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Performance Evaluation of Nigerian Ports: Pre and Post Concession Eras

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Abstract
This paper x-rays the performance of the Nigerian ports at two points in time; that is, from 1956-2005 as pre concession era and 2006-2012 as post concession era. It highlights the challenges that undermine the capacity of the sector from meeting up with the global best practices. The data on cargo movement were derived from the Nigerian Port Authority Annual Reports. The study relied on descriptive statistics, trend analysis, chi-square analysis and port performance indicators such as indicator of output and indicator of service in explaining the trend of port performance for the periods under review. The trend analysis employed to explain the trend of cargo movements in all the ports in Nigeria was the Quarterly Moving Averages. It was revealed that the trend of cargo throughput in Nigeria is determined by the inward cargo movement. The analysis also revealed a fluctuation in cargo movement from 1956 to 2005 while the cargo throughput continues to increase unabated from 2006 to 2012. The concession of the port must have been responsible for this upward movement in cargo trend. There was a remarkable increase in inward and outward cargo movement during the post concession era in comparison to the pre concession era. This paper recommends that government encourages public ownership and private sector operations of the port infrastructure in Nigeria.
Keyword: Port concession, infrastructure, evaluation, indicators, performance

1. Introduction

A port is a location on a coast or shore containing one or more harbours where ships can dock and transfer people or cargo to or from land. Port locations are selected to optimize access to land and navigable water, for commercial demand, and for shelter from wind and waves. The use of the sea as a means of transport in Nigeria dates back to the 15th century (1485) when the Portuguese sailed into Lagos with their vessels basically to trade on artifacts in Benin City. From the pre-independence era till date, the nation's maritime industry is characterized by the domination of foreign vessels and/or carriers from the developed market economies of Western Europe and America. In order to control this scenario, subsequent developments led to the opening of ports at Apapa and Port Harcourt, rolling in the creation of the Nigerian Ports Authority (NPA) by the provision of Ports Act 1954 to load and discharge as well as maintain and develop the ports (Njoku, 2009).

From the commencement of operation of the NPA in 1956, Nigeria had operated a service port model. This was fraught with a lot of challenges which informed the idea of switching over to a landlord port model or port concession. The port concession program was completed in 2006 after an international competitive bidding process. This led to the emergence of 26 terminals which were concessioned to private terminal operators on the Build, Operate and Transfer (BOT) model. The reform brought about ceding of cargo handling operations at the port to private terminal operators, leaving NPA as the landlord. The Nigerian ports witnessed a rapid transformation as a result of this reform in which Nigerian ports were concession to the port operators called concessionaires. The ports as well as the terminal operators are under-listed as follows:

Before the advent of port concession (1956-2005), the Nigerian port system suffered from numerous ills which included the following: The turnaround time for ships was too long and usually calculated in weeks, sometimes months, depending on the cargo being loaded or discharged; Cargo-handling plants and equipment owned by the NPA were few and mostly unserviceable leading to shipping companies hiring these machines from private sector sources after having paid NPA; Dwell time for goods in ports was prolonged due to poor port management and as a such overtime cargo filled the most active seaports leading to port congestion; Labour for ship work was held in the vice-grip of wharf overlords who controlled dockworker unions and supplied less than the manpower paid for. This fraud, which became accepted by the maritime community lasted for years and was usually perpetrated to extract maximum revenue from helpless ship owners and their agents without minding how this impacted on the Nigerian economy and the already dented image of the Nigerian seaports. As a result

of the compounded problems, the Nigerian seaports were rated as one of the costliest seaports in the world. Consequently, it adversely affected the patronage of our seaports (Njoku, 2009).

