

Contextualising Sustainable Infrastructure Development in Nigeria

¹Olanipekun A.O., ²Aje, I.O. and; ³Awodele, O.A.

^{1,2,3}Department of Quantity Surveying, Federal University of Technology, Akure.

[1olanipekun1439@yahoo.com](mailto:olanipekun1439@yahoo.com), [2aje_niyi2002@yahoo.com](mailto:aje_niyi2002@yahoo.com), [3deledayo4christ@yahoo.com](mailto:deledayo4christ@yahoo.com)

Email of Corresponding Author: olanipekun1439@yahoo.com

Abstract

The clamour for sustainability in all spheres of development is more in the developed economies but the responsibility is no less for the developing economies. Efforts targeted at sustaining infrastructural development in Nigeria are deficient in context and formalisation. This paper therefore contributes to the efforts at formalising and contextualising sustainable infrastructural development in Nigeria. The paper relied on literature review for textual data in support of sustainable infrastructural development. The findings reveal the state of infrastructure development and approaches that are strategic to the development of sustainable infrastructure in Nigeria. The suggested approaches grinded on global best practice and made to reflect the peculiarity of the contemporary Nigerian environment. The paper advocates for a more committed government effort and an inclusive civil society participation in sustainable infrastructure development in Nigeria.

Keywords: Sustainability, Infrastructure, Development, Construction Industry, Nigeria

Introduction

Sustainable infrastructural development is embedded within the conceptual framework of sustainable development. According to Odedairo, Oke and Oyalowo (2011), the paradigm sustainable development has its origins in the environmental movement and has acquired significance across all facets of human life from social, to economic and political aspects. Indeed, the last few years have witnessed its acceptance as a challenge to global development expected to be met by national governments. According to Brundtland (1983), humanity has the ability to make development sustainable; to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. Furthermore, the concept of sustainable development does imply limits but requires meeting the basic needs of all and extending to all the opportunity to fulfill their aspirations for a better life. Boswell and Walker (2004) further reiterate on sustainable development that it means achieving four objectives at the same time: effective protection of the environment; prudent use of natural resources; social progress which recognises the needs of everyone; and maintenance of high and stable levels of economic growth and employment. Shah (1999) describes the concept of sustainable development as perhaps one of the most significant gifts of the 20th century to human kind in search of peace, harmony and well-being. As a robust concept, sustainable development is footed on three tripods (economic development, environmental protection and social justice) (Odedairo *et al.*, 2011; Perdana and Perera, 2009; Abidin, 2009). This paper emphasizes on sustainable infrastructural development. Infrastructure is normally viewed as the physical assets that are defined as fundamental facilities and systems serving a country, city, or an area e.g. transportation and communication systems, power plants, and schools (Na and Raksakulthai, 2006; Brixiova, 2011). There are also the non-physical aspects of infrastructure including management. There are two types of infrastructure, "*Hard and Soft*" infrastructure (Oyedele, 2012). Hard refers to

the large physical networks necessary for the functioning of a modern industrial nation, whereas soft infrastructure refers to all the institutions which are required to maintain the economic, health cultural and social standards of a country, such as the financial system, the education system, the health system, the governance system, and judiciary system, as well as security (Kumar, 2005).

For a physical or a social phenomenon to be sustainable, it means it must have the capacity to endure a particular state for a period of time. Therefore, *Sustainable infrastructure* can be defined as infrastructure in harmony with the continuation of economic and environmental sustainability (Na and Raksakulthai, 2006). Sustainability could mean to endure, or upheld and/or support. The term *sustainability* is not completely a meaningful term on its own. The meaning of *sustainability* enlarges when used with another term such *development*. Lawal and Oluwatoyin (2011) argued that the term *development* is a victim of definitional pluralism but however concur that development means improvement in material well-being of all citizens. A more encompassing definition is provided by Business Dictionary (2013). Development was described as the systematic use of scientific and technical knowledge to meet specific objectives or requirements. Development also encompasses the economic and social transformation that is based on complex, cultural and environmental factors and their interaction. Seemingly, infrastructural development involves all activities, efforts and tendencies towards the provision of basic infrastructure in a society (Adenikinju, 2005). The amalgamation of *sustainability, infrastructure and development* will then mean the provision of infrastructure as an impetus of developmental strives in a way that will endure the test of time; technological and environmental advancement. In clearer terms, developing infrastructure that is sustainable means improving the processes and mechanisms in building infrastructure, in a way that it not only meets the present needs of the people but also reduces the impacts it would provide in the future. Further, it looks at the aspects of how we build, what we build, and whether we should build the infrastructure at all. Sustainable infrastructure could be seen as designing and maintaining buildings, structures, and other facilities with an eye towards resource conservation over the life of the infrastructure (Aje, 2013).

