ABOUT THE GUEST LECTURER

Prof. Olu Ajakaiye is currently Executive Chairman, African Centre for Shared Development Capacity Building (ACSDCB), Ibadan - a research and training Centre for

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Prof. Ajakaiye served on various planning bodies in Nigeria, including the Joint Planning Board and the National Council on Development Planning. He chaired the National Core Team for the preparation of the Interim Poverty Reduction Strategy Paper (I-PRSP) and Economic Policy Working Group of the Agricultural Transformation Agenda, Federal Ministry of Agriculture.

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Prof. Ajakaiye consults for several international organizations including The World Bank, UNECA, UNDP, ECOWAS, IDRC, ACBF, JICA (UK) and several Nigerian government Ministries, Departments and Agencies.

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Olu Ajakaiye specializes in development economics and has published widely in the area.



DEPARTMENT OF ECONOMICS
Faculty of Social Sciences
University of Lagos

DISTINGUISHED PUBLIC LECTURE

The State of Infrastructure in Nigeria: Challenges and the Way Forward

Distinguished Guest Lecturer:
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Former Director-General of NISER

Date: Tuesday, 21st June 2016 Time: 10.00 am

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Olu Ajakaiye

African Centre for Shared Development Capacity Building Ibadan

I. Introduction

Infrastructure has been defined in various ways. For example, Nigeria's National Integrated Infrastructure Master Plan (NIIMP) finalized in 2015 defines infrastructure as fixed assets with a long lifetime. On this basis, the plan covers what is called "core" and non-core infrastructure. Core infrastructure encompasses transport, energy, ICT and water. Non-core infrastructure, according to NIIMP, encompasses agriculture, mining, social infrastructure, housing, vital registration and security.

Infrastructure has also been defined as all basic facilities, equipment, services and installations required for the growth and proper functioning of a country, community or organization. On this basis, the concept can accommodate the so-called hard and soft infrastructure. Hard infrastructure refers to physical structures or facilities that support the functioning of a society and economy, such as transport (air and seaports, roads and railways and pipelines); energy (electricity generation, electrical grids, transmission and distribution networks); telecommunications (telephone and internet); and, basic utilities (water supply and sanitation including dams) social services infrastructure (, hospitals and health clinics, schools,). Soft infrastructure, on the other hand, refers to non-tangibles supporting the development and operation of hard infrastructure, such as laws, policy, regulatory and institutional frameworks; governance mechanisms; systems and procedures; social networks; and transparency and accountability of financing and procurement systems (Bhattacharyay, 2008).

For the present purpose, attention is focused on the following components of hard infrastructure, namely,

- Transport (road, rail, water and air transport)
- Power (mainly electricity generation, transmission and distribution)
- Information and Communication Technology (mainly telephone and internet facilities)
- Water and Sanitation (water and sanitation facilities)

In this paper, therefore, we examine the state of these infrastructural facilities in Nigeria, identify the challenges and propose options for addressing the challenges. To this end, a comparative analysis of the state of these infrastructural facilities in Nigeria and the usual comparator countries is adopted. The comparator countries are China, Indonesia, Malaysia, South Korea and South Africa. China is included among the comparator countries because of its population size and the remarkable growth and development feat it achieved over time; Indonesia because it is a large oil producing country; Malaysia and South Korea because their initial conditions were similar to those of Nigeria in the 1960s and South Africa because Nigeria overtook it to become the largest economy in Africa only in 2010. It is anticipated that insights and lessons drawn from this approach will provide useful basis for identifying infrastructural challenges in Nigeria and proposing options for addressing them.

The rest of the paper is organized as follows. Section II presents growth and development profiles of Nigeria and the comparator countries. This is followed in Section III by a comparative analyses of the state of infrastructure in Nigeria and the comparator countries. Section IV presents the challenges while section V contains the way forward where key strategies for sustainably addressing the challenges are presented. Concluding remarks are in section VI.

I. Growth and Development Profiles of Nigeria and Comparator Countries

There is no doubt that since the beginning of this Century, growth performance of the Nigerian economy was quite comparable with those of the comparator countries. As shown in Table 1, compared to the comparator countries, Nigeria registered the second highest average annual growth rate during the first one and a half decades of this Century.