Table 1. Ports Terminals and Operators

S/N	Berth/Area Occupied	Terminal Operator
1.	Apapa Terminal B; Berths 4 – 5	Apapa Bulk Terminal Ltd.
2	Apapa Terminal B; Berths 4 – 5	Apapa Bulk Terminal Ltd.
3.	Apapa Terminal C; Berths 6 – 12	ENL Consortium Ltd.
4.	Apapa Terminal D, Berth 13 (Bullnose)	ENL Consortium Ltd.
5.	Apapa Terminal E; Berths 19 – 20	Green View Dev. Nig. Ltd.
6.	Apapa Container Terminal; Berth 15–18A	APM Terminals Ltd.
7.	Lilypond Ijora Container Depot	A.P Moller
8.	Tin Can Island Port Terminal A	Josephdam Ports Services Ltd.
9.	Tin Can Island Port Terminal B	Tin Can Island Terminal Ltd.
10.	Tin Can Island Port Terminal C	Ports and Cargo Handling Services
11.	Tin Can Island Port RoRo Terminal	Five Star Logistics
12.	Port Harcourt Terminal A; Berths 1 – 4	Ports and Terminal Operators Ltd.
13.	Port Harcourt Terminal B; Berths 5-8	Bua Ports & Terminal Ltd.
14.	Onne FOT A Onne FOT A	Intels Nig. Ltd.
15.	Onne FLT A	Brawal Oil Services Ltd.
16.	Onne FLT B	Intels Nig. Ltd.
17.	Onne FOT Jetty	Atlas Cement Co. Ltd.
18.	Warri Old Terminal A	Intels Nig. Ltd.
19.	Warri Old Terminal A	Associated Maritime Services ltd.
20.	Warri New Terminal B	Intels Nig. Ltd.
21.	Warri Terminal C	Julius Berger Plc.
22.	Warri New Terminal A	Global Infrastructure Nig. Ltd.
23.	Koko Terminal	Gulfinger Ltd.
24.	Calabar New Terminal A; Berths 1-2	Intels Nig. Ltd.
25.	Calabar New Terminal B; Berths 3 –6	Ecomarine
26.	Calabar New Terminal C	Addax Logistics Nig. Ltd.

Source: Yusuf Suleiman, 2010

Bert Kruk (2008) also opined that the ills that bedeviled Nigerian ports before port concession in 2006 includes long turnaround time for ships, insecurity of cargo, unproductive labour force in NPA, multiple government agencies in the port, corrupt practices and excessive charges.

Alan Harding et. al. (2007) held that Africa accounts for less than one percent of world container traffic. An extra 2,200 TEU vessel service from Europe to a small country in the West and Central Africa sub-region would have a 27 percent market share whereas a 5,500 TEU vessel from the Far East to Europe would potentially generate a 3.6 percent market share taking into account market size. For shipping lines, port turnaround time has become an increasingly important factor to decide which port to call in the world. One extra day at a port costs more than US$35,000 to a shipping line for a 2,200 TEU vessel. He therefore suggested the need for reform.

Ndikom (2006) stated that many port premises and quay aprons had fallen to disuse and failed road sections inside the ports made movement of goods within port grounds cumbersome and very slow. Following the seaport congestion, complaints of untraceable or missing cargoes were being regularly lodged against the NPA, all to no avail. Security inside Nigerian seaports was compromised by the relentless ingress of multitudes of all shades of persons into the seaports. As a result, miscreants called wharf rats easily gained access into the ports and pilfered goods in storage or vehicle parts. In fact, security within port grounds was at the mercy of an elusive racket.

James Leigland and Gylfi Palsson (2007) were of the view that the Sub-Saharan (SSA) Africa has been slower than some other regions to embrace private participation. By the late 1990s, only 10 percent of SSA's ninety main ports involved private participation beyond stevedoring services. By 2006, that situation had begun to

change with concessions concluded for container and general cargo terminals in Tanzania, Cameroon, Madagascar, Mozambique, and other SSA countries.
The raison d'etre of this paper is to assess the difference in the port performance during the pre and post concession eras, appraise the measures adopted by the concessionaires to bring about the change and to make recommendations based on the findings. The scope of this work covers all the exiting ports as at the time of this research. The evaluation parameters were based upon port performance indicators such as indicator of output (throughput) and indicator of service (ship turnaround time).