This planet (earth) is the only place where people live and has to be developed to meet their needs and maintained for future generation (Soegiarso, *et al* (2007). Infrastructure provision is seemingly a way to the development of the planet. Akinwale (2010) corroborates this assertion stating that the development of a society depends on the availability of infrastructure for homes and industries. However, with basic infrastructures and services in acute short supply in developing economies (Odedairo et al., 2011), questions arise that: Has there not been tendencies towards infrastructural development overtime? Has there not been infrastructural development overtime? Why is it that the few provided infrastructure has not been able to endure the test of time and demand? The answers to these questions lie in sustainable infrastructural development, which will be explicated in this paper. A major and integral part of sustainable development is efficient provision of environmentally sound infrastructure (Panayotou, 1997). It is thus reasonable to view sustainable infrastructural development from the context of sustainable development. Shah (1999) thus posited that sustainable development is a development that is much more than material progress. It links micro to macro, present with future, human to nature, and material to spiritual; it values natural resources as social capital; points out limits to growth, the finite nature of the globe's resources, and it emphasizes its judicious and responsible use and equitable sharing; it puts ecological balance and environmental vulnerability in perspective and emphasizes the link

with human activity. Further, sustainable development puts economic growth in the framework of lasting human happiness. The pursuance and subsequent realization of sustainable infrastructural development is more desirable than ever especially in developing economies like Nigeria. In light of this, Na and Raksakulthai (2006) advocate for the implementation of strategic changes in the provision of infrastructure; since majority of existing infrastructure has great impact on the environment (Ahn, *et al* 2010), while some of these facilities are not sustainable.

Concepts of Sustainable Infrastructure

1. Green growth

Green Growth is an approach to pursuing the economic growth necessary for pressure on the environment's limited carrying capacity, by improving the eco-efficiency of the society as a whole (Na and Raksakulthai, 2006). The international financing organisations (World Bank, IMF) have reported Nigeria to be growing macro-economically in the last few years. However, this pace of economic growth is placing increasing pressure on the ecological carrying capacity of the nation. More worrying is the limited focus of the Nigerian government to sustainable development. Now the challenge for nation is how to progress its economic growth and poverty reduction, while ensuring environmental sustainability. A shift towards environmentally sustainable economic growth or "Green Growth" would be necessary to continue economic growth while maintaining environmental sustainability.

2. Eco-efficiency

Eco-efficiency is achieved by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle to a level at least in line with the earth's estimated carrying capacity (World Business Council on Sustainable Development, 2013). It is often expressed as the creation of more value with fewer resources and less impact, or doing more with less. Many developing countries are now undergoing a process of designing their infrastructure and laying the foundation for their consumption and production patterns and, it is the optimum moment for these countries to apply and integrate eco-efficiency into their infrastructure development, consumption patterns, and production patterns (Na and Raksakulthai, 2006).

3. Infrastructure

Infrastructure is normally viewed as the physical assets that are defined as fundamental facilities and systems serving country, city, or area, as transportation and communication systems, power plants, and schools (Na and Raksakulthai, 2006; Oyedele, 2012). Infrastructure as a concept of sustainable development advocates the provision of necessary infrastructure as a means of sustaining developmental strives. The development of infrastructure is one of the main drivers of growth in an economy (Adenikinju, 2005). Infrastructure systems such as water supply and sanitation, solid waste and wastewater, power, and transport form the backbone of the economy (Familoni, 2000) as they provide social as well as economic benefits to the people.

