

Maintenance Culture and the Challenges of Infrastructural Development in Nigeria: Implications for the Welfare of the Citizenry in the Fourth Republic

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Abstract

In developed climes, policy makers and civil servants usually put in place an appropriate maintenance scheme for sustenance of public infrastructural facilities in their country. However, in Nigeria's fourth republic between 1999 and 2023, reverse is the case; as adequate maintenance of public infrastructure has not been given the deserved attention by federal, state and local governments in the country. Notwithstanding this, successive governments at federal, state and local levels in the country always budgeted huge sums for overheads and maintenance costs which are rarely carry out on these facilities. To discover the fact, survey and participant observatory methods as well as secondary data were employed. The paper found that the factors responsible for poor management of infrastructural facilities include: poor leadership, corruption, bad attitude of citizens to public infrastructure facilities, insufficient of maintenance workers, insufficient fund and shortage of maintenance materials, among others. The paper also found that the poor maintenance of public infrastructure has adversely affected the life span of public utilities in the country. As a way forward, it recommended that national maintenance policy should be formulated, facility management agency should be created across ministries, departments and agencies of government to periodically carry out maintenance scheme for public infrastructural facilities to enable them be in good condition at all times, for the welfare of the citizenry.

Keywords: Maintenance, Maintenance Culture, Infrastructure, Public Infrastructure, Maintenance Management

Introduction

In Nigeria, the federal, state and local governments have the primary responsibility to ensure that public infrastructural facilities perform well up to the public satisfaction level. To achieve this, governments at all levels usually vote certain percentage of their annual budgets for overhead costs for maintenance of these infrastructural facilities. However, the reality on ground across the nation under the current fourth republic is that the few available public infrastructures have been unable to achieve public satisfaction level due to lack of proper facility management scheme by ministries, departments and agencies of government in various sectors of the economy. Lack of maintenance culture for public infrastructure by public institutions of the three levels of government in Nigeria has therefore posed serious challenges, resulting to increasing dilapidation of these infrastructures and the attendant poor service delivery to the citizenry. Despite the increasing allocation for overheads and maintenance costs in the annual

budgets of the three levels of government, the evidence on ground showing the poor state of public infrastructure leaves much to be desired.

Presently, in Nigeria, public infrastructure audit and monitoring is rarely done by public agencies. Additionally, decadence and rottenness of public infrastructural facilities are frequent occurrence and littered the nook and crannies of Nigeria's landscape especially the electricity cables, oil pipelines, roads, bridges, rail tracks, dams, sewage and drainages; thus, the vast majority of these public facilities are consistently not in good working order, resulting to poor service delivery to the citizenry (Manjo,2020)

This paper attempted to uncover the inherent challenges inhibiting proper and adequate maintenance as well as the implications of the current poor maintenance culture on the nation's infrastructural development. As a way forward, the paper also proffers some solutions towards effective maintenance of the nation's public infrastructural facilities so that they are in good

conditions at all times, for their efficient and effective service delivery, for public satisfaction level and better welfare of the citizenry

Literature Review and Conceptual Clarifications

For better understanding of the theme of the paper, conceptual clarifications of key terms used in the work were examined especially the concept of maintenance; maintenance culture; maintenance management; infrastructure; and public infrastructure; while the review of related literature was also carried out on the types of infrastructures; characteristics of public infrastructures; and classification of maintenance for public infrastructure as follows;

Maintenance Defined

According to British Standard Institute (1974), maintenance is the combination of technical and administrative actions taken to preserve or protect a structure, system or equipment to function properly. Similarly, Advanced Learners Dictionary (2019) defined maintenance as the action or process of preserving an object, activity, etc. From these two definitions, it implies that maintenance is an action taken to prevent a device, structure, system or facilities from failing. Maintenance connotes repairs, rehabilitation or renovation of equipment or facility that have experienced degradation to keep or restore it into proper working order.

Therefore, maintenance of public infrastructure involves the process of preserving the infrastructure in its state of continuous use and to make them function above a minimum acceptable level of performance, over the infrastructure's design lifespan. Maintenance, within the context of public infrastructure is those activities necessary to realize the originally anticipated life of a public infrastructure hence, it is preventive in nature. It is also curative in nature when such repair works are done to restore damaged facilities to their normal operating condition (Mobley, 2004). In this work therefore, maintenance is viewed as an action taken to prevent a device, structure, system or facilities from failing while maintenance

culture is considered as the values, way of thinking, and behavior of any institution that considers maintenance as a matter that is necessary and execute it on the existing facilities.

Maintenance Culture

Maintenance culture is not universal in nature. It is the value, way of thinking, behavior, perception and the underlying assumptions of any person, group or society that considers maintenance as a matter that is important and practices it in their life (Suwaibatul, 2012). When this definition is applied to public infrastructure, it implies that when an organization has maintenance culture, such establishment would have the attitude to maintain, preserve and protect the public infrastructural facilities. This connotes that maintenance culture is something that is learned through an individual making maintenance a day by day practice that can be followed and emulated by others

Mark (2006) portrayed maintenance culture as the internal arrangement between management and staff, ensuring effective maintenance through sharing of ideas, beliefs and values of each member in an organization. In this regard, attitudinal development, effective leadership and sound policy among the management and staff of the organization are essentials for maintenance culture in an organization.

