A Project Management Perspective to the Management of Federal Roads in Nigeria: A Case Study of Minna-Bida Road

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Abstract This paper is the report of a study on the improvement of road infrastructure in Nigeria using the Minna-Bida road as a case study. The ₦1.414 trillion which has been appropriated for the road sector in Nigeria since 1999 is seen as an acknowledgement of the crucial role of road transportation in national development. There are views that inadequate funding has contributed substantially to the deplorable condition of some roads, specifically the Minna-Bida road axis; which is additional to the lack of robust project management strategies capable of sustaining these investments. Anecdotal evidence suggests that Nigeria needs a sustainable framework which would ensure the preservation of her road transportation infrastructure; the attainment of which is affected by the level of funding. This paper highlights the failure of direct conventional tolling and makes a case for Public Private Partnership (PPP), by concessioning, as a means of achieving sustainable preservation of the road transportation infrastructure in Nigeria. The financial viability of both the conventional tolling and the modified shadow-toll concession (STC) models were tested using the Internal Rate of Return (IRR) and Net Present Value (NPV). The result shows that while the STC model is financially viable, the conventional tolling model is not.

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1. Introduction

Transportation is seen as the cornerstone of civilization [1], and a major contributor to economic development [2]. This contribution is however, dependent on the availability of road infrastructure, which is recognized as a driver of national economic growth and development [3]. Nigeria (Figure 1 below) has a landmass of 923,768 km^2 [4]; 28.9 million households, and a population of 140.3 million according to the 2006 census [5]. However, a United Nations projection shows that the population would have increased to 162.4 million in 2011 [6].

There is a transportation network made up of about 193,200 kilometres (Federal: 34,123 km; State: 30,500 km, and Local Government: 129,577 km) of road [7]; 3,500km railway; 8,600km inland waterway; and 22 airports [8], to facilitate movement of goods and passengers. In order to achieve the purpose(s) for which this transport network has been designed for, there is a need for adequate investments in infrastructure development that would enhance its efficiency and effectiveness. The identified shortcomings with the other modes of transportation which has made about 90% to 95% passenger and freight movements to be made by road [9,10] presents a compelling case for adequate funding of the road transport sub-sector.

Figure 1. Map of Nigeria (Source: [11]. Reproduced with permission)

Although the Federal Government of Nigeria has appropriated about ₦1.4 trillion for the road sector between 1999 and 2012 [12,13], the level of contribution

of the road transport sector to national economic development could be affected by inadequate funding. Although it could be argued that this level of investment in the road transport sector is adequate, there are also observations that the high budgetary allocation to road infrastructure could have been caused by the relatively high unit cost of materials [14]. Major stakeholders in the transport sector have variously suggested that the level of investment in the sector is inadequate. For instance, Osita Chidoka, the Corps Marshal and Chief Executive of the Federal Road Safety Commission, relying on the total appropriation to highway infrastructure between 2000 and 2009, notes that the investment on road, amounting to about 7.51% of the total budget within the period, is low [8]. There are also observations of under-funding in specific areas of the sector. For instance, [14] observes that although a road preventive maintenance benchmark of $240 million per year is recommended; Nigeria allocates about $50 million per year to preventive maintenance, thus, failing to reserve enough resources for this purpose. This practice seems to have been deeply entrenched in the system as there are evidences of undue bias towards funding the construction of new roads, while under-funding maintenance of existing ones [10]. Again, [15] notes that in addition to Nigeria's spending falling substantially short of maintenance needs, it is indeed, worse than those of her West African neighbours (Figure 2 below).
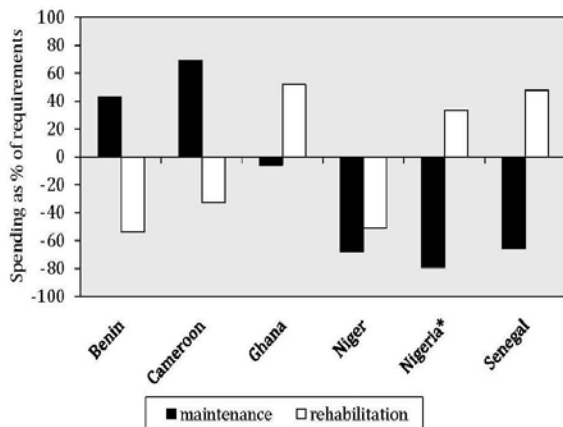

