

Efficiency of Railway Transport as a Sustainable Mode of Transport in Nigeria: A Study of Rail Mass Transit in Lagos and its Environs.

by

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Abstract

This paper compacts with the notion of relevance of railway transportation in the Nigerian economy. Assessments, Issues, challenges and operational rail-line in Nigeria. Specifically, impact of railway in Lagos (Rail Mass Transit) The study also highlighted factors that may affect or retard the relevance of railway transportation in the Nigerian economy and solutions propounded. The paper presenter researched for the paper with reliance on textbooks, internet websites and operational case study since there is a dearth of material in the subject area most especially data from pre-colonial period in Nigeria railway operations. Also, the researcher relied on secondary data from Nigerian Railway cooperation for his SPSS analysis. At the end of the paper, the presenter proposed a number of recommendations for efficient operations of railway service in Nigeria. Significant among is government improvement of infrastructure and enabling environment as well as privatization or commercialization of railway operation as the government does not have the political will and motivation to invest in a capital intensive project like a railway.

Keywords: Railway, Nigeria, Train, Lagos, privatization, terminals, propelling power, transportation

Introduction:

The railroad is one of the ways (tracks) utilized for transportation. Rail transport is a method for passing on passenger and freight through wheeled vehicles running on rails. ((Abril et al., 2013). Such is by and large symbolized as train transport. These rail vehicles are straightforwardly directed by the tracks on which they run. These tracks are comprised of steel rails introduced on sleepers/ties and on the ballast, on which the metal moving stock is typically fitted with metal wheels, moves. Be that as it may, different varieties are conceivable, for example, slab track where this rails are attached to a solid base lying on a prepared subsurface (conceptDraw.com).

Rolling stock in railroad transport frameworks by and large has lower frictional resistance when compared to highway vehicles, passenger and freight carriages can be coupled to form larger trains. The activity of a railroad is done by a railway organization providing transport between train stations or freight customer facilities. Power is being created either by coal, diesel engine and so on.

NOTE: Railway transport is a protected land transport framework when contrasted with different types of vehicle ashore.

Railroads are frequently adaptable and more capital concentrated than other land transport, and it has a lower traffic levels.

What Really Is A Train?

A train is a connected series of rail vehicles that move along the track. Propulsions for the train is provided by a separate locomotive or from individual motors in self-propelled multiple units (Wikipedia 031nch22, March 13, 2018).

Traditionally, trains are pulled using a locomotive. This involves a single or multiple powered vehicles that are being situated at the front of the train and this provides more sufficient adhesion to have the weight of the full train according to American Railway Engineering and Maintenance of Way Association Committee 24 Education and Training, 2003.

A push pull train has the end passenger car equipped with a drivers cab. A railroad car is a vehicle used for haulage of either passenger or freight.

A Train Propelling Power: Steam Locomotives:

These are locomotives which possess a steam engine that provide adhesion. In this engine it contains a background called a fire box which burns up either coal, petroleum or wood. The heat generated from the fire box that boils water in the fire tube boiler to create.

In the process the steam travels though the smoke box before leaving via the funnel, invariably, this will power a piston that transmits power directly through a connecting and a Crankpin on the driving wheel or to a crank on a driving axle. But in most developing cities like Lagos State Steam locomotive, it's been used (Wiki, 2, 031nch22, March 15, 2018).

Here below are the other propelling powers that could be introduced in Lagos railway system which includes: Electric locomotives, Diesel locomotives, Magnetic levitation, Cable, Gravity, Pneumatics, Gas turbine.

Railway Stations:

Railway stations serve as an area where passengers can board and alight from trains. It's exclusively used for loading and unloading humans and cargo (Wikipedia, 2018). In transport terms, this railway station is called terminals.

A megacity like Lagos, which has an estimated population of more than twelve million residents, thus transport is a key necessity for movement which gives a proper avenue for logistics. On a daily basis the demand for transport keep increasing thus the need for a longer mode of transport is needed to convey the population of Lagos from their point of origin to destination safely. That's why there's a need for an efficient railway system (Lewis, 2001).

History of Railway in Nigeria:

The Nigerian railways were initially worked by the colonial power, Great Britain. The railways were constructed up to the 3 ft 6 in (1,067 mm) Cape gauge, a similar track gauge utilized in most other British settlements in Africa. The nation has two significant Cape gauge

rail lines: the Western line which associates Lagos on the Bight of Benin to Nguru in the northern territory of Yobe, over a separation of 1,126 kilometers (700 mi) and the Eastern line which interfaces Port Harcourt in the Niger Delta to Maiduguri in the northeastern province of Borno, close to the border with Chad (Everipedia, 2019).

There are likewise a few branch lines: the Linking Line that interfaces Kaduna on the Western Line to Kafanchan on the Eastern Line; Ifaw–Ilaro (Western Line), 20 kilometers (12 mi); Minna–Baro (Western Line), 155 kilometers (96 mi); Zaria–Kaura Namoda (Western Line), 245 kilometers (152 mi) and Kuru–Jos (Eastern Line), 55 kilometers (34 mi). Everipedia (2019).

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- Zaria–Kaura Namoda (Western Line), 245 kilometers (152 mi).
- Kuru–Jos (Eastern Line), 55 kilometers (34 mi)

In the past the 2 ft 6 in (762 mm) check Bauchi Light Railway worked among Zaria and Jos over a separation of 184 kilometers (114 mi). This line was incompletely changed over to 3 ft 6 in (1,067 mm) in 1927, and the rest of deserted in 1957 (Everipedia, 2019).

The eastern line from Port Harcourt to Maiduguri was restored at a cost of US\$427 million by Lingo Nigeria, Eser West Africa, and the China Gezhouba Group. In order to remedy the poor condition, efficiency, and profitability of the nation’s railroads, the government is also seeking to privatize the Nigerian Railway Corporation.

The Lagos Government Railway began operations in March 1901 and was extended to Minna in 1911, where it met the Baro–Kano Railway that was built by the government of Northern Nigeria between 1907 and 1911. The two lines were amalgamated in 1912 into the Government Department of Railways, the predecessor to the Nigerian Railway Corporation (Carland J, 1985).

The 187 km line is the first segment of the planned Lagos–Kano Standard Gauge Railway to be completed. The Warri–Itakpe standard gauge line connects the port city of Warri to Itakpe (BBC News, published 7th of December, 2017).

A standard gauge railway connects the national capital of Abuja to the city of Kaduna, an important junction point on the Cape gauge railway network (BBC News, published 7th of December, 2017).

The 320 km line began test runs in November 2018, but the stations will not be completed until the first quarter of 2019. The construction of railways in Nigeria started from

Map 2: Railway Routes across Nigeria with Single, standard and Narrow gauge railway²



Table 1: Passenger and Freight traffic and revenue in Nigeria (Pre-independence)-1946~1957³

Year	Passenger	Revenue(£)	Freight(Tonnes)	Revenue(£)
1946-1947	6,200			
1947-1948	6,500			
1948-1949	6,100			
1949-1950	5,500			
1950-1951	5,500			
1951-1952	5,500		1,752.00	5,899.00
1952-1953	5552	1,187,881.00	2,086.00	8,154.00
1953-1954	5432	1,216,106.00	2,298.00	9,256.00
1954-1955	5450	1,202,097.00	2,602.00	10,643.00
1955-1956	6309	1,387,573.00	2,653.00	11,407.00
1956-1957	7270	1,517,000.00	2,808.00	11,842.00

² Source:: Okeyode & Yakubu (2015)

³ Source: International Bank for construction and development published 5th of April 1958

Table 2: Passenger and freight traffic and revenue (post-independence)-1970~2010⁴