In this work, to be specific, maintenance culture implies the habit of regularly keeping public infrastructure in good working condition by ministries, departments and agencies of government. Maintenance culture therefore connotes the values and activities of the ministries, departments and agencies that consider maintenance of its facilities as a matter that is important and practice it in the institution's daily operations. It is quite unfortunate that Nigeria lacks the maintenance culture as the nation accords low priority to infrastructural maintenance leading to neglect of these public facilities (Tijani, 2016).

Equally, Iyamu (2018) averred that Nigeria has no maintenance policy; hence, no such culture exists. Over the years, the neglect of maintenance of public infrastructure has accumulated negative consequences in form of

rapid increase in deterioration of the public infrastructure across the nation. If a nation such as Nigeria must develop, maintenance of the existing public infrastructure facilities must be given priority. This is necessary considering the huge gap that exists in the supply and demand for public infrastructure in Nigeria due to the increasing rate of population growth, which is day by day putting pressure on the few infrastructures that are available.

The Concept of Maintenance Management

In the administration of public infrastructure, closely related to maintenance culture is the term: maintenance management. Wireman (1990) viewed maintenance management of public infrastructure as a combination of all technical, administrative and managerial actions during the life cycle of an infrastructure, intended to retain it or restore it to a state in which it can perform the required function to the public. Management, when adopted for maintenance of public infrastructure plays an important role to determine the success of maintenance work carried out by the ministry or organization. To ensure effective maintenance of public infrastructure, it is important to have a sound management technique applied to carry out the maintenance work on these infrastructures.

In a similar manner, Armstrong (1987) equates maintenance management of public infrastructure to the organization of public infrastructure within an agreed policy that determines the maintenance objectives and responsibilities, and directs how to implement them by means such as maintenance planning, maintenance control and supervision, maintenance budgets and several management methods including economy and efficiency aspects in the organization. Also, management, when applied to public infrastructure connotes the adequate maintenance of public infrastructural facilities, based on maximizing the return on government investment in these facilities. Additionally, the maintenance of these facilities involves proper inventory and procurement, work order systems, technical and inter-personnel training, operational involvement, proactive maintenance and continuous improvement of these public infrastructures. Each of these aspects is a

building block of the management process.

In the work of Duffuaa(2000), the application of maintenance management to the maintenance of public infrastructure is further simplified; showing how a maintenance system can be seen as an input-output system. This means that in the management system of the public infrastructure, the input are the manpower (personnel, maintenance workers), management techniques (planning, control, supervision, budget) equipment (machineries), etc. and the output is the public infrastructural facilities (roads, transformers, refineries, etc.) working perfectly, reliably and well configured to reach the planned public satisfaction level. However, Manjo (2020) averred that for activities of the management system to be functional, there must be the following management techniques:

- I. Maintenance planning such as scheduling, maintenance workload forecast, and capacity;
- ii. Maintenance organization such as work design, standard, work measurement and facility administration; and
- iii. Maintenance control of works, materials, inventories, cost and quality management.

In the long run, maintenance management of public infrastructure, if properly applied, would ensure effective planning and implementation of tasks performed to maintain the operation of equipment and facilities. It involves varieties of functions and responsibilities, starting from designing maintenance jobs, to providing and managing the resource needed to complete the maintenance work. It also covers maintenance operation such as repair of physical plants, production equipment, building service, utilities repairs, material handling, and equipment, compliance with safety and pollution rules as well as minimizing energy expenditures in the organization. The accurate information about the public infrastructural facilities and equipment to be maintained is necessary in order for success in planning the maintenance procedure (Mohammed, 2019).

Conceptualizing Infrastructure

Infrastructure can be defined as the basic physical system required for the effective operation of the society. It is the foundation of

modern economy in the globe today. Infrastructure is viewed as public service and production systems, which cover a wide array of facilities and equipment required to provide social services and support private sector economic activities such as roads, bridges, water and sewage systems, airports, seaports, communication masts, public buildings which may include among others; schools, health facilities, prison yards, recreation facilities, electric power stations, fire stations, solid waste disposal and telecommunication stations. Infrastructure is the fundamental facilities serving a nation and it covers the services necessary for the running of the economy. It composed of both public and private physical facilities that sustain or enhance the living conditions of the populace (Manjo, 2020).

Historically, the word 'Infrastructure' was used in French in 1875 and in English in 1887; to mean "the installation that forms the basis for any operation or systems". The word '*Infrastructure*' was imported from French where it was used for establishing a roadbed of substrate material, required before rail road tracks or constructed pavement could be laid on top of it. The word is a combination of Latin prefix '*infra*' meaning 'below' as many of these constructions are underground (tunnels, water and gas system, railways) and the French word '*structure*', (derived from Latin word '*structure*') (Lewis, 2008).

In this paper, infrastructure simply means the system of public works of a nation and assets such as personnel, building and equipment required for an activity. It connotes the underlying foundation and basic framework and structure of a system, institution or state necessary for effective operation such as public water works, energy, communication and transport systems, etc. These structures tend to be capital intensive investment and are vital to a nation's economic development and prosperity.