Figure 2. Comparison of allocation to road maintenance by some countries in 2006 (Source: [15])

It is worth noting that, perhaps, with a view to addressing these shortcomings, there have been notable interventions in road infrastructure by different regimes. For instance, the Federal Government intervened between 1996 and 1998 through the Petroleum Trust Fund (PTF). In year 2000, there was a further intervention programme tagged 'operation 500 roads', aimed at upgrading 500 roads across the country by the then Federal Ministry of Works, while year 2003 saw yet another intervention, culminating in the establishment of the Federal Road Maintenance Agency (FERMA). The frequency of these interventions has precipitated concerns about their efficiency and effectiveness, as the road networks are still in deplorable conditions (Figure 3 and Figure 4 below), with just a small percentage adjudged to be in good condition [8,10,12,13]. To the man on the street, these have been caused by inconsistencies in government

policies, flawed procurement practices, and corruption. The argument emanating from government officials in-charge of road transport infrastructure that the inability to fully release appropriated funds is a major cause of the deplorable condition of our roads [12], only goes further to corroboate the view that government policies have been incosistent.

Figure 3. Sections of Minna-Bida road showing potholes, failed spots and uneven road surfaces (Courtesy: Authors, 2013)

There are also observations that in addition to the man hours spent in traffic, Nigeria loses between ₦133.8 billion and ₦175 billion because of increased vehicle operating cost, delayed turn-around, increased travel time, as well as reduction in asset value [9,16]. This also impacts on the overall national productivity, with the financial value of losses by road users due to ill-maintained roads amounting to about ₦450 billion [17]. There is equally a human cost as about 80% of injuries in Nigeria are traffic accident related, making it the country with the second highest road traffic accident fatalities among 193 countries of the world [18].

Figure 4. Typical impacts of poor road condition during rainy season (Source: http://nigeriaworld.com/columnist/ajayi/images/040713-1.jpg)

This paper explores the problems associated with the management of road infrastructure in Nigeria, and presents concessioning as a strategy that would guaranty effective and efficient construction and management (upgrading and maintenance) of these roads. It shall go further to justify the need to institutionalise PPP in the Nigerian transport sector reform framework [7]. In so doing, it is envisaged that a project management perspective to road construction, funding and management, capable of ensuring quality road infrastructure in Nigeria would be established.

2. Literature Review

The National Technical Working Group on Transport [7] observes that an efficient transport system could enhance the socio-economic development of a nation; and the provision of an efficient and effective transport system is a social responsibility of government. However, the fulfilment of this social responsibility is threatened by inadequate fund, probably caused by the lapses inherent in funding and execution of road projects through budgetary provisions and the traditional method of direct contract award [9]. It is evident that road infrastructure competes with projects in other sectors and subsectors of the economy for fund [19]; and it behoves on government to balance and spread investments amidst scarce resources. In view of this, Public Private Partnerships become viable means of bridging the funding gap in the road sector [7]. The ability to carry out certain transactions without any form of physical contact, made possible by a wide variety of Information and Communication Technology platforms could precipitate the questioning of the level of investment advocated for the transport sector. However, transportation is a means of breaking down the spatial barrier between production and consumption, and with good management and timely application of an appropriate flow of inputs for repairs and improvements, their long run productivity can be enhanced [20].

2.1. Public Private Partnerships (PPP)

Globally, PPP is used in the delivery of physical and social infrastructure to the people [21]; however, it has different connotations to different people. But, put simply, it is a formal business arrangement between public and private sectors [22], where the private sector actors become involved in the delivery of public services [23]. It is usually a long-term relationship motivated by prospects of mutual gains [24,25]. This form of collaboration, which is necessitated by the need to reduce or eliminate cost over-runs and delays, is more common in countries where governments suffer from heavy debt burdens [26]. PPP has been practiced in varying degrees across the world. In England, for instance, it is heavily utilized [27], with private companies involved in infrastructural development such as designing, financing, construction, ownership, as well as operation of public sector utilities or services [28]. This is not quite the same in China where it is the foreign firms or international financial institutions that are engaged in PPP projects because local firms are yet to embrace the practice to the same degree as their counterparts in England [29]. In Nigeria, it is a mixed story. Although the idea of PPP driven infrastructure projects is becoming more acceptable especially in road construction, "Not so much has been achieved at the Federal Government level in terms PPPs in road infrastructure…" [21].