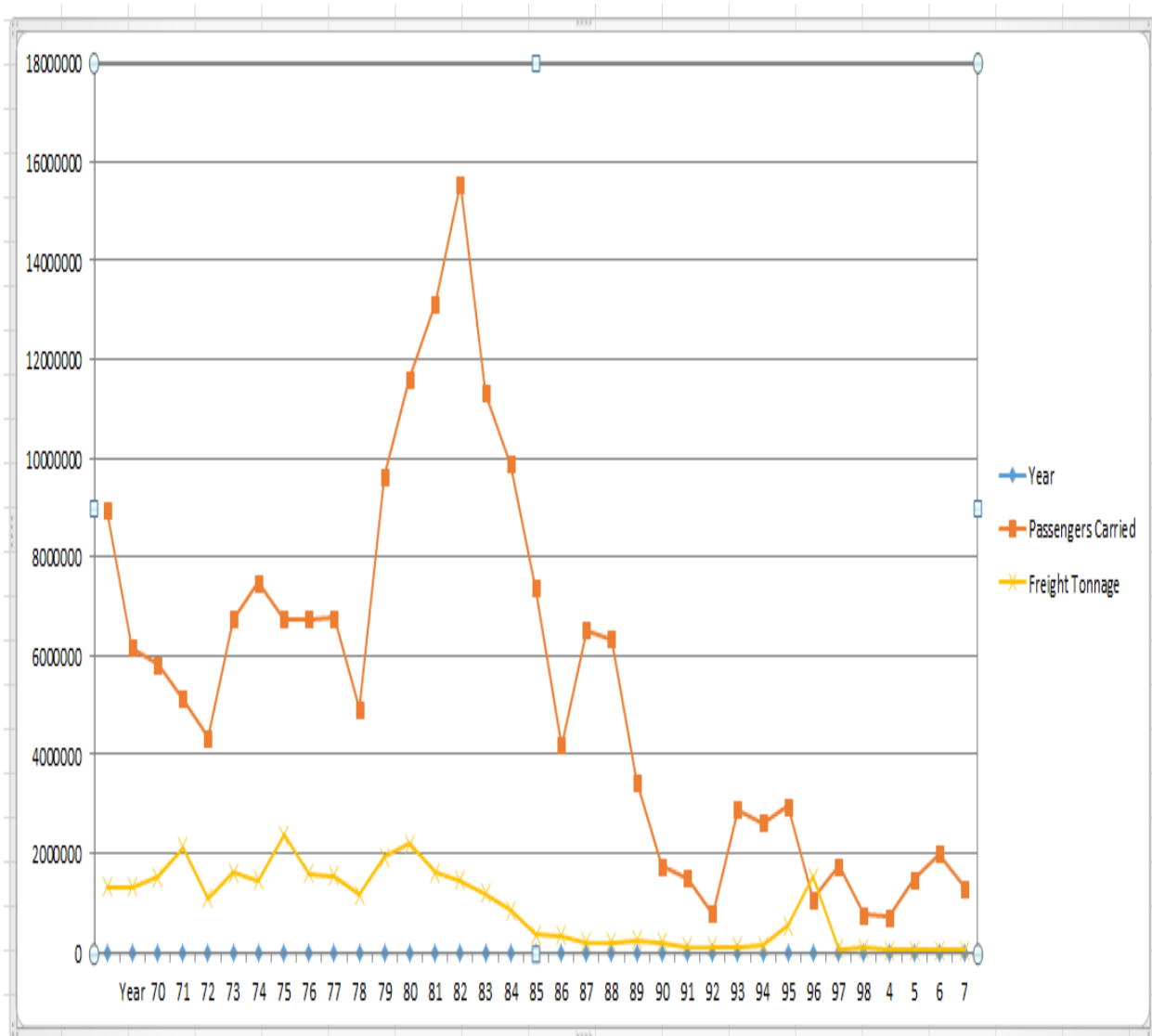
Year	Passengers Carried	Passengers' Revenue N	Freight Tonnage	Freight revenue N	Total Revenue (Pass + Freight) N
1970	8,942,000	4,676,000	1,311,000	18,438,000	23,114,000
1971	6,151,000	6,296,000	1,311,000	15,680,000	21,976,000
1972	5,819,000	7,447,000	1,519,000	17,095,000	24,542,000
1973	5,131,000	6,906,000	2,129,000	18,025,000	24,931,000
1974	4,342,000	6,067,000	1,098,000	12,205,000	18,272,000
1975	6,755,000	11,003,000	1,612,000	14,724,000	25,727,000
1976	7,491,000	10,004,000	1,452,000	16,772,000	26,726,000
1977	6,747,000	10,822,000	2,375,000	17,172,000	27,994,000
1978	6,750,000	12,982,000	1,592,000	16,251,000	29,233,000
1979	6,771,000	18,716,000	1,543,000	21,861,000	40,577,000
1980	4,917,000	17,290,000	1,153,000	23,313,000	40,603,000
1981	9,638,000	26,623,000	1,932,000	45,090,000	71,713,000
1982	11,612,000	28,288,000	2,185,000	49,021,000	77,309,000
1983	13,142,000	29,877,000	1,619,000	36,499,000	66,376,000
1984	15,553,000	33,147,000	1,458,000	33,335,000	66,482,000
1985	11,324,000	36,205,000	1,182,000	34,237,000	70,452,000
1986	9,878,000	39,059,000	852,000	26,335,000	65,394,000
1987	7,383,000	35,750,000	353,000	15,632,000	51,382,000
1988	4,196,000	25,117,000	326,000	13,206,000	38,323,000
1989	6,520,000	24,318,000	202,000	18,155,000	42,473,000
1990	6,345,000	31,403,000	198,000	35,911,000	67,314,000
1991	3,443,000	19,300,000	237,000	64,400,000	83,700,000
1992	1,747,000	17,013,000	204,000	49,732,000	66,745,000
1993	1,502,000	14,627,000	106,000	25,841,000	40,468,000
1994	784,491	36,809,884	106,000	121,911,902	158,712,786
1995	2,889,977	56,144,354	107,878	133,911,902	190,026,256
1996	2,626,026	112,907,824	137,661	161,348,796	274,256,624
1997	2,946,940	126,456,928	535,000	219,175,125	435,632,053
1998	1,070,424	74,457,194	1,513,077	438,779,607	513,236,801
2004	1,751,159	206,772,909	62,575	112,480,539	319,253,448
2005	752,842	87,178,829	84,652	110,001,353	197,190,182
2006	708,802	84,322,338	41,495	108,948,616	193,270,954
2007	1,478,700	145,094,569	36,758	82,811,334	227,905,902
2008	1,996,324	186,792,779	47,409	78,600,975	265,393,754
2009	1,285,080	165,954,403	40,624	60,711,935	226,666,338

An overview of the operational performance of the Nigerian Railway Corporation especially between 1978 and 1982 paints a picture of the boom in its operations and its zenith till 1982 and thereafter started a process of decline in its business operations. The essential factors in this situation are what the Nigerian Railway watchers have called "the systemic decay of the

