# Identifying Appropriate Funding Model for Public Infrastructures in Nigeria: A Non-Empirical Analysis

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# Abstract

The state of public infrastructures in Nigeria has been described by many scholars as very deplorable. The study which focused on the Nigerian economy aimed to examine the public infrastructures funding models in Nigeria, their effectiveness and suggest an alternative model to maximize public infrastructure development. The opportunities offered by the PPPs, bond and equity markets to fund infrastructural projects are massive in terms of limitless funds, expertise and timely completion of projects. A hybrid funding model that makes a right combination of PPPs, debts and equity could be less expensive than when the public infrastructures could be for some socio-economic reasons with direct or indirect impacts on economic development, job creation, ease of doing business, security, welfare, standard of living and government popularity but the aim of the private sector whether the funding comes in the form of PPP, debts (bonds) or equity is wealth maximization. The government is advised to seek more funding opportunities outside its internally generated revenue and federal allocation sources but this should be done with caution to strike a positive and favourable balance between its socio-economic aims and the wealth maximization objective of the private sector who intend to fund the public infrastructures.

Keywords: Economic growth and development, capital market, funding models, government, bond, PPP, poverty, Public infrastructure, security

JEL Classification: H54, I30, J68, L33

# Introduction

The level of public infrastructure development in any nation can be used to depict the level of economic development or otherwise, the standard of living of the people and the preparedness of the nation to sustain and improve on those indices amongst others. Several studies following the Aschauer (1989) have shown that there is a strong and positive correlation in many cases between public infrastructures and economic growth and development as well as the standard of living, job creations, education and social life of the populace (Garcia, Meseguer, Ortiz and Tuesta, 2017; Nedozi, Obasanmi and Ighata, 2014; Sojoodi, Zonuzi, Nia, 2012; Estache and Garsous, 2012; Enimola, 2011; O'Fallon, 2003).

Nevertheless, arguments continue to subsist among scholars regarding the minimum level of public infrastructures that can trigger and sustain the growth and development in any economy and the upper level at which any additional investments in public infrastructures would begin to decline the nation's economic growth and development (Bello and Osinubi,-; Ansar, Flybjerg, Budzier and Lunn, 2016). Just like well advanced economy with controlled population could be showing concern of not over investing in public infrastructures to avoid unnecessary capital lock up and maintenance costs, the same cannot be said of majority of countries in Africa who are still struggling with essential public infrastructures like electricity, water, roads and basic health facilities. For instance, power was identified by Pottas (-) and, Foster and Briceno-Garmendia (2010) as the biggest public infrastructure challenge with about thirty nations on the continent experiencing constant power failures. The effects of irregular supply of power to the productive sector of the economy that require such facility are consequential in low productivity, high cost of production, job loss as those that could afford it would have to seek alternatives in petrol and diesel powered generators which cost much more.

In a study that assessed the impact of infrastructure on economic growth and global competitiveness, Palei (2015) identified several factors for the growth and development of any nation's economy. Prominent among the factors are institutions, conducive business environment, technology, public infrastructures, health and education. There is no doubt that Africa is lacking in many of those essential requirements identified above by the Palei (2015). For instance, there is a short supply of public infrastructures required to transform many African nations from their current status of underdevelopment to developed economies in the same manner that the conducive business environments and institutional supports are lacking. In fact, one of the descriptive features of many of the African nations as underdeveloped is the absence or poor state of their public infrastructures which has been identified (Addae-Korankye, 2014) as one of the major causes of poverty in the continent. Calderon and Serven (2010) observed that sub-Saharan Africa consistently ranked at the bottom of developing nations in terms of public infrastructures performance which in turn has been the major obstacle for growth and poverty alleviation

in that region of the continent.

