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ANALYSIS OF KANO-NGURU RAIL TRANSPORT OPERATIONS FROM 2007-2016

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ABSTRACT

Railway transport plays a significant role in any economy through the movement of people and goods from one destination to the other safely. In essence, an effective and efficient transport system aids commerce and helps economic activities of any country (Abioye et al 2016). This study analysed the performance of the Kano-Nguru railway transport service from 2007-2016. Data was obtained through questionnaires administration on the staff of the Nigeria Railway Corporation and the use of rail traffic register. Convenience sampling technique was employed in the selection of targeted respondents. A sample size of 108 was used but only 102 were completed, returned and analysed. The findings showed that majority (34%) of the respondents considered inadequate locomotives as the major factor that affect the performance of the train. While minority (19%) of the respondents observed track problem as the major factor that affect the performance of the train.

1.0 INTRODUCTION

An efficient transport system, especially railway transport, plays a significant role in any economy through the movement of people and goods from one destination to the other safely. In essence, an effective and efficient transport system aids commerce and helps economic activities of any country. Rail transport therefore plays a significant role in commerce and economic activities of the Nigerian economy due to its ability to haul large volumes of cargo and carry large numbers of passengers at a very low cost (Abioye et al 2016).

Rail transport plays a significant role in the development and overall growth of any economy, it is often regarded as the wheels of economic activity, because of its crucial role in catalysing economic growth and development. It opens up regions, hinterlands and rural areas by facilitating agricultural development as well as the growth of cottage and large scale industries (Ojekunle, 2006). The Nigeria railway was originally a

government department in 1898 which later metamorphosed to Nigeria Railway Corporation (NRC) as created under the 1955 act (amended by 1990 Act). The establishment of the corporation took place in October 1955, by an act of Parliament which also granted the corporation a monopoly power. In total, at the official inauguration, Nigeria had a total of 3505 kilometer narrow gauge single-track railway network system (Abubakar, 2006; and Odeleye, 2010).

NRC was therefore established to carry on its activities among others including the movement of passengers and haulage of freight in a way that offers full scale transportation services, ensure value for money, adhere to the corporate goals, meet the expectations of passengers, ensure safety of operation with maximum efficiency, meeting the social responsibility of the corporation in the manner that meets and satisfy the needs of the rail users, industry, the general public and other stakeholders (Adesanya, 2010).

Nigerian railways played a very active role in land transport in the early years after national independence in 1960, to the extent that it accounted for approximately one-third of freight traffic. At some point in time, the Nigerian railways played a key role in enhancing colonial administration, by maintaining links between the central seat of colonial government in Lagos and other parts of Nigeria (Adesanya 2002). It also served as a major mode of transport used in facilitating the opening up of several mineral producing and agricultural areas. It was also a major mover of freight and passengers across the country, especially where the rail lines traverse.

A retrospective look at the operational performance of the NRC particularly somewhere around 1955 and 1977 paints a picture of great productivity in its operations up till 1984 when it began a process of decrease in its business operations. Statistical records of the NRC's passenger and freight traffic demonstrates that the Corporation in 1964 conveyed 11,288,000 passengers and 2,960,000 tonnes of freight. It was observed that 10 years after these figures had dropped to 4,342,000 passengers and 1,098,000 tons of freight (The NRC, 2006). Along these lines, figures for the Corporation's operation in 1995 demonstrated a marginal decrease from 6,755,000 passengers and 1,612,000 tons of freight to 6,520,000 and 202,000 tonnes of freight in 1989 (Agunloye, 2008).

Challenges facing the Nigerian railways include poor productivity (and its negative effect on staff morale), retention and maintenance of non-profitable routes, huge wage and pension bills - despite the reduction in staff strength of the NRC from about 45,000 in the 1970s to about 7,000 in 2004, and poor quality of service (Odeleye, 2000 and Adesanya, 2002). These problems have combined to weaken the railway transport system in Nigeria (Agbaeze and Onwuka, 2014).