⁴ Source:Nigerian Railway Corporation Headquarters, 2010

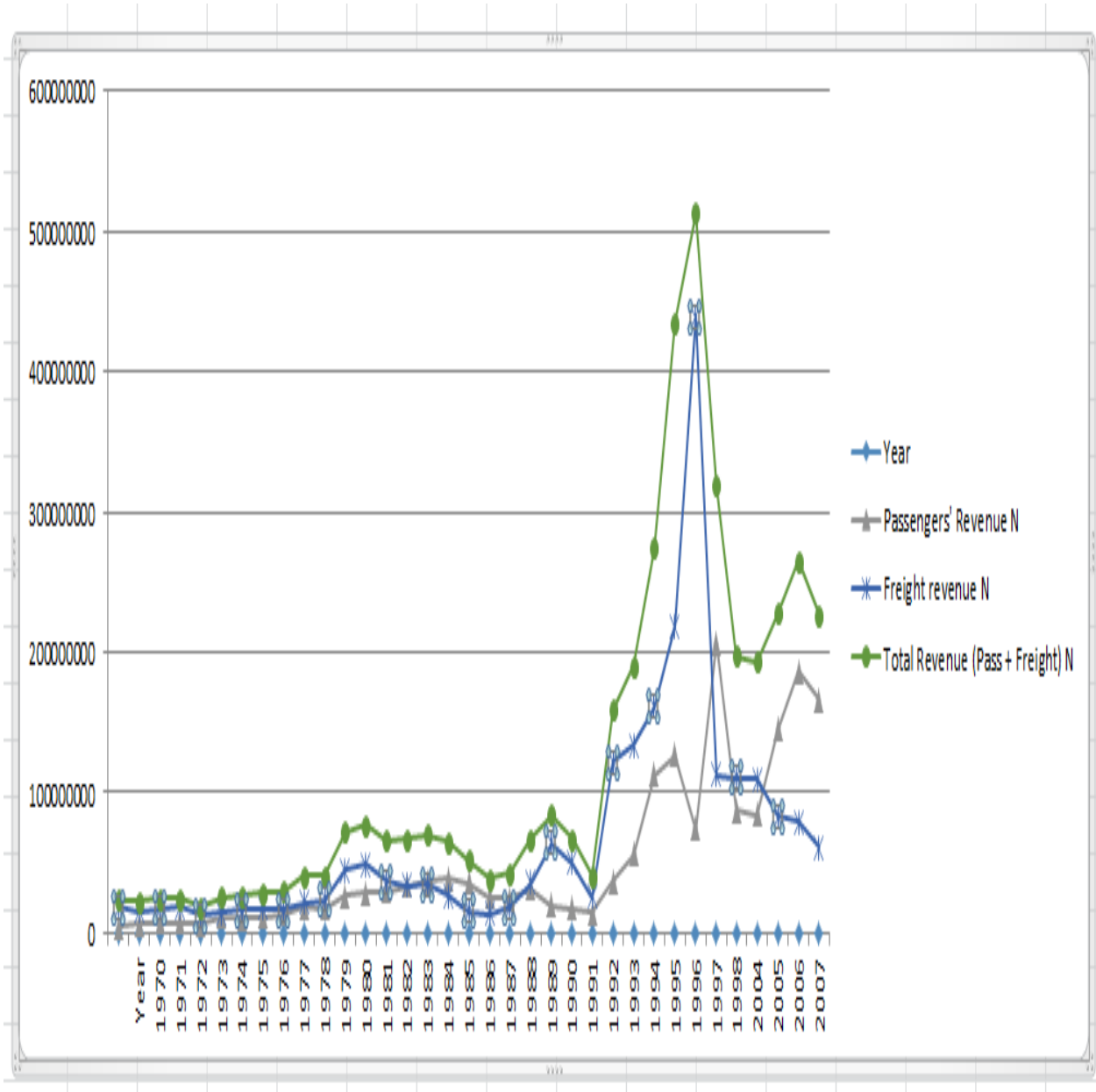
Corporation's entire infrastructure, manpower and institutions in the last five decades. A graphic picture below shown using the statistical figures of the Corporation's passenger and freight traffics shows that in 1972, there is a decline in passenger 5,819,000 passenger and freight pick up with 1,519,000 tonnage of cargo, also in 1977, there was a drop in passenger to 6,747,000 and an increase in passenger to 2,375,000 and passengers picked in 1978 to 6,750,000 tons with a decrease in cargo in the same year. The highest passenger Nigeria has ever recorded was between 1981 and 1985 with passenger 9,638,000, 11,612,000, 13,142,000 15,553,000 and 11,324,000 which constitute 32% (61,262,000) of passenger patronage when compared to passenger between 1970 and 2010 (190,389,765) and ever since then the passenger keep on declining with a humiliating figure like we had in 2009 with 1,285,080 passengers and 40,624 tonnes cargo.

Graph 1: Passenger and cargo volume carried between 1970 and 2010⁵



⁵ Source: Author's field research 2019

Graph 2: Passenger and cargo revenue between 1970 and 2010⁶



Aims and Objective of Railway in Nigeria:

A. Transportation or mobility:

Transportation is an act of moving people, goods and services from point of origin to point of destination safely. Thus the railway (trains) contributes to part of this logistics. It helps reducing the overuse of the road, air and marine transport, thereby reducing the wear and tear of infrastructure in other transport sector in Nigeria.

⁶ Source: Author's field research 2019

B. Creates Employment:

A vibrant railway sector creates employment (jobs) to core professionals who are unemployed and are seeking so eagerly for jobs. Below are some of the employment opportunities the railway sector could absorb.

- Engineering/Mechanical Engineers
- Accountants
- Marketers (help in the sale of tickets)
- Security
- Pilots, etc.

C. Generates Revenue:

The railway sector is one that, if it's been efficiently managed by core professionals who give in their best for the growth of the railway, in the long run it could serve as a source that generates revenue on a daily basis.

D. Resources Congestion:

In a city like Lagos with an estimated population of twelve million. Ninety five percent of the populace makes use of road transportation, which consist of cars, motorcycle, buses, lorries etc. Due to the high number of road, it thereby causes congestion and brings about delay of goods, people and services not getting to their destination on time.

With the steady introduction of railway, it will help to reduce congestion and reduce delay. Since there is no congestion on rails

Conceptual Framework:

Efficient railway transportation helps ensure both population mobility and a functioning supply chain. Most times, railway reliability is often threatened by:

- Inadequate capacity
- Aging infrastructure
- Increasing freight cost
- Potential security threat
- Poor coordination and control of government transport parastatals
- Lack of transport policy.

It should be noted that Lagos state has grown from a small fishing settlement to a Megapolis accommodating over twelve million people. The huge population requires mobility by various transportation means most especially the railway system.

Many of the observed inadequacies in the transportation system in Lagos shoot from sector management weakness (Lamata, 2017). This is as a result of lack of transport policy.

The rail service is controlled by the Nigerian Railway Cooperation (NRC) which currently operates a limited commuter service between Agbado (Lagos north) and Iddo (Lagos south).

The railway here in Lagos constitutes an under-utilized assets. Thus, it carries less than 1% of the overall traffic in Lagos, but it still has a very good potential to play and greater roles in the movement of people, goods and services.

Understanding of institutional arrangement should contribute through assessing the interaction of legislation and regulations, administrative, economic and financial arrangements; political structures and processes; and historical and traditional customs and values. Greater understanding of the way in which these variables interact on rail transport and its traffic management, which helps in forecasting about the future. Sustainability tendencies of the railway transport system in Lagos rest on the capacity to manage the traffic and railway transport sector for an improved, efficient and enhanced public transport network.

Railway Institutional Failure in Lagos:

Evidences have shown that there is no clear definition of responsibilities among the three tiers of government in making sure that the railway system in Lagos thrives. This condition has steered into institutional conflicts in numerous areas, especially in the enforcement, infrastructure provision and use, policy formulation and coordination. Oni, S.I; Okanlawon, K. R. & Asenime, C.O. (2006). Deficiency of long-term strategic planning, poor regulation and enforcement — the land use control and regulatory instruments are ineffective (Oni, 1999).

The poor rail network reflects the political institution shortfalls of commitment, money and skills, many agencies are involved in providing rails, but few in maintenance; legal responsibilities are not clear and there are shortages of core competence professionals in the railway transport.

In cities with numerous local governments such as Lagos metropolis, in a situation like this, the creation of a single authority named Lagos Metropolitan Area Transport Authority (LAMATA) is a welcome idea according to Oni, S.I., Okanlawon, K. R. & Asenime, C.O. (2006). This body brings an effective unification and coordination, coordination and implementation of transport policies which will bring a long term institutional reform objective.

Other problems affecting railway transport in Lagos include:

- a) Unplanned Urbanization
 - Markets on railway tracks
 - Occasional vehicular traffic on railway tracks
 - Dumping of waste on railway track
 - Having social gatherings on or close to railway tracks
- b) Land Use
- c) Human Factors and institutional failure
 - Indiscipline and corruption

- Disobedience and disregard for law
 - Poor driving habits by train drivers.
 - Poor coordination and control of government transport parastatals
 - Lack of transport policy.
 - Inadequate capacity
 - Aging infrastructure
 - Increasing freight cost
 - Lack of political will power and foresight
- d) Poor Transit Facilities
- Lack of traffic control systems
 - Lack of traffic managers.
- e) Lack of Involvement of the Private Sector
- Lack of Funds
- f) Potential security threat

Challenges of Railway Sector in Lagos State:

Rails development work began in Lagos with the single-track arrangement of 1067 mm (3'6") measurement (NRC, 2007). The Nigeria Railway Corporation, particularly the Lagos metropolis railway districts, has throughout the years been experiencing some troublesome occasions. A portion of its difficulties in Lagos metropolis entails poor government financing, old narrow gauge tracks, poor gradient poor communication and signaling equipment, poor road access, lack of parts for maintenance and incapacitated engines. In spite of these difficulties, the corporation has figured out how to give skeletal intra-city transport benefits in Lagos State (Eugene, 2007).

Lagos is a city which has a huge deluge of individuals dwelling in the city and transacting business among themselves. Along these lines, there is a requirement for efficient and effective railway vehicle system that would convey people, goods and services within Lagos.

But the railway sector is being neglected which has made it inefficient. These are some of the reasons that are responsible for its failure;

- a. Insufficient funds
- b. Planning not in place
- c. No proper organization
- d. Poor staffing

Insufficient Funds:

Proper and adequate funding of the railway sector has been the brain behind the derail of the railway sector. Without funds (money) proper maintenance of infrastructures in the railway

in Lagos can't be achieved, employees can't be paid well etc. Thus, for the sector to grow, funds (capital) should be sufficient to run the railway sector in Lagos.

Planning not in place:

The railway sector in Lagos lacks proper planning, focuses on desired goals that need an accomplishment in a given time frame. The vision to move the railway sector in Lagos to be among the best in the world is not there. Thus, for proper growth in the sector. There should be a vision in order to achieve their planned, desired goal.

No proper organization:

When there is no proper organization, there would be difficulty in integrating human, physical and material resources.

Moreover, most departments in the railway sector in Lagos are being run by the wrong personnel. Since this is a lack of professionals handling those departments, there would definitely be rigidity in its services

Poor staffing:

Since employees (individuals) are an integral factor in the development of the railway sector in Lagos. They should be given the basic requirement needed to carry out their duties dedicatedly.

Moreover, most departments in the railway sector in Lagos are being run by the wrong personnel. Since they are not core professionals handling those departments, there would definitely be rigidity in its services.

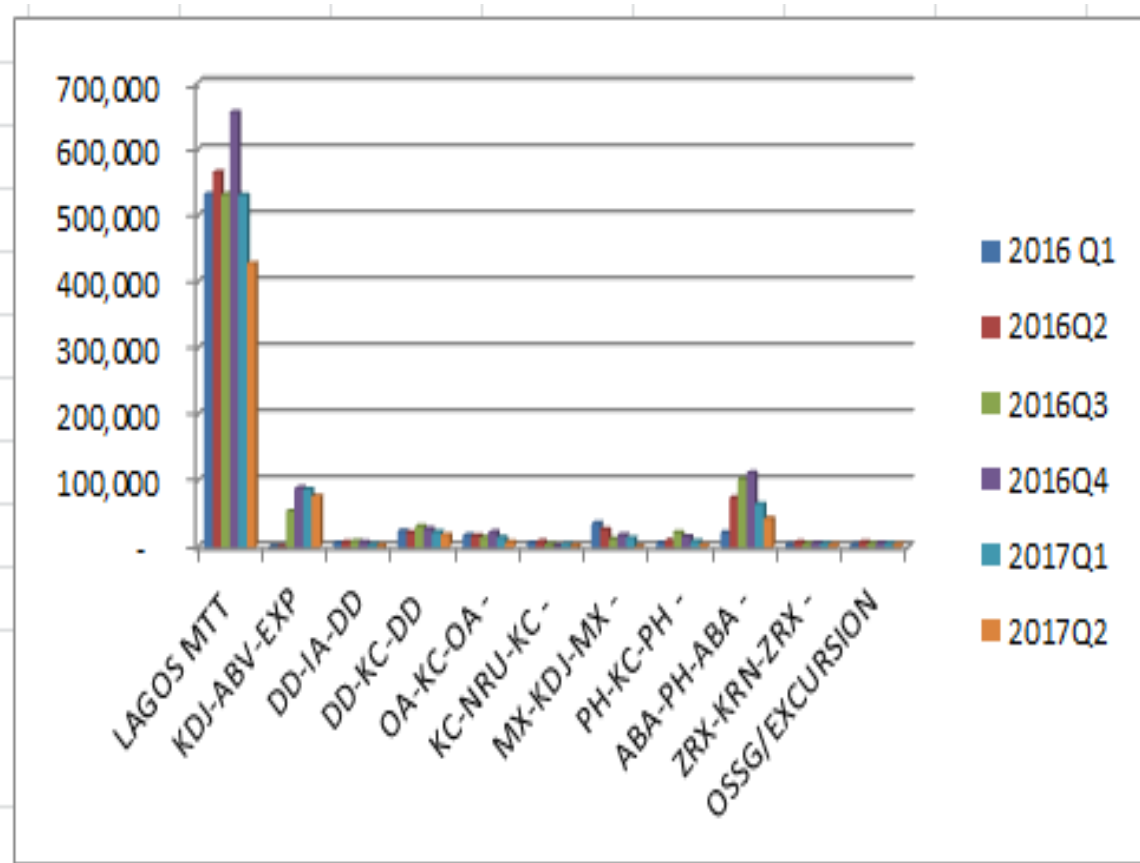
Functional railway in Nigeria between 2016~2017:

Table 3 2016~2017 Passenger data for 11 functional passenger trains in Nigeria⁷

Rail	2016 Q1	2016Q2	2016Q3	2016Q4	2017Q1	2017Q2
LAGOS MTT	532,474	565,642	531,898	655,724	530,993	427,760
KDJ-ABV-EXP	-	-	53,874	89,263	86,966	76,820
DD-IA-DD	6,109	7,535	8,585	7,012	3,620	2,663
DD-KC-DD	24,100	21,529	31,088	26,951	22,898	18,512
OA-KC-OA -	17,810	16,732	14,269	22,693	14,612	6,709
KC-NRU-KC -	6,262	7,941	3,288	894	4,264	2,783
MX-KDJ-MX -	36,308	26,573	11,753	17,948	13,761	573
PH-KC-PH -	6,122	9,508	21,804	15,829	8,359	2,870
ABA-PH-ABA -	21,557	73,768	102,248	111,617	64,924	42,547
ZRX-KRN-ZRX -	3,997	7,118	4,574	6,240	5,116	3,189
OSSG/EXCURSION	3,997	7,118	4,574	6,240	5,116	3,189

⁷ Data Sources: National Bureau of statistics report November 2017

Bar chart 1: 2016~2017 passenger data for 11 functional passenger trains in Nigeria⁸



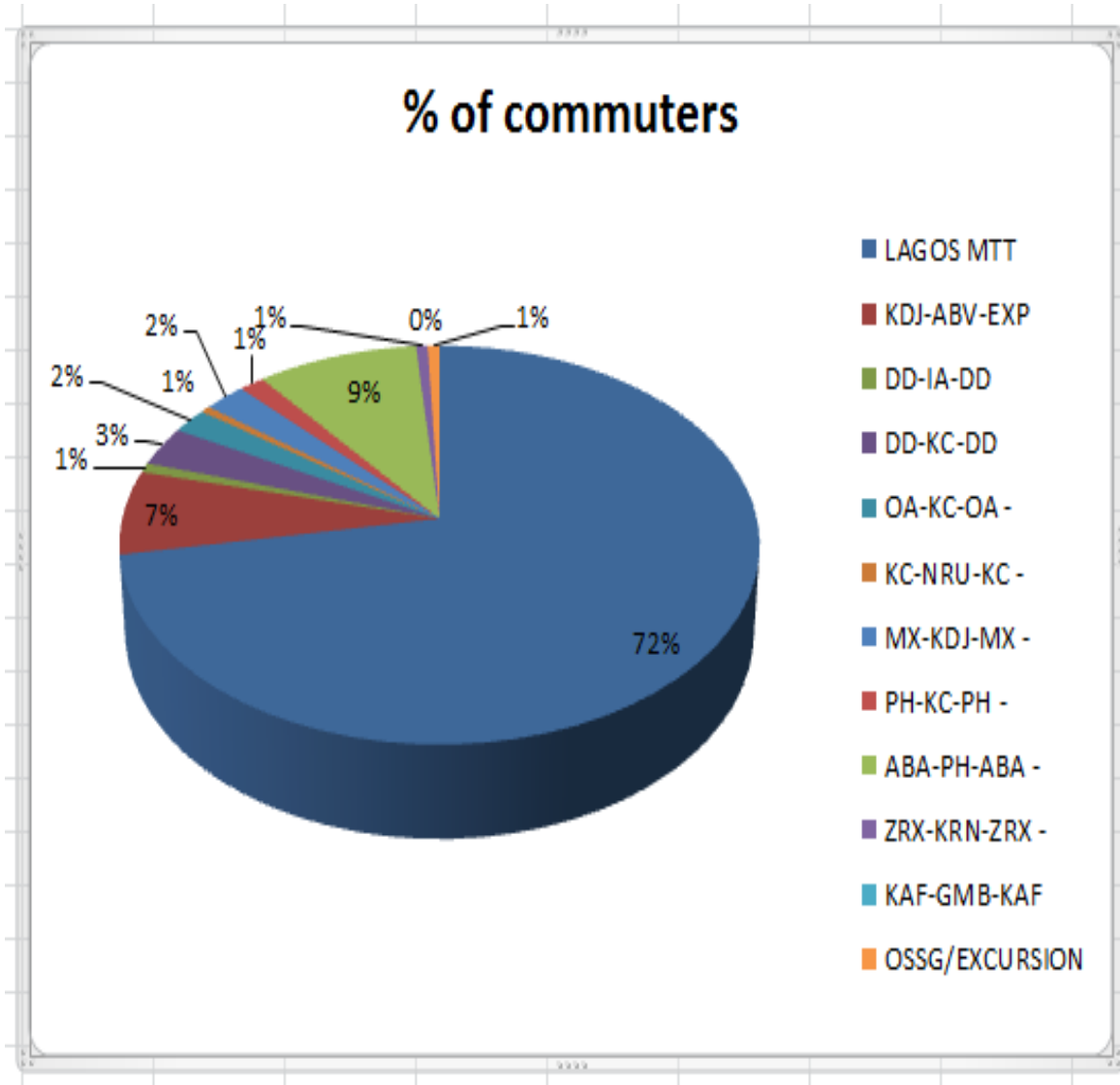
Lagos MTT (Lagos Mass Transit Train from Iddo/Apapa to Ijoko) had shown consistence voyage for the period under review. In Summary, Lagos MTT is the most consistent rail line across the 6 quarters under review (2016~2017), while ABA-PH-ABA (Aba to Port Harcourt Train Service) and KDJ-ABV-EXP (Kaduna (Rigasa) to Abuja (Idu) Train Service) respectively, also shown consistent operational activity even if patronage is less.

Below rail line does not have any voyage during the period under review (They are not operational) although some of them are not commercially inclined and are used to carry specific product like, cement, flours, grains, empty containers etc.

Special Train e.g Chartered train to move people to Oshogbo paid for by Osun State Government.(OSSG/EXCURSION), Cement traffic for Lafarge from Ewekoro (Ogun) to Ilorin, Minna and Kano. Also, Asaka Cement from Gombe to Kaduna (CEMENT), Bonded Container from Apapa Terminal port of AP Molla to Kano (CONT/UP/APMT), Bonded Container from Apapa Terminal port for ICNL to Kaduna Inland Container Depots (CONT/UP/ICNL), Return of empty Containers from Kano to Apapa (RETURN EMPTY/CONT), Return of empty Containers from Kaduna to Apapa (RETURN/LD/CONT), From up North down to Lagos (GRAINS), From Apapa Lagos to Kano (FLOUR/ WHEAT), From Lagos to Kaduna (FERTILIZER), From Lagos to Kano for Nig Railway Corporation use(PETROLEUM),From Gusau to Lagos and from Gombe to Port Harcourt(CATTLE) (National Bureau of statistics report November 2017).

⁸ Source: Authors field survey 2019

Pie-chart 1 Percentage of passenger train performance between 2016 and 2017⁹



72% Passenger patronage is from Lagos to its suburb.it is save to say that 72% operational efficiency is from Lagos alone while other rail locations shared the remaining 28%.

Aba to Port Harcourt Train Service had 9% patronage and efficiency followed by Kaduna(Rigasa) to Abuja (Idu) Train Service.

In the same vein,Cargo within the period of coverage are almost evenly distributed among all functional rail line in Nigeria with Kano to Nguru Train Service having 34% and 22% for Iddo(Lagos) to Kano Train Service 4.

Aba to Port Harcourt Train Service had been consistence for both passenger and cargo with 12%onlike Lagos that is super active on passenger alone and 4% cargo.

It is worthy of note that our rail line to the northern part of Nigeria are active for Cargo even if passenger patronage never existed is those places, for example Ufa for Kano Train

⁹ Source: Authors field survey 2019

Service for the train is (9%) and Minna to Kaduna Train Service (8%) while both share 2% each for passenger patronage.

And for the trip, apart from Lagos Mass Transit Train from Iddo/Apapa to Ijoko, Kaduna (Rigasa) to Abuja (Idu) Train Service and Aba to Port Harcourt Train Service with trip consistency 52%, 19% and 13% respectively. All other locations have less than 10% and even some nearly have no trip, including the northern areas with more freight potential having a little trip on record between 1% and 2%.

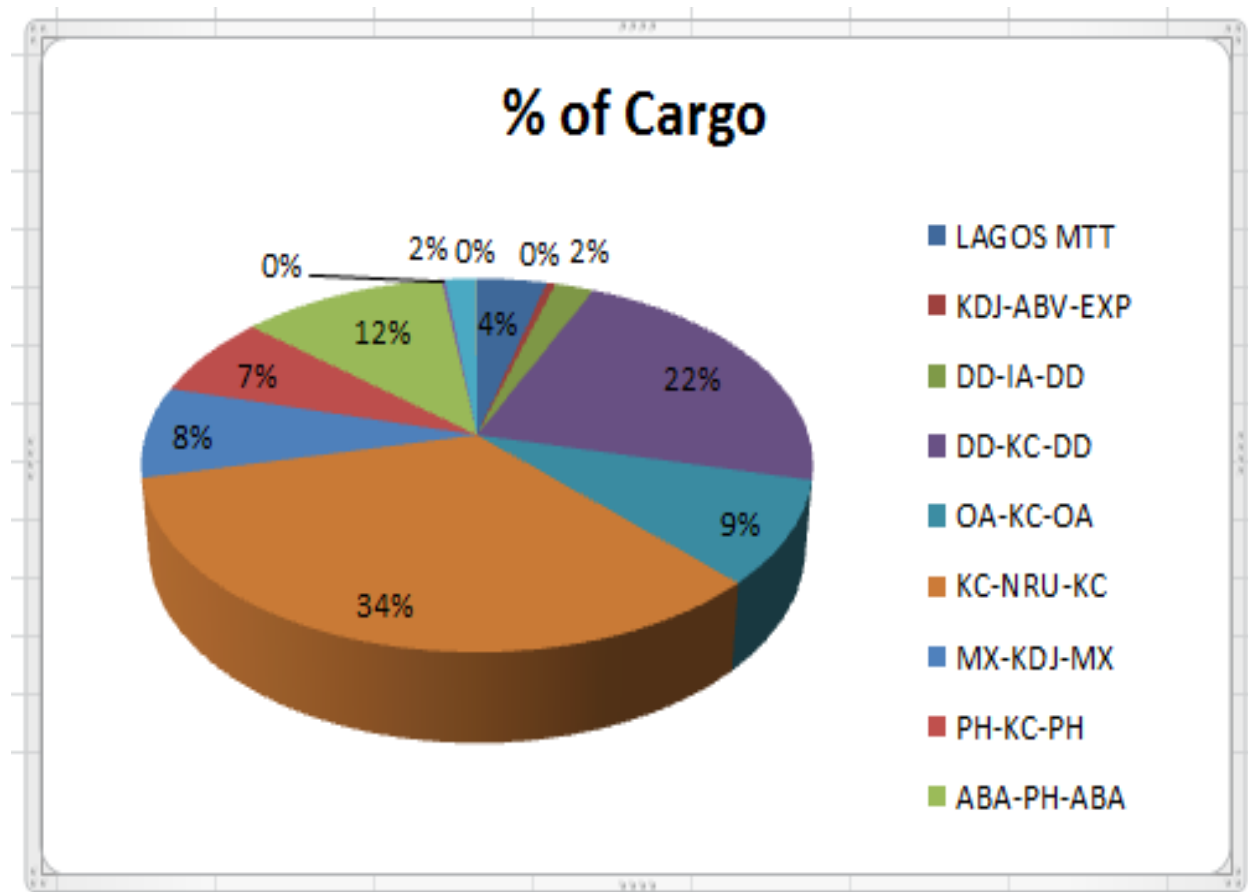
It is safe to say that high freight in northern area when compare to other locations, does not translate to better freight rail efficiency as evident by trips in those places.

Summarily, Lagos MTT (Lagos Mass Transit Train from Iddo/Apapa to Ijoko) constitute 72% of the total voyage in the country between 2016~2017. According to News agency of Nigeria, the station in the this corridor covers: Iganmu-Ebute Metta Junction, Yaba, Mushin, Oshodi, Shogunle Ikeja, Agege, Iju, Agbado, Itoki, Oposuru, Ijoko and Kajola

For Cargo or freight, Kano to Nguru Train Service and Iddo (Lagos) to Kano Train Service and Aba to Port Harcourt Train Service with 34%, 22% and 12% respectively.

For Trip coverage, Lagos Mass Transit Train from Iddo/Apapa to Ijoko, Kaduna (Rigasa) to Abuja (Idu) Train Service and Aba to Port Harcourt Train Service 52%, 19% and 13%.

Pie-chart 2 Percentage of train performance between 2016 and 2017 (Cargo)¹⁰

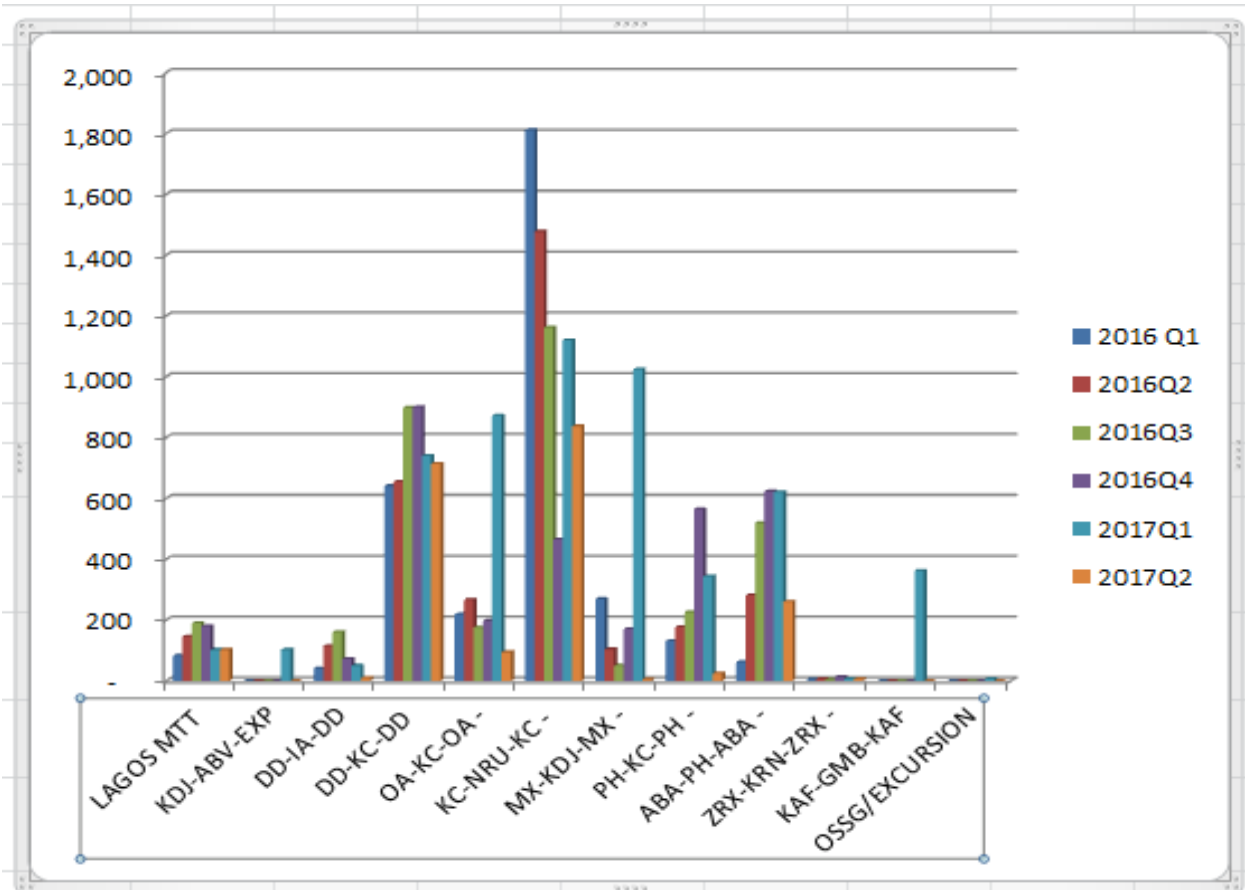


¹⁰ Source: Author's field survey 2019

Table 4: 2016~2017 Freight data (Cargo) for 12 functional freight trains in Nigeria¹¹

Rail	2016 Q1	2016Q2	2016Q3	2016Q4	2017Q1	2017Q2
LAGOS MTT	83	146	190	180	102	102
KDJ-ABV-EXP	-	-	-	-	102	-
DD-IA-DD	41	114	160	72	50	10
DD-KC-DD	641	655	899	900	740	714
OA-KC-OA -	219	267	175	197	872	94
KC-NRU-KC -	1,811	1,477	1,162	465	1,120	837
MX-KDJ-MX -	269	104	51	170	1,024	5
PH-KC-PH -	131	177	226	565	344	25
ABA-PH-ABA -	62	281	519	623	620	260
ZRX-KRN-ZRX -	5	6	4	12	7	6
KAF-GMB-KAF	-	-	-	-	362	-
OSSG/EXCURSION	-	-	-	-	7	-

Bar chart 2: 2016~2017 Freight data (Cargo)¹²



¹¹ Data Sources: National Bureau of statistics report November 2017

¹² Author's field survey/work 2019

Pie-chart 3 Percentage of trip performance between 2016 and 2017 (Trip)¹³

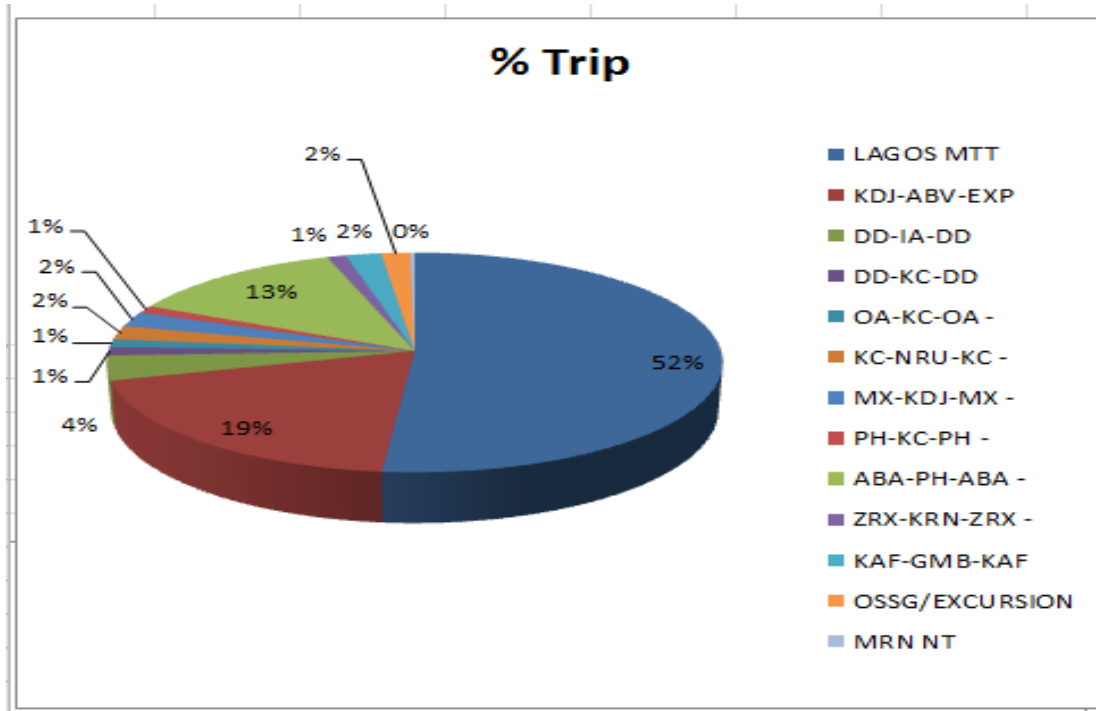


Table 5 2016~2017 Trip data for 12 functional train trip in Nigeria¹⁴

Rail	2016 Q1	2016Q2	2016Q3	2016Q4	2017Q1	2017Q2
LAGOS MTT	684	1,016	1,058	1,071	1,049	1,002
KDJ-ABV-EXP	-	-	124	302	1,349	414
DD-IA-DD	16	28	22	19	314	14
DD-KC-DD	18	24	20	24	33	23
OA-KC-OA -	15	25	19	16	41	16
KC-NRU-KC -	33	53	37	22	46	41
MX-KDJ-MX -	50	72	35	34	48	14
PH-KC-PH -	16	22	18	21	44	2
ABA-PH-ABA -	140	276	254	274	254	267
ZRX-KRN-ZRX -	16	26	20	26	18	19
KAF-GMB-KAF	-	-	-	-	234	-
OSSG/EXCURSION	24	46	-	18	49	54
MRN NT	-	-	-	-	31	-

¹³ Author's field survey/work 2019

¹⁴ Data Sources: National Bureau of statistics report November 2017

Bar chart 3 2016~2017 trip data¹⁵

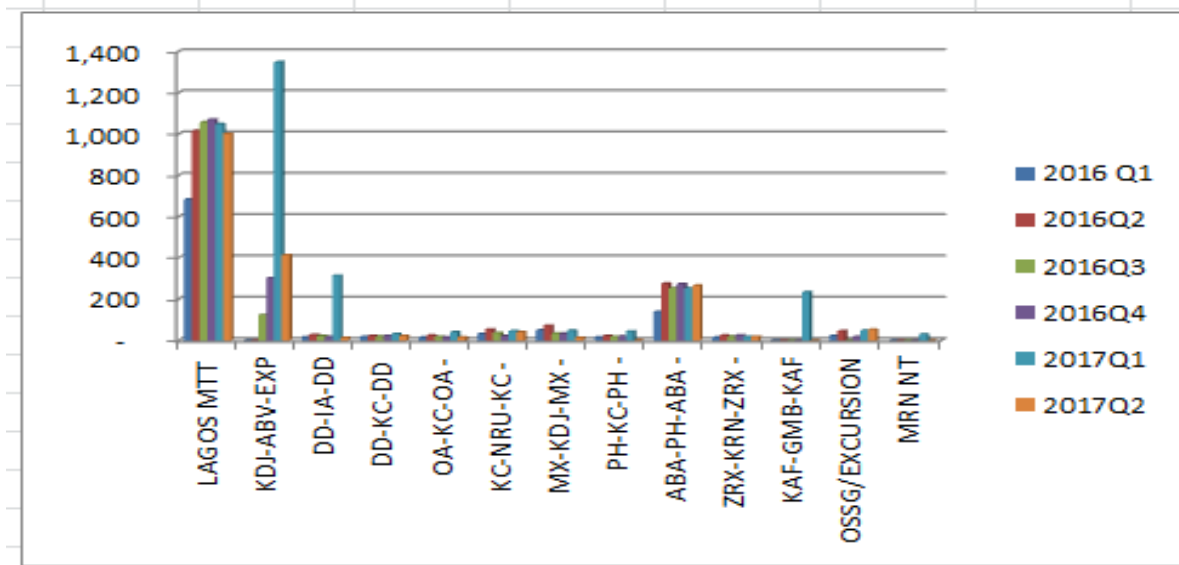


Table 6 Definition of rail route in Nigeria.

Route abbreviation	Description
LAGOS MTT	Lagos Mass Transit Train from Iddo/Apapa to Ijoko
KDJ-ABV-EXP	Kaduna(Rigasa) to Abuja (Idu) Train Service
DD-IA-DD	Iddo(Lagos) to Ilorin Train Service
DD-KC-DD	Iddo(Lagos) to Kano Train Service 4
OA-KC-OA	Offa to Kano Train Service
KC-NRU-KC	Kano to Nguru Train Service
MX-KDJ-MX	Minna to Kaduna Train Service
PH-KC-PH	Port Harcourt to Kano Train Service
ABA-PH-ABA	Aba to Port Harcourt Train Service
ZRX-KRN-ZRX	Zaria to Kaura Namoda Train Service
KAF-GMB-KAF	Zaria to Kaura Namoda Train Service
OSSG/EXCURSION	paid for by Osun State Government.
CEMENT	Cement traffic for Lafarge from Ewekoro (Ogun) to Ilorin, Minna and Kano. Also, Asaka Cement from Gombe to Kaduna
CONT/UP/APMT	Bonded Container from Apapa Terminal port of AP Molla to Kano
CONT/UP/ICNL	Bonded Container from Apapa Terminal port for ICNL to Kaduna Inland Container Depots
RETURN EMPTY/CONT	Return of empty Containers from Kano to Apapa
RETURN/LD/CONT	Return of empty Containers from Kaduna to Apapa
GRAINS	From up North down to Lagos
FLOUR/ WHEAT	From Apapa Lagos to Kano
FERTILIZER	From Lagos to Kaduna
PETROLEUM	From Lagos to Kano for Nig Railway Corporation use
CATTLE	From Gusau to Lagos and from Gombe to Port Harcourt

¹⁵ Author's field survey/work 2019

Solutions for a successful institutional arrangement in making the railway transportation more relevant in Nigeria economy:

An urban rail transport policy should be instituted which has the features of guided participation of the government, thereby including private institutions and non-governmental organizations should be clearly defined.