Text of a paper presented at the public lecture organized by Department of Economics, University of Lagos, Lagos, Nigeria, June 21, 2016

² Prof. Olu Ajakaiye is Executive Chairman, African Centre for Shared Development Capacity Building, Ibadan.

Table 1: Annual Growth Rates of Nigeria and Comparator Countries, 2000-2014

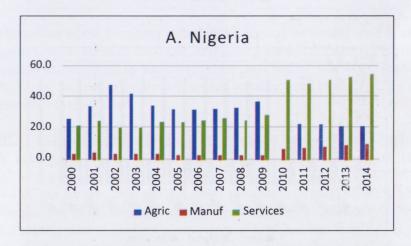
	Nigeria	China	Indonesia	Korea	Malaysia	South Africa
2000	5.3	8.4	4.9	8.8	8.9	4.2
2001			4.5	0.5 5.4	3.7	
2002			7.4			
2003	10.4	10.0	4.8	2.9	5.8	2.9
2004 33.7 2005 3.4		10.1	5.0	4.9 3.9	6.8 5.3	5.3
2007	6.8					
2008	6.3	9.6	6.0			
2009	6.9	9.2	4.6	0.7	-1.5	:-1.5
2010	7.8	10.6	6.2	6.5	7.4	3.0
2011			6.2	3.7	5.3	3.2
2012						
2013	5.4	7.7	5.6	2.9	4.7 6.0	2.2
2014	6.3	7.3	5.0			
Average	7.9	9.7	5.3	4.4	5.1	3.2

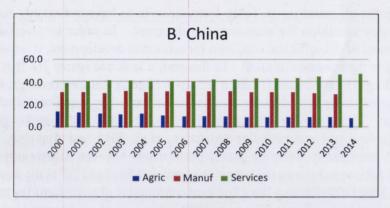
Source: World Development Indicators, May 2, 2016

Economic development is growth plus structural transformation. (Ajakaiye, 2002; Cypher and Dietz, 2010). In other words, growth is a necessary but not sufficient condition for economic development. Put simply, GDP growth accompanied by reduction in the share of primary production (mainly agriculture) and increase in share of secondary production (especially manufacturing) and subsequently tertiary (modern technology and knowledge intensive services) activities in total GDP is indicative of economic development.

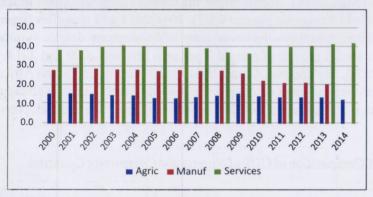
Evidently, all countries in Table 1 can be seen to have reasonably met the necessary condition for economic development. In order to ascertain the fulfilment of the sufficient condition for economic development, it is useful to examine the structure of GDP. To this end, a look at Figures 1(a-f) is quite revealing. The indication is that, it is only in Nigeria that the decent growth of the period under consideration was not accompanied by significant structural change. This is another evidence in support of the view that Nigeria's growth was jobless and non-inclusive (Ajakaiye, et.al. 2015 and Ajakaiye, et.al., 2014). Importantly, while the growth performance has seen Nigeria surge pass South African to become the largest economy in Africa and 26th in the world, by 2010, after GDP rebasing, the 25 percent contribution of manufacturing to GDP envisioned in the Nigeria Vision 20:2020 is far above the 9.5 percent achieved in 2015 (NBS, 2016). Accordingly, the Global Competitiveness Index (GCI) of the World Economic Forum(WEF), 2014-2015 still classifies Nigeria as a factor driven economy – the lowest stage of development despite its impressive average annual growth of around 8 per cent between 2000 and 2014. (WEF, 2015: 282)). By contrast, China, Indonesia, Malaysia and South Africa are at efficiency driven stage of development while South Korea is already at the innovation driven stage of development (the highest stage of development).