Public Infrastructure

In this work, public infrastructure are infrastructural facilities, institutions, equipment, systems and structures owned and operated by the government, for the common good and use of the general public. It includes all facilities and systems that facilitate day to day running of the economy, for the

enhancement of the standard of living of the general populace. Public infrastructure is entirely different from private infrastructure with respect to policy, purpose, financing, management and ownership. Public Infrastructure implies publicly owned physical infrastructure required for sustaining human life such as drainage, water treatment systems, water dams and reticulation pipes, roads, bridges, parking ramps, schools, research centre, skyway, railway, traffic signal lights, pipelines, and so forth.

Based on practical experience in public service, Manjo (2020) identified numerous examples of public infrastructure such as;

- i. Power Infrastructure: power lines, power stations, turbines, gas pipelines, solar power;
- ii. Water Infrastructure: dams, water pipes, flood management drains and channels, sewage systems;
- iii. Telecommunication Infrastructure: telephone networks, broadband network, Wi-Fi services;
- iv. Educational Infrastructure: public schools, universities, research and training institutes;
- v. Health Infrastructure: public hospitals, clinics, and diagnostic centres;
- vi. Transport Infrastructure: bridges, roads, airport, rail, sea ports, earth moving equipment;
- vii. Governance Infrastructure: government offices and public institutions such as courts of law, national assembly complex, presidential buildings, security services buildings such as police, army, air force jet and equipment, civil service building;
- viii. Recreational Infrastructure: public parks and gardens, beaches, historical sites, natural reserves, stadia, swimming pools, public hotels, film centre, conference hall; and
- ix. Waste Disposal Infrastructure: waste disposal drains and waste recycling plant.

From the foregoing classification of public infrastructure, it is evident that public infrastructure is a universal consumption product that must be provided for the citizenry by the government. Planning and implementation of public infrastructure is an

important task of any government and provision of public infrastructure requires huge financial and material resources. All citizens, regardless of race, religion, tribe and culture use public infrastructure uniformly and without any limitation. In this paper, public infrastructure connotes public good and in essence, public infrastructure means the goods and services that are not produced within the market system. In many countries, public infrastructure is a fundamental component for delivering public goods (Zarmadze, 2009).

Need for Maintenance of Public Infrastructure

At this juncture, it becomes imperative to stress the need of maintenance of public infrastructure in Nigeria. Firstly, by way of summary, maintenance of public infrastructure is essential for the following reasons.

- i. Rigid adherence to maintenance will take care of the breakdown or malfunction of the facilities;
- ii. It will keep the facilities in utmost working condition in order to minimize disruption of infrastructural services;
- iii. It will keep the facilities in a state of good repair for the owner's safety;
- iv. it will keep the facilities from deteriorating and retain the aesthetics of the facilities;
- v. it will enable the facilities achieve its optimal and full potentials service life;
- vi. ensure efficient functioning of the facilities;
- vii. enable the infrastructure to satisfy the citizenry; and
- viii. prevent unnecessary damage to the infrastructure that may result in the facility's performance failure.

Secondly, maintaining public infrastructure in good condition is critical. Public infrastructure such as roads wears out with time and use. Neglected public infrastructure often results to degradation and it has negative effect on the nation's economy because huge costs will be required to reconstruct such infrastructure over time.

The major objective of maintenance of public infrastructure is to preserve such facilities. The aim of maintaining public infrastructure is not to upgrade it, rather, the aim

is to repair and improve the depreciating state to eliminate the cause of defects and to avoid excessive repetition of periodic maintenance effects. Manjo (2020), in his book titled: *Administration of Public Infrastructure in Nigeria*, succinctly submitted that the amount allocated in the annual budgets for maintenance in Nigeria is often insufficient to meet even minimal level of periodic maintenance. In some cases, the appropriated fund for maintenance may not be released in the course of the budget implementation cycle, thus making the actual maintenance works a mirage. The long years of neglect of maintenance of many public infrastructures has led to the dilapidation of most public infrastructure in the country.

It is a common feature in most institutions in Nigeria that fixed registers of public infrastructure are lacking. Infrastructure asset registers are either rarely maintained or do not exist in most government institutions in Nigeria. The maintenance of asset register for public infrastructure is vital to reduce maintenance costs and increase the life span of such infrastructure. The asset register will provide maintenance managers with record of all previous maintenance transactions pertaining to the public infrastructure in question, its last maintenance date, performance information and what type of maintenance is required. Financing periodic maintenance of public infrastructure has constituted a big problem in Nigeria.

The government may in some cases, released fund for maintenance, but they are usually diverted, mismanaged, misappropriated or stole by officers in charge of the maintenance. In some cases, maintenance can be delayed or canceled by public infrastructure supervising agency for no concrete reasons. The neglect of maintenance of public infrastructure has taken its toll on the citizens and the economy. For instance, the effect of bad roads, filled with potholes on the vehicles operating cost is enormous. Road users will spend huge amounts repairing the vehicles plying potholes filled road than road users plying expressway. The negative effect of the neglect of maintenance of such road on an economy is the necessity to spend huge fund on construction of new road projects

In practice, the establishment of the

maintenance agency to maintain public infrastructure such as Federal Road Maintenance Agency (FERMA), is supposedly created to improve timely maintenance response and efficient maintenance of public infrastructure such as roads and bridges. However, in reality, it is not so due to their epileptic operations and poor performance. Therefore, maintenance needs to be incorporated into public infrastructure construction cycle to forestall neglect of such infrastructure from deteriorating. Deterioration of public infrastructure translates into huge money requirements to restore such infrastructure into normal state. The deterioration of public infrastructure in some cases turns to increase maintenance and rehabilitation costs.