4. Sustainable infrastructural development

It is admissible that infrastructure could achieve economic and/or social development. Familoni (2000) corroborated this and stated that socio-economic development can be

facilitated and accelerated by the presence of social and economic infrastructures. However, the environmental aspects should not be compromised for the sake of the first two objectives. In order to achieve sustainability, decision makers must inculcate policies on infrastructure development that would conform to environmental protection policies. The infrastructure policies must enable increase in the efficiency of resource use to obtain more from less and reduce waste. This is the advocacy of sustainable infrastructure development, a concept of sustainable development.

State of Infrastructure Development in Nigeria

The role of infrastructure in contributing to economic development is an essential one. Good quality infrastructure is necessary to avoid bottlenecks and service disruptions and to support a range of important activities in the economy (Na and Raksakulthai, 2006). Akinwale (2010) used Brett Frischmann's *'Economic Theory of Infrastructure and Commons Management'* of 2005 to describe infrastructure. The theory argues that *'certain important resources should equitably be used for the benefits of all members of a society'*. Unfortunately, the Nigerian infrastructure is meager and efforts to improve them have not yielded the desired results (Akinwale, 2010). This implies that the Nigerian infrastructure situation sharply contrasts the *'Economic Theory of Infrastructure and Commons Management'* of 2005. This infrastructure situation in Nigeria becomes more worrying due to the increased demand and limited resources. Oyedele (2012) expressed this fear that demand for infrastructural development is higher and resources used in provision of infrastructure are limited. The provision of infrastructure in most developing countries is the responsibility of the government (Adenikinju, 2005). Nigeria, with a very good share of Military government, has the era characterized by economic boom and only succeeded in widening the gap in infrastructure demand and provision. The current situation now is that most infrastructures are now decayed and needed repair or replacement (Oyedele, 2012).

Adenikinju (2005) in a study analysed the cost of power infrastructure inadequacy to the business sector of the Nigerian economy and a strong outcome of the study was 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 were in the form of acquisition of very expensive backup power. Suffice to say that these power backups in form of petroleum and diesel driven generators that emits carbon (IV) oxide (CO₂) causing the blackage of human lungs when inhaled and also contributes to the depletion of the ozone layer. Oyedele (2012) equates the infrastructure development of Nigeria with other developing economies but a critical analysis conducted by Akinwale (2010) reveals that Nigeria rates lower than countries like South Africa and even some low income countries in areas of power, road and telecommunication, water, health and disposal infrastructures. A critique analysis of Nigeria's infrastructure cutting across physical infrastructure (power, transport, oil and gas) and social infrastructure (health, education, water and sanitation) was conducted by Olaseni and Alade (2012) and summarised as follows:

- 1. Power:** The current power generation in the country is about 4000MW. Nigeria's electricity consumption per capita is 111 kWh, which is one of the lowest in Sub-Saharan Africa (SSA). The total average per capita annual consumption in SSA is around 155 kWh (Bazilian et al., 2012). Before the attainment of the current power generation, Akhalumeh and Izien (2013) observed that only 40 per cent of Nigerians, mainly in urban centers have access to electricity. The installed available generation capacity was 5200MW, and in its epileptic performance, out of this 5200MW only 3700MW are

actually generated as at 2009, this has moved up to about 4000MW. Currently, power generation and distribution have been improved in the past year but the expected level has not been attained.

