor financing of projects, poor business climate for construction and poor participation of indigenous contractors in infrastructure provision as the most important factors with RII of 0.7947, 0.768 and 0.763 respectively.

The consultants ranked corruption and fraudulent practices in the sector as the first challenging factor with RII of 0.8312. This is a major issue in Nigeria bedevilling the performance of many other sectors including the construction sector. The second and third factors from the perception of the consultants are poor participation of indigenous contractors and decayed and ineffective technical education with RII of 0.8124 and 0.8032 respectively. The contractors ranked low involvement of the private sector, corruption and fraudulent practices and poor business climate as the first, second and third most important factors with II of 0.8326, 0.8052 and 0.7880 respectively. The responses of the three categories of the stakeholders are presented in fig. 1 while average ranking of all the respondents is presented in Table 3.

**Table 3.** Overall ranking of factors affecting the performance of the construction industry toward infrastructure provision

Factors	Weighing					RII	Rank
	5	4	3	2	1		
Low investment in infrastructure Development and poor financing of projects.	63	36	8	5	4	0.8568	1
Poor business climate for the construction industry	62	29	13	8	4	0.8362	2
Poor participation of indigenous contractors in infrastructure development.	47	33	18	12	6	0.7775	3
Low involvement of private sector in realizing infrastructure projects.	35	28	26	18	9	0.7068	4
High cost of construction due to imported materials	35	27	26	12	16	0.6913	5
Decayed and ineffective technical and vocational education	31	26	29	18	12	0.6793	6
Corruption and fraudulent practice in the industry	38	19	22	19	18	0.6689	7
Low allocation of capital expenditures in the previous budgets	29	27	27	16	18	0.6620	8
Meeting the sustainability requirement.	31	26	17	24	18	0.6482	9
Poor state of technological development for construction	29	27	18	18	24	0.6327	10
Uncoordinated physical development plan	26	27	22	21	20	0.6310	11
Inadequate maintenance consideration of existing infrastructures	27	24	25	18	22	0.6275	12
Unavailability of the state-of-art equipment.	25	24	23	29	15	0.6258	13
Loose regulations relating to business in the sector	28	21	22	19	26	0.6103	14
Instability discouraging foreign direct investment in infrastructure development.	24	22	27	19	24	0.6051	15
Scarcity of skilled human resources in the industry	22	24	17	25	28	0.5775	16

Considering the overall ranking of the respondents the factor low investment and poor financing of infrastructure projects was ranked first with RII of 0.8568. This was also identified by Oyedele (2012), Sitaula, (2010) and Alabi and Ocholi (2010) as an important challenging factor. Poor business climate for construction activities, poor participation of indigenous contractors and low involvement of the private sector in infrastructure provision were ranked as 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> factors with RII of 0.8362, 0.775 and 0.7068 respectively. The significance of private sector participation was also recognized by Okeola and Salami (2012) and Taye and Dada (2012).



**Fig. 1.** Responses of the Three Categories of Stakeholders

#### 4. Conclusion

Infrastructure development is vital for the economic growth of any country. The challenges bedeviling the construction sector toward the provision of infrastructure development in Nigeria are numerous. The study indicates that low investment and poor financing of infrastructure projects is the most significant factor. The issue of lack of funding of infrastructure projects has been identified as a challenge for the attainment of the required level of infrastructure in Nigeria. The paper also identified other factors like poor business climate for the construction activities, low participation of the private sector in infrastructure provision, corruption and fraudulent practices and poor and ineffective technical education among others. It is therefore recommended that government should make efforts toward funding infrastructure projects and improve the participation of the private sector in realizing the goal of infrastructure development.

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