Regular maintenance of public infrastructure will ensure such infrastructure perform well up to the public satisfaction level. However, in Nigeria, this public satisfaction level is a mirage due to lack of facility management and maintenance culture for many of the nation's public infrastructure. Maintenance, repair, rehabilitation and continuous provision of public infrastructure are important to the economic well-being of the nation; hence, policy makers and civil servants need to put in place an appropriate maintenance management tool for the effective and efficient of maintenance of public infrastructure in the country (Tijani, 2016)

Stressing the Importance of Infrastructure in today's Nigeria

For almost two years i.e., from January, 2020 to January, 2022, the global corona virus pandemic (otherwise known as Covid-19) attracted the attention of the citizens to the condition of the nation's social infrastructure, especially the hospitals and medical facilities. The corona virus pandemic equally moved the government's attention to the need to modernize the nation's social infrastructure to enable the hospitals and medical facilities tackle the contemporary health challenges of the citizenry. No doubt, the nation's infrastructure is old and grossly inadequate compared to developed industrial nations. While the telecommunication infrastructure have marginally improved, other infrastructures such

as health facilities, road, bridges, rail, energy, aviation and other vital systems remain in weak conditions. It is sad to state that Nigeria has no modern functional public-owned refinery despite being an oil producing nations since 1950s. The nation keeps on depending significantly on imported refined fuels till date. While some Asian countries are building speed rails, modern highway and airports, Nigeria state cannot maintain majority of its inherited colonial rail tracks which run from Lagos-Kano and Port Harcourt-Maiduguri. Worst still, insecurity has been hampering effective operations of the newly built Abuja-Kaduna and Itakpe-Warri standard gauge rail lines since 2022 till date (THISDAYLIVE, 2023).

Nevertheless, it is on records that during the 60s and 70s, infrastructure projects of other developed nations inspired our policy makers such as Tafawa-Balewa, Ahmadu Bello, Obafemi Awolowo, Nnamdi-Azikiwe and Yakubu Gowon. Specifically, the television in Britain inspired Awolowo to establish the Western Broadcasting Station in Ibadan in the 50s and the sky scrapper building in London motivated him to construct Cocoa House in Ibadan. Likewise, his contemporary in the North; Ahmadu Bello, subsequently imitated Awolowo and established Ahmadu Bello University, New Nigerian Newspaper, Kaduna Television Station, Northern Nigerian Development Company, and a host of other Infrastructures that exists till date (Obafemi, 1985). Today, Nigerian policy makers suffers from a gridlock of will and commitments to address the nation's crumbling infrastructure and this will have devastating effects on the future of our Country and her people.

No doubt, infrastructure is a pre-requisite for the wellbeing of the citizenry. Infrastructure influences the development of nations. For instance, a robust well-maintained transport infrastructure system ensures that the nation is able to move goods and services and her people in the most effective way possible. Also, in order to attract and retain quality jobs, the country needs functioning infrastructure. Businesses are attracted to nations that have quality infrastructure. Scholarly researches have shown that public infrastructure projects boost the amenities and economic development of nations and communities within it. Equally,

infrastructure can unite or divide the citizens.

If the policy makers properly design infrastructure, it can reconnect the social fabric of the citizens and communities. In Nigeria, the South West, North West rail track (Lagos-Kano) and South – South, South-East and North-East (Port-Harcourt-Maiduguri) rail tracks built by the colonial masters is a typical example. In the same manner, an ill-conceived infrastructure such as road can harm communities. For instance, as good as urban renewal program can be, improper design of roads and its subsequent construction can destroy communities and heritage sites. Infrastructure can unite the citizens when projects bring amenities and multiple transportation modes to communities. For example, the proposed railway modernization project that entails the construction of modern dual speed rail tracks from Lagos – Kano and Port Harcourt-Maiduguri, crisscrossing Abuja, will go a long way in enhancing unity in Nigeria, if religiously executed (Manjo, 2020).

Lastly, infrastructure can inspire communities in many ways (Mobley, 2004). While Awolowo and Sadauna's infrastructure plans inspired the nation with their ideas, concepts, plans, buildings and designs, the nation's moves by Buhari Government, inviting Chinese to build infrastructure such as rails and airport terminals at cheaper rates may give Nigerians uninspiring development with short-shelf lifespan. Nevertheless, to secure our nation, we need to focus on creating modern sustainable infrastructure systems since Nigeria has the natural, material and human resources as a nation. As many policy scientists have suggested, with the right policy makers and robust strategic infrastructure plan, the country can fund Infrastructure projects on a grand scale, like those executed during the colonial era, the first republic period and post-civil war reconstruction projects. The damage of not updating our infrastructure by the succeeding administrations of the current fourth republic will surely affect the future generations, much more than the infrastructural deficits we are currently experiencing. Year in, year out, in the current 4th Republic, infrastructure spending is dropping significantly and recurrent expenditure of the budget is growing at astronomical rate.