2. **Transport:** Nigeria has a total road length of 193,200 kilometers, comprising 34,123 km Federal roads, 30,500 km State roads, and 129,577 km Local Government roads. However, Akinwale (2010) quickly draws out attention to a Central Bank of Nigeria document of 2003 that out of the total road length in Nigeria, only 19% have been paved. While it is admissible that there would have been improvement since 2003, it must also be noted that the expected level of road network had not been achieved in Nigeria. With the inadequacy of the road network, the railway that is supposed to be an alternative means of transport accounts for less than 1% of land transport in the country. This leads to over-dependence on the inadequate road transport; with 98% of goods still being transported by road.
3. **Oil and gas:** Oil is a major income earner for Nigeria and currently account for about 75% of her annual revenue. However, due to limited gas distribution infrastructure, Nigeria today flares about 2.6 billion cubic feet of gas per day (bcf/d), representing 12.5% of all globally flared gas, which is 68% of the associated gas produced or 51% of the total gas production. This undoubtedly constitutes much, not to mention the effect of the gas flaring on the environment. Domestic gas demand is about 400 million cubic feet a day (MMcf/d), which is very low compared to the size of Nigeria's population and its gas resources. The limited domestic gas demand can be attributed to the dearth of infrastructure that requires such gas for powering and operation.
4. **Education infrastructure:** Oyeyinka (2011) presented a cursory outlook of Nigeria's educational condition as a means of justifying the level of education infrastructure. Nigeria's net primary and gross secondary enrolment rates are among the 10 worst in the world, while gross tertiary enrolment is low, placing Nigeria 83rd in the Legatum Prosperity Index (LPI). Only 60% of children of primary school age are enrolled in education with a clear under representation of girls in both primary and secondary education. Also, there are 46 pupils for every one primary school teacher placing Nigeria among the 10 lowest countries in the world. The Nigerian workforce has, on average, less than a year of secondary education, and several months of tertiary education, placing the country 97th and 85th on the LPI respectively. These are reflections of the poor state of education infrastructure in the country.
5. **Health infrastructure:** In 2007 when the population of the country was a little above 140 million, there were 13,703 public primary health care centres in the country. Also, there were 845 and 59 public secondary and tertiary health care facilities respectively and there were only three hospital beds for every 10,000 people. Indeed, only 45.9% have access to medical facilities in the country in 2006, all information was obtained from the National Bureau of Statistics in 2008 (Olaseni and Alade, 2012).
6. **Water and Sanitation infrastructure:** Evidences points to the gross inadequacy of water and sanitation infrastructure in the country. A study of the provision of improved drinking water, households connected with water and improved access to sanitation in Nigeria compared to other nations in the league of 60 top economies shows that Nigeria ranks among the lowest. In addition to Nigeria's gross inadequacies, another pointer was

the decline from 39% to 36% in access to improved sanitation in urban areas between 1990 and 2008.

According to Okelola and Salami (2012), Nigeria's infrastructure challenges comes with another dimension where, many years of underinvestment and poor maintenance have left the nation with a significant infrastructure deficit that is holding back her development and economic growth. Furthermore and in 2008, the Federal government of Nigeria disclosed that Nigeria requires about \$100 Billion (N11.70trillion) to address only four infrastructure areas considered critical:

1. Power-US\$18–20Billion;
2. Rail -US\$10Billion;
3. Roads - US\$14billion; and
4. Oil and Gas -US\$60Billion.

In addition, Lagos State alone according to her government needs: - US\$2billion for expansion and modernization of its water supply network in the next 20years; and US\$715m for road networks' in the next 5years amongst many others. The limited infrastructure on ground failed to meet international quality requirements in a manner of sustainability. Infrastructures are developed in Nigeria without recourse for carbon emission standard set by international organizations like International Standard Organisation. Tests like Air Capture Analysis (TCA) are not done on completed projects to ensure that they emit as little greenhouse gases (GHGs) as possible. Domestic residences hardly favour co-habitation with other animals and plants in a manner of bio-diversification. Unarguably, infrastructure development in Nigeria presents a pathetic posture. Okelola and Salami (2012) attribute Nigeria's infrastructure challenge to years of under investment and poor maintenance culture. While the two factors listed here cannot be undermined, it goes without saying that both factors are fully embedded in sustainable infrastructure development. Sustainable infrastructure development as a concept of development goes to the extent of questioning the essence of a development. Na and Raksakulthai (2006) reiterate that sustainable infrastructural development asks why a development should be carried out.

For a Nation that is worth \$23.48 billion in revenue in 2013 (CIA World Fact Book, 2013); and with the declining international assistance, the question is: How will these infrastructure needs and challenges be confronted? Without mincing words, answers lie in sustainable infrastructural development. The argument here is that there's less need to dwell on the mistakes of the past and move into the future. The future of infrastructure development in Nigeria comes with prospects. Further questions will then be: How prepared is the Nation to prevent the future generation from reeling in the pains resulting from shortage of infrastructure that is being experiencing today? Shaw, *et al* (2012) outlined what should constitute the approaches or means to sustaining infrastructural development. They include consideration for economic and environmental factors, the positive and negative impact the infrastructure assets and their attending activities will have on the community and the entire society. This paper has thus outlined the approaches to sustaining infrastructural development in similar manner.

Research Methodology

This paper adopts a qualitative research approach. Yin (2009) reiterates that qualitative research focuses on contemporary events. This paper aims to contextualize approaches to

sustaining infrastructure development; a phenomenon that is still evolving in Nigeria. Therefore, the paper was grounded in extensive literature review on global best practices in sustaining infrastructure development. The findings were interpreted to in light of the experiences of the authors in the Nigerian infrastructure development. The interpretation of the synergy of both literature review and authors' experience was contextualised to reflect the peculiarity of the Nigerian environment. The approach used in this paper was similar to Adalakun (2009) who sought to develop an understanding of the need for emerging economies like Nigeria to make use of strategic alliances by carrying out extensive literature review to gather data upon which recommendations were made.

Approaches to Sustaining Infrastructural Development in Nigeria

Sustainable development has evolved as a paradigm to balance the developmental needs of man and to ensure that economic development is achieved without compromise to the environment and with due respect to delicate social balance (Lordos, *et al*, 2011). The clamour for sustainability in all spheres of development is more in the developed economies. However, this responsibility is no less important for developing countries including Nigeria, given a number of factors, such as: rapid urbanization, decaying infrastructures, heavy regulation, little growth in productivity with chronic budget deficits, a preoccupation with meeting the needs of the present by all means, with resulting environmental degradation and exploitation (Odedairo *et al.*, 2011). Infrastructure has a significant impact on sustainability, and promoting environmentally sustainable and eco-efficient infrastructure are important goals that must be pursued not only in developing economies, but globally. Insights from the existing level of infrastructure development in Nigeria and global practices inform the following proposed means of ensuring sustainable infrastructure development in Nigeria.

1. Institutionalisation

Fadare (2010) reiterate that legal and institutional policy framework is a response to environmental problem in Nigeria. Institutionalisation refers to setting up of capacities in form of public parastatals backed by appropriate laws to oversee the tendencies towards sustainable development and by extension; sustainable infrastructural development (Boxenbaum, 2010). These institutions should establish clear plans and rules for service provision, regulate and monitor service quality, coordinate infrastructure project development and deliver services efficiently and equitably. Within this mandate, these institutions must be managed professionally, open to public scrutiny, and accountable to their customers. These institutions should be strengthened to provide sustainable infrastructure through economic, financial, legal, and institutional reforms as well as adopting eco-efficient practices in management and provision. The scope of such institutions should incorporate both growth and sustainability over the long-term in order to achieve eco-efficient infrastructure and green growth. This will require a system approach to identify the relationships between various system elements and to integrate them with the goal of sustainability. In Nigeria, the Federal and States Ministry of Environment have been saddled with most responsibility towards sustainable development. Though the awareness of sustainable development is not lacking in these government parastatals, much has not been achieved in areas of setting up of Nigerian-friendly policy towards sustainable development, creating a national awareness, establishment of foot soldiers in form of decentralized institutions saddled with the responsibility of enforcing relevant policies nationally and coming up with assessment basis for sustainable development in Nigeria. Considering the largeness of the Nigerian environment, such responsibility should have been better if reposed on local authorities. In

the developed countries, the national government is just to provide the policy direction on sustainable development while the actualization becomes the responsibility of the municipals. Autonomy should be accorded the local governments in Nigeria which will allow for concentrated efforts on issues such as sustainable development.