Projects undertaken under a PPP arrangement are more likely to be implemented within budget and time estimates than those procured through the tradition arrangement [30]. Although [31] contains a list of attributes of the PPP arrangement that have endeared it to stakeholders, those listed in [32] are more likely reasons for public sector involvement. The above positive attributes notwithstanding, PPP is not a panacea to infrastructure deficits [32]. The huge management time spent in contract transaction, lengthy delays in negotiation, as well as high participation costs [33] are notable difficulties associated with it.

Although sources such as [31] suggest that the ability to transfer risk to a partner in a PPP arrangement is a motive for embracing it, authors such as [34] advise that a risk should be allocated only to those who are better equipped to control and manage it. Another source, [35] believes that the degree to which the private sector stakeholder is able to influence or control the outcome of a risk, as well as the ability to bear the risk should determine whether the responsibility for a particular risk should be shifted to another party or not. Table 1 below summarizes some suggestions on risk allocation criteria.

Table 1. Allocation of Risk in PPP Arrangement

Type	Responsibility	Source
Site availability and political risks	Public sector partner	[36]
Project risks	Private sector partner	[33]
	Public sector partner	[37]
Relationship and force majeure	Shared	[36]
Design risks	Public sector	[22]
Finance risk	Private	[38]

2.1.1. Types of Public Private Partnerships

PPP could be of a purely contractual nature, with public-private sector partnership based solely on contractual links, in which case, the associated rights and obligations are regulated by an administrative contract or series of contracts [39]. Contnuing, [39] notes that it could also be of institutional nature; the cooperation guaranteed by the company's statutes and the shareholder agreement between public and private parties; and the responsibility for the management of the cooperation vested in an entity established for this purpose and co-owned by all partners. Contractual PPPs are undertaken in a variety of ways that are determined by the characteristics of the relationship as well as the delegation of tasks to the private partner. The private sector partner in assuming the responsibility for the construction, operation and maintenance of specified infrastructure, is authorized to charge users for the service. Thus, within this arrangement, there is a direct link between the private partner and the final user (the beneficiary of the services provided) on behalf of the public partner (the supervisory partner) [39]. A particular model of this, the private finance initiative (PFI), is applied in situations where the public sector partner makes periodical payments to the private sector partner for providing an infrastructure such as hospitals or schools [39]. Merna and Njiru [40] note that this form of PPP is best used for the provision of infrastructure where there is a need to assure an economic-financial balance.

It could be observed from Table 2 below – a classification of public-private partnership provided by [23] that concession suits the purpose of this work. Consequently, concession would be described briefly below.

Table 2. Elements of Different PPP Scheme (Source: [23])

		Out-sourcing	PFI	Concession	Lease	BOT
Operation	Operation of service	X	X	X	X	X
	Capital investment financed by private operator		X	X		X
Finance	Recouped by user charges			X	X	
	Recouped by contract from municipality	X	X			X
Construction	Construction of asset by private company		X	X		X
Ownership	Public during and after contract	X	X	X	X	
	Private during contract, public after			X		X
	Private indefinitely					

2.1.2. Concession Practice: An Overview

A concession is a practice whereby a franchisee is granted a right by the State to finance, build, own, improve, upgrade, maintain or operate a public infrastructure for a given period of time, and to charge the users for the cost of the services [41]. Although there are broad distinctions, a concession is similar to public private partnerships (PPPs) and Private Finance Initiatives (PFIs), and may even be perceived as an arm of privatization, if defined broadly [42]. The above suggests that concession arrangements must be made within the provisions of the law. In Nigeria for instance, the body responsible for this is the Infrastructure Concession Regulatory Commission established by the Infrastructure Concession Regulatory Commission Act, 2005. There are two approaches or views to concession. In the first approach, a public authority grants specific rights (as well as risks associated with it) to a concessionaire (private or semi-public organization) to construct, maintain, and operate an infrastructure and be remunerated through service charges paid by the users of the service and/or the public authority; in the second approach, a concession right could be accorded to a private enterprise or a state-owned entity and is used as a tool for entrenching competition where it does not already exist [43,44].

