

Alternative Financing Models for Transport Infrastructure: Factors Influencing its Adoption and Challenges in Lagos State

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Abstract

Financing of infrastructure, be it social or economic, has always been a major problem for many governments in developing countries. This has made Africa, as a continent, to suffer shortage of critical infrastructure which hinders its productivity and competitiveness in the comity of nations. This challenge may however not be unconnected with the issue of finance and the approach employed in securing it. Like many other developing nations, Nigeria have remained loyal to traditional financing models despite the availability of alternative financing options. This research investigated the factors affecting choice of financing model to fund the provision of transport infrastructure as well as barriers militating against the acceptance of contemporary financing models in Lagos State. Data was obtained via questionnaire from 62 respondents, cutting across 3 groups, namely; staff of Lagos State Ministry of Works and Infrastructure, contractors and private investors in Lagos State and was analysed using relative importance index. Findings revealed that out of 16 factors identified from literature, economic development, environmental issues and sprawling growth and urbanisation amongst others are the most influential factors determining choice of financing approach. Meanwhile, from the 15 barriers affecting the adoption of the innovative financing models, excessive reliance on traditional sources of finance; inadequate knowledge of the innovative models and corruption issues are the three most pronounced impeding factors. In conclusion, Lagos State and by extension, other governments in Nigeria should not rely solely on federal allocations, internally generated revenue and external/internal loans to develop their transport infrastructure but rather explore all available avenues to meet a significant part of her infrastructure deficit from domestic sources through alternative financing options.

Keywords: economic infrastructure, transport infrastructure, innovative financing, infrastructure gap

Introduction

The bulk of literature on infrastructure deals with the impact of infrastructure on economic development with little attention being paid to financing of infrastructure in order to support the economic development. Estache (2006) opined that the poorest countries need to spend about nine percent (9%) of their GDP on operations, maintenance and expansion of their infrastructure if they are to reach the MDGs.

The financing of infrastructure, be it economic or social, has always been on the exclusive list of governments in developing countries. In the study of Ngowi, Pienaar and Akindele (2006), a review of infrastructure financing was traced to the Roman Empire when the master-contractor model was adopted to finance infrastructure. In developed countries like US, UK and France, the financing of infrastructure was

between the government and private investors while in developing countries, it was solely by the government.

The need for private investors in infrastructure financing arose as a result of falling government revenue, dwindling oil prices and urbanization. In the eighties, financing infrastructure projects in Nigeria was not a problem because of the oil boom. It was reported that one of the Heads of state said 'Money is not our problem but what to spend the money on'. This booming period could have been the best period to invest in infrastructure, but lack of foresight on what to do and to project for the future disenfranchised the unborn citizens and subjected us to the current infrastructural deficit being experienced presently in the country.

The need for innovative financing is based on the submission of Croce and Gatti (2014); that despite the theoretically ideal match between a large source of capital and an asset class in need of investment, the overall level of investment in infrastructure by institutional investors has been modest and insufficient to overcome the financing gap.

For the purpose of this research, efforts were directed towards investigating the factors affecting the adoption of innovative financing to fund the provision of transport infrastructure as well as barriers militating against the full realisation of its potentials in Lagos State.

Concept and Classification of Infrastructure

There are various definitions of infrastructure. According to Alm (2010), infrastructure is described as long-lived capital facilities used in providing certain types of services to households, and also in providing services that enhance private sector production. Infrastructure therefore includes services from water systems, solid waste management, sewer systems, power generating plants, roads, mass transportation, electricity generation, and telecommunication systems.

Infrastructure are public goods and services that go into the production process as complementary inputs for traditional factors of production such as capital, labour and entrepreneur. They help to increase returns on investment by reducing production cost and improving transition efficiency (Bello and Osinubi, 2012). Snieska and Simkunaite (2009) defined infrastructure as complex goods which are not consumed directly; they provide services only in combination with labour and other inputs. It can also be viewed from dictionary meaning to be "the basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communication systems, water and power lines, and public institutions including schools, post offices and prisons" (American Heritage Dictionary).