The government should continue to provide funds for rail transport infrastructure majorly in urban areas, construction of routes and also a better traffic management scheme.

The agency which would be constituted should be concerned with the following functions:

- Proper urban rail transport planning,
- Proper strategic management,
- Maintenance of infrastructural facilities,
- Regulation of public rail transport services,
- Effective implementation of appropriate traffic management and control measures,
- Constant training of staff/workers with up to date skills,
- Proper fixing, collecting and controlling fares and rates,
- Ensuring effective intermodal and coordination through collaboration
- Proper enlightenment/education of road users.
- Conducive environment for railway workers to work
- Railway Employees should be given the right working tools
- Salaries/wages should be Paid as at when due
- Additional incentives should be given to hardworking railway staffs for motivation

Organizational structure for public transport management:

In organizing the rail transport system, the government must recognize their relationship with other institutional bodies which interact to make the whole public transport sector conducive for operation. This means the isolation of other rail transport operators should not exist.

The governments must complement the effort of private operators and not compete with them. The potentials of these private operators must be assessed and fixed in areas where they are best suitable. There must be a reflection on the historical, social and cultural background.

The desire of the administration, private:

In organizing the rail transport system, the government must recognize their relationship with other institutional bodies which interact to make the whole public transport sector conducive for operation. This means isolation of other rail transport operators should not exist.

The governments must complement the effort of private operators and not compete with them. The potentials of these private operators must be assessed and fixed in areas where they are best suitable. There must be a reflection on the historical, social and cultural background.

The desires for the administration, private sector and non-governmental organizations in the transportation sector require an authoritative body to explain these sources of information with the end goal that there would be a general productivity of the activity of railway transport framework in Lagos state as indicated by one, Okanlawon and Asenime, 2006.

This authority is proposed as an administrative body to articulate these units for the effective unification and coordination of transport policies, programmes and actions in the area as noted by one, Okanlawon & Asenime, 2006. The principal duty of The principal duty of the authority is to coordinate the transport investment plan and programmes

It should also be noted the economic relevance of railway transportation is a philosophical approach on a combination of diverse components with each forming individually to enhance and complement its operations so as to achieve its desired goal.

The elements of transport which include

- The way which is rail track.
- The terminal
- The vehicle which is the train
- The motive power which could be either diesel, electric, magnetic levitation solar, gas turbines etc.

All these and many factors effectively combined to ensure that an efficient rail transport system is indispensable to the economic, social and environmental sanity of a nation.

Analysis:

Secondary data analysis was used, which is the data collected from Nigerian Railway Cooperation between 2016~2017 (2016 Q1,2,3,4 & 2017Q1,2).

The null hypothesis (Railway operation in Lagos is efficient) were generally assumed to be true until evidence indicates otherwise. In this case, the null hypothesis is accepted and an alternative hypothesis is rejected in its place.

We could conclude that the CHI square test carried out on data was not significant at 0.008 level (2-tailed $p > 0.0005$) of significance. ($X^2=24$, $df=110$). $P\text{-value} > 0.05$; indicates weak evidence against the null hypothesis (The P-value is not significant, indicating that there is no association between the variables) so we conclude that there is no significance difference between railway transport and operational efficiency in Lagos.

Although, the Lagos commuter standard is 72% better than other rail line across Nigeria but the total operational standard is far from Global standard with developing and less-developing economies, considering Nigeria population and poor road network for vehicular movement which often caused traffic congestion on Nigerian road.

In summary, Railway line for passenger transport in Lagos is operationally effective, considering the number of voyage and/or trip and commuter's patronage.

Table 7 Chi Square Test

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	120.000 ^a	110	.242
Likelihood Ratio	56.865	110	1.000
N of Valid Cases	12		

a. 132 cells (100.0%) have expected count less than 5. The minimum expected count is .08.

Table 8 Directional Measures

Directional Measures

			Value	Asymptotic Standardized Error ^a	Approximate T ^b	Approximate Significance
Nominal by Nominal	Lambda	Symmetric	.952	.047	9.258	.000
		Rail Dependent	.909	.087	7.746	.000
		Passenger Dependent	1.000	.000	7.746	.000
	Goodman and Kruskal tau	Rail Dependent	.909	.000		.482 ^c
		Passenger Dependent	1.000	.000		.482 ^c
	Uncertainty Coefficient	Symmetric	.976	.016	31.774	1.000 ^d
Rail Dependent		.954	.030	31.774	1.000 ^d	
Passenger Dependent		1.000	.000	31.774	1.000 ^d	
Ordinal by Ordinal	Somers' d	Symmetric	-.198	.224	-.889	.374
		Rail Dependent	-.200	.226	-.889	.374
		Passenger Dependent	-.197	.221	-.889	.374

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on chi-square approximation

d. Likelihood ratio chi-square probability.

Table 9 Symmetric Measures

Symmetric Measures^c

		Value	Asymptotic Standardized Error ^a	Approximate T ^b	Approximate Significance
Nominal by Nominal	Phi	3.162			.242
	Cramer's V	1.000			.242
	Contingency Coefficient	.953			.242
Ordinal by Ordinal	Kendall's tau-b	-.198	.224	-.889	.374
	Kendall's tau-c	-.199	.223	-.889	.374
	Gamma	-.200	.226	-.889	.374
N of Valid Cases		12			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Correlation statistics are available for numeric data only.

Summary :

The awakening of the railways in Lagos will not be progressive until the managements weakness, corruption, nepotism and institutional decadence which has flawed the railway system for more than fifty year are being corrected.

There is an urgent necessity to address this situation by establishing a functional, efficient, and a viable railway in Lagos.

The only solution is to transfer the management and operations of the railway system to the private sector. The idea of a concession should be considered by the government. This will help in bringing the railway sector in Lagos to its rightful place by possessing the following:

- Increased efficiency
- Specialization
- Zero corruption
- Accountability
- Purposeful goals/objectives
- Security
- Employments

Conclusion:

The present state of the railway in Lagos state is very low in development; therefore there is an urgent need to engage professionals to assist in achieving a functional, responsive and sustainable transport by rail.

An agency should be instituted which must be allowed to take care of rail traffic management. The government in collaboration with the private sector should endeavor to develop a metro system for an improved service, thereby creating a need for a rail transport development plan and forum whereby all stakeholders are brought to formulate a working and an effective transport policy for Lagos (Oni, Okanlawon & Asenime, 2006).

Thus, the policies and programmes of the board may be executed through the authority of any of the agencies represented. The managing director of such an authority is to liaise with all agencies connected to rail transport such that the recommendations made to the board take account of the proposed transport plans and programmes of these agencies (Oni, Okanlawon & Asenime, 2006).

Also, users need to be enlightened, more about laws and regulations in order to gain their acceptance and compliance. The strong interrelationship that exists between enforcement, the driving environment and education on how to use the rail facilities in Lagos should be reflected on the agencies represented. The managing director of such an authority is to liaise with all agencies connected to rail transport such that the recommendations made to the board take account of the proposed transport plans and programmes of these agencies. Oni, Okanlawon & Asenime, 2006).

If this case study of the present railway system in Lagos state, is properly studied, there is no iota of doubt that in a few years when the ideas are being implemented, the railway transport system would be among the best in the world, because the railway is an essential mode of transport, which has really helped in transforming economies and cities such that Lagos should have.

Recommendations:

I strongly recommend efficient Private Firms to Manage Railway in Nigeria and specifically in Lagos. Railway privatization will reduce rail subsidies/government budget allocation, lower end user fares, improved service and improved customer service, and will encourage more investments.

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