Bousquet and Fayard [41] describe a concession as contract arrangement where a public sector entity or authority accords specific rights to a concessionaire to construct, maintain and/or operate a network for a given period, with an aim of providing infrastructure. This, according to [41] could be in the form of:

Build, Operate and Transfer (BOT) where a company funds, constructs, owns and operates an infrastructure for a limited period (approximately 30 years), and transfers the infrastructure, at no charge, to the concession authority;

Build, Transfer and Operate (BTO) where the concessionaire transfers ownership of the infrastructure to the concession authority upon completion of the construction phase, and thereafter leases the infrastructure from the concession authority, operates it for a limited period, at the expiration of which all rights are restored to the concession authority;

Build, Own and Operate (BOO): a company funds and constructs an infrastructure, which it owns and operates for an unlimited period. A variant of this is the BOOT (Build, Own, Operate and Transfer) contract;

Lease contract, which differs from a conventional concession because the infrastructures necessary for operation of the service are not constructed by the operator (lessee), but made available to the latter by the public authority, which is generally responsible for funding the project. The lessee, who thus has exclusive responsibility for operating the service, obtains remuneration from users, paying a fee to the public authority designed to contribute to amortisation of the investments made by said authority.

Irrespective of the type of concession adopted, there are views that budgetary shortfalls and endemic inability or failure by the government to maintain public sector financed infrastructure are the major reasons why increased attention has been paid to PPP [45]. The efficient maintenance and operation of pubic assets which would have been economically inefficient and politically impossible for private ownership is a major advantage of a concession contract, while the difficulty in implementation, as well as the complex design and monitoring systems are some disadvantages of concession contract [45]. In consideration of the above points, and strengthened by the conclusion reached by [46] that conventional tolling system is not viable, this paper shall project another variant of concession (the Design, Build, Finance and Operate, DBFO), which uses shadow tolling.

2.1.3. Shadow Toll Concession (STC)

According to [41], the shadow toll concession, also referred to as the Design, Build, Finance and Operate (DBFO) describes a concession arrangement whereby the public authority (government) determines and remunerates the concessionaire based on actual usage of a specific infrastructure (e.g. road). The term 'shadow tolling', according to [47] signifies that instead of collecting charges from users at toll points, the concessionaire seeks payment from the sponsoring public agency based on traffic volumes and service levels; with majority of shadow toll projects undertaken in order to upgrade existing roads. It could be inferred that neither the concessionaire nor the concession authority (government) collects tolls from users. The level of traffic and the performance (gauged through factors such as number of lanes closed to traffic, time taken to execute repair work, or measures taken by the concession holder to increase road safety) of the concessionaire are taken into account during the process of determining the remuneration of the concessionaire by the public authority [41,47]. The possibility of either over billing or under payment in this type arrangement is acknowledged. However, going by the observations in [48], it seems that adequate measures to forestall the occurrence of this have been put in place.

It has been observed that by transferring risks and responsibilities to private partners, the DBFO/shadow toll method increases the efficiency of the road transport

sector [41,47]. Equally, there are no expenses associated with toll collection, and traffic volume would not be affected as road users are not charged for using the road [41]. These factors make the shadow toll system suitable for use on the Minna-Bida road which is used mainly by surrounding agrarian communities and civil servants. These notwithstanding, there are major disadvantages of shadow toll contract. These include a high financial and legal cost [41]; a failure to generate revenues, as well as the transfer of cost to the taxpayer (whose money is used in paying the operator) from the user [41,47].

2.2. Financial Considerations in Concessions

There have been earlier researches on financing and viability of PPP projects by authors such as [49,50]. These researches could have been motivated by the strategic role of proper financing in the successful execution of projects. Equally, there have been studies on the return and value of projects undertaken through PPP arrangements [51]. It is expected that the private partner recoups any capital that may have been invested through the revenue generated over the concession period. It is also worthy to note that the capital intensive nature of PPP projects, as well as the peculiar nature of certain aspects of it (e.g. the STC model), necessitates that concessionaires be shielded from risks such as those that may arise from loan requirements. This requires the adoption of a special form of financing known as the non-recourse project financing, which makes it possible that loans secured for PPP projects are paid entirely from the project's cash flow, rather than from the general assets or creditworthiness of the project sponsors [52]. This targeted and specialized type of financing enhances a good return on investment as noted by [53].