2. Private sector participation

According to Odedairo et al. (2011), a major development theory advocates for neo-liberalism, which is epitomized by government pulling out from direct provision in favour of private sector driven participation, as the panacea to underdevelopment in Africa, Asia, Latin America and the Caribbean. The situation now is such that; 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 (Adenikinju, 2005). However, the Nigerian government is encouraged to continually pursue the avenue of private sector participation in infrastructure development. It is noteworthy to point out that in the past year; concerted efforts have been noticed on the part of the Nigerian governments (States and Federal) in allowing for the private sector expertise in power projects across the country. This is very encouraging as the private sector becomes the driving force or the engine of development and growth of the power sector while the government's role is reduced to that of a catalyst responsible for the creation of an enabling environment. This way, government can concentrate on other areas of the economy and the private sector is left to give total attention to the concerned area of infrastructure development. This approach is nothing but a means to sustaining power infrastructure development in Nigeria.

Privatization and commercialization strategy is a latter-day form of the classical laissez – faire policy or strategy of development. The concept embraces deregulation of the economy so as to encourage private initiative and boost productivity and efficiency. From a global perspective, this is a strategy of development through a more efficient pattern of resource allocation by a free interplay of market forces. Deregulation encourages competition and in this way, a greater quantum of economic and social overhead capital or infrastructures will be built up in a more efficient and in a competitive market environment. This is the strategy of the new millennium as governments try to shed their economically inefficient and unproductive overloads to generate more revenue from the sale of the state owned enterprises (SOEs). This would enable the governments of developing economies like Nigeria to reduce their public expenditures, generate more revenue and balance their budgets. The disposal of the economic infrastructures and parastatals would enable the government to focus more attention to and fund more adequately the social parastatals and infrastructures that create substantial external economies through the provision of public goods such as health, education, sanitation and portable water (Familoni, 2000).

3. International Community Participation

The international community can also contribute to sustainable infrastructure by supporting the implementation of best practices in infrastructure management as well as promoting sustainable development initiatives. Since 1983, sustainable development has been a global agenda. It is one of the few areas where the global community voices in unity. Though the damage done to the global environmental landscape varies, there's the recognition that the

fight against the depletion of a common abode is a joint one. There's also the recognition that the resources needed to confront this challenge depends on the proportionate level of development of each nation. For the developing economies, rather than pursue the cause of sustainable development, the limited resources is better expended on more pressing issues. In this case, sustainable development is seen not as of primary concern, which is gross mistake. Thoughts and acts along this line is only a matter of time that it will come biting harder and, with graver consequences. However, the need for the international community participation in ensuring sustainable development and sustainable infrastructural development cannot be overemphasized. Apart from the fact that sustainable development is a subject of utmost interest in the international community, a lot of breakthroughs in form of research and development have been made, as well as the required resources that will definitely benefit the sustainability tendencies of the developing economies. Government of the developing nations including Nigeria must thus show commitment to development that is sustainable in all areas including infrastructure. The enabling environment where the international community can operate is thus advocated to ensure a successful working relationship with the government.