As a way forward, Nigeria needs her citizens and her policy makers to focus on long-term infrastructure goals, instead of short term projects, being embark upon by succeeding governments. Though, there is no small projects to say the least, while our policy makers is caught in apathy and gridlock to design and build long term infrastructure, China – the nation's new found friend, is daily designing and funding huge infrastructural projects in her country. Public apathy, citizen's lack of concern and governmental gridlock is holding back affordable infrastructure financing in Nigeria and making private sector to retreat on daily basis. If this ugly trend or monstrous pattern doesn't change, Nigeria state and her people will continue to suffer and remains in affliction perpetually. Therefore, governments at all levels must as a matter of urgency, put in place proper maintenance scheme for public infrastructures in their purview.

Lack of Maintenance Culture for Public Infrastructure in Nigeria

The primary purpose of government's provision of public infrastructural facilities such as road, rails, electricity, hospitals, schools, etc is to satisfy social and economic and welfare of the citizenry. Despite these objectives, maintenance of public infrastructure has not been given the deserved attention by governments at all levels. As a result, national development becomes an illusion by a gaping infrastructural deficit and decay, occasioned by the apparently poor maintenance of existing public infrastructural facilities.

Generally, poor maintenance of existing public infrastructure is typical characteristics of developing nations. Since availability of public infrastructure facilities is an essential ingredient to sustainable development in a nation, improving the quality of existing public infrastructure through adequate maintenance should be an important national decision. Every year, Nigeria continues to allocate fund in the budget for overheads, but the sustenance of the existing infrastructural facilities suffer from neglect and poor maintenance culture. Improving the existing infrastructure to perform optimally consistently has been the most despicable aspect of advancement and the

bane of development in Nigeria (Manjo, 2020)

In Nigeria, practical experience in public service have shown that public institution's maintenance practices are poor because majority of these establishments perceived maintenance as an avoidable activity; and as an insignificant function and inconsequential capacity to the nature and quality of their infrastructure facilities. Because of this perception, maintenance of public infrastructural facilities such as dams, electricity poles and cables, petroleum pipelines, water pipelines, drainage, roads and bridges is extremely bad and awful as some components of these infrastructures are at a point of virtual collapse or breakdown while others continue to depreciate, deteriorate and lose value as a result of poor maintenance culture.

It is noteworthy to stress that during political campaigns (as recently witnessed prior to 2023 general elections), conferences and workshops, political executives usually express the desire to improve maintenance practices in the nation's public institutions, but the political will and ability to implement same is exceptionally low. The issue of poor maintenance culture in Nigeria has enjoyed tremendous public debate but without the required concomitant concrete implementation action plan on public infrastructure. Presently, the despicable condition of public infrastructural facilities in Nigeria such as hospitals, public schools and universities, roads, bridges, airports, transformers, water pipelines, etc is demonstrating a terribly sign that Nigerian state lacks institutions that would have overseen, manage, guarantee effective and efficient functioning of the infrastructural facilities to foster and sustain national development. For instance, Nahimah (2008) in his work on the Nigerian Aviation Industry, demonstrated that the problem in the Nigerian aviation sector during the 80s and 90s was as a result of lack of maintenance culture and that acquiring new aircrafts isn't pertinent to the aviation industry, as good maintenance of the existing aircrafts and a well-maintained aging aircraft is as tantamount to a poorly maintained new aircraft.

Similarly, the works of Dabara and Guyimu (2015) shows the deteriorating nature

of public infrastructural facilities in terms of street lights that were erected in Gombe state a few years back by past administration in Gombe state. The streetlights which would have served as means of beautification and illumination in Gombe town, has turned the roads to death traps and hubs of illicit games such as armed robbery spots during the night hours, due to lack of maintenance culture by the state government in terms of mere bulbs replacement or fixing minor faults.

Additionally, practical experience in public service has also shown that inadequate maintenance culture is a peculiar feature of almost every public infrastructure facilities in Nigeria. Due to poor maintenance culture or absence of maintenance culture, the life of a significant number of public infrastructural facility last before the total obsolescence state. The poor maintenance culture in Nigeria and its consequential effects on public infrastructure facilities has become a recurring problem to government at various levels. For example, in 2020, survey and observatory works to ten public schools in Kwara north axis of Baruten, Kaiama, Edu, Patigi and Moro local government areas of Kwara state revealed deteriorating state of school buildings, requiring urgent maintenance. In the schools visited, deplorable conditions of their facilities have forced teachers and pupils to result to teaching under trees. The features of defects observed in the buildings of the ten public schools visited across the five local government areas includes: defacing of wall surface, rising dampness in structure, floor slab failure, doors and windows defects, leaking roof, foundation failure and sagging at beam, broken chairs and desks, windows without louvers, and dirty buildings (Survey Report, 2020). It is quite unfortunate that maintenance culture in public schools across the country is very low.

Factors Responsible for Poor Maintenance Culture for Public Infrastructural Facilities In Nigeria

Based on practical experience in the administration of public infrastructures especially roads, dams, bridges and public street lights which belongs to ministry of works and transport where the writer was opportune to serve at the highest level at sub-national level,

and further collaboration in the works of Manjo (2020), numerous factors are responsible for poor maintenance of public infrastructure in Nigeria. Notable among these factors are:

Leadership

Few among Nigerian leaders are up to the tasks in the maintenance of public infrastructure in Nigeria. Majority of Nigerian leaders especially ministers and commissioners, lack the required ingredients for effective leadership which accounts for why the majority of the nation's public infrastructures are in shambles and in a decadence state. Most of the Nigerian leaders lack maintenance culture, vision and passion to influence and propel Nigerian's attitude and mentality towards protecting and maintaining public infrastructures in their domain.