Some of the associated risks are; revenue risk, traffic risk, collection risk, construction, completion, operation, planning and environmental reformation, financing risk, as well as political risk. For maximum efficiency, there is need to adequately assess, share and manage these risks. Grimsey and Lewis [48] provides a flow chart of financial variables of interest to stakeholders and how their associated risks can be analysed (Figure 5 below)
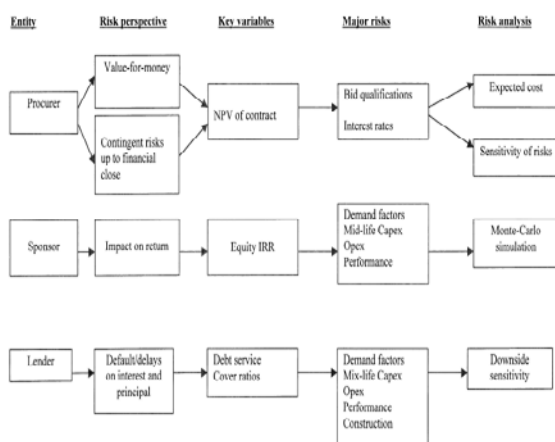

Fig. 2. Flow chart of analytical approach.

Figure 5. Major investment considerations by investors (Source: [30])

3. Materials and Method

This paper utilized information obtained from secondary (existing literature) as well as primary sources (interviews, field measurements). Specifically, random interviews were held with motorists, officials of the Niger State Ministry of Works and Infrastructure Development, the Federal Road Safety Commission Zone R.S-2, and the Federal Roads Maintenance Agency (FERMA). Physical inspections and tape-survey of failure points were also carried out on the case study road between November and December, 2007.

The guidelines on data collection suggested by [54] influenced the focus of the study on the road transport sub-sector at the intra-state level, using the approximately 83 kilometers long Minna-Bida federal road in Niger State (Figure 1 above) as a case study. This stretch of road was chosen because by linking the two largest cities (Minna and Bida) in Niger State, it serves a sizable population of the state. Again, due to the agrarian nature of the communities along the road, it is extensively used by haulers of agricultural produce such as yam, rice, millet, guinea corn, sugar cane, fresh fish among other produce. The establishment of the Federal University of Technology, Minna, National Headquarters of the National Examinations Council (NECO), and the Maizube farm along the road also adds to the volume of traffic. Part of the data used were taken from an earlier study [46], with further data collected during a follow-up study conducted between August and September 2010. These were aimed at establishing the true condition of the road, the distribution of the observed failure spots (including reasons for these), as well as an assessment of past efforts at maintaining the road.

4. Findings from the Study

The initial earthworks on the road were carried in two stretches (Minna-Kataeregi and Kataeregi-Bida) in 1983. The Minna-Kataeregi segment was undertaken by Albishir Construction Company, while the Kataeregi-Bida segment was handled by PW Nig. Ltd. The surface-dressing of the entire road (totalling about 83km) was done by PW Nig. Ltd. The interactions with Ministry officials highlighted that the deterioration of the road, especially the Minna-Kataeregi segment, was due to the failure of the underlying layers. Furthermore, the scope of work needed to rectify this was beyond routine maintenance. Secondly, there are indications of poor application of project management principles in the design, construction, as well as management of the road. For instance, pavement evaluation using modern instruments was not carried out because of the cost involved. Evaluation was thus limited to visual inspection and observation only. Furthermore, contrary to the specifications of the Minna master plan which envisaged a Trunk A capacity, lack of funds meant that the road was designed with Trunk 'B' specifications and characteristics. In spite of this, it carries Trunk 'A' transportation responsibilities, as it is used by trucks, trailers and even military vehicles above 20-ton capacity. This, perhaps, contributed to the collapse of the Gada-Eregi Bridge. As a result, the residual life of the stretch was temporarily reduced to zero, necessitating a complete reconstruction. In February 2004, a contract worth about ₦1.80 billion was awarded to Triacta Nigeria Limited to reconstruct this road. Interestingly, it was again, with Trunk 'B' specifications that included 7.3 meters standard

width and 2.0 meters shoulders. This was completed in 2005. As part of a wider study, an assessment of the condition of the road was carried out in 2010. Failure spots popularly called 'pot-holes' were enumerated and dimensions of these taken. This method was considered adequate for the purpose of this study. The surface dimension of these pot holes ranged between 0.5 m^2 and 5.25m^2, with depths between 0.10m and 0.30m. Table 3 below shows the number of observed failure points along the stretch of the road three years and five respectively years after its completion.