The state of public infrastructures in Nigeria has been described by many scholars as very deplorable (Ogunlana, Yaqub and Alhassan, 2016; Ijaiya and Akanbi, 2009;). Some of the reasons given by Ogunlana, Yaqub and Alhassan (2016) for the deplorable state include reductions in government spending on public infrastructures, vandalization of existing ones, corruption and bureaucratic bottlenecks. Nedozi, Obasanmi and Ighata (2014) argue that the deplorable state of public infrastructures in Nigeria accounted for relocation of many firms from the country to neighbouring countries like Ghana and the emergence of insurgents in Niger Delta, North East and some other parts of the country.

It is not unusual for the governments at the point of formation to shoulder the provision of basic public infrastructures and conducive business environment that would attract investments to the economy and ensure growth and development up to a point where it can shelve partially or fully, the responsibility of providing public infrastructures to the private sector. However, opinions are still divided with regards to the contributions of the government to the state of the public infrastructures in African countries. While many scholars argue that corruption in government, lack of priority to issues of public infrastructures, diversions of government revenues to curtail civil wars, militancy and illiteracy in government account for lack and poor state of public infrastructures in Africa, some other scholars argue that government has no business in view of its limited resources providing public infrastructures for the economy. The latter scholars opined that government role is not more than creation of conducive business environments and institutional supports for the economy.

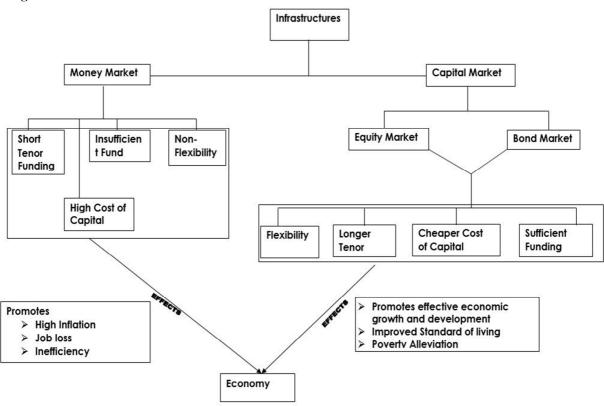
This study which is particularly focused on the Nigerian economy aimed to examine the public infrastructures funding models in Nigeria, their effectiveness and suggest an alternative model to maximize public infrastructure development. Without mincing words, public infrastructures require huge capital outlays and long gestation period for private investors to breakeven and make returns. This study would be addressing the questions of what is the public infrastructures funding model in Nigeria and what role has the private sector being playing. The study believes that answers to the research questions would assist policy makers, public infrastructures administrators and other stakeholders to reassess their funding models for more effective project delivery.

# **Conceptual framework**

Studies have shown that the level of public infrastructure development has influence on the nation's economic growth and development, populace standard of living, life expectancy, unemployment and poverty alleviation. This study is of the view that if adequate and modern economic public infrastructures are available in Nigeria, the cost of production and product quality would be positively affected in such a way that foreign and smuggled goods would be priced out of the markets rather than the other way round. The economic public infrastructures are those that have direct impact on the productive and distributive sectors of the economy. Examples include electricity, water supply, telecommunication system, and transportation (roads, railways, waterways and airways). Similarly, social public infrastructures have potentials to create harmony, social integration and security of lives and property which invariably impact on productivity, life expectancy and, economic growth and development.

The funding of public infrastructures outside the government can be done by private sector through at least three sources namely, money market and capital market including institutional investors like development finance institutions (DFIs) and the non-governmental agencies (NGOs). The money market funding is not sustainable as it can only lead to mismatch of short term funds with long term investments. Aside high costs of capital, the investments would not be matured to generate required cash flows that can support loan repayments. The capital market on the other hand provides long term funding through mainly the instruments of bonds and equities. The money market comprises mainly of commercial and merchant banks while the capital market is made up of the equity and the bond markets.