There are two major classification of infrastructure; economic and social infrastructure (Srinivasu and Rao, 2013; Brookings-Rockefeller, 2012). Economic infrastructure refers to facilities promoting economic activities that support other factors of production such as transport, power, telecommunication, water and sanitation, while social infrastructure refers to facilities promoting social objectives such as schools, libraries, hospitals, museums and parks (Mengistu, 2013). "Economic infrastructure" assets are those where the users (households, passengers, commercial entities, etc.) have the means and the will to pay for the service provided (Jain, 2008). The assets derive income majorly from consumers or corporate customers. Economic infrastructure is also referred to as critical infrastructure. The Board on Infrastructure and the Constructed Environment (BICE) has argued that five "lifeline" infrastructures are the most critical because all the others depend on them for survival. These are; power, telecommunications, transportation, water and wastewater systems (ASME, 2009).

Infrastructure Financing Gap

According to Ncube (2014) Africa suffers from a critical shortage of infrastructure

which hinders it from competitiveness and productivity, reaching the MDGs, and participating in the global economy. Africa has a large infrastructure gap in terms of access and quality. Closing it would require additional US\$50 billion a year and which will boost Africa's annual growth by 2%.

McKinsey Global Institute (2013) indicates that from 2008 to 2017, infrastructure spending is expected to be USD 9 trillion in China, USD 2.7 trillion in India, USD 2 trillion in Russia and USD 1 trillion in Brazil. Similarly, in Nigeria the required investment in infrastructure was broken down into the following by the Nigerian Institute of Quantity Surveyors (NIQS) during their 2014 Annual conference. Nigerian Government needs \$800 billion for transportation deficit, \$350 billion to fix the road infrastructure deficit, \$75 billion for the rail infrastructure deficit, \$50 billion to fix aviation facilities deficit, \$900 billion to fix energy infrastructure deficit, \$300 billion to fix ICT deficit, \$180 billion to fix the water infrastructure deficit and \$121 billion for Agric infrastructure deficit.

In an attempt to bridge the financing gap, a mixed finance approach is required to increase the overall funding available for infrastructure, and to match the timing of funds with when they are needed. A mixed approach strategically utilizes own-source revenue, grants, borrowing (loans and bonds), and equity. By leveraging these varied sources against one another, federal, state and local governments will be in a better position to fully finance their priority projects.

The existing financing scheme is becoming more reduced and inadequate to meet the required infrastructure and the available infrastructure become more congested and greenhouse gas levels increase. It is expected that the new financing mechanisms will reshape the financing patterns and government commitment to infrastructure investment and consequently changing the ways cities develop. Based on the existing studies, capacity increase of transportation infrastructure, provision of an

environmentally friendly transportation, and promotion of sustainable financing options are all important motivations for alternative financing mechanisms.

According to the department of Business Innovation and Skills (BIS, 2011) the design, construction and operation of infrastructure networks is a complex task that depends upon a network of public and private sector clients, financiers, suppliers, economic regulators and infrastructure users. United Nations Capital Development Fund (UNCDF) found out that infrastructure bottlenecks are key barrier to local economic development. These bottlenecks are the factors motivating the infrastructure providers and researchers to device means of alternative financing for infrastructure.

Mwangi (2007) examined factors influencing financial innovation in Kenya's securities market using listed firms on Nairobi stock exchange. The study identified regulatory factor, unstable foreign exchange rates and fluctuations of interest rates, technology and global financial competition and integration.

Schwartz, Corbacho and Koranchelian (2015) submitted that the use of innovative financing mechanisms have been motivated by tight government budgets and a desire to circumvent restrictions and controls that apply to traditional financing. Mostafavi, Abraham and Lee (2012) identified a range of factors for adoption of innovative financing to include enhancing public benefit, economic development, job creation and reduce project cost. Economic development is the primary economic benefits of infrastructure accrue to users over the life of the assets is one of the determining factors for the implementation of financing mechanisms that will close the financing gap. Pakkala (2002) identified aging infrastructures, cost escalation, limited resources, productivity, acute regional development, environmental issues, and sprawling growth as the strong incentives for seeking alternative and innovative means to procure the main

foundations of society and maintain economic stability.

Stakeholder's Perceptions of the Barriers of Innovative Financing for Infrastructure

According to the report of AIFWG, there are three main stakeholders in the demand and supply of infrastructure which are: the community, industry and government. In this study the group is classified mainly to Public (Government ministries) and Private organizations such as investors, financier, consortium.