2.0 STUDY AREA AND RESEARCH METHODS

2.1 STUDY AREA

Kano is found in Northern Nigeria. It is located between Latitude 10° 38' N and 12° 28' N and Longitude 8° 04' E to 9° 10' E. Kano is the largest urban centre in Hausa-land, and most influential commercial town in the Sudan region, it is the largest in the Federation of Nigeria followed by Lagos, with a long standing sedentary population in an organized emirate, Kano's growth has been phenomenal. Manufacturing and commercial activities are prominent in Kano due to the large population of tradesmen and small-scale light manufacturing activities (Falola, 2002).

Nguru on the other hand, is a Local Government Area in Yobe State, Nigeria. Its headquarters are in the town of Nguru near the Hadejia River. It is located between Latitude 12° 52' 45" N and 12. 87917° N and Longitude 10° 27' 09 "E to 10.45250° E. It has an area of 916 km² and a population of 150,632 at the 2006 census. The town probably dates from around the 15th century. There is a variety of landscape types in the area, including the protected Hadejia-Nguru wetlands of Nguru Lake, and the "Sand Dunes", a semi-desert area (Acharya, and Berbier, 1997).

Since the arrival of the railroad in 1929, Nguru has become one of Nigeria's major collecting points for gum arabic, and it also ships peanuts (groundnuts), cotton, meat, hides, and skins by rail to Lagos. The town serves as the chief trade centre (sorghum, millet, peanuts, cowpeas, cotton) for the nearby predominantly Muslim Kanuri, Bede (Bedde), and Manga peoples. Nguru is the northeastern terminus of the railway branch from Zaria and Kano. It is also served by a local highway that connects it with the main highway network at Damaturu, to the southeast (Thompson, and Goes, 1997).