Table 3. Failure Points by Road Section and Period

	Road section	Failure points	
		2008	2009/2010
1	Kpakungu – Gidan Kwano	33	47
2	Gidan Kwano - Tsohondaga	27	39
3	Tsohondaga - Sabondaga	60	81
4	Sabondaga - Gada Eregi	FEW	5
5	Gada Eregi - Kataeregi	FEW	8
6	Kataeregi - Bida	FEW	11

4.1. Major Projections from the Study

4.1.1. Project Cost

A project cost estimate of ₦700 million was arrived at using the information obtained from the Niger State Ministry of Works, and road construction companies in the city.

4.1.2. Traffic Volume

A traffic volume of 2,512 vehicles per day was observed through enumeration at a spot after Kpakungu bridge, using the whole-stretch principle. This was found to be consistent with the records of the Federal Road Safety Commission, and amounts to 208,496 (i.e. 2512 × 83km) vehicle-kilometres per day (vehicle-km/day). Assuming 300 working days per annum, the annual traffic volume would be 300 × 208496 or 62,548,800 vehicle-km p.a.

4.1.3. Toll Charges per Kilometer

It is expected, based on the number of vehicles and toll charges from other tolls operated elsewhere in Nigeria, that the cash inflow from tolls would be ₦164, 410,000 per annum. The toll to be charged per vehicle per kilometer is calculated as follows:

$$\text{Expected income/vehicle/diem} = \frac{\text{Total income}}{\text{Total traffic volume}}$$

$$\text{Expected income/vehicle/diem} = \frac{164410000}{62548800}$$

∴ Toll charge per vehicle/ km = N2.63

It should be noted that the above figure was arrived out using data available at the time of the study, and may not be applicable outside this period. The important thing to note is that the value of the toll chargeable per vehicle per kilometre must be determined using current toll charges (as may be determined by all stakeholders) and traffic volume.

4.1.4. Revenue from Tolls

The revenue derivable from toll charges could be calculated using either the "whole stretch" or "segment" principles. In the whole stretch principle, the amount billed to the Government is based on the assumption that every vehicle would travel the entire length of the road (83km). Thus, the Federal Government of Nigeria is expected to pay ₦2.63/km to the concessionaire, for every vehicle that uses the road.

The amount billable/payable in the STC model could be determined using the "segment principle" as follows:

$$\alpha \text{ vehicles on Minna - GK segment (14km)} = 14\alpha \text{ veh.km/day}$$
$$\beta \text{ vehicles on Minna - Kat segment (43km)} = 43\beta \text{ veh.km/day}$$
$$\theta \text{ vehicles on Gidan Kwano - Kat segment (30km)} = 30\theta \text{ veh.km/day}$$
$$\sigma \text{ vehicles on Minna - Bida segment (83km)} = 83\sigma \text{ veh.km}$$
$$\text{Daily traffic volume } (\varepsilon) = 14\alpha + 43\beta + 30\theta + 83\sigma \text{ veh.km}$$
$$\text{Annual traffic volume} = 300\varepsilon \text{ veh.km p.a}$$

Where α, β, θ, σ, and ε represent number of vehicles on the various segments.

If cash inflow (₦) is represented by δ , then, remuneration (λ) per vehicle –km is given by:

$$\lambda = \frac{\text{Cash inflow}}{\text{Annual traffic volume}}$$

$$\lambda = \frac{\delta}{300\varepsilon}$$

The above signifies that in the shadow toll concession system, tolls are located at the beginning (or end) of every segment.

5. Discussion

A viability appraisal of conventional tolling system was conducted using capital expenditures and operating costs over a period of 20 years, using global parameters. A resulting debt servicing pro-forma for the ₦700 million needed for the road, based on a 30-year period of loan amortization, is presented in Appendix 2. This is consistent with global practice of long term financing for social development projects adopted by the International Bank for Reconstruction and Development (IBRD). IBRD is an international loan provider that could offer funding at rates as low as 7% per annum, for up to 30 years. The cash flow forecast reveals that the project would record deficits in the first four years of operation and would not break-even until the twelfth year. Again, from the cash flow, a seemingly substantial surplus would be recorded but when discounted at target rate of 30% per annum, a discouraging net present value (NPV) of ₦40 million was achieved. Using Microsoft excel, internal rate of return (IRR) of 11.21% was achieved when the above arguments were entered. It should be noted that the daily traffic volume of 2,512 vehicles (inclusive of bikes) was used in the IRR and NPV calculations; and this is still far below the recommended level of 3,500 required to sustain road tolling.