Generally, every new idea has various degrees of challenges to its implementation. Authors have identified various challenges of innovative financing for infrastructure ranges from those that are peculiar to the infrastructure sector and to the choice of financing mechanisms. Business Innovation and Skills (BIS, 2011) identified lack of production capacity, timing issues and immature technology as part of the challenges of innovative financing mechanisms for infrastructure provision.

Badu, Edwards, Owusu-Manu and Brown (2012) identified fourteen (14) barriers to the implementation of innovative financing in Ghana to include; expectation of the populace, lack of revenue generation potential, adequacy of revenue, enforcement of laws, maintaining and replacing infrastructure assets, cost of inefficiency (delays/cost overruns), issues of how funds are spent, fiscal prudence, limited alternative sources, sustainability of the strategy in the long run, governance and institutional capacity issues, excessive reliance on traditional sources, corruption issues and lack of long-term financing at fixed interests.

African Business Review magazine (2014) identified knowledge of infrastructure and financing tools as another barrier to the development of infrastructure. The knowledge side of infrastructure development should be given the needed attention such that government can create Infrastructure Development Index (IDI) like

that of African Development Bank (AfDB) index. The Bank recently developed the Africa Infrastructure Development Index to monitor the state and progress of infrastructure development on the continent.

Similarly, economic, environmental and political issues are other challenges to the implementation of innovative financing. In the study of Paritha (2005) on innovative approach to Municipal infrastructure financing in Tamil Nadu, India, success was recorded on the level and percentage of the infrastructure that was achieved with the adoption of the new financing tools. However, litigations and frequent disruption by private transport companies and members of the society who take the toll road and bridges as social infrastructure reduces the anticipated revenue and elongate the period of recouping the money invested.

Research Methodology

Study Area

Lagos State is the most populous city in Nigeria and the second largest metropolitan area in Africa, after Cairo with a land area of about 3,577sq/km and projected population of 14.86 million in year 2021 (UN-HABITAT, 2010). Lagos State is a major African financial centre and is the economic hub of Nigeria at large. Lagos hosts the nation's major seaports, airport and the telecommunication gateways and houses over half of the Nigeria's industrial capacity (Lagos Statement, 2014). With its present population and expected growth, the need for robust and effective transport infrastructure development cannot be over emphasised.

Research Method

The study considered three study groups, namely: Lagos State Ministry of Works and Infrastructure, registered infrastructure-based contractors and private investors in Lagos state for the investigation and employed survey approach using questionnaire as data collection instrument. There were sixty-two (62) identified respondents in total and opinions of respondents were rated using likert scale

while data obtained was analysed using Relative Importance Index (RII).

Result and Discussion

From Table 1 above, the study groups responses were categorized into three: “Very Influential and Extremely Influential” as the top-most category, “Somewhat Influential and Slightly Influential” as the medium class and “Not Influential” as lower class. The result of the larger proportion of the respondents whose perception fall within the top-most category of influence indicates the following; sprawling growth or urbanization (78.6), economic development (75.0%), time and safety (78.6), value for money (67.9%), quality (69.6%) and regulatory factors (69.6). This implies that all the six (6) variables identified are vital, and influence the adoption of innovative financing mechanisms for transport infrastructure.

The essence of these factors is that they serve as an indicator that may be used to take decision on either to adopt alternative financing mechanisms as a means of financing or use budgetary allocation.

Organisations’ capacity to recoup the cost, and enabling law will be additional key factors that should be considered in adopting financing mechanisms.

The respondents whose perception falls within the middle level confirmed that three (3) major factors are not much important, they are; environmental issues (76.8%), job creation and reduced project cost (64.3%), and limited resources (67.9%) are not as significant as the other four (4) variables. This implies that not all the risks will significantly affect the adoption of innovative financing for projects development.

The respondents whose perception falls within the lower level indicated unstable foreign exchange (14.3%), value for money (16.1%), enhance public benefit (14.3). Generally, all the identified factors have impact in the use of innovative financing. However, the degree of influence varies significantly. In order to ensure a clearer focus on the findings, simple descriptive analysis, which ranks each variable orderly was analysed.

