International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2015): 6.391

# Appraisal of Transport Infrastructure Finance for Sustainable Development in Nigeria

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**Abstract:** ***This paper examined the various methods used in financing transport infrastructures in Nigeria with the objectives to determine the level of their contributions to the nation's sustainable developments. Four major methods (Budgeting/Maintenance Agencies, Concessioning, Taxation and User's charge) were identified as means of financing the infrastructures in Nigeria. Data were collected through interview and online questionnaires from 382 respondents in total. Descriptive analysis and ANOVA (One-way) were used to analyse the collected data. The results has shown that, concessioning and government finance were the most potent tool to finance transport infrastructure while, user's charge and taxation were closely related in percentages with 21% and 20% contributions to financing transport infrastructures respectively. The researchers concluded that, revenue generated from transport should not be diverted to finance other sector and there should be a modality for transparency and accountability especially through the creation of online transactions even for public notice in revenue generations and expenditures. The indigenous contractor should be used in executing transport projects with adequate and accurate monitoring. The most infrastructures that require huge financial investment should be financed by the federal government or other tiers of government. The other infrastructures should be concessioned and or commercialized. There should be reports on the infrastructures possibly every five-year term.***

**Keywords:** Transport, Infrastructure, Finance, Sustainable Development and Nigeria

## 1. Introduction

Transportation as the lubricant and engine of economic development should have its rightful of place in its infrastructure finance if sustainable development is to be achieved. Transportation from all modes has been a major source of revenue for government, organizations (both public and private) and individual. Transport is multi-faceted as it has different modes and different operational characteristics. As such the context of description of appraising its investment is complex. Investment appraisal is the process of identifying the ways in which, and the extent to which, alternative projects will maximize the increase in real income and enables alternative projects to be compared (Cole, 2005). Regrettably, revenue generated from transport through taxes, vehicle particulars, tariffs, excise duties, toll charges among others are shared with other sectors like education, health, defense e.t.c which consequently will make the transport infrastructures either not to be effective or collapse in the long run. According to Department of Transport UK, (1989a) from the 24.6 million vehicles registered, road taxes of £12.7 billion were collected (including the £1.4 billion car tax), or 2.9 times the Department's figures for 'road costs.' Approaches to solving road transport infrastructure finance problems in Nigeria by using revenue from taxes and levies on vehicle particulars comes with extortions from various enforcement agencies present along major Nigerian roads. Oni and Okanlawon (2006) expressed that, road user charges including fuel tax, vehicle registration tax, vehicle import taxes, driver licenses, road tolls and taxes on tyres, lubricants and consumable spare parts are gaining world-wide acceptance as sources of revenue for augmenting government allocation for road maintenance and construction. However, the problems arise as a result of inability to clear-cut the difference between social objective and commercial objective which the revenues generated meant to service. For instance, government attention may be draw to a particular road as a result of incessant crashes, congestion or lack of drainage. The expenditure of government in this regard may be opportunity cost as the money perhaps should be expended on other areas for economic development. The inability to delineate the roles of different tiers of government (i.e Local, State and Federal) both in terms of ownership of road transport infrastructures and how to actually generate revenues worsen the situation of Nigerian roads especially during the raining seasons. According to Cole (2005), the urban public transport system in Eastern cities in Europe, eg Moscow, Prague, Vilnius, St Petersburg, are decaying due to lack of investment and to historically low fares covering only 25 per cent of operating costs with shortages, since the former days, of funds to pay wages and maintenance costs and none for reinvestment. Oni (2004) asserted that, the rural areas in particular in Nigeria, where the bulk of our population resides, are largely deprived of basic pieces of transport infrastructure. The moribund state of Nigerian Railway System was believed to have generated from lack of vision to commercialize its activities at the inception. The Nigerian Railway Corporation was believed to have been over staffed and not initially focused on commercial objectives and as such culminated in its comatose state witnessed today. In London, the cost of underground Tunnel to the effects of congestion and environmental pollution may be high at the short run but can be justified because generations unborn can still benefit from it. One crucial aspect of Nigerian is the issue of subsidy in transport investment. Cole (1976) argued that, that any subsidy provided for a service should equate to the savings to be derived from the closure of the service. Through this the normal cost benefit analysis will relate to the savings disbenefit analysis (Cole, 1976).