1.1 Historical Background of Port Development in Nigeria

The history of port development in Nigeria can be dated back to the 19th century. This was after the onset of sea borne trade and transactions which followed the adventure of early exploration on the Africa coasts. Initial efforts towards provision of facilities for ocean going vessels were the attempt to open up the entrance of the Lagos lagoon. Considerable littoral drift occurred along the coast and the constantly shifting channels in the bar at the entrance made entry very difficult. On February 1, 1914, the first mail – steamer Akoko drawing (vessel) 5.64 metres entered the Lagos harbour. Months later, vessels began to use the facilities provided at the customs wharf on Lagos Island. Prior to this time, exploration and trade activities involving European Missionaries and businessmen in Africa made the existence of the port on a wide coastal stretch from Calabar to Lagos imperative. Specifically, in the 15th century the European opened marine contract and discovered the rich natural resources in the west and central region that were needed for their economic and industrial revolution. The first major breakthrough in opening the Lagos lagoon was in 1906 when orders were placed for dredgers to work at the bar. During the same year approval was given for the construction of the first length of the east mole (massive wall). The construction of railway from Lagos to Ota and then to Abeokuta provided easy transportation of stone needed for the construction of the mole. Depth over the bar increase steadily as the entrance moles were pushed further seawards. The development of water transportation in Nigeria also brought about the development of other modes of transport such as rail and road networks. Decision to develop Apapa port was taken in 1913 and construction of the four deepwater berths of 548.64 metres long at Apapa began in 1921. Twenty seven years later (1948) an additional 762 metres of berthage were constructed as continuation downstream of the first four berths and around 41 hectares of reclamation behind the warehouses and marshalling yards. The discovery of coal at Enugu motivate the building of ports in the eastern flank of the country; work commenced on the building of Port Harcourt wharf during the first quarter of this century. In 1913, Port Harcourt was opened to shipping by Lord Lugard, the governor general. The railway line to Enugu was completed three years later in 1916. A berth for colliers (coal miners) was dredged out and constructed as a place where loading could be effected (Ogunsanya, 2010).
Within the first eleven years (1955 – 1966) of its existence as a corporate body, the NPA focused on fundamental issues vital to the success of the port industry and equally relevant to the overall development of the national economy. In recognition of the importance of having trained hands on its payroll and in response to the policy of Nigerianization in the year preceding independence in 1960, the NPA embarked on an elaborate manpower development through cadetship training awards. Emphasis was on Marine Engineering, Accountancy, General Management, Civil, Mechanical and Electrical Engineering. By the early sixties, beneficiaries of this training award had begun to graduate and to form the core of Nigerian professionals to shape the future of the ports industry. The authority within this period, continued to sustain the efforts already made towards expansion of port facilities in Lagos and Port Harcourt. In Lagos, six berths of 943m quay length were added to the existing ones, while four berths with a total quay length of 506m were added to the facilities and steps were taken to mechanize the traffic operations in these ports. In this era, port development approach became tailored along declared national objectives. The Authority's development strategy became programmed to fall in line with the first National Development plan 1962 – 1968. The second Apapa wharf extension was executed and so also were further improvements of port facilities in Port Harcourt.
The Civil War era (1967 – 1970) had tremendous impact on the ports industry in Nigeria. The security aspect of port came into sharp focus. Port Harcourt (Rivers Ports) was closed to foreign traffic. Lagos thus became the only available port serving the country's maritime transport needs. The Federal Military government enacted a special decree which empowered NPA to acquire port of Warri, Burutu and Calabar, previously operated by private entrepreneurs. Holts transport were former owners of Warri port, UAC owned Burutu port. Calabar port

was originally owned by five operators. Lagos port with its comparatively limited capacity was made to bear the weight and burden of the tremendous flow of war time cargoes and other goods coming into the country.