Table 1: Factor Determining the Use of Innovative Financing

S/ N	Factors	Not Influential (%) 1	Slightly Influential (%) 2	Somewhat Influential (%) 3	Very Influential (%) 4	Extremely Influential (%) 5	Mean Value	Ranks
1.	Economic Development			1 (1.8)	42 (75.0)	12 (21.4)	4.2000	1
2.	Environmental issues	3 (5.4)	2 (3.6)	43 (76.8)	7 (12.5)	-	3.8909	2
3.	Sprawling growth or Urbanization	2 (3.6)	3 (5.4)	3 (5.4)	44 (78.6)	3 (5.4)	3.7818	3
4.	Job creation and reduction of project cost	1 (1.8)	3(5.4)	36 (64.3)	6 (10.7)	9 (16.1)	3.3455	4
5.	Limited resources	1 (1.8)	3 (5.4)	38 (67.9)	3 (5.4)	10 (17.9)	3.3273	5
6.	Closing infrastructure financing gap	-	1 (1.8)	13 (23.2)	7 (12.5)	34 (60.7)	2.2364	6
7.	Decline in public fund	-	2 (3.6)	11 (19.6)	8 (14.3)	34 (60.7)	2.2182	7
8.	Enhance public benefit	8 (14.3)		1(1.8)	10 (17.9)	36 (64.3)	2.1636	8
9.	Value for Money	9 (16.1)	8 (16.1)	3 (5.4)	38 (67.9)	-	2.0909	9

10.	Technology and global financial competition	6 (10.7)	6 (10.7)	1 (1.8)	7 (12.5)	35(62.5)	1.9636	10
11.	Aging Infrastructure	4 (7.1)	2 (3.6)	4 (7.1)	8 (14.3)	37 (66.1)	1.9091	11
12.	Quality	3 (5.4)	1 (1.8)	3 (5.4)	39 (69.6)		1.8364	12
13.	Desire to circumvent restrictions and control over traditional financing	3 (5.4)	7(12.5)	2 (3.6)	7 (12.5)	36(64.3)	1.8000	13
14.	Unstable foreign exchange	4 (7.1)	8 (14.3)	1 (1.8)	5 (8.9)	37 (66.1)	1.7455	14
15.	Regulatory factor	2 (3.6)	7 (12.5)	2 (3.6)	5 (8.9)	39 (69.6)	1.6182	15
16.	Time and safety	2 (3.6)	3 (5.4)		6 (10.7)	44 (78.6)	1.5273	16

Relative importance index analysis of Table 1 shows that Economic development with mean value = 4.2000 was ranked first and was closely followed by environmental issues (Mean Value = 3.8909) which was ranked second while sprawling growth or urbanization (Mean Value = 3.7818) was ranked third. Ranked fourth was job creation and reduced project cost (Mean Value = 3.3455) and coming fifth, sixth, seventh, eighth, ninth and tenth respectively are limited resources (Mean Value = 3.3273), closing infrastructure financing gap (Mean Value = 2.2364), decline in public fund (Mean Value = 2.2182), enhancing public benefit (Mean Value = 2.1636), value for money (Mean Value = 2.0909) and Technology and global financial competition (Mean Value = 1.9636). In other words, economic development and environmental issues are the most influencing factors for innovative financing for transport infrastructure in the study area.

The high ranking of the first five factors could be as a result of the impact of infrastructure on economic development which has been established in literature that infrastructure has a positive impact on economic development (Snieska and Simkunaite, 2009). Economic development is the primary economic benefit of infrastructure accruable to users over the life

of the assets. It is one of the determining factors for the use of innovative financing mechanisms.

Table 2 presents the analysis of the respondents' opinion on the barriers to innovative financing for transport infrastructure. The larger percentage of the respondents agreed with the identified challenges. The following are the response rates of the sample population; Inadequate knowledge of innovative financing tools (85.7), Governance and institutional capacity issues (92.9), Expectation of the populace (75.0), Size of the finance required/Adequacy of the revenue (91.1), Lack of revenue generation potential (89.3), Enforcement of law (80.4) and Corruption issues (85.7) while a fraction of the aggregate population (64.3% and 76.8% respectively) strongly disagreed with Bureaucratic problem and Negative impact on government budget as challenges to implementing innovative financing mechanisms for transport infrastructure financing.

The relative importance index of the challenges of implementing innovative financing for infrastructure delivery in the State was analysed with the aim of determining the most impeding factor. Table 4 shows that Excessive reliance on traditional sources of finance and

Inadequate knowledge of innovative financing tools with mean values = 4.1273 each were ranked as first, and closely followed by Corruption issues (Mean Value = 4.1111) which was ranked third, while Lack of organized system for collection of taxes (Mean Value = 4.1091) was the fourth. Ranked fifth was Governance and institutional capacity issues (Mean Value = 4.0000) and ranked sixth are Size of the finance required/Adequacy of the revenue (Mean Value = 3.9273) and Expectation of the populace (Mean Value = 3.9273). Enforcement of law and Lack of willingness

to pay for infrastructure by users were each ranked eighth respectively, while Lack of revenue generation potential and Limited resources were ranked tenth and eleventh respectively. Fiscal prudence, Maintaining and replacing infrastructure assets, Bureaucratic problem and negative impact on government budget were the lowest ranked impediments to the implementation of innovative financing. The result of the findings shows that the first five challenges have a significant effect on the implementation of innovative financing for transport infrastructure in the study area.

Table 2: Challenges of Innovative Financing Mechanisms for Transport Infrastructure

S/N	Challenges of Innovative Financing	Strongly Disagreed (%) 1	Disagreed (%) 2	Neutral/ Undecided (%) 3	Agreed (%) 4	Strongly Agreed (%) 5	Mean Value	Ranks
1.	Excessive reliance on traditional sources			1 (1.8)	46 (82.1)	1 (1.8)	4.1273	1 st
2.	Inadequate knowledge of innovative financing tools	-	-	-	48 (85.7)	7 (12.5)	4.1273	1 st
3.	Corruption issues				48 (85.7)	6 (10.7)	4.1111	3 rd
4.	Lack of organised system for collection of taxes				49 (87.5)	6 (10.7)	4.1019	4 th
5.	Governance and institutional capacity issues		1 (1.8)		52 (92.9)	2 (3.6)	4.0000	5 th
6.	Expectation of the populace	6 (10.7)		6 (10.7)	42 (75.0)	1 (1.8)	3.9273	6 th
7.	Size of the finance required/Adequacy of the revenue		2 (3.6)	1 (1.8)	51 (91.1)	1 (1.8)	3.9273	6 th
8.	Enforcement of law		5 (8.9)		45 (80.4)	5 (8.9)	3.9091	8 th
9.	Lack of willingness to pay for infrastructure by the users	3 (5.4)			51 (91.1)	1 (1.8)	3.9091	8 th
10.	Lack of revenue generation potential		4 (7.1)		50 (89.3)	1 (1.8)	3.8727	10 th
11.	Limited alternative	1 (1.8)	6 (10.7)	1 (1.8)	44 (78.6)	3 (5.4)	3.7636	11 th

	funding sources							
12.	Fiscal prudence		8 (14.3)	3 (5.4)	43 (76.8)	1 (1.8)	3.6727	12 th
13.	Maintaining and replacing infrastructure assets	5 (8.9)	2 (3.6)	1 (1.8)	46 (82.1)	1 (1.8)	3.6545	13 th
14.	Bureaucratic problem	36 (64.3)	2 (3.6)		15 (26.8)	2 (3.6)	2.0000	14 th
15.	Negative impact on government budget	43 (76.8)	7 (12.5)		4(7.1)	1 (1.8)	1.4182	15 th

Conclusion and Policy Implication

In conclusion, government, contractors and investors in Nigeria should not rely solely on federal allocation for the development of transport infrastructure, but rather look inward to generate funds through sustainable means that will not only develop the needed infrastructure, but will provide for the maintenance and replacement of the existing infrastructure. Nigeria has the potential to meet a significant part of her infrastructure financing deficit from domestic sources, through alternative financing scheme without recourse to external funding. Some states are financially stable due to the volume of their economic activities. Specifically, Lagos State, if only the platform to obtain this fund can be developed and harmonized in a sustainable manner.

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