*Figure 1* below provides a pictorial analysis of the two major sources of funding public infrastructures in Nigeria which this study set out to examine the economic and the non-economic effects on the nation's growth and development. The money market as a major source of funding tends to lead to inadequate provision of new and modern public infrastructures and maintenance of existing ones as a result of high cost associated with funding, lower tenured funding, limited and competing demands for funding by the consumer and real sector from the market and its non-flexibility.



# Figure 1: Conceptual Framework for Funding of Public infrastructures Diagram

#### Source: The Author

The effects of these challenges associated with funding of public infrastructures through the money markets would include slowed economic growth and development, high inflation, job cuts, inefficiency and abandoned projects.

On the other hand, both equity and bond markets provide a longer tenor, cheaper costs of funds and flexibility in funding public infrastructures than what obtains in the money market. In addition, the capital market is able to provide more funding for public infrastructures than the money market. The effects of capital market funding on the economy would also be more positive than the money market and these would be evidenced in increased gross domestic product, improved standard of living, poverty alleviation and improved life expectancy amongst others.

# Literature review

Public infrastructures play a critical role in the economic development and growth of any nation and the welfare of its people. It sometimes provide the bedrock or supports for economic emancipation and expansion. In fact, Perkins (2011) likened (economic) public infrastructures to the foundation of a building. He further argued that public infrastructures provide a supporting role, facilitating the multitude of productive economic activities that constitute the bulk of the economy or the GDP. According to Sharma and Vashist (2010), public infrastructures determine to a very large proportion the level of industrialization of any economy. In essence, the available and functional public infrastructures influence the nature of industrial development that takes place in the economy (Sarkar, 2009). In the study of public infrastructures are a catalyst to increase domestic productivity as well as attracting foreign direct investment inflows to the economy. Public infrastructures can also be defined as the fundamental structures and facilities provided to serve a community for its economy to function. According to an article shared by Mehta (2017), "public infrastructures are those basic facilities and services which facilitate different economic activities and thereby help in economic development of the country". She went on to refer to them as social overhead capital.

Nedozi, Obasanmi and Ighata (2014) described public infrastructures as basic essential services required for economic development to happen. They opined that the absence of required public infrastructures is the bane of economic development and growth in Nigeria which is evidenced in high cost of production, decrease in national

productivity and firms' competitiveness. The effect of poor and absence of public infrastructures planning in Nigeria caused the poor road networks, power supply, aviation, health and education facilities amongst others across the nation. Kabiru and Arshad (2016) describe public infrastructures as capital goods not meant for direct consumption rather as the means of generating and promoting economic activities that could result in employment creation and poverty alleviation. According to Nurre et.al (2012), a nation's current level of development and what the immediate future holds can be measured by the type, adequacy and quality of existing public infrastructures. In another study, Diugwu, Mohammed and Baba (2015) agreed that a correlation exists between the level of development and economic growth, however observed that in spite of the huge budgetary allocation for public infrastructures in Nigeria, the desired benefits and impact on the economic growth and development as well as on the wellbeing of the citizenry were not attained in most cases for reasons that bother on poor project conception, design and execution. Unfortunately, the recorded Nigerian economic growths over the years according to Edun, Akinde, Olaleye and Idowu (2013) have not translated to economic development for the nation due to inadequate and absence of required public infrastructures. In fact, they argue that most of the existing public infrastructures in Nigeria were developed during the second national development plan of 1970 and 1974.

A study of the role of public infrastructures in promoting economic growth in Iran by Sojoodi, Zonuzi and Nia (2012) revealed that transportation facilities with regards to the length of the railways and roadways and telecommunication infrastructures made positive and significant impact on the economic growth of that country. The Soojodi, Zonuzi and Nia (2012) actually confirmed the earlier studies of Sanchez (1998) and Easterly (2001) that established positive and significant correlation between public infrastructures and economic growth and development especially in developing economies. It is important to have relevant and efficient public infrastructures to achieve positive impacts as according to Singh, Batra and Singh (2007), inadequate and inefficient public infrastructures can prevent the economic drivers. More specifically, Perkins, Fedderke and Luiz (2005) stated that the relationship between public infrastructures could create bottlenecks that may lead to missing opportunities for promotion of economic growth.