Corruption

In Nigeria, it is a common occurrence that a sitting government awards projects at inflated costs without means of completing it, only to be abandoned by succeeding governments due to personal gain and inflated contract costs. Similarly, there are several cases where a government would award projects, completed and commissioned the facilities for public use, while successive governments, who ought to maintain and consolidate on the existing facilities, abandon the facilities and opted to award new projects at inflated costs to profit the new administration's stakeholders and party faithful at the expense of the general public. A typical example is Kwara state where there is a functional banquet hall built in 2007 by past administration with public fund and through loans collected by the government. While the state is still making full use of the hall for all its functions, the current government in 2021 decided to take fresh loans via bonds, and embarked on construction of a new international conference centre within the same vicinity. Similar to this is the conversion of a cargo airport terminal in to garment factory within the vicinity of Ilorin international airport by the current government of Kwara state in 2022. The cargo terminal in question was completed and commissioned in 2010 by President Jonathan and commenced operations via emirate and Saudi cargo planes, but in 2012

thereafter, it stopped operations and was abandoned, resulted in to its vandalisation sometimes in 2016. Surprisingly, in 2022, instead of the Kwara state government to rehabilitate and restore the vandalized materials at the terminal, and make it resume operations, the current government for reasons other than economic, converted the terminal to garment factory

Bad Attitude to Public Infrastructure

Nigerian's attitude toward public infrastructural facilities is terribly bad. It is common practice in Nigeria that most incoming governments usually make little or no efforts in maintaining inherited and existing public infrastructural facilities and always embark on new infrastructure with a view to draining the scare resource of the nation. More worrisome in Nigerians is the "I don't care attitude" to facilities in public hospitals, public schools, roads, public water pipes and public electricity cables. The attitude of users to public infrastructural facilities is appalling. Misuse of public facilities is a recurring incident in the country. Recent example is the vandalization of rail tracks by some vandals in 2022 along the newly completed Warri-Itakpe standard rail line corridor.

Absence of Maintenance Policy

The vast majority of the nation's public infrastructural facilities are in total state of mess due to absence of maintenance policy in most of the supervising ministries and agencies. Presently, there is no deliberate policy, programme or plan at both state and federal levels on how public infrastructural facilities should be maintained. The practice is for the executive arm of government to adopts fire brigade approach to maintaining and rehabilitating the nation's public infrastructural facilities, because the legislatures are yet to promulgate any maintenance law that will address the major problems facing the public institutions in the administration of public infrastructure in Nigeria.

Insufficient Funds

Insufficient fund allocation for maintenance of public infrastructure by the executive and legislature is a recurring decimal. Insufficient

fund often results to difficulty in procuring the required spare parts for repair or maintenance of public infrastructural facilities in the country. In some cases, the maintenance department may procure poor quality spare parts and materials for rehabilitation works due to insufficient fund allocated for the maintenance exercise. A recurring example is the nation's four moribund refineries that suffers from turnaround maintenance since 2010 due to non provision of adequate fund for their rehabilitation.

Low Capacity of Maintenance Staff

Most maintenance staff of public institutions are unskilled and semi-skilled personnel. The required manpower and capacity is lacking for proper maintenance of public infrastructures. Similarly, maintenance staff suffers from inadequate training and capacity development. In some cases, there is lack of skilled manpower to maintain infrastructure facilities designed and constructed by expatriates after their exit from the country. Complexity of design and non-involvement of maintenance officers during facility's design and construction stage also accounted for poor maintenance and management of public infrastructure in the country. Ajaokuta steel company is grossly affected by this factor since 1984 till date.

Indiscipline

Persistent breakdown of some infrastructural facilities occurred due to indiscipline and ignorance of maintenance staff in operating these facilities. In some cases, vandalism and theft pose great threat to effective maintenance of some critical infrastructure such as oil pipelines, electricity cable etc.

Absence of Planned Maintenance Programmes

The majority of the public institutions usually fail in putting in place a planned maintenance programmes for some of these public infrastructure. Similarly, lack of successful maintenance programmes by the maintenance department usually discourages public institutions from engaging in maintenance programme for their facilities. In some institutions, facility maintenance managers often fail to adopt appropriate maintenance

cycle for their facilities.

Organizational Ineptitude to Maintenance

Numerous public organizations fail to make long-term arrangement for the supply of essential parts due for replacement in infrastructural facilities under its control and supervision. This normally results into inappropriate and inadequate maintenance of facilities, plants and equipment due for maintenance operations. In some cases, some public organizations are often reluctant to innovation support for the maintenance of its facilities. Likewise, the scale of efforts and resources for the maintenance of facilities by many public agencies is exceptionally very low and inadequate.

Shortage of Maintenance Materials

In Nigeria, some public agencies regularly experience frequent shortage of maintenance materials and incessant deficiency of spare parts due to absence of efficient inventory system for these infrastructural facilities.