Figure 1 Composition of GDP of Nigeria and Comparator Countries

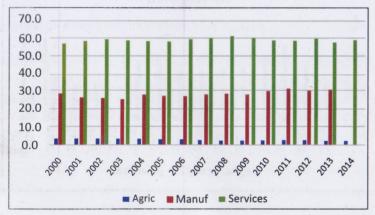


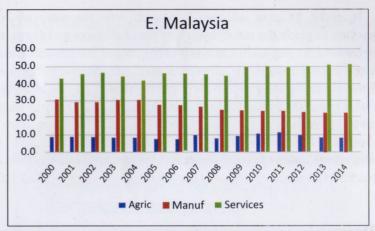


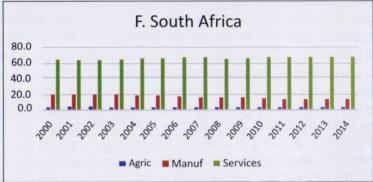
C: Indonesia



D. Korea







The upshot of the foregoing is that while Nigeria performed well in terms of growth profile between 2000 and 20014, the growth was factor (oil) driven and was not accompanied by significant structural change. Not surprisingly, when the factor that drove the growth started to falter from June 2014, the growth process was terminated.

III. State of Infrastructure in Nigeria and Comparator Countries

A number of recent studies and reports have addressed the state of infrastructure in Nigeria (AICD, 2011; AfDB, 2013, 2016; and MBNP, 2015). All of the reports indicate that, with possible exception of ICT, all other components of infrastructure are deficient in quantity and quality. Details of the current state of the four components of infrastructure facilities in Nigeria are already available in these reports thus obviating the need to repeat them

here. In order to gain additional insights into the state of Nigeria's infrastructure to guide the identification of the challenges and suggestions on the way forward, a comparative analysis of the state of infrastructure in Nigeria and the comparator countries is adopted. Specifically, the comparative analysis should provide useful insights into the plight of infrastructure in Nigeria and the comparator countries during the high growth period of 2000-2014 ex-rayed in the preceding section. For this purpose, we rely on data from World Development Indicators of the World Bank (2016), the Global Competitiveness Index of World Economic Forum, (2015-16) and the African Infrastructure Development Index of the African Development Bank (2013 and 2016).

III.1. Transport Infrastructure in Nigeria and the Comparator Countries.

Beginning with road transport infrastructure, data on paved roads in km per 10,000 persons published by the African Development Bank as part of the African Infrastructure Development Index are available for Nigeria and South Africa. Accordingly, the comparative analysis is carried out for the two countries. Figure 2 reveals that the kilometre of paved roads per 10,000 persons in South African dwarfs that of Nigeria (the largest economy in Africa) between 2000 and 2010. The indication is that Nigeria and Nigerians are grossly underserved when it comes to the quantity of paved roads. When compared with South Africa and South Africans. In terms of quality of roads, data from the Global Competitiveness Index, 2015-16 shows that the quality of Nigerian roads is the poorest among the comparator countries (see Figure 3)

Figure 2: Paved Roads KM Per 10,000 persons for Nigeria and South Africa, 2000-2010.

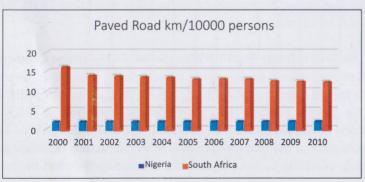
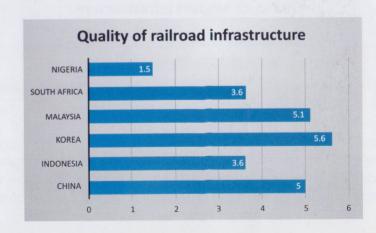


Figure 3: Quality of Road Infrastructure for Nigeria and Comparator Countries, 2016



Turning to rail transport, there is no comparative data set on railways in the AIDI. However, there is no doubt that the stock of railways in Nigeria is quite small compared to that of South Africa. Moreover, data from the latest edition of the Global Competitiveness Index of the World Economic Forum suggest that the quality of railroad infrastructure is poorest in Nigeria compared to the comparator countries as shown in Figure 4

Figure 4: Quality of Railroad Infrastructure in Nigeria and Comparator Countries, 2016



Similarly, data constraints prevents a comparative analysis of the stock of airport and seaport facilities. However, data from the 2015-16 edition of the GCI of WEF shown in Figures 5 and 6 indicates that the quality indices for air and sea ports are lowest for Nigeria.