Public infrastructures do not generate direct outputs however they are established to serve various sectors of the economy by easing the ways of life of the people and production of goods and services. There are several classifications of public infrastructures. Most of the common ones are economic and social public infrastructures, and hard and soft public infrastructures. According to Pooja (2017), economic public infrastructures refer to public and private utilities that aid the process of production and distribution in an economy such as transportation, power and irrigation. Social public infrastructures are those structures and facilities that support the quality of life of the people in a country regardless of its appearance. Some of these include education, healthcare, recreation and so on. The economic public infrastructures include transportation, communication, irrigation, power/energy, science and technology while social public infrastructures include education, healthcare, banking, insurance, irrigation, community support, public safety, sports, recreation, arts and culture.

#### Funding of public infrastructures in Nigeria

The primary responsibility of funding infrastructural projects in developing economies like Nigeria rest solely on the government for two major reasons. First, the citizenry assumes it is the responsibility of the government to do so more so that the government richness and authority to make things happen are limitless. Secondly, the government for political reasons see award of infrastructural projects to communities that voted them into power as dividends of democracy regardless of whether the projects have economic or social benefits. The politicians in government use public infrastructures to reward or punish the citizenry depending on the kind of support they got during elections. That largely accounts for some abandoned projects by incumbent government to either discredit the previous government that initiated the project or punish the communities the projects were cited for not supporting the election of the incumbent government.

However in the recent past, there had been discussions around public private partnership (PPP) in funding public infrastructures in Nigeria. According to World Bank Institute (2012), PPP is a long term contract between a private party and a government agency for providing a public asset or service, in which the private party bears significant risk and management responsibility. The approach which has yielded good results in other economies like Taiwan where a total of 1217 PPP projects were commissioned between 2002 and 2004 (Hsueh and Chang, 2017), China (Chan, Lam, Chan, Cheung, Ke, 2010), United Kingdom though with few instances of failure especially the London underground PPP project (Margarita Khoteeva and Daria Khoteeva, 2017) and Germany (Frank Friesecke, 2006. The success recorded with PPPs in those economies cannot be said of Nigeria. The failures of PPP in Nigeria have been attributed to several reasons including poor human relations (Egboh and Chukwuemeka, 2012), corruption (Umar and Okafor, 2015) the political instability (Otairu, et.al; 2014), inconsistency in the government policies and insincerity of the government to honour agreements (Oluwasanmi

and Ogidi, 2014; Kadiri, Ojo and Jagboro, 2015; Oladimeji, Adebiyi and Gambo, 2017).

Instances of PPP collaborations in Nigeria include the construction of the Lagos Lekki-Epe concenssaire road, terminal 2 wing of the Muritala Mohammed local airport with a hotel and a number of road projects connecting Abuja suburbs including the airport to the Federal Capital Territory. Some of the projects like the Lagos-Epe concessionaire road was truncated because of public resistance to be tolled through the length and breath of the road while the hotel part of the terminal 2 wing of the Murtala Mohammed local airport remained abandoned for reasons of irreconcilable differences between the government and the construction contractors.

Though statistics are not available but equally important is the contributions of private households and communities in funding public infrastructures for private use in the absence of public infrastructures. Many households in Nigeria rely on privately dug boreholes for water supply, power generators for electricity and communities for road constructions and purchase of electricity transformers for the failure of the government to meet basic provisions.

From the experience of other nations, the best provider of public infrastructures is the private sector through collaboration with the public sector. The public sector collaboration becomes necessary in the area of regulations, settlement of land owners and those that would be deprived of their properties amongst other issues that would enable prompt and successful delivery of projects. The private sector becomes the financier and project executors operating within the terms and conditions of the PPP collaboration.