Problems Associated with Maintenance Staff

In Nigeria, the maintenance staff frequently inflates the cost of maintenance of public facilities and some maintenance staff often connives to vandalise electrical cables, bridge railing, etc. Similarly, some public agencies rarely carry out maintenance training, retraining and they seldom do compelling on the job continuing education of maintenance staff who supposed to carry out the maintenance, so, many maintenance staff really don't have the knowledge of what to do. The ministry of works across states of the federation faces this problem on daily basis and there is still no solution in sight till date.

Natural Events

Natural deterioration of public infrastructural facilities occurs due to old age, harsh environment, and natural disaster which often constitute major threats to maintenance management of public infrastructure in Nigeria (Manjo, 2020)

Effects and Implications of Poor Maintenance of Public Infrastructure in Nigeria

Over the years, lack of maintenance for public infrastructure in Nigeria has been identified as one of the problems of the nation's development. The way and manner Nigerians handle public infrastructural facilities is worrisome, forgetting that these facilities belong to them. Poor maintenance of public infrastructure has therefore affected the life span of public facilities in the country. In fact, inadequate maintenance of government offices, electricity poles and cables, petroleum pipelines, aircrafts, airports, public schools and public hospitals has remained the major cause of their short life span (Matse, 2021). For example, in all states in the country, there are several bad portions of federal roads, leading to road accidents and its attendant loss of lives and injuries. The major cause of which is the lack of concise maintenance programme for these federal roads in question. Since the maintenance of public infrastructure is a panacea to the development of any nature, it become necessary for the federal, state and local government to fashion out a national policy for effective management of public infrastructure to enable the citizens reap the fruit of these public facilities.

It is worrisome that remarkable action which is needed to ensure sustainability of public infrastructural facilities has not been given sufficient attention by the three tiers of governments in the country. Proper maintenance and care of these infrastructural facilities have not gained ground in the minds of political executives and legislatures in the country over the years and consequently, Nigerians see on daily basis, public infrastructural facilities such as public schools collapsing, public water pipeline rusted, dilapidated public hospitals, potholes on the public highway roads, moribund public corporations and host of other facilities belonging to our nation which have little problem, and couldn't serve the general public, due to inability of government to provide effective maintenance at appropriate required time (Gboye, 2023) These actions or inactions, from various public institutions, have resulted to a colossal waste of scarce resources expended

on these public infrastructural facilities by the government. Absence of effective maintenance for these infrastructural facilities has therefore constitutes one of the major problems undermining infrastructural development in Nigeria. The non-functional of the nation's four moribund refineries since 2010, due to lack of maintenance is a typical example in this regard

The negative impact of the nation's poor maintenance of public infrastructural facilities has enormously manifested itself in the educational sector. The devastating state of infrastructural facilities in our public primary schools and secondary schools, public polytechnics and universities is worrisome. Many pupils in the public primary schools continue to sit on bare floor in some classes while teaching is going on. A typical example was witnessed across ten public schools visited in 2020 in five local government areas of Kwara State (Survey Report, 2020). The classrooms in public primary schools are overcrowded with several broken chairs and desks. In some public schools, pupils are forced to repair defective chairs and desks. The hostels in some public secondary schools are eye sore and are no longer fit for human habitation, yet students were sleeping in these hostels without functional toilets, windows, doors and leaking roofs. All these horrible situations are due to lack of maintenance and the terrible situation of some public schools has killed the zeal and enthusiasm of some pupils, students and teachers to accomplish best in their academic pursuit.

The poor maintenance of economic infrastructural facilities such as oil and gas pipelines, electricity poles and cables, airport, and sea ports have adversely influence the output and service delivery of these infrastructure in term of capacity reduction, increase in service costs, poor quality of services and increase in public dissatisfaction level.

The Necessity of Maintenance Culture for Public Infrastructure in Nigeria

Across the globe, governments have assumed a dominant role in ownership and operation of infrastructural facilities such as schools, roads, hospitals, bridges, railways, airports, seaports, water, electricity supply facilities and

telecommunication networks. Government involvement in building public infrastructure is mainly because it is a public good, which makes infrastructure possess natural monopoly. Infrastructure requires enormous capital investment to build, put in place and maintain for welfare of the citizens. Government is therefore the only available body that can mobilize the required capitals to build and maintain infrastructure for the populace. This is because infrastructure usually enjoy relative economic of scale, where one organization or entity may be able to supply a local market at a lower cost than two or three entities, thus, making most infrastructural facilities enjoy natural monopoly in construction and operation. In the past, the concern of governments was that if private organization champion the provision of infrastructure, the provider would enjoy monopoly, which may propel raising prices excessively and arbitrarily at will, resulting to an inefficiently low level consumption by the populace. The reality is that, even if the market power of increasing the prices is not exercised by the private provider, such private organization must cover all fixed and variable costs of providing the infrastructure (Manjo,2020)

Also, the consumption of public infrastructure of one person or the consumption of a service by one individual, usually doesn't affect the amount available to others. In reality, citizens cannot be prevented from consuming public infrastructure, even if they refuse to pay for it because the service is a public good (Zarmadze, 2009). A private organization will therefore not provide services the cost of which cannot be recouped through the market forces. In practical terms, provision of public infrastructure bring along with it an associated problems such as immunity from market signals and high cost, which usually discourage private organization from its provision. Government ownership prevails majorly in public infrastructure such as road, dams, water, postal services, rails, ports, electricity generation and telecommunications. Strong public good featured by these public infrastructures make it difficult, even undesirable, to privatize some of these infrastructural facilities.