Figure 5: Quality of Airport Infrastructure for Nigeria and Comparator Countries, 2016

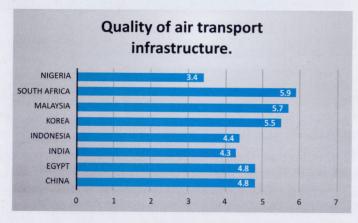


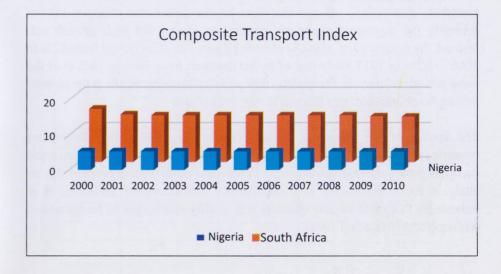
Figure 6: Quality of Seaport Infrastructure for Nigeria and Comparator Countries, 2016



On the whole, the gap between Nigeria and South Africa reflected in the composite index of transport infrastructure published by the African Development Bank in 2013, shown in Figure 7, reinforces the view that the quantity of transport infrastructure in Nigeria is inferior to that of South Africa.

Evidently, during the high growth period, Nigeria did not significantly increase the quantity and quality of its transport infrastructural facilities Moreover, while it soared pass South Africa to become the largest economy in Africa since 2010, it remained inferior to South Africa in the area of transport infrastructure.

Figure 7: Composite Transport Infrastructure Index for Nigeria and South Africa, 2000-2010



III.2. Power Infrastructure in Nigeria and Comparator Countries

Typically, electricity infrastructural facilities is the primary focus in the area of power infrastructure. Specifically, attention is focused on electricity generation, transmission and distribution. A distinguishing feature of the electricity infrastructure reform in Nigeria is the unbundling of the erstwhile Power Holding Company of Nigeria (PHCN) and subsequent privatization of the generation and distribution segments while the transmission segment is

retained by Government under a management contract with a private entity, In addition, the National Electricity Regulatory Commission (NERC) was established to regulate activities of the private entities. Needless to say, it is anticipated that the benefits of these reforms will start streaming in eventually.

Meanwhile, for the present purposes, indices of electricity generation, access to electricity and quality of electricity in Nigeria are compared with those of the comparator countries between 2000 and 2015. Beginning with electricity generation, interest is in diversified sources of electricity generation. In this regard, Table 2 shows the percentage distribution of electricity generation from various sources for Nigeria and the comparator countries. From the Table, it is clear that Korea, Indonesia and Malaysia have more diversified sources of electricity generation while Nigeria has the least diversified source of electricity generation. It can therefore be concluded that Nigeria did not diversify the source of electricity generation during the high growth era. Instead, the contribution of gas to electricity generation increased from 62% in 2000 to 82% in 2013 while that of hydro declined from 38% to 18% over the same period. Moreover, the quality of Nigeria's electricity supply is the poorest among the comparator countries as shown in Figure 8.

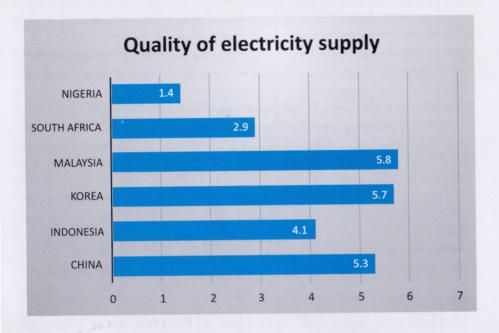
The upshot of the foregoing is that Nigeria lags behind the comparator countries in terms of stock and quality of electricity generation infrastructural facilities during the high growth era. While data limitations prevented similar analysis for transmission and distribution infrastructural facilities, it is reasonable to expect similar quantity and quality challenges to be witnessed with respect to these facilities.

Table 2: Percentage Distribution of Electricity Generation by Source, 2000-2013

	Source	2000	2005	2010	2011	2012	2013
N igeria	Hydro	38	33	24	22	20	18
	Gas	62	67	76	78	80	82
	Total	100	100	100	100	100	100
China	Coal	78	79	79	81	79	79
	Hydro	16	16	17	15	17	17
	Gas	0	0	2	2	2	2
	Nuclear	1	2	2	2	2	2
	Oil	3	3	0	0	0	0
	Total	100	100	100	100	100	100
		1	- (-)		- 11-11	- 1,- 241	9.19
Indonesia	Coal	42	46	46	49	54	56
	Hydro	11	8	10	7	7	8
	Gas	28	15	24	21	24	24
	Oil	20	31	20	23	15	12
	Total	100	100	100	100	100	100
Korea	Coal	39	39	45	44	46	42
	Hydro	1	1	1	1	1	1
	Gas	10	16	21	22	21	27
	Nuclear	38	38	30	30	2.8	26
	Oil	12	6	4	3	4	4
	Total	100	100	100	100	100	100
	174 1000	Hi-			1		
M alaysia	Coal	11	24	35	42	43	40
	Hydro	10	6	5	6	7	8
	Gas	74	67	57	45	47	49
	Oil	5	3	3	7	4	4
	Total	100	100	100	100	100	100
South A frica	Coal	93	95	94	94	95	94