The Federal government drew up its second National Development plan (1970 – 1974) which was the first major policy thrust in reconstructing and rehabilitating the civil war damaged economy. The sum of N4.1million was initially made available for the rehabilitation of port infrastructures and necessary mechanical handling equipment. The rehabilitated and reconstructed ports include Port Harcourt, Bonny, Calabar, Koko and Lagos. Thereafter the civil war, port congestion was experienced in two different dimensions: ship congestion and cargo congestion. One of the adverse effects of the port congestion was on the nation's external reserves. A demurrage estimated at $4, 120 per day for each cement vessel for delay in excess of ten days was paid by the Federal government. The period can rightly be described as a major turning point in the history of ports development as the ports management ceased to be just an NPA affairs, it became a national issue. The nation also witnessed enormous growth and development in port owing to the oil boom days of 1970s and 1980s. On October 14, 1977, the ultra modern Tin Can Island port was commissioned. Two years later (16th June 1979) the new Warri port was commissioned together with the new Calabar port (19th June 1979) bringing the number to eight (8) with a total annual capacity of 25 metric tons. The Federal Ocean Terminals at Onne with a maximum draught of 13 metres was constructed to cater for sub-regional transshipment trade and also the old Apapa Port was upgraded to cater for more than general cargo trade (Ogunsanya, 2010).

2. Methodology

2.1 Sources of Data

In this research work, secondary data were used in the analysis. The data were sourced from the internet, dissertation, NPA Handbooks and textbooks.

2.2 Method of Data Analysis

This research made use of descriptive statistics, the trend analysis and Chi-square analysis. The trend is the general path which the data had followed over a long period. The two methods usually used in finding the trend of a time series are the calculation of the regression line or least square and the moving averages. The later was specifically employed in the analysis of the data collected. The study also made use of port performance indicators such as indicator of output and indicator of service in determining the trend of port performance. Chi-square was also used in comparing the performance of the ports during pre and post concession periods. The equation of the Chi-square is presented as follows.

$$Chi.Square = X^2 = \frac{\Sigma(\Theta - E)^2}{E}$$

Where:

X^2 = Chi-square

Θ = Observed Frequency

E = Expected Frequency

Σ = Summation

2.3 Moving Averages

The method of moving averages is one of the smoothing techniques used in time–series analysis to establish a trend. It is based on the mathematical concept of arithmetic mean. It is possible to have a 4 year average (quarterly moving average), 5, 6 or 10 years moving averages (Okoko, 2000). There are different techniques of calculating the moving average trend values. In this research work we made use of quarterly moving averages. The figure for the first four years were added and the average calculated and the next four years average was calculated and the averages of the two were taken and the value place in front of the third year and the process was repeated for subsequent values as shown in Table 3 below.

3. Cargo Throughput

Table 2 shows the volume of cargo throughput handled at the Nigerian ports from 1956 to 2012. Cargo throughput is the sum of both the inward and the outward cargo processed by the ports in the given period. There was a slow growth in cargo traffic from 1956 to 1974; and the fall noticeable in-between 1966 and 1970, as a result of the civil war, was not enough to utterly obscure the growth trend. The rise in traffic between 1975 and 1979 was significant although the rise began in 1970. The abrupt rise was not preceded by port development

sufficient enough to handle the traffic. The result was the 1975-1978 congestion problems which stemmed from the massive importation of cement called 'cement armada' and other construction material for the rehabilitation of infrastructure destroyed by the civil war. Traffic dropped from 20,075,237 metric tons in 1979 to 17,957,195 metric tons in 1980, peaked again in 1981 and then suffered serious decline that coincided with the global economic recession. This downward trend can be ascribed to the austerity measures introduced by the then government with the view to revamping the ailing economy. The downward trend continued for about nine years with the total cargo throughput in 1989 falling to 13,376,187metric tons. The traffic picked up again in 1990 only for a brief period as it fell during the county's political uncertainty of 1992 and 1993. Since 1996 there has been a rapid rise in cargo throughput culminating in an unprecedented volume in 2011 with a slight decline in 2012.

3.1 Calculating the Trend Line Using the Quarterly Moving Averages

When data are available on a quarterly basis we can use the quarterly moving averages to calculate the trend line. This is done using the technique of centering, by calculating the trend for the first four cases, and the trend for the second four cases and finding the average of the two trend values. The value is placed in front of the third year in the first quarter and the process continues. From Table 3: the trend for the 1st quarter of 1956 - 1959 is derived by adding 2.742 + 3.172 + 3.099 + 3.543 and the result is divided by 4 = 3.139. This gives a trend value of 3.139, which should be placed midway between 2nd and 3rd of the first quarter but this will pose some problems. So the second four are added together and divided by 4, i.e. 3.172+ 3.099 + 3.543 + 3.593 / 4 = 3.351. When the two trend values are added together and divided by two, the result is 3.24 and the value is now placed midway between the two fours, i.e., in front of the 3rd year in the first quarter. The process continues until the data are treated. This is for the first quarter of the cargo throughput value. This method is repeated for all the value of cargo throughput, import and Export (Table 3) below refers:

4. Comparative Analysis of Nigerian Ports Performance during the Pre and Post Concession Eras

It is worthy of note that average cargo throughput from 1956 to 2005 is 14,467,024 metric tons while the average cargo throughput from 2006 to 2012 is 67,240,231.86 metric tons. The yearly average cargo throughput of 67,240,231.86 metric tons of cargo from 2006 to 2012 over the yearly average of 14,467,024 metric tons from 1956 to 2005 shows a percentage increase of 456.69%. This shows the remarkable progress made in our port developmental efforts since the port concession era. In a nutshell, the pattern in Nigerian port traffic during the pre concession era is sinusoidal while the post concession experienced a sharp progressive rise. The statistics on Table 2 shows that the cargo throughput increased from 46,150,518metric tons in 2006 to 77,104,738metric tons in 2012. This means that between 2006 and 2012, cargo throughput at the nation's ports increased by over 67 per cent. This was as a result of the landlord model of port management which was adopted in 2006 that led to the concession of sections of the ports to private terminal operators, otherwise called concessionaires, and has led to the consistent improvement in cargo throughput.

Table 2. Cargo Throughput at Nigerian Ports (Pre & Post Concession)

YEAR	INWARD	OUTWARD	THROUGHPUT
1956	1,386,480	1,356,480	2,742,960
1957	1,620,195	1,552,752	3,172,947
1958	1,680,222	1,419,552	3,099,774
1959	1,823,506	1,720,356	3,543,862
1960	2,110,440	1,482,901	3,593,341
1961	2,256,453	1,374,263	3,630,716
1962	2,350,087	1,664,431	4,014,518
1963	2,387,446	1,631,560	4,019,006
1964	2,527,730	1,830,576	4,358,306
1965	2,640,672	2,037,828	4,678,500
1966	2,853,627	1,997,834	4,851,461
1967	2,428,106	1,753,800	4,181,906
1968	2,272,681	1,562,887	3,835,568
1969	2,177,611	1,661,517	3,839,128
1970	2,719,518	1,507,964	4,227,482
1971	4,492,152	2,816,851	7,309,003
1972	5,281,466	2,831,638	8,113,104
1973	4,459,164	3,103,075	7,562,239
1974	5,256,724	3,218,696	8,475,420
1975	5,979,492	2,461,934	8,441,426
1976	8,481,284	2,518,241	10,999,525
1977	11,853,063	2,552,183	14,405,246
1978	15,694,964	2,419,808	18,114,772
1979	17,395,286	2,679,951	20,075,237
1980	15,600,380	2,356,815	17,957,195
1981	20,728,974	2,913,742	23,642,716
1982	20,073,797	2,537,432	22,611,229
1983	16,394,509	2,346,700	18,741,209
1984	12,372,417	2,278,685	14,651,102
1985	13,453,939	2,947,740	16,401,679
1986	9,851,059	2,423,520	12,274,579
1987	9,288,006	2,249,584	11,537,590
1988	7,773,258	3,402,088	11,175,346
1989	8,759,961	4,616,226	13,376,187
1990	9,338,801	6,830,356	16,169,157
1991	11,021,521	6,819,380	17,840,901
1992	13,414,501	5,487,925	18,902,426
1993	12,897,955	5,739,047	18,637,002
1994	9,579,969	4,281,879	13,861,848
1995	9,289,971	3,983,082	13,273,053
1996	10,224,300	5,251,001	15,475,301
1997	11,213,624	5,369,181	16,582,805
1998	14,286,864	5,038,854	19,325,718
1999	15,751,331	6,481,605	22,232,936
2000	19,230,496	9,702,384	28,932,880
2001	24,668,791	11,271,901	35,940,692
2002	25,206,380	11,780,861	36,987,241
2003	27,839,293	11,926,652	39,765,945
2004	26,907,075	13,909,872	40,816,947
2005	29,254,766	15,697,312	44,952,078
2006	29,089,268	17,061,250	46,150,518
2007	35,544,965	21,928,385	57,473,350
2008	41,195,616	22,787,133	63,982,749
2009	45,757,149	20,018,360	65,775,509
2010	46,928,848	29,815,879	76,744,727
2011	52,010,440	31,439,592	83,450,032
2012	46,234,240	30,870,498	77,104,738
TOTAL	813,310,833	380,721,999	1,194,032,832

Source: Nigerian Ports Authority (1956-2012)

Table 3. Quarterly Moving Averages for Cargo Movement (1956-2012)

Year	Quarter	Cargo Throughput (Million tons)	Cargo Throughput Trend	Inward Cargo (Million tons)	Inward CargoTrend	Outward Cargo (Million tons)	Outward CargoTrend
1956	1 (1)	2.742		1.386		1.356	
1957	2 (2)	3.172		1.62		1.552	
1958	3 (3)	3.099	3.24	1.68	1.72	1.419	1.53
1959	4 (4)	3.543	3.40	1.823	1.89	1.72	1.52
1960	1 (5)	3.593	3.58	2.11	2.05	1.482	1.53
1961	2 (6)	3.63	3..75	2.256	2.2	1.374	1.55
1962	3 (7)	4.014	3.90	2.35	2.32	1.664	1.58
1963	4 (8)	4.019	4.13	2.387	2.42	1.631	1.71
1964	1 (9)	4.353	4.37	2.527	2.53	1.83	1.83
1965	2 (10)	4.678	4.49	2.64	2.6	2.037	1.89
1966	3 (11)	4.851	4.45	2.853	2.58	1.997	1.87
1967	4 (12)	4.182	4.28	2.428	2.49	1.753	1.79
1968	1 (13)	3.835	4.09	2.272	2.41	1.562	1.68
1969	2 (14)	3.839	4.41	2.177	2.65	1.661	1.75
1970	3 (15)	4.227	5.33	2.719	3.29	1.507	2.05
1971	4 (16)	7.309	6.33	4.492	3.95	2.816	2.38
1972	1 (17)	8.113	7.33	5.281	4.55	2.831	2.78
1973	2 (18)	7.562	8.00	4.459	5.05	3.103	2.95
1974	3 (19)	8.475	8.50	5.256	5.64	3.218	2.86
1975	4 (20)	8.441	9.72	5.979	6.96	2.461	2.76
1976	1 (21)	10.999	11.78	8.481	9.19	2.518	2.59
1977	2 (22)	14.405	14.45	11.853	11.92	2.552	2.5
1978	3 (23)	18.145	16.99	15.694	14.24	2.419	2.52
1979	4 (24)	20.075	18.80	17.395	16.24	2.679	2.55
1980	1 (25)	17.957	20.51	15.6	17.9	2.356	2.61
1981	2 (26)	23.648	20.90	20.728	18.32	2.913	2.58
1982	3 (27)	22.611	20.32	20.073	17.79	2.537	2.53
1983	4 (28)	18.741	19.00	16.394	16.48	2.346	2.52
1984	1 (29)	14.651	16.80	12.372	14.29	2.278	2.51
1985	2 (30)	16.402	14.61	13.453	12.12	2.947	2.49
1986	3 (31)	12.275	13.28	9.851	10.66	2.423	2.61
1987	4 (32)	11.538	12.46	9.288	9.5	2.249	2.96
1988	1 (33)	11.175	12.57	7.773	8.85	3.402	3.72
1989	2 (34)	13.376	13.85	8.759	9	4.616	4.85
1990	3 (35)	16.169	15.60	9.338	9.92	6.83	5.68
1991	4 (36)	17.841	17.22	11.021	11.15	6.819	6.08
1992	1 (37)	18.902	17.59	13.414	11.69	5.487	5.9
1993	2 (38)	18.637	16.16	12.897	11.51	5.739	5.23
1994	3 (39)	13.862	15.73	9.579	10.89	4.281	4.84
1995	4 (40)	13.273	15.05	9.289	10.28	3.983	4.77
1996	1 (41)	15.475	15.48	10.224	10.66	5.251	4.82
1997	2 (42)	16.583	17.28	11.213	12.06	5.369	5.22
1998	3 (43)	19.326	20.08	14.286	13.99	5.038	6.09
1999	4 (44)	22.233	24.18	15.751	16.8	6.481	7.39
2000	1 (45)	28.933	28.81	19.23	19.84	9.702	8.97
2001	2 (46)	35.941	33.21	24.668	22.72	11.271	10.49
2002	3 (47)	36.987	36.89	25.206	25.19	11.78	11.69
2003	4 (48)	39.766	39.50	27.839	26.72	11.926	12.77
2004	1 (49)	40.817	41.77	26.907	27.78	13.909	13.98
2005	2 (50)	44.952	45.13	29.254	29.23	15.697	15.89
2006	3 (51)	46.150	50.24	29.089	31.98	17.061	18.25
2007	4 (52)	57.473	55.74	35.544	35.83	21.928	19.90
2008	1 (53)	63.982	62.16	41.195	40.12	22.787	22.04
2009	2 (54)	65.775	69.24	45.757	44.36	20.018	24.85
2010	3 (55)	76.744	74.12	46.928	47.10	29.815	27.02
2011	4 (56)	83.450		52.010		31.439	
2012	1 (57)	77.104		46.234		30.870	

Source: Authors

Figure1 depicts the trend of cargo throughput at the Nigerian ports during the period under review. The figure represents the entirety of growth in port traffic including some fluctuations.
The Figure shows the trend of cargo throughput fluctuating from 1956 through 2005 but rose continuously from 2006 to 2012.

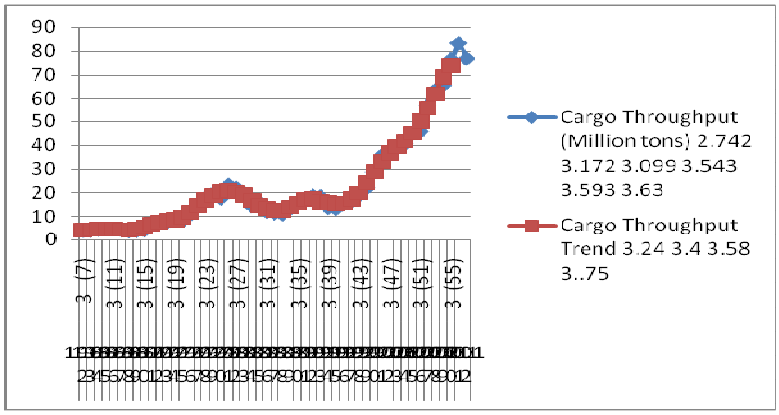

Figure 1. Trend Line in Cargo Throughput (1956-2012)

Figure 2 below shows the inward cargo trend from 1956 to 2012. It follows the same pattern like the cargo throughput trend shown in figure1. The trend of cargo throughput follows the same pattern as import trend. It means then that the trend of cargo throughput is greatly determined by the trend of import or inward cargo movement. In a nutshell, the pattern in Nigerian port traffic during the pre concession era is sinusoidal while the post concession experienced a stable and continuous growth as indicated with the blue line. The trend concurs with that witnessed in total cargo throughput which is clear evidence that the pattern of Nigeria's port traffic is controlled by imports. During the period 1956-2012 import traffic overwhelmed exports. Table 3 above refers.

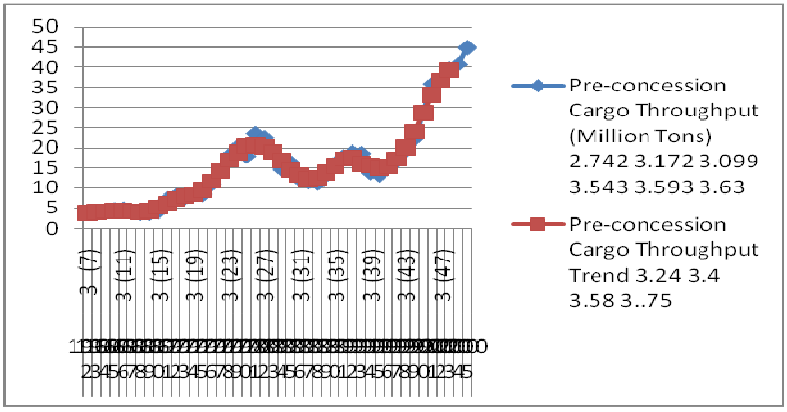

Figure 2. Trend Line in Cargo Throughput Pre-Concession (1956-2005)

Figure 3 below represents the trend line for post-concession cargo throughput. From 2006-2012 the trend experienced a drastic upward movement. This far outweighed the increase in inward cargo movement recorded during the pre-concession period (1997-2005). This corroborated the fact that import trend determines the trend of throughput. Table 3 above refers.

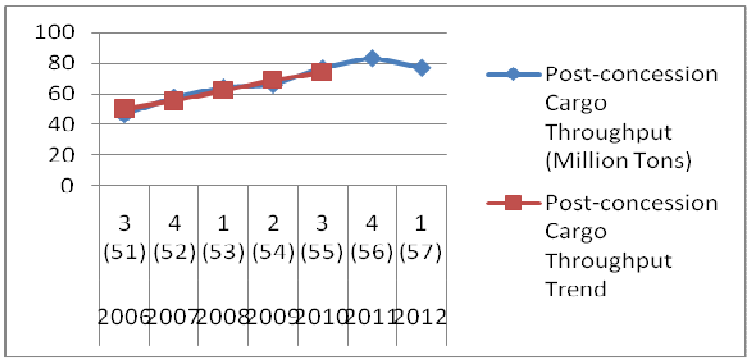

Figure 3. Trend Line in Cargo Throughput Post-Concession (2006-2012)

Figure 4 below shows the trend line for pre-concession inward cargo. From 1956-70 the trend was parallel. The trend line started rising from 1971 up to1981. Then 1982-1987 the trend was fluctuating. But from 1988-1992 the trend experienced upward movement. From 1993-1996 there was a downward movement of the trend. And then from1997-2005 it started rising again. Table 3 above refers.

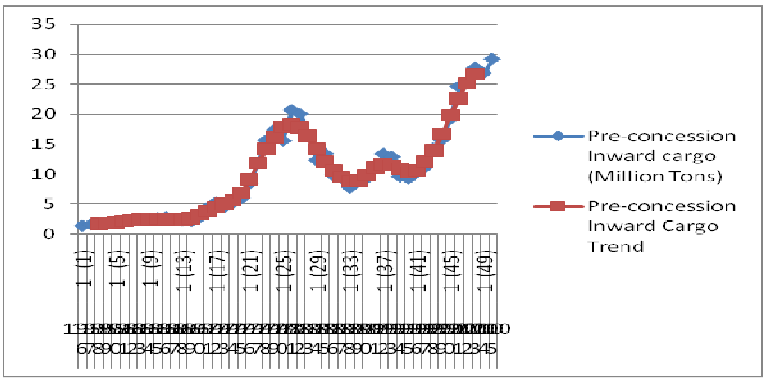

Figure 4. Pre Concession Trend Line for Import Cargo

Figure 5 below represