

A Scientometric and Meta-analysis of Rail Infrastructure in Nigeria

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ABSTRACT

Mobility is an essential human need. Human survival and societal interaction depend on the ability to move people and goods. Efficient mobility systems are essential facilitators of economic development. Cities could not exist and global trade could not occur without systems to transport people and goods cheaply and efficiently. Rail has been considered as one of the important components of the transportation infrastructure required to service and improve the performance and productivity of an economy. In Nigeria, the rail infrastructure built by the colonial master several decades ago has been left in a state of total deterioration. This long neglect was occasioned by the failure of the government to pay adequate attention to infrastructure development. There is a vital and urgent need for rail infrastructure development in Nigeria. This study presents a systematic review of the evolution of rail, the current nature of railway infrastructure delivery in Nigeria, and offers possible suggestions on how to achieve an effective and sustainable rail infrastructure delivery in Nigeria. A thorough literature search of academic databases was conducted on current research trends on the subject of railway infrastructure by systematically reviewing selected published articles from reputable research domains. The analysis of the selected articles revealed the following among others (1) the existing railway infrastructure is in a state of mess and not sustainable, and (2), Government's investment/commitment in rail infrastructure seems inadequate compared to what is obtainable in other developed countries. Rail infrastructure development cannot be left to the Federal government of Nigeria to solve on its own; collaboration and participation are required. Government as a matter of priority should devote considerable attention to the development of rail infrastructure to harness the economic potential and transformation that sustainable rail infrastructural projects will provide.

Key words: Railway, Transportation, Infrastructure, Nigeria

1. INTRODUCTION

Mobility is an essential human need. Human survival and societal interaction depend on the ability to move people and goods. Efficient mobility systems are essential facilitators of economic development. Cities could not exist and global trade would not occur without systems to transport

people and goods cheaply and efficiently (WBCSD, 2002). The railway transportation system has remained an important element of the overall logistics sector throughout the world and has maintained its rightful position as a good source of economic advancement. This is because it offers many advantages over other means of transportation in terms of goods and passengers conveyance overland. Notwithstanding the advantages, Nigeria's experience is different from that of other countries as Nigeria's rail transportation system has undergone a staggard and retarded curve when it comes to financing and investment (Agbaeze and Onwuka, 2014). Nigeria railway is almost 125years old and yet government investment in this commission is inadequate (Odeleye, 2000). This low investment by government has led to the decadence experience in this sector.

Railways, in particular, can benefit rural towns by providing a mode of public transportation for local populations (especially where car ownership is low). Nigeria has recently begun the most extensive railway rehabilitation and extension project in its history (Ehizele 2021). However, there is a risk that local communities will fail to reap the benefits of rail transportation. Nigeria's railway master plan makes no mention of a rural or local development strategy. Professor Sumaila, a nationally recognized expert in transportation and logistics, described the neglect of rural transportation as one of the primary issues that Nigeria's transportation system has faced since independence in 1960(Ehizele 2021).

Because of institutional barriers to collaboration, federal transportation priorities and spending have not always been adequately linked with local requirements. As a result, there is a scarcity of opportunities for local rail growth. The Nigeria Railway Corporation (NRC) Act of 1955, for example, states that the NRC has sole authority to build and operate rail services. Nigeria's geography is diverse. It also has a diverse ethnic population (each with its own culture). As a result, various travel patterns emerge in each location. A "one-size-fits-all" approach to railway development will not be the most effective way to maximize rail's benefits. Local decision-makers are more accessible to rail customers and communities and are more accountable to them. As a result, state governments must have some input (e.g., strategic planning) over federal-led rail projects that pass through their territory. As well as the option to pursue their rail projects if they so desire (Ehizele 2021).

Concerns have been made about the integration of railway stations into local communities as part of the installation of standard gauge railway infrastructure (e.g Owa-Oyibu on the Warri-Itakpe line). Nigeria's approach to developing rural rail services will decide whether the government achieves the transformational economic growth it seeks from rail transportation.

1. 1 Historical Perspective of Railway In Nigeria And Its Development

There seems to be a common consensus about the history of the railway which was dated back to 1898. This is evident from various authors and publications on the railway. Nigeria's rail transport network was started in 1898 by the British and Nigerian colonial governments. This was an integral aspect of late-nineteenth-century European "railway imperialism" in Africa. The Lagos Railway, the first section of Nigeria's railway network, began operations in 1898. In 1901, the railway was expanded 120 miles from Lagos (Iddo) on the south coast to Abeokuta and then Ibadan(Daniel 1981; Davis &Wilburn 1991; Divall 2003; Ayoola, 2016).

The line was expanded from Ibadan to Jebba. The Baro-Kano line in the colony's northern reaches was finished in 1911, and a year later it was connected to the Lagos Railway line at Minna. The completion of the Jebba Bridge across the Niger River in 1915 necessitated the expansion of the southern railway to Kano in the north. The Port Harcourt to Enugu line was built in 1916 in eastern Nigeria to aid in the transportation of coal from the Udi Hills near Enugu to other parts of the country. The Eastern Line ultimately reached Kaduna in 1932, then Markudi Bridge was

completed, which made crossing the Benue River easier. More railways were built in stages, and by 1945, the fast-expanding rail network had reached Kaura Namoda in northwest Nigeria and Nguru, near Bornu, in the northeast (Ayoola, 2004). The Nigerian Railway (NR) was owned and controlled by the Nigerian colonial government from the late 1800s to 1955, with the Nigerian Railway Department in charge of day-to-day operations. Originally built to transport up to 1.5 million tons of goods annually, it was hauling slightly more than 1.2 million tons on the eve of WWII, and by late 1945, it had exceeded its installed capacity. For example, in the 1944/45 fiscal year, it transported around 1.7 million tons of cargo. (Report of Mission Colonial No 211 of 1947)

The railway infrastructure was the backbone of the British colonial government-run economy, which was predominantly dependent on import and export trade, from the first decade of the twentieth century until the early 1960s, when vehicle transport replaced rail transport in importance in Nigeria. In fact, in West Africa, train routes were built and highly developed before the contemporary road network. (Wrangham, n.d.). Despite the fact that the Nigeria Railway (NR) industry's operation and management from 1901 to 1960, when Nigeria got independence, Nigeria rail could not be described as financial success, the Nigerian Railway Department did post moderate operational surpluses for numerous years. Before 1960, the biggest of these was in the 1958/9 fiscal year, when income topped £15.75 million and an operating surplus of £2,030,606 was established. This strong success was followed by bad financial results in 1960/1, with a net operating deficit of £988,000. However, the Corporation's best financial performance to date was in 1963/4, with revenue of almost £16.30 million and a working surplus of around £2 million (Nigeria Railway Corporation, 1965). Following it, the NRC's fortunes began to swiftly deteriorate, from which it never fully recovered. Rail has long been regarded as one of the most significant elements of the transportation infrastructure needed to service and improve an economy's performance and output (Richter, Wang and Adeola 2014). The colonial master's train system in Nigeria has been left in a state of absolute disrepair for several decades. The government's failure to pay enough attention to infrastructure development caused this extended period of neglect. The improvement of rail infrastructure in Nigeria is critical and urgent. This research intends to provide critical analysis of rail's evolution, the current state of railway infrastructure delivery in Nigeria, and suggests possible strategies for achieving effective and sustainable rail infrastructure delivery in Nigeria.

2. LITERATURE REVIEW

2.1 Overview of Railway projects and Infrastructure

Wrangham (n.d.) claims that between the first decade of the twentieth century and the 1960s, road transport superseded rail transport, particularly when rail was the backbone of colonial masters, principally acting as an export and import enterprise. These rail routes existed long before West Africa's contemporary road network. Oni and Okanlawon (2012) investigated Nigerian railway infrastructure development by taking a historical look at railway development and the efforts done so far by previous Nigerian leaders in the area of railway system. Through a review of passenger and freight traffic by the Nigeria Railway Corporation (NRC) between 1959 and 2009, the study demonstrated decadence in railway infrastructure provision. The study concluded that urgent attention is required to restructure and revive the NR system for the benefit of its residents and the country as a whole, based on the years studied.

Agbaeze and Onwuka, (2014) investigated how private involvement/engagement may improve Nigeria's railway infrastructure. Given the budgeted allocation for the Nigeria Railway Transportation System, it is clear that such a sum will not be sufficient to bring about the desired changes in the sector (Agbaeze and Onwuka, 2014). They argued, however, that without the

assistance and skills of the private sector, the government alone will not be able to entirely resolve the outdated infrastructure provision seen in the railway system. Because of the success stories of countries that have taken similar approaches, the report advocated a private-public partnership approach to resuscitating the Nigeria Railway System.

Ayoola, (2016) assert that the primary reason for the establishment of the Nigeria Railway Corporation was selfish on the part of the British colonial government for two reasons: One is to allow foreign interest and control in Nigeria and secondly to remove the management power from Nigeria nationalist whom they perceived can challenge their action.

Sustainable issues in railway infrastructure transportation projects in Nigeria were conducted by Oraegbube and Ogwu, (2017) using a case study method. Using the case study of Abuja light rail mass transit, the study examined challenges and issues that hinder successful sustainable railway infrastructure project delivery in Nigeria. The study developed a model for infrastructure projects towards a sustainable railway system. Part of the recommendations proposed by the study is that sustainability best practices should be institutionalized and integrated into the transportation, operation, construction, and design of infrastructural projects.