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In order to finance some of these projects, governments all over the world used different strategies. Grants were received from international organizations, Bond and counter trade politics (where government of one country provides certain thing in exchange for another), Public Private Partnership initiatives, privatization and concessioning. Nigerian seaports have been concessioned to boost productivity and operational efficiency. Similarly, parts of Nigerian airports have been privatized. Rail transport however, is difficult to privatize because of its monopolistic nature. Federal Roads Maintenance Agency (FERMA) and similar agencies across states in Nigeria were established to solve myriads of road transportation infrastructural problems in Nigeria. Aderamo (2009) espoused that, Nigeria's Federal Road Maintenance Agency (FERMA) began to patch 32,000Km federal roads in 2004 and in 2005; FERMA initiated a more substantial rehabilitation. In Nigeria, the rainy season and poor equipment pose challenges to road maintenance. Also, the Nigerian governments at various levels used accruable revenues from oil tax and in the early 1990s road pricing techniques to finance transport infrastructures. To this end, this paper examined different approaches used in Nigeria to solving road transportation infrastructural problems in Nigeria. The current usage of online transactions for vehicle licensing and registration is indeed a way forward. In other to embark on the investment on transport infrastructure, care must be taken to evaluate the benefits that will be derived from such investment. However, investment in transport infrastructures is not the type that usually brings revenue to defray the cost even in the long run. Examining this is very important in appraising transport infrastructure investment in Nigeria. In most cases, transport projects are given time-frame for project execution which are not usually met by the contractors. This tends to be a bane to not only Nigerian infrastructural development but also socio-political and economic developments. Running rail transport profitably in Nigeria considering its attendants operational cost is a serious challenge. The gap that this paper attempts to fill is to understand how transport infrastructure should be financed and how these infrastructures are actually being financed.

## 2. Literature Review and conceptual underpinnings

Scholars attributed the investment in transport infrastructure for economic and sustainable development to accessibility, income generation, time value and environmental friendliness. Roland Maquid in Banister (2005) opined that, in discussing the choice and treatment of these issues, four main areas are looked at: the scale of perspective taken; the key variables linking transport and economic activity; the different impacts of different types of investment or industry; and the time period considered. According to Berechman (2004), the two main factors that are responsible for economic development from transportation infrastructure investment are: the investment effect (income-multiplier) and improved accessibility. Banister (2005) argued that, Intermodal Surface Transportation Efficiency Act (ISTEA), demands the investment analysis in transportation consider the followings:

- Air quality
- Congestion and relief of congestion
- Multi-modal solutions and,
- Land use changes

Mohring, (1993) asserted that, investment in transportation facilities in one region may raise land rents and labour wages in this region which, in part, will be paid by inhabitants of neighbouring regions. If development takes place as infill in older urban areas reiterated by (Banister,2005), the existing transportation and activity infrastructure should prove to be adequate, and a part of normal urban redevelopment. Among the case studies enumerated by Cole, (2005) in appraising concept of Cost Benefit Analysis in transport investments expressed that, the socio-economic appraisal includes the following elements:

– Construction costs
– Operating costs of rail infrastructure (including renewal investments)
– Operating costs of train services
– Revenue of train services
– Accessibility
– Travel time
– Frequency
– Road-rail crossings
– Accidents
– Road travellers' costs
– Non-corrected external effects
– Pollution
– Wear and tear (other modes)
– Accidents (other modes)
– Congestion including traffic monitoring (road)
– Noise
– Barrier effects
– Producer surplus for freight operators.

However, as opined by Cole, (2005) social cost benefit basis is a comprehensive evaluation of modal options, where all relevant impacts are taken into account using social, rather than the private, benefits and costs.(Cole and Holvad, 2001) believed that, the appraisal form is more relevant in those situations where private capital is used (Cole and Holvad, 2001), eg appraisals undertaken by private operators. WTRC, (2004) expressed that, public transport in Europe usually provides subsidy for elderly people and students. This may invariably affect the cost generated from service provisions. In most instances, the use of Cost Benefit Analysis or Multi-criteria analysis in assessing transport investment do not in all areas cover the costs and the accruable benefits from such investments. One major issue is that of analyzing the returns on investments is in forecasting the benefits. As the estimation of future benefits may not equate the present value if the project is carried out within shortest period, the value of money usually varies between the observed period of the transport projects.

There are different strategies that have been used to ensure that, transport infrastructures are well financed most importantly to recoup the cost on investment. In most modes, infrastructure and operations are separately owned and managed, with few difficulties arising (for example, airports and airlines; roads and bus services) (White, 2009). Banister (ed) (1995) observed that, investments in transportation infrastructure (including highways, rail, mass transit, ports and airports) generate accessibility, economic,


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environmental and social impacts, is hardly news for transportation economists and planners. Numerous studies have documented these impacts and, in general, have classified them as being adverse ones (e.g. air pollution, community displacement) or positive ones (e.g. job creation and economic growth). While it is generally agreed that improved accessibility should be the prime objective of transportation investments (Mohring, 1993), in many cases the presumed capability of a project to generate other positive impacts is regarded as the main motivation for undertaking the investment. Indeed, historical records show that the provision of transport facilities like local roads, turnpikes, canals and bridges, in the long-run, could not be supported by the private sector mainly because of heavy losses induced by the inability to enforce excludability, recover capital costs and by competition from substitutable facilities and modes (Taylor, 1951).