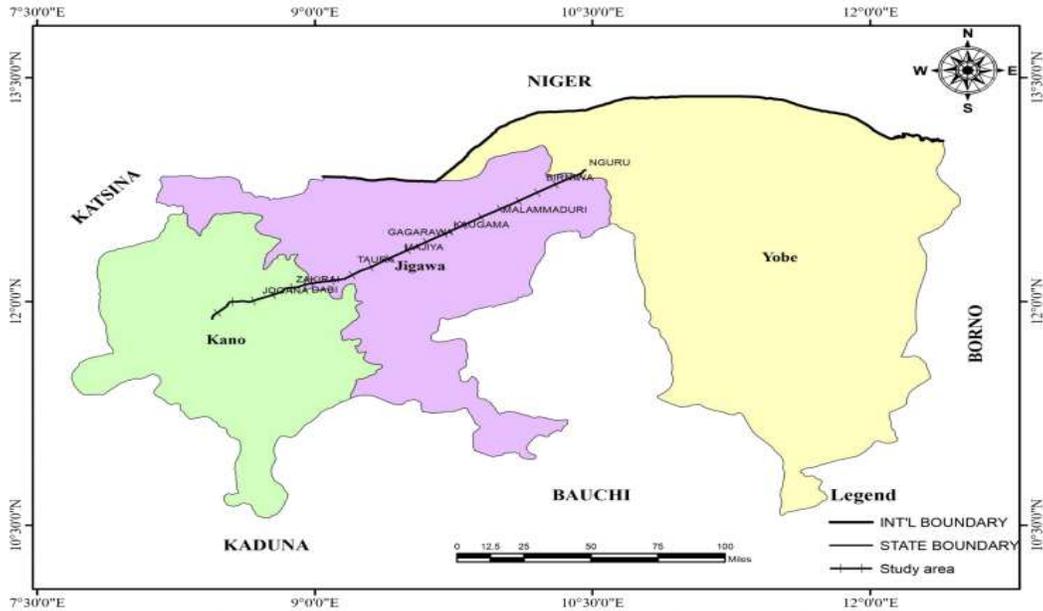
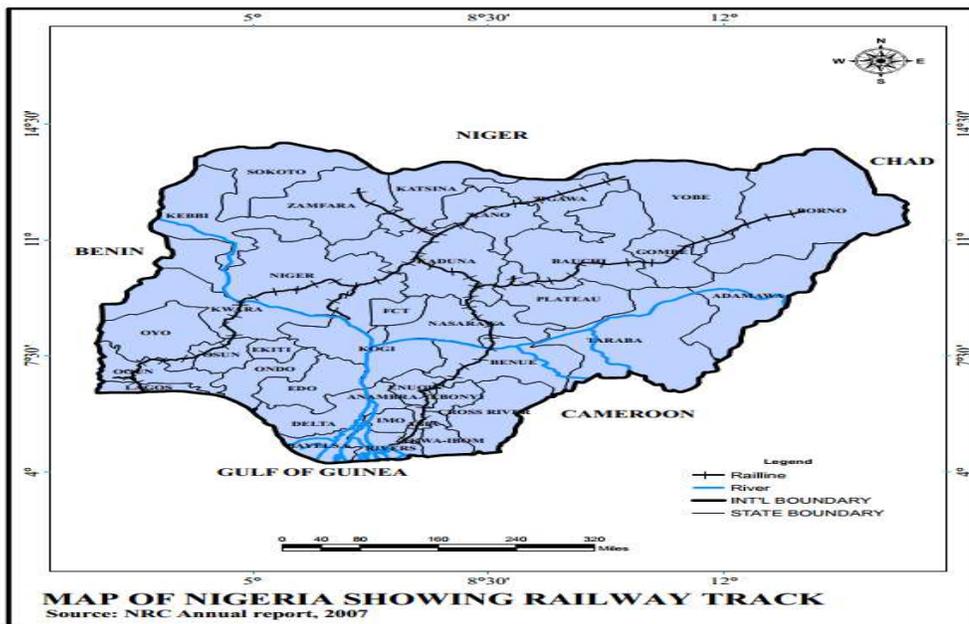


FIG. 1 MAP OF STUDY AREA SHOWING KANO-NGURU RAIL LINE
 Source: NRC Annual report, 2007



MAP OF NIGERIA SHOWING RAILWAY TRACK
 Source: NRC Annual report, 2007

2.2 RESEARCH METHODOLOGY

The data for this study were obtained through both primary and secondary sources. The secondary source involved the use of railway traffic register which was used to obtain data on the revenue generated, frequency of travel, passengers and freight transported by the Kano-Nguru rail transport service. While the primary source involved questionnaire administered to the staff of NRC at both Kano

and Nguru railway stations to illicit information on the major factors that affect the Kano-Nguru rail transport performance. Based on the information gathered from the railway management, there are 147 staff in charge of train operation at both Kano and Nguru railway stations. 102 staff work at Kano railway station and 35 staff work at Nguru railway station. This constitutes staff from different departments which include; operation

and commercial departments, civil engineering departments, Mechanical engineering and signalling and communication departments. Therefore, 147 represent the population size for the study. The method used for determining the sample size was Yamane (1967) formula:

$$n = \frac{N}{1 + Ne^2}$$

Where n is the sample size, N is the population size, 1 is constant and e is the error tolerance or margin represented by confidence limit e.g. 0.05 for 95%. The sample size obtained using this formula is 108 and this represents the total number of questionnaires administered to the respondents. 75 questionnaires were allocated to the staff working at Kano railway station while 33 questionnaires were allocated to the staff working at Nguru railway station based on the percentage of staff in charge of the train operation at both stations. However, only 102 questionnaires were duly completed, return and analysed. The questionnaire administration spanned a period of 5 days with visits to the Kano and Nguru railway stations. The questionnaire was administered between 12.00 p.m. and 1:30 p.m. when all workers were on break.

Convenience sampling technique which is part of non-random sampling strategy that fall within the context of qualitative research was used in the selection of targeted respondents. Descriptive statistical analysis was adopted for summarization of data using tables, percentage, pie chart and graph.

3.0 DATA PRESENTATION AND ANALYSIS

3.1 Frequency of the Kano-Nguru train operation

Frequency is defined as the number of times a modality of a particular railway line dwells at a stop (Cole and Cooper 2005). According to NRC train schedule time table, the Kano-Ngunu train was scheduled to make four trips per week (to and fro) making a total of sixteen trips per month. The train comprises of both passengers' and freight coaches moving passengers and freight from Kano to Jigawa and parts of Yobe state and return back with agricultural products.

Table 1 reveals the monthly trip frequency made by the Kano-Nguru train from 2007-2016. An observation of the table shows a steady declined in annual trip frequency between

2007, 2008 and 2009. The year 2007 recorded the highest number of trips with 172 trips due to effective and efficient service delivery by the railway management which led to consistent running of the train throughout the year. The reason behind year 2007 having the highest trip frequency was because, the Kano-Nguru train was recommissioned in 2007 after the railway corporation suspended the train operation for 3 years (from 2014-2016) due to managerial problems. The NRC put some measures in place that ensured steady and consistent running of the train being the year of recommissioning. These measures include track rehabilitation, steady diesel supply, adequate funding, and the use of sound locomotives for the train operations. Year 2008 and 2009 recorded 156 and 152 trips respectively, indicating a decline in the annual trip frequency. However, year 2010 recorded a sharp decline in the performance of the train with trip frequency dropping from 152 to 96 trips due to absent of train operations in the month of September, October and November 2010 as a result of managerial problems according to the railway officials. These problems include poor funding, locomotives failure, fuel or diesel scarcity and track problem which some time causes short down of the train operations for months. The table further reveals an improvement in performance with trip frequency increasing from 96 trips in 2010 to 114 trips in 2011 and maintained a steady decline in the year 2013 and 2014 with 108 and 103 trips respectively. The table also reveals a sudden decline with trip frequency dropping from 103 trips in 2013 to 81 trips in 2014 and maintained a steady decline in performance between year 2014, 2015 and 2016. Year 2016 recorded the least number of trip frequency with only 30 trips made as a result of engine failure which causes the train to stopped running in the month of November and December 2016. Among the locomotives assigned for the Kano-Nguru rail service, only one locomotive is functioning and whenever the engine failed, the train stopped running until the engine is fixed. This problem seriously affects the Kano-Nguru rail service according to the railway officials.

Table 1: Monthly trip frequencies of Kano-Nguru rail transport service from 2007-2016

Years	Jan.	Feb.	Mar.	Apr.	May	Jun e	Jul.	Aug .	Se p	Oct.	Nov .	Dec.	Ann. total trips
2007	16	12	12	14	16	12	16	16	12	14	16	16	172
2008	16	-	16	14	16	16	12	14	14	12	10	16	156
2009	16	16	16	10	10	16	14	10	10	12	8	14	152
2010	10	8	10	12	16	12	14	6	-	-	-	8	96
2011	-	8	12	8	16	14	16	-	-	10	14	16	114
2012	14	12	12	8	10	10	4	-	-	12	14	12	108
2013	12	13	11	9	11	8	-	-	7	11	10	11	103
2014	11	11	8	15	13	7	3	6	3	4	-	-	81
2015	-	-	2	2	3	7	6	10	11	2	3	6	53
2016	4	2	6	4	5	3	3	4	4	3	-	-	30

Source: Railway traffic register and field survey, 2017

3.2 Number of passengers and quantity of freight transported from 2007-2016

Based on the Kano-Nguru train traffic register, railway traffic is grouped into two categories passengers and freight, below is table 2 shows the number of passengers transported by the train from 2007 to 2016.