One of the questions this study would be addressing is, which of the options between the money and capital markets is better to provide the required funds for public infrastructures in the interest of all the stakeholders.

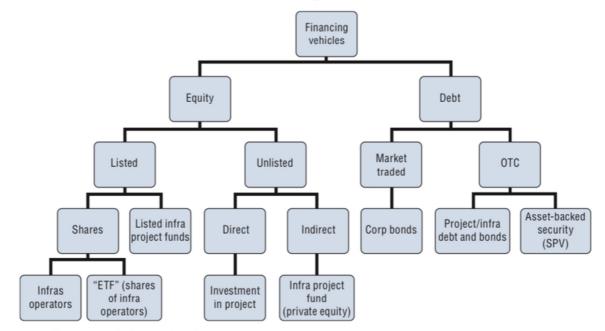
# Public infrastructures funding challenges in Nigeria

Though there is no dispute that the state of public infrastructures in Nigeria is deplorable and grossly inadequate and also that over the years public infrastructures have suffered from under funding, there is however no consensus yet on the amount of funding required to bring the current state of public infrastructures in Nigeria to the level required to catalyze the nation's economic growth and development. For instance, a report by Federal Ministry of Works (2013) on road public infrastructures and related development in Nigeria puts the average annual funding requirements for road public infrastructures in Nigeria at 500 billion naira with average budget allocation of 120 billion naira. The report further stated that out of the 143 billion naira budgetary allocation for 2012, only 110 billion was released. The deficit of thirty-three billion naira even if the actual amount released was judiciously applied and immunized against corruption and adverse foreign exchange fluctuations would impact negatively on the completion and quality of the commissioned projects and invariably undermine the nation's economic growth and development.

ModuKumshe, Magaji and Bani (2015) relying on the statement of the late President Umar Musa Yar'adua put the amount required to scale up the level of public infrastructures at US\$ 19 trillion whereas the country inflows were estimated at about US\$ 3 billion for the year 2009 when the statement was made. It is therefore obvious that the government is financially incapacitated to provide the required funding for public infrastructures and without doubts funding alternatives which Badu, Owusu-Manu, Edwards and Holt (2011) described as innovative financing of public infrastructures have become imperative. The capital expenditure on infrastructural development is grossly below the minimum of 6 percent of the nation's GDP stipulated by the African Development Bank (2010) as required to achieve reasonable level of economic growth and development. Empirical studies revealed that for over two decades, Nigeria devoted higher proportions of its budgets to recurrent expenditures with some of the evidences establishing that the gap became wider from 2000 just after the country returned to democracy (Modebe, et.al; 2012; Aigheyisi, 2013; Okoro, 2013).

The continued deficits in government funding of public infrastructures show that private sector intervention is inevitable to achieve the desired level of infrastructural development. Even if the pension funds, proceeds of unclaimed dividends and other pockets of seemly idle funds are to be accessed by the private sector, this can only be done through either the money or capital markets for efficiency. However, Croce and Gatti (2014) argue that though public infrastructures can be funded through several capital channels, the most appropriate channel is the capital market in view of its ability to attract larger amount of funds required for development.

In Figure II below adopted from Croce and Gatti (2014), there are different funding instruments between equities and bonds that are available from the capital market. While some of the instruments like equity can either be listed or unlisted, the bonds can be market traded or over the counter (OTC). The Nigerian government over the years have been sourcing funds from the bond market to finance its public infrastructure projects like roads, bridges, water supply and power stations. The FMDQ has been a major platform outside the Nigerian Stock Exchange which is primarily concerned with equities that the government has been utilizing to raise bonds. For instance, in November, 2017 the Federal Government of Nigeria issued its first Sukuk bond to raise 100 billion naira to fund the construction and rehabilitation of 25 roads across the nation's six geopolitical zones. The government believes that the roads after completion would contribute positively and significantly to the economies of the six geopolitical zones and the nation.