Source: World Development Indicators, 2016

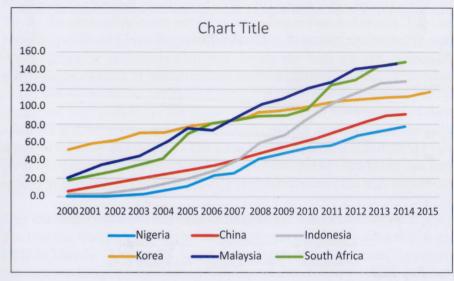
Figure 8: Quality of Electricity Generation in Nigeria and Comparator Countries



III.3. ICT Infrastructure in Nigeria and Comparator Countries

Turning to ICT infrastructure, Figure 9 shows that the number of fixed and mobile telephone lines per 100 persons increased phenomenally in Nigeria as well as in all comparator countries during the high growth era. However, throughout the period, Nigeria recorded the lowest number implying that while Nigeria benefitted from the ICT revolution driven mainly by the mobile cellular phone revolution, the country still lagged behind the comparator countries. Again the indication is that during the high growth era, there was considerable expansion in ICT facilities in Nigeria but the rate of expansion was very low compared to the other countries. It can therefore be concluded that while there has been a remarkable progress in ICT infrastructure, there is considerable room for improvement in quantity and quality of ICT infrastructure facilities in Nigeria

Figure 9: Mobile and Fixed Lines per 100 Persons in Nigeria and Comparator Countries



III.4. Water and Sanitation Infrastructure in Nigeria and Comparator Countries

Finally, Figures 10 and 11 show the trend of population with access to improved water and sanitation facilities, respectively. Evidently, while there was sustained increase in population with access to improved water facility in Nigeria and the comparator countries during the high growth era, Nigeria lagged far behind all other countries, including South Africa (Figure 10). In the case of sanitation, Figure 11 shows that while the population with access to improved sanitation facility maintained an upward trend in other countries, the reverse was the case for Nigeria.

Evidently, there is considerable room for improvement in the area of water supply infrastructural facilities in Nigeria. In the case of sanitation, the declining trend is undesirable and should be reversed through massive investment in expansion and modernization of sanitation infrastructural facilities.

Figure 10: Percentage of Population with Access to Improved Water Facility in Nigeria and Comparator Countries, 2000-2015

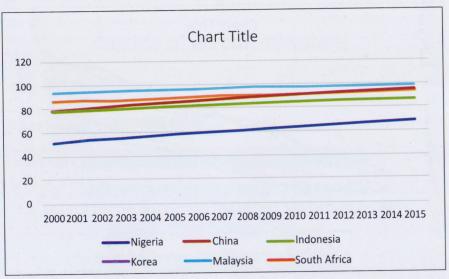
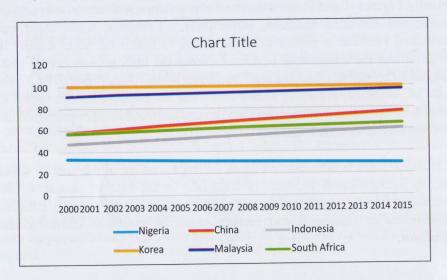


Figure 11: Percentage of Population with Access to Improved Sanitation Facility in Nigeria and Comparator Countries, 2000-2015



IV. Challenges of Infrastructure in Nigeria

The comparative analysis approach to assessing the status of infrastructure in Nigeria during the high growth era of 2000-2014 point to two broad challenges. Firstly, the stock of transport, power, water and sanitation and even ICT did not benefit significantly from the growth in income. Secondly, and probably more disappointing is the observation that during the high growth period, the relatively small stock of infrastructural facilities suffered neglect. The failure to expand, upgrade and modernize these infrastructural facilities in Nigeria during the high growth era has resulted in the generally low quality of these facilities and the wide gap between Nigeria and the comparator countries in terms of quantity and quality. The situation has seriously contributed to the paradox of growth and poverty reduction, jobless growth syndrome and poor quality 9factor driven) growth witnessed in Nigeria during the high growth era.