From table 2, it was discovered a decline in the number of passengers transported by the Kano-Nguru rail transport service from 2007 to 2016. An observation of the table shows that, year 2007 recorded the highest number of passengers transported due to the measures put in place by the railway management after recommissioning the train in year 2007 which led to high trip frequency as explained earlier in table 1. Also, between year 2008 to 2009, the table revealed a steady decline in the

number of passengers transported by the train with year 2008 recorded 35,854 and 2009 recorded 35,334 respectively. However, year 2010 recorded a sharp decline in the number of passengers transported by the train from 35,334 in the year 2009 to 22,393 in 2010 as a result of the low trip frequency recorded by the train in that particular year as shown in table 1. This further explained that, the lower the trip frequency made, the lower the passengers transported by the train and vice versa. Furthermore, the table also showed a steady decline in the number of passengers transported by the train from year 2010 to 2016 with 2016 recorded the least passengers transported with only 12,014 due to low trip frequency made in that particular year due to managerial problems.

Table 2: Number of passengers transported by Kano-Nguru rail transport from 2007-2016

Year s	Jan	Feb	Mar	Apr.	May	June	Jul.	Aug.	Sep	Oct.	Nov.	Dec.	Ann. total passengers
2007	4907	4516	3692	3912	4373	2996	3123	3674	2720	2689	4338	3622	44,562
2008	4401	-	3205	3821	4042	3653	2321	2882	2605	2639	2161	4124	35,854
2009	4401	3182	5000	2258	2299	3521	3085	2616	1772	3241	1675	2284	35,334
2010	2588	1545	2167	2171	3387	2046	3650	1640	-	-	-	3199	22,393
2011	-	275	473	780	3387	3414	5054	-	-	758	2250	4663	21,054
2012	2584	1745	3459	2472	3546	1694	106	-	-	2292	3523	2137	23,558
2013	4228	4560	3518	1740	2325	994	-	-	1202	2987	2395	2549	26,498
2014	4029	4100	3139	4434	3500	2301	775	497	239	430	-	-	19,438
2015	-	-	86	166	242	1693	1238	-	45	31	816	2007	13,422
2016	2291	1850	1121	1552	535	854	923	1397	968	104	429	-	12,014

Source: Railway traffic register and field survey, 2017

Table 3 indicates a decline in the quantity of freight transported by the Kano-Nguru train between year 2007 to 2010 due to decline in the trip frequency as shown in table 1. Year 2011 recorded the highest quantity of freight transported by the train with 6682 tonnes. The reason behind this sudden increase was because of 2958 tons and 1166 tons of construction materials transported in the months of May and December 2011. According

to the railway officials, the NRC was awarded with a contract to transport ballast (stones) from quarry site to Kano for track rehabilitation. This led to an increase in the quantity of freight transported in 2011. The table further indicates a steady decline in the quantity of freight transported from year 2012 to 2016 with 2016 having the least with only 1,689 tons of freight transported as a result of low number of trip frequency in that particular year due to managerial problems.

Table 3: Quantity of freight transported by Kano-Nguru rail transport from 2007-2016

Years	Jan.	Feb.	Mar.	Apr.	May	June	Jul.	Aug.	Sep	Oct.	Nov.	Dec.	Ann. total freight
2007	212	346	239	344	437	399	499	201	200	427	280	205	3,789
2008	226	-	321	206	228	373	256	295	376	261	333	383	3,258
2009	277	260	177	266	171	191	276	154	144	257	261	214	2,648
2010	121	236	135	235	262	258	206	149	-	-	-	298	1,900
2011	-	244	388	159	2,958	321	771	-	-	321	345	1,166	6,673
2012	215	135	392	365	382	270	365	-	-	373	357	357	3,211
2013	235	354	339	321	212	246	-	-	320	393	254	312	2,986
2014	372	349	219	226	129	106	212	227	249	339	-	-	2,428
2015	-	-	248	254	285	126	125	-	261	250	221	278	2,048
2016	143	140	155	173	269	125	78	213	126	101	166	-	1,689

Source: Railway traffic register and field survey, 2017

3.3 Revenue generated from Kano-Nguru train from 2007-2016

Revenue generated from the Kano-Nguru rail operation is categorised into passengers and freight revenue as grouped in the railway traffic register. However, the revenue generated from the Kano-Nguru rail operation is presented annually from 2007-2016 in table 4 below.

Based on table 4, revenue generated from both passengers and freight declined from year 2007 to 2010 due to decline in the number of passengers' and quantity of freight transported by the train as showed in table 2 and 3 respectively. Passengers' revenue dropped from 7,557,584 in 2007 to 3,255,983 in 2010, while freight revenue also dropped from 1,579,542 in 2007 to 1,065,188 in 2010. This consequently led to the declined in the total annual revenue from 9,137,126 in 2007 to 4,321,171 in 2010.

Furthermore, the passengers' and freight revenue recorded an increase between year

2011 to 2015 with passengers revenue increasing from 3,255,983 in year 2010 to 5,642,019 in 2011 while freight revenue also increased from 1,065,188 in 2010 to 7,804,512 in year 2011 which resulted to an increase in the total annual revenue from 4,321,171 in 2010 to 13,446,531 in 2011. The table also revealed a steady increase in the total annual revenue between year 2011 to 2013 were the total annual revenue increases from 13,446,531 in year 2011 to 20,472,448 in 2013. However, the total annual revenue started declining from 20,472,448 in 2013 to 7,639,220 in 2016 which was the least due to the declined in both the passengers and freight transported by the train as revealed in table 2 and 3 respectively. This further explains that, the train frequency of trip has a strong relationship with the number of passengers and quantity of freight to be transported by the train and consequently determine the total annual revenue to be generated by the NRC.

Table 4: Passengers’ and freight revenue generated by Kano-Nguru train from 2007-2016

Year	No. of passengers’	Passenger Revenue (Naira)	Freight (tons)	Freight Revenue (Naira)	Total Annual Revenue (Naira)
2007	44,562	7,557,584	3,789	1,579,542	9,137,126
2008	35,854	6,650,722	3,258	1,549,265	8,199,987
2009	35,334	5,609,262	2,648	1,393,687	7,002,949
2010	22,392	3,255,983	1,900	1,065,188	4,321,171
2011	21,054	5,642,019	6,673	7,804,512	13,446,531
2012	23,558	6,134,275	3,211	9,399,196	15,533,471
2013	26,496	7,068,530	2,986	13,403,918	20,472,448
2014	19,438	7,669,355	2,428	11,472,750	19,142,105
2015	13,422	8,261,150	2,048	10,755,606	19,016,756
2016	12,024	2,140,643	1,89	5,498,577	7,639,220
Total	254,134	59,989,523	29,130	63,922,241	123,911,764