Through the framework, techniques, and tools, the study explored the level of sustainability practice in railway transportation infrastructure projects, as well as identified infrastructure sustainability priority indicators among stakeholders. To develop the mathematical model, the weighted sum model technique in multi-criteria decision analysis (MCDA) and the Weighted Sum Model (WSM) was utilized to compute the sustainability index (SI). Key performance indicators for infrastructure projects are used to assess their long-term viability. The paper recommended collaborative decision-making and gradual exploitation for mathematics and assessment models in Nigeria (Oraegbube and Ogwu, 2020).



Figure 1. Neglected Rail line in Nigeria

Figure 2. Horizontal Rail Line in Nigeria and Nigeria Railway Map

3. REVIEW METHOD

To gain insights into the state of the art and trends in a particular topic, it is imperative for research community to embark on a review of articles published in academic journals (Darko and Chan, 2016; Owusu et al., 2017). Authors are well-known for publishing their findings in scholarly journals. When studying retrieved articles, identical analytical structures in terms of research aims and procedures are also used by focusing on a single type of publication, such as journals or textbooks (Mok et al, 2015). This research used a systematic review of literature on railway evolution and the current state of railway infrastructure delivery in Nigeria. The systematic literature review adopted in this paper begins with a search for relevant papers in databases like Web of Science, Google Scholar, and Scopus, among others. The search was conducted using the terms "railway infrastructure " and "railway projects development." Journals, conference proceedings, reports, and books are all included in the search. Prior to the start of the review analysis, the publications that were acquired from multiple databases were filtered. All papers written in a language other than English were sorted out. Since this study is a review paper,

secondary data were sourced from journal articles, conference papers, internets, textbooks, historical documentation, and Nigerian Railway Corporation (NRC). Some relevant papers were also gotten through references from papers reviewed as depicted in table 1 below.

Table 1. Source

Item	Document Source Type	Number
1	Journal Articles	14
2	Conference Paper	5
3	Text Book	3
4	Others	9
	Total	31

Author Review (2022)

3.1. Discussion of findings

Government's investment/commitment in rail infrastructure seems inadequate compared to what is obtainable in other developed countries. Rail infrastructure development cannot be left to Federal government of Nigeria to solve on its own; collaboration and participation are required. Government as a matter of priority should devote considerable attention to the development of rail infrastructure so as to harness the economic potential and transformation that sustainable rail infrastructural projects will provide.

From the review of the railway infrastructure, data available indicates that most developed economy devote considerable investment into rail infrastructure financing and management. This is because railway infrastructure planning and maintenance are incorporated in railway management. The review also indicates that some of the developed world deploy the use of the latest technology to the management and maintenance of rail infrastructure. Although rail infrastructure development cannot be left to Federal government of Nigeria to solve on its own; collaboration and participation are required. There is a lot of lessons for the Nigerian Government and Nigeria railway Cooperation to learn. Adequate budgetary provision for railway infrastructure is important to enjoy the economic benefits that railway offers.

4. CONCLUSION

Rail infrastructure financing is crucial for encouraging economic growth, raising living standards, reducing poverty through jobs creation and increasing competitiveness. Nigeria is currently beset by a massive infrastructural gap, which has hampered its desire to capitalize on its abundant natural and human resources to spur growth. Though the Nigerian government has recently made an effort to rehabilitate the existing rail track or route created by the colonial ruler, this restoration is insufficient; the government must give more than lip service to infrastructural development and make it a priority. The amount planned for rail infrastructure development in the annual budget will demonstrate that it is a priority, and the amount must be monitored to ensure that the amount authorized for rail infrastructure development is accomplished in terms of value. Nigeria's railway system has devolved as a result of lengthy neglect, and the moment has come for the Nigerian government to step up and make a serious commitment to its rehabilitation. The development of a better rail system has economic implications for the Nation. This will also help to alleviate traffic congestion caused by heavy goods that could have been moved more quickly and safely through rail.

Meeting the ever-growing demands in the transportation of goods and passengers, railway systems and infrastructures have proven to be highly efficient transportation modes. From the

review of railway infrastructure, data available indicates that most developed economy devote considerable investment into rail infrastructure financing and management. This is because railway infrastructure planning and maintenance are incorporated in the railway management. The review also indicates that some of the developed countries deploy the use of the latest technology to the management and maintenance of rail infrastructure. There is a lot of lessons for the Nigerian Government and Nigeria railway Cooperation to learn. Adequate budgetary provision for railway infrastructure is important to enjoy the economic benefits that railway offers.

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