This situation probably explains the OLS regression results which show positive but insignificant relationships between composite infrastructure and GDP in Nigeria. The results for the components of infrastructure also reveal positive but insignificant relationships except for electricity which is barely significant. What is more, with the exception of transport infrastructure, the coefficients are generally small indicating very low elasticities.

Meanwhile, the Granger causality tests suggest that the causality runs from water and sanitation, ICT and transport infrastructure to GDP. The implication is that the development of these infrastructural facilities should be guided by the needs of the economy. This presupposes a clear articulation of the kind of economy envisaged and the quantity and quality of infrastructural facilities required to support effective and efficient functioning of the economy. The tests for electricity infrastructure suggest no significant relationship either way possibly reflecting the parlous state of electricity infrastructure and the undeerviersified character of electricity generation facilities in Nigeria.

³ The OLS results are as follows: GDP (t) = 0.945 + 0.563INFR (t) - -.094 INFR(t-1) + 0.426GDP9t-1); Adj. R2 = .81 (.97) (1.47) (-0.45) (1.35)

The results for the components of infrastructure are as follows: GDP(t) = -38.32 + 0.144W&S(t) + 5.53Transp(t) (0.76) (0.41) (0.74) + 0.111 ICT + 0.04Elect(t) + 0.720GDP(t-1) (0.99) (2.00) (2.84)

The foregoing suggest that the key challenges of infrastructure in Nigeria are lack of maintenance of existing facilities and lack of investment in new and modern facilities. A review of the experiences of the comparator countries suggests that they all embraced and are fully committed to vigorous implementation of a series of medium term development plans. See Ajakaiye (2007 and 2012) for detailed discussion of the development planning experiences of China, South Korea, and Malaysia. The commitment of South Africa to development planning is also not in doubt. The tendency to jettison the preparation and implementation of an all inclusive participatory development plans since the beginning of this century contributed to the sustained inferior development and operation of transport, power, ICT and water and sanitation infrastructure in Nigeria when compared with the comparator countries. The failure to plan during the period of high growth and associated enabling fiscal space represented a missed opportunity which should not be repeated.

Infrastructural development programmes predicated on and forming an integral part of an all incusive participary development plans is likely to effectively address the various deficits in quality and quantity of infrastructural facilities in Nigeria. In this regrd, the NIIMP is a step in the right direction but it could have been better if it was predicated on the needs of the economy envisioned in the Vision 2020. More importantly, the failure to vigorously implement the medium-term plan dubbed National Implementation Plans (NIP) and the weak link between the NIP and the annual budgets is a major lacuna. When this lacuna is effectively addressed, the medium term plans will be strongly linked to the budget. Perhaps more importantly in the context of the prevailing circumstance with no fiscal space, the articulation of the policies and programmes in an all stakeholder planning process will provide appropriate signals to the domestic private investors and their foreign counterparts. Vigorous and systematic implementation of plan policies and investment programmes will give necessary confidence to the private sector to participate in the process of filling the infrastructure gaps. In that case, the challenges confronting initiatives like PPP, BOT, BOOT, user charges and tolls will be ameliorated if not eliminated. In addition, the instrumentality and efficacy of alternative financing arrangements including diaspora bonds, infrastructure bonds, pension funds and similar initiatives will be clarified and appropriate responses should be elicited from the investing public.

I. Way Forward

The foregoing suggests that the key challenges of infrastructure in Nigeria are lack of maintenance of existing facilities and lack of investment in new and modern facilities. A review of the experiences of the comparator countries suggests that they all embraced and were fully committed to vigorous implementation of a series of medium term development plans. See Ajakaiye (2007 and 2012) for detailed discussion of the development planning experiences of China, South Korea, and Malaysia. The commitment of South Africa to development planning is also not in doubt. In these countries, the development of infrastructure was predicated on the needs of the economy envisioned in the medium term plans which were drawn up against the background of an underlying long-term plan. The medium term plans are vigorously implemented with the short-term plan – the annual budgets. In these countries, there was mutual trust among all stakeholders and there was intensive formal and informal interface among them.