Important national goals depend on infrastructure. The nation's economy needs

solid infrastructure to connect supply chains and efficiently move goods and services across states. Critical infrastructure connects communities; provides quality opportunities for employment, healthcare and education, roads, bridges, and rails, while other economic infrastructure such as telecommunication, oil and gas, energy could be financed through public-private partnership financing option (Mimi,2017). In essence, partnerships with the private sector are not appropriate for critical providing and maintaining infrastructure projects. This is because some critical infrastructure may not be profitable enough to attract investors. The best infrastructure project for private sector involvement is those with clear revenue stream from rate-payers such as water infrastructure and toll roads. For example, private sector can bring in new technologies for metering and billing electricity, water or roads tolls that can improve services, with government regulatory oversight.

As a matter of necessity, government must change its focus to infrastructure investments and maintenance, to transform the nation to developed economy in decade to come. This is because infrastructural investment, maintenance, financing, designing, constructing and operating is the primary responsibility of any government. Government at all levels must therefore come out of saddle and tackle the issue of infrastructural provision and maintenance frontally. Provisions and maintenances of infrastructure to citizenry is a necessity for any government that must be addressed.

Regrettably, despite our huge oil resources in over six decades after the nation's flag's independence, Nigeria is still battling with the twin problems of infrastructural deficits and infrastructural decay, occasioned by lack of maintenance culture for all the existing public infrastructures in the country (Rufus,2017). Based on the findings of this work, an appropriate management technique need to be put in place to assist policy makers and civil servants to ensure public infrastructural are well-managed in the country. Also, appropriate and timely maintenance, repairs and rehabilitation of public infrastructural facilities is essential for efficient operations and overall service delivery. The decisions as to what,

where, when and how maintenance, repairs and rehabilitation should be performed need to be made by policy makers and bureaucrats. This is necessary to ensure that public infrastructures are in good shape at all times for public satisfaction level and better welfare to be achieved.

Accordingly, the paper is calling on Nigerian governments to urgently address the twin problems of lack of maintenance culture and infrastructure deficits and decay confronting the nation at this crucial time for the accompanying reasons:

- i. The investment in infrastructure will improve nation's economy now and in future, as such investment will boost productivity that make the needed investment in infrastructure, lifting long-term economic growth and increased wages;
- ii. Key infrastructural investments will provide immediate job opportunities for the teeming unemployed youths;
- iii. Opportunities to finance infrastructural investment abound. For instance, using debt, bond or long term loans from Pension fund, Central Bank or Stock Exchange is a sound option to finance infrastructure that can serve generations;
- iv. Nigeria is in a relative strong position to afford the required investments in infrastructure. The nation's resources can afford infrastructural investments. The government only needs to direct its attention toward the type of infrastructure investments that will boost productivity, support business growth, create jobs, provide healthier environment and improve opportunities for all the citizens; and
- v. The nation's infrastructure needs improvement, due to several years of neglect which make the nation's infrastructure witnesses serious decay such as crumbling roads, dilapidated bridges, inadequate public transport systems, outdated public school buildings, poor power supplies, and so on.

Recommendations

Based on the foregoing factors discovered to be responsible for poor maintenance of public

infrastructures and the resultant adverse implications on the nation's infrastructural development, the paper submits that maintenance of public infrastructural facilities is the bedrock of the nation's development and must not be taken with levity if the nation is to attain economic development within the next two decades. Based on practical experience in public service about how public institutions poorly manage these infrastructures, it is high time Nigerian governments embrace proper maintenance scheme for her public infrastructure facilities to enable the citizens enjoys the best of life and better welfare. Accordingly, the following recommendations are put forward the proper maintenance of public infrastructure for efficient service delivery and better welfare for citizens of Nigeria;

- a. The three tiers of government; federal, state and local government should formulate a National Maintenance Policy for public infrastructural facilities in the country;
- b. Nigerians should be sensitized to embrace the maintenance culture for public infrastructural facilities to sustain their life span for the betterment of the citizenry;
- c. Facility Maintenance Agency should be established for different category of public infrastructure facilities to keep the facilities in good condition at all times; and
- d. Maintenance as a course of study should be incorporated into educational curriculum in secondary and tertiary institutions, to produce experts in effectivemaintenance management for public infrastructure in the country.

Conclusions

In the final analysis, the application of maintenance management for public infrastructural facilities is also necessary to allows for periodic review of maintenance strategies and policies in line with the objective of the public infrastructure. Ministries, department and agencies are therefore required to periodically review their maintenance objectives in order to make sure that their infrastructure facilities are in good conditions. To achieve effective application of these management techniques for maintenance of public infrastructure facilities, the paper additionally proposed that effective staffing of the maintenance department with technical staff

for rapid response and timely maintenance of facilities; adequate funding in annual budgets for the maintenance of facilities; application of due process, tendering process, documentation and proper recording of maintenance works to ensure that maintenance schedules are followed and implemented; and finally, regular inspection of infrastructural facilities should be carried out periodically for preventive maintenance works; while observation and inspection activities must be properly recorded, and documented; and recommendations on rectification requirements implemented appropriately.

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