4. Public Sector Commitment

The nucleus of sustainable development globally is the government. Most of the other approaches towards sustainable infrastructural development are either wholly or partially dependent on the government. Government plays a dominant role in level of sustainability that will be inculcated in her developmental strives. For sustainable infrastructure development, the public sector must strengthen the provision of sustainable infrastructure through economic, financial, legal, and institutional reforms as well as adopting eco-efficient practices in management and provision. In similar manner, Na and Raksakulthai (2006) stress that governments can stimulate progress in infrastructure sustainability by enacting legislative, financial, and technical measures to create the right incentives for innovation and changes in performance. In Nigeria and as stated earlier, it is important that the autonomy of the local government be granted. This way, the responsibility of ensuring sustainable development can be reposed on the local governments; as done globally. This will drastically take the responsibility away from both the Federal and States governments. With the responsibility of sustainability practices reposed on the local governments, the efforts can then concerted and concentrated. With respect to infrastructural development, the local authorities should be accorded with the responsibility of granting permits to clients and their contractors to ensure conformity to guiding policies. The local authority will also carry-out the assessment of completed infrastructure using standardised rating systems. An example is the Georgia City of Atlanta's office of sustainability in the United States where the Mayor oversees all activities that have to do with sustainable development. Another dimension to the public approach to sustainable infrastructure development is social inclusion and coverage. It is unarguably that an infrastructure cannot be tagged sustainable until if it does not meet any requirement nor cover areas that are normally excluded from developmental strives e.g. migrants' zone, lower castes, slums and ghettos. This is the more reason why the local authorities' participation in sustainable development is important. It is a government closer to the people and thus will be able to ensure that infrastructure provided does not only meet people's requirement but covers the all areas.

5. Stakeholder Participation (Civil Societies and Construction Professionals)

The intertwining roles of various stakeholders such as construction professionals and civil societies are essential in the development and management of sustainable infrastructure

(Steurer, *et al*, 2005). In the contemporary times, stakeholder participation is an important consideration in most social phenomenon such sustainable infrastructural development. Stakeholders help define service requirements and the prioritization of infrastructure projects that will deliver these services. It is thus the best for any government to consult with diverse groups of residents, business leaders, local government leaders, civic organizations, and technical experts. Participation contributes to better-conceived projects and facilitates resolution of the inevitable conflicts that arise in every complex infrastructure project. Infrastructural presents a management aspect. Na and Raksakulthai (2006) stress that non-physical aspects of infrastructure, including management, play major roles in the sustainability goal and that; this guiding principle, if internalized among various stakeholders, could lead to achieving environmental sustainability while still maintaining productivity in their activities. It is therefore confident to say that if infrastructure must be sustainable; all construction professionals have a role to play. Civil society and non-Governmental organisations (NGOs) also play an important role in the accountability of infrastructure institutions through consumer participation or through participation in monitoring and evaluation. An example is the Republic of Korea, where the civil societies are at the forefront of sustainable development practices such as advocacy, providing alternative but sustainable solutions to the government in areas of construction as well as the development of sustainable development index. The government is also encouraged to embrace civil society participation in sustainable development and by extension; sustainable infrastructural development.

Conclusion

Developing economies not only confront daunting sustainable development challenges, but also have significant opportunities abounding from the concept. The period since the beginning of this new millennium has been one of strong economic performance for some developing economies including Nigeria. If economic growth can be sustained, progressed and the benefits widely shared, developing economies can accelerate social progress, including relieving the burden of poverty, hunger and disease on much of its population. The development of Nigeria has the potential to follow a more sustainable path than has been the case in many other parts of the world, where development often resulted in severe environmental problems before governments and other actors began to get to grips with pollution and resource degradation. The pursuit of a more sustainable course will by no means be easy. It will call for innovative thinking and practice among all concerned. Infrastructure development is an important consideration in sustainable development. The argument will always be to ensure that infrastructure development is carried out in a sustainable manner. This is rather important because the role of infrastructure in contributing to economic development is an essential one. Good quality infrastructure is necessary to avoid bottlenecks and service disruptions and to support a range of important activities in the economy. It must also be recognised that the economic role and significance of infrastructure should not be accorded precedence over the other dimensions of sustainable development—the social, cultural, and environmental aspects. Impacts of infrastructure on these aspects of well-being are equally important, and the positive contribution that well-conceived infrastructure can make to improve other dimensions of sustainability is also vital. The intertwining roles of various stakeholders such as the government, international organizations, NGOs, civil society groups, and the private sector are essential in the development and management of sustainable infrastructure. The Nigerian government is encouraged to show more commitment to sustainable development than ever. The role of the government is indispensable and more importantly, other approaches of sustainable

development depends on the level of commitment shown by government. Other actors like the international organisation, civil societies and the private sector are implored not to give up on their efforts towards an infrastructure development that can be called real and sustainable.

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