Cole, (2005) reviewed some of the methods of used in testing monetary costs and benefits in transport finance:

1) **First year rate of return:** assesses the benefits in the first year after the opening of the scheme and compares them with the total expenditure. In its simplest form it assumes all costs and benefits occurred in the same year. He however, explained the disadvantages of this approach as it does not take into consideration years ahead and discounted benefits are difficult to estimate by limited period of time.
2) **Pay-back period:** looked at the period in which various project will recoup the investment. And by its rule, the project which the accrue benefit will be realized within the shortest possible period is to be considered.
3) **Surplus of revenue over cost:** This surplus is calculated as a rate of return on the sum invested and projects are ranked according to the average annual rate of return over the full expected life of the project.
4) **Benefits/cost ratio:** This is one of the most frequently used measurements. It comprises the net benefits of the project (ie the benefits achieved by the project less the disbenefits created) divided by the net capital cost:
   B/CR =Total net benefits/Total costs
   Schemes with a ratio of less than 1:0 have costs in excess of benefits. Road schemes would be expected to have a ratio of at least 1:1.
5) **Net present value (NPV):** The present value of future benefits and costs resulting from the investment is compared with the present value of the sum invested.

Whichever criteria used, there seems to be complexity in measures relating to infrastructure finance in the sense that, continuous cost of maintenance and labour are not present in the analysis. In most cases the benefits derived from social costs cannot be estimated with monetary costs. Example of such is in terms of accessibility, time, environmental, safety, security and employment. Cole, (2005) espoused on the usage of public-private finance scheme under **Private Finance Initiatives (PFI)** where private company will undertake investment and recovers its costs through toll charges to users, collaboration between public and private sectors and leasing concession methods.

## 3. Methodology

Nigeria is a country located in western part of Africa. The country is made up of 36 states and Federal Capita Territory, (Abuja). Buhari, (2000) provided the rough estimation of road transport infrastructure in Nigeria which he said consists of 32,000 km of Federal highways including seven major bridges across the Niger and Benue Rivers, the Lagos ring road, the third mainland axial bridge; 30,500 km of state roads; and 130,000 km of local roads.

The researchers collected information based on different locations across the country through phone interview, questionnaires and internet by asking the respondents about the best method in financing transport infrastructures in Nigeria. 382 respondents were selected at random across the country to answer questions with questionnaire as instrument of data collection. Only 14 responses were received from internet interview. The respondents were asked to select based on Linkert scale to state the methods that they consider to be the best in financing transport infrastructure in Nigeria in descending order. Consequently, Descriptive analysis and Analysis of Variance (ANOVA-one way) was used to analyse the collected data.

## 4. Result and Discussion

Majorly, exclusively of private individual or companies' contributions to the finance of transport infrastructures in Nigeria, the followings were identified by the researchers as previous methods used in financing and investing on transport infrastructures for sustainable development.

- **User's charge: This** is primarily used to ensure that the users of transport infrastructures pay for the usage of such infrastructure mainly in the 80s till late 90s in Nigeria. Toll gates were erected across the country at designated places where different vehicles base on their weight and capacity pay for the usage of road transport infrastructure in Nigeria. The users normally collect ticket for the payment made. The disadvantages witnessed before the closure of toll gates in Nigeria are in the fact that, though revenues were generated but hardly go to government coffers that will be responsible for maintenance and necessary repairs of those roads.
- **Taxation:** Tax is a levy place on individual or an organization to be remitted to government for a particular purpose (usually, to better the life of the citizens of a particular country). Hence, tax being referred here has to do with ensuring that vehicle particulars are registered. E.g Vehicle license, import duty, insurance, driver's license e.t.c.
- **Budget:** Through the establishments of State or Federal government agencies responsible for maintenance or repair/construction of transport infrastructure, Nigerian government at various levels set aside fund for this purpose. Hence, the Federal Roads Maintenance Agency (FERMA) and other different names were coined for State Roads Maintenance Agencies used to be given financial allocations.
- **Concessioning:** This is leasing the infrastructure to private company/individual for a specified period of time. It comes under certain agreement in privatization. It can


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be Build Operate and Transfer (BOT), Build, Own, Operate and Transfer (BOOT), among other privatization methods.