#### Figure II: Different channels to public infrastructures investments available to the private sector

Source: Della Croce and Sharma (2014).

However, many bonds are not tradeable in the secondary markets which naturally limits interested investors to only buy and hold the assets and thereby depriving other investors who prioritize stability to capital appreciation. The equity platform provides the public infrastructure promoters that are raising funds, the alternatives between the listed equity markets or the unlisted equity markets. Special investment products can also be created in both markets to attract funding such as Exchange Traded Funds (ETFs) as derivatives of the quoted shares of the public infrastructure providers.

The Nigerian money market comprising mainly of commercial banks, merchant banks and other financial houses have been incapable of providing the required funding for infrastructural developments in view of the smallness of their capital base in relation to huge infrastructural capital requirements, nature of the funds which comprises mainly of demand deposits and the high costs of capital.

Estache, Serebrisky and Wren-Lewis (2015) developed funding models to address public infrastructures financing in developing countries. Their study examined three funding options that could be explored by the public infrastructures promoters which in this case is the government. These options are public funds derived from budgetary allocations, private equities and debts.

The optimal model proposed by the Estache, Serebrisky and Wren-Lewis (2015) was premised on certain assumptions. The assumptions include: there are no transfer limits the government can make to the private firms, operation costs are observable and can be contracted on by both the government and the private equity investors, the government can commit to transfers and prices in the immediate preceding period and lastly the government maximizes social welfare.

#### Public and private partnerships and bond issuance to fund public infrastructures

The Nigerian economy in the recent years has witnessed increased government attention on infrastructural development compared to the era of military rule and early years of the current democratic rule. Some of the notable public infrastructures are the construction of rail lines across the country and within some major cities like Abuja, Lagos and Port Harcourt, public transportation parks and amenities in major cities like Lagos, roads, modern and specialist hospitals, power stations and water projects. Though the developments were observed not to be even across the states of the federation as about 80 to 90 percent of some of the state governments' budgets which were largely funded by the monthly allocations from the federation account (the federal government) were devoted to payment of salaries and other recurrent expenditures. However, a few states like Lagos, Akwa Ibom and Port Harcourt were able to effect some laudable infrastructural developments that could sustain the existing businesses and attract more local and foreign investments to them. The states that were able to make some laudable infrastructural developments depended largely on funding from internally generated revenue, bond markets and public and private partnerships (PPPs). Some of the examples include:

i) The Oshodi regeneration public infrastructures which include transport interchange and

terminals at a cost of US\$70 Million was a PPP between Lagos State Government and financial institutions. The project would improve the image of the state and the nation as it is located along the gateway to the country and would also boost trades and investments, security and urban renewal.

- ii) The federal government in 2017 issued a seven year 16.47 percent Sukuk bond for a 100 billion naira. The bond which was oversubscribed was to fund construction and rehabilitation of roads across the nation's six geopolitical zones. The projects after completion would improve movement of goods especially farm produce to factories and urban centres from farm settlements and improve security and safety on the high ways.
- iii) In 2017, the Federal Government of Nigeria secured a USD\$67 Million World Bank loan to fund the construction of Hadejia Valley Dam in Jigawa State and the dredging of the river to provide irrigation facilities to farmers and water for live stocks along the corridor. The project after completion would boost employment in the agriculture value chain, improve security by productively engaging idle youths that were constituting social vices, food production and healthy live stocks.
- iv) The massive rail line construction by the federal government across several states and geopolitical zones in partnership with the China government was also partly funded by African Export-Import Bank. The projects are asides the States and Federal Capital Territory initiated rail projects such as the Lagos monorail estimated at US\$1 billion, Lagos Blue Line light rail estimated at US\$1.2 billion and Abuja light rail estimated at US\$841.64 billion. All the projects are funded by a combination of internally generated revenue, loans and PPPs. The projects when completed would improve intercity transportation especially in a vehicular congested city like Lagos, trade and commerce, security as well as reduce carnage arising from heavy cargo trucks on the overburdened roads.

Some other PPP and concessionaire public infrastructures at various stages of implementation include:

Public infrastructures	Sector	Location	Value (US\$)
MKO Abiola International Airport	Transport	Ogun State	69 Billion
Lekki Sea Port	Transport	Lagos State	1.5 Billion
Warri-Effurun Water Supply Project	Natural Resources	Delta State	70 Million
Nnamdi Azikiwe International Airport	Transport	Abuja	-
Adiyan Phase II Water Scheme	Natural Resources		-
Gurara Hydropower Plant (Phase I)	Energy		-
Ibom Deep Seaport	Transport	Akwa Ibom	-
Ajaokuta-Kaduna-Kano Gas Pipeline	Energy	Kogi, Kaduna and Kano States	2.8 Million

Extracts of PPP/ Concessionaire Projects in Nigeria

Source: InfraPPP (2018)

All the infrastructural projects at one stage of completion or the other portend great socio-economic benefits to the economy and the citizenry if completed. The risk of completion lies more with the funding sources, the commitment of the government to the projects and the ability of the citizenry to hold the government accountable. Funding public infrastructures through debts and PPPs could be more costly than through internally generated revenues but it offers a higher probability that the projects would be completed at more reasonable time and quality than the latter source of funding.

The amount that can be assigned to infrastructural developments from internally generated revenue sources like taxes, penalties, levies and charges are limited and dependable on the government wage bills, overheads and other important recurrent expenditure commitments. In many of the States in Nigeria, little or nothing is left for infrastructural developments from the proceeds of the monthly federal allocations and internally generated revenue. In such States, the likelihood that infrastructural projects that depend on funding from the internally generated revenue would be abandoned or poorly delivered would be high. Such projects are highly susceptible to cost variations because of time overrun (inflations) in pooling funds from the internally generated sources to support the projects.

# **Conclusion and recommendations**

The opportunities offered by the PPPs, bond and equity markets to fund infrastructural projects are massive in terms of limitless funds, expertise and timely completion of projects. A hybrid funding model that makes a right combination of PPPs, debts and equity could be less expensive than when the public infrastructures are funded wholly from PPP or debts. The government's aim of funding any particular public infrastructures could be for some socio-economic reasons with direct or indirect impacts on economic development, job creation, ease of

doing business, security, welfare, standard of living and government popularity while the aim of the private sector whether the funding comes inform of PPP, debts (bonds) or equity is wealth maximization.

The government is advised to seek more funding opportunities outside its internally generated revenue and federal allocation sources but this should be done with caution to strike a positive and favourable balance between its socio-economic aims and the wealth maximization objective of the private sector who intends to fund the public infrastructures.

The policy makers should review the existing laws and conventions that appear to put so much bottlenecks in terms of requirements and approval processes in initiating and implementing PPP arrangements and other external sources of funding. When so much time is taken to process and agree on funding sources and to conclude discussion with funding partners, the projected costs would have changed significantly in an economy that is import dependent and highly susceptible to changes in foreign exchange rates leading to costs variations and a new set of approval processes.

The government should be faithful to the covenants of the external funding arrangements. The attitude of the government to operational contracts determine to a large extent the cooperation that would be accrued on future projects and partnerships with the providers of the external funding sources. The government should not waive its sticks of the "almightiness" to twist consciously agreed contracts to the detriment of the other parties.

Lastly, the direct and indirect beneficiaries of the public infrastructures should appreciate that the government without external sources of funding cannot meet the huge demands for public infrastructures. The government should encourage payment of tolls and rents chargeable on those facilities to enable the government meet up with its repayment contracts to its funding partners which would encourage more beneficial partnerships for the benefits of all the stakeholders.

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