In Nigeria, the tendency to jettison the preparation and implementation of an all inclusive participatory development plans since the beginning of this century contributed to the sustained inferior development and operation of transport, power, ICT and water and sanitation infrastructure in the country when compared with the comparator countries. The failure to plan during the period of high growth and associated enabling fiscal space represented a missed opportunity to expand and modernize infrastructure to meet the needs or an economy envisioned in the Vision 20:2020, for example. It is imperative to ensure that this mistake is not repeated.

Accordingly, the way forward is to embark on a participatory development planning process at state federal and state levels of government. Key steps in this process include:

1. The Federal Ministry of Budget and National Planning should organize a *National Development Summit* to be attended by the national leadership of all stakeholder groups, including those of Federal MDAs, Committees of National Assembly on Planning and Economic Development, State Government Planning Agencies, State

Assembly Committee on Planning and Economic Development, the political parties, private sector organizations, labour union organizations, professional organizations and major civil society organizations such as the National Council of Women Societies. The purpose of this Summit is to build consensus on the objectives of the next medium-term plan and agree on key priority actions to be taken by each of the stakeholder groups working in concert to achieve the plan objectives.

- 2. State Planning Agency should organize a *State Development Summit* to be attended by the Federal Ministry of Budget and National Planning, State Government MDAs, State Assembly Committee on Planning and Economic Development, Chairmen of all Local Government Councils, the State Leadership of all stakeholder groups, including political parties, private sector organizations, labour organizations, professional organizations and major civil society organizations such as State Council of Women Societies. Again, the objective of the Summit is to build consensus on the objectives and targets of the next state medium term plan and agree on key priority actions to be taken by each stakeholder groups working in concert to achieve the plan objectives.
- 3. Federal Ministry of Budget and National Planning and the State Planning Agencies should prepare their respective Federal and State Medium term (Rolling) Development Plan based on the outcome of the respective National and State Development Summits for consideration and approval by the Federal and State Executive Councils and subsequent transmission to the National and State Assemblies for adoption. Copies of the Plan should be made available to all participants at the National Development Summit and to the general public.
- 4. The Federal and State Plans should contain:
 - A precise statement of the development objectives based on the outcome of the National and State Development Summits
 - Federal and State Government investment programmes required for the achievement of the medium term development goals agreed upon at the Development Summits;
 - Estimates of private sector investment profile necessary to secure

- the contributions of the private sector to the achievement of the agreed development objectives.
- Broad directions of monetary, fiscal, trade, exchange rate, incomes, sectoral and other development policies that are compatible with the enabler roles and constitutional responsibilities of Federal and State Governments and also complementary to the achievement of the development objectives during the plan period; and
- A macroeconomic framework including the basic macroeconomic projections and sectoral development targets all of which are conditional on the public investment programmes, estimates of private sector investment profile and the complementary policy directions.

See Ajakaiye (2015). For further elaborations including the legal framework for making the process mandatory and predictable.

I. Concluding Remarks

The infrastructural development programmes derived from such participatory all inclusive development planning process will not only address the lacuna identified above but also provide an enabling environment for effective and profitable private sector involvement in ways compatible with the realization of the agreed national and state development goals and aspirations. This way, the missed opportunity to develop an infrastructural base to support proper functioning of the Nigerian economy and society should not repeat itself. This way, the challenges of low quality and inadequate/inappropriate infrastructural facilities will be a thng of the past. And finally, the much desired durable synergetic involvement of all stakeholders and the federal and state levels will be secured. In that case, the current situation where Nigeria lags behind the comparator countries will be replaced by one in which Nigeria will surge pass South Africa, Malaysia and Indonesia in terms of quality and quality of its infrastructural facilities. By then, Nigeria should belong to the group of countries where development is driven by innovation a la WEF classification.

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DEPARTMENT OF ECONOMICS
Faculty of Social Sciences
University of Lagos

DISTINGUISHED PUBLIC LECTURE

The State of Infrastructure in Nigeria: Challenges and the Way Forward

Distinguished Guest Lecturer:
Professor Olu Ajakaiye
Former Director-General of NISER

Date: Tuesday, 21st June 2016 ■ Time: 10.00 am Venue: Afe Babalola Lecture Theatre, University of Lagos