Source: Railway traffic register and field survey, 2017

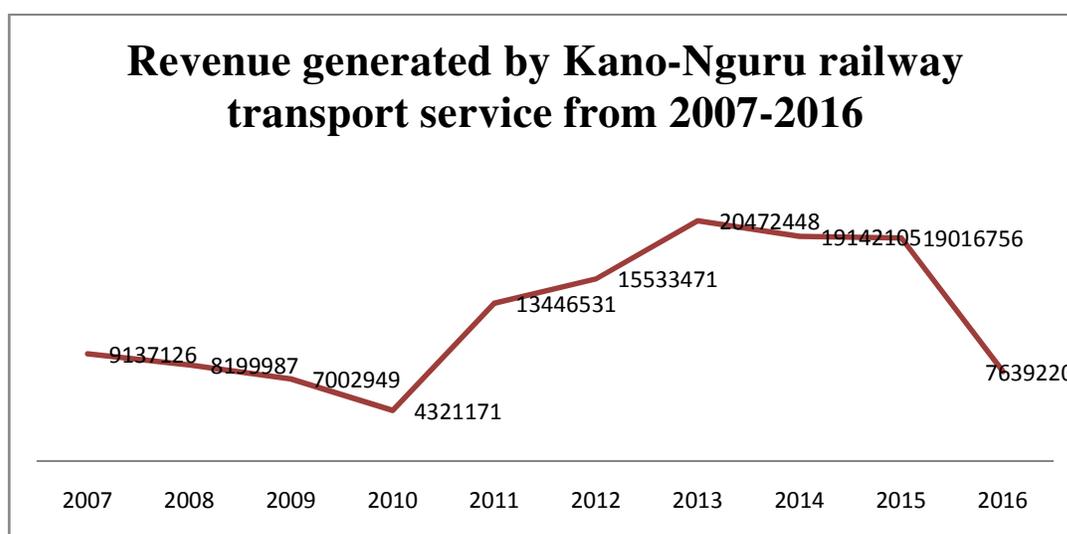


Figure 3: Passengers and freight revenue generated by Kano-Nguru train from 2007-2016

4.0 Perception of railway staff on factors influencing Kano-Nguru rail transport performance

Based on the responses of railway staff in table 5, the major factors that influenced the performance of the Kano-Nguru railway transport service are categorised into four factors namely; inadequate locomotives, managerial problem, track problem and poor funding. Based on table 5, majority (34%) of the staff opined that the problem of locomotives is the major problem affecting the performance of Kano-Nguru railway transport service.

This is due to the fact that, only one locomotive is working among the locomotives assigned for the train operation and therefore any time the locomotive failed the train stopped running until it’s fixed. Also, 21% of the staff believed that, the problem of poor or inadequate funding is the major problem that affects the performance of Kano-Nguru railway transport service. This is because of the poor budgetary allocation for the train operation by the railway management. Sometimes the train operation stopped for months due inability of the railway management to purchase spare part or diesel for the train service.

In addition, 19% of the staff in charge of the Kano-Nguru railway train operation indicates that, track problem constituted the major problem that affects the performance of Kano-Nguru railway transport service due to the fact that, the Kano-Nguru railway track is a narrow gage track that permits a maximum speed of about 65 to 90 kilometres per hour which causes passengers to spend long time in journey before reaching their destination. Also, the track was laid during colonial administration and therefore has exceeded its life span. This subjected the track to frequent derailment and washout (destruction of track

by rain) especially during raining season which sometimes stopped the train operation for months.

However, 26% of the staff observed managerial problem as the major problem that affects the performance of Kano-Nguru railway transport service. Example of managerial problem include non remittance of revenue generated from the train service by the train staff, inadequate staff for the train operation, poor arrangement of diesel for train operation where some time train is delayed because of delay in fuel supply and poor maintenance of station and train facilities.

Table 5: Staff responses on the problems influencing the Kano-Nguru train performance

Staff Departments	Inadequate Locomotive	Managerial problems	Track problems	Poor Funding	Total
Civil engineering	16	13	10	7	46
Mechanical engineering	7	6	2	3	18
Operation and commercial	8	3	5	6	22
Signalling and communication	4	5	2	5	16
Total	35	27	19	21	102
Percentage (%)	34(%)	26(%)	19(%)	21(%)	100(%)

Source: Authors field survey 2017

5.0 Conclusion

This paper has examined the performance the Kano-Nguru rail operation from 2007-2016. The paper concludes that, the major factors that affect the performance of the train include; inadequate locomotives, managerial problem, track problem and poor funding. Majority (34%) of the railway staff considered

inadequate locomotive as the major problem that affects the performance of Kano-Nguru railway transport service. The finding of the study also revealed that, the train frequency of trip is the major determinant of the number of passengers, quantity of freight and revenue to be generated by the train.

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