- The responses gathered from the interview are shown in Fig 4.1 below:
- Phone interview

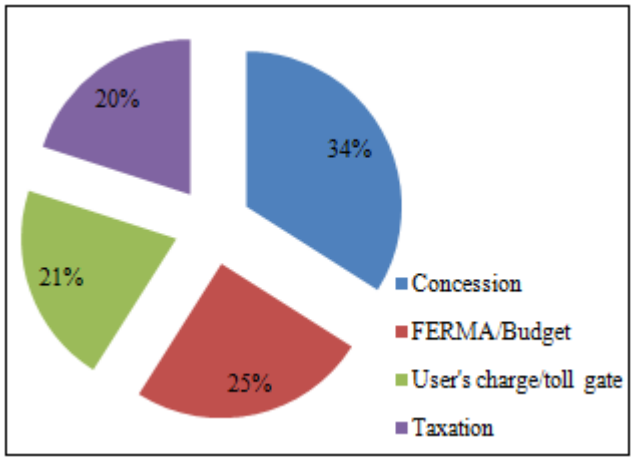


**Figure 4.1:** Responses on methods used in financing transport infrastructures in Nigeria

The opinion of the respondents revealed that 34% believed in using concession method for financing transport infrastructures in Nigeria. Examining this method in Nigeria, it was realized that; it is the method used to expedite actions at Nigerian seaports and some selected airports. Hence, the performance of Nigerian seaports has increased using this approach.

Secondly, the responses revealed that, the use of allocation or budget to finance the transport infrastructure is accounted for by 25%. Meaning that, the efforts of government at all levels are appreciated and most importantly, financing transport infrastructure cannot be carried out especially when there are no financial gains by private sector.

Thirdly, User's charge in form of road pricing accounted for 21%. As good as this method, the challenge in Nigeria is how to determine the revenue generated and how the public will monitor the usage of the revenue in infrastructure finance/ re-investment. When tickets are issued, the people in charge always know how they doctor the documents or in some cases where the users are in haste and careless about getting such receipt. Alternatively, using automation with or without camera means that the cost of enforcement and revenue that will be generated will be examined and may undermine the provision of such services..

Lastly, Taxation accounted for 20% of the responses. Our observation in this regard is about the issue of multi-agencies responsible for collection and administration of the fund generated in this regard whose accumulated remuneration per annum will be far more than the revenue and can not even cater for the finance of these infrastructures. Conversely, the employment of the personnel serves as a justification in this regard.

**Table: 4.1:** Analysis of Variance for the Appraisal

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| Taxation | Between Groups | 207.951 | 4 | 51.988 | 35.720 | .000 |
| | Within Groups | 403.155 | 277 | 1.455 | | |
| | Total | 611.106 | 281 | | | |
| Budget/Agency | Between Groups | 478.986 | 4 | 119.746 | 315.903 | .000 |
| | Within Groups | 105.000 | 277 | .379 | | |
| | Total | 583.986 | 281 | | | |
| User's charge | Between Groups | 420.771 | 4 | 105.193 | 162.278 | .000 |
| | Within Groups | 179.558 | 277 | .648 | | |
| | Total | 600.330 | 281 | | | |
| Concessioning | Between Groups | 281.261 | 4 | 70.315 | 68.767 | .000 |
| | Within Groups | 283.235 | 277 | 1.023 | | |
| | Total | 564.496 | 281 | | | |

Source: Output based on survey (2016).

In table 4.1 above, the F-values are greater than the sig. values for all variables selected. That means in one way or the other, all the methods proved to be useful in financing transport infrastructures in Nigeria. Based on the contributions of the individual method however, Budget/usage of agencies by governments at all levels provided the best result with F-value of 315.903, followed by user's charge with F-value of 162.278, concessioning with F-value of 68.767 and Taxation with F-value of 35.720 respectively.

Obviously, the results from phone interview are quite different from that of questionnaires. While concessioning received the highest percentage in phone interview, budget and Agencies provided highest values from questionnaires. User's charge though took third position in phone interview, it came third under questionnaires. Of course, it seems the opinions of Nigerians are the same about taxation which at both levels of instrument of data collection came fourth.

## 5. Conclusion and Recommendations

The researchers concluded that, revenue generated from transport should not be diverted to finance other sector and there should be a modality for transparency and accountability especially through the creation of online transactions even for public notice in revenue generations and expenditures. The indigenous contractor should be used in executing transport projects with adequate and accurate monitoring.


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The inference drawn from the analysis above, although; the same populations were not used for both phone interview and questionnaires' administration. While conccessioning was seen as the best method of financing transport infrastructure in Nigeria, similarly allocation of budget/setting up agencies is also seen as the best method. It means that, both methods are good for infrastructural financing in Nigeria. User's charge can be the next best option and lastly, taxation as the last. Even though from the respondents, taxation seems to be the last chosen method, it is the best method that generates money and provides employment for most Nigerians. We therefore recommend that, most infrastructures that require huge financial investment should be financed by the federal government or other tiers of government. The other infrastructures should be concessioned and or commercialized. There should be reports on the infrastructures possibly every five year term.

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