6. Conclusions and Recommendations

In view of the above, the study concludes that proper maintenance and preservation of road infrastructure require adequate and sustained funding. There is also a

need to explore alternative sources of funding of road infrastructure as both budgetary funding and conventional tolling systems have not been effective. Following on from these, the decision on funds needed to maintain and preserve road infrastructure in Nigeria should not be taken solely on economic viability analysis, but rather by a consideration of the strategic role of road infrastructure in the overall national economic stability and integration.

The shadow tolling system is a feasible means of financing road infrastructure in Nigeria. First, the Federal Government would still retain ownership of these roads at the end of the concession period. Within this period of concession, the burden of direct financing of road maintenance if taken off the shoulders of government. On the part of the concessionaire, his repayment of invested capital is based on cash flow of the particular project; with the concessioning authority/government guaranteeing the loan. The road user is saved a lot of cost that would have arisen from using a poorly maintained road.

It is therefore recommended that:

- the concessioning model be used in funding the reconstruction/maintenance of Minna-Bida and road infrastructures in Nigeria;
- aspects of estate management and valuation as well as project management principles such as in the bidding and procurement procedure, risk management, and communication among others be used in the planning, screening and engagement of prospective concessionaires;
- a maximum amount of ₦2.63/vehicle km at the initial stage is paid to the concessionaire for full and regular restoration of the road to satisfactory standard of repairs over the duration of 30 years. Thereafter the traffic-band concept should be mutually considered;
- the legislative framework establishing the ICRC be further strengthened to ensure optimal performance.

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Appendix 1. Repayment Plan on N700 Million Naira Infrastructure Loan

Year	D/B	Interest @7%p.a.	Principal	Total Annual Repayment
0	700.00			0.000
1	700.00	49.00	23.33	72.33
2	676.67	47.37	23.33	70.70
3	653.33	45.73	23.33	69.07
4	630.00	44.10	23.33	67.43
5	606.67	42.47	23.33	65.80
6	583.33	40.83	23.33	64.17
7	560.00	39.20	23.33	62.53
8	536.67	37.57	23.33	60.90
9	513.33	35.93	23.33	59.27
10	490.00	34.30	23.33	57.63
11	466.67	32.67	23.33	56.00
12	443.33	31.03	23.33	54.37
13	420.00	29.40	23.33	52.73
14	396.67	27.77	23.33	51.10
15	373.33	26.13	23.33	49.47
16	350.00	24.50	23.33	47.83
17	326.67	22.87	23.33	46.20
18	303.33	21.23	23.33	44.57
19	280.00	19.60	23.33	42.93
20	256.67	17.97	23.33	41.30
21	233.33	16.33	23.33	39.67
22	210.00	14.70	23.33	38.03
23	186.67	13.07	23.33	36.40
24	163.33	11.43	23.33	34.77
25	140.00	9.80	23.33	33.13
26	116.67	8.17	23.33	31.50
27	93.33	6.53	23.33	29.87
28	70.00	4.90	23.33	28.23
29	46.67	3.27	23.33	26.60
30	23.33	1.63	23.33	24.97

Appendix 2. Discounted Cashflow Table for Upgrading of Minna-Bida Road under Conventional Tolling System (N'000,000)

YEAR	CASH OUTFLOW	CASH INFLOW	NET CASHFLOW	PV of N1 at 22%	DCF
0	700		0	1.0000	-700
1	217.33	167.41	-49.92	0.8197	-41
2	228.95	192.52	-36.43	0.6719	-24
3	241.82	221.4	-20.42	0.5507	-11
4	256.37	254.61	-1.76	0.4514	-1
5	272.29	292.8	20.51	0.3700	8
6	289.77	336.72	46.95	0.3033	14
7	308.1	387.22	79.12	0.2486	20
8	330.46	445.31	114.85	0.2038	23
9	354	512.11	158.11	0.1670	26
10	380.01	588.92	208.91	0.1369	29
11	408.66	677.26	268.6	0.1122	30
12	440.12	788.85	348.73	0.0920	32
13	465.07	895.67	430.6	0.0754	32
14	513.45	1030	516.55	0.0618	32
15	555.67	1184.53	628.86	0.0507	32
16	602.19	1362.18	759.99	0.0415	32
17	653.4	1566.5	913.1	0.0340	31
18	709.85	1801.48	1091.63	0.0279	30
19	771.98	2071.7	1299.72	0.0229	30
20	840.23	2382.45	1542.22	0.0187	29
	5000	5000		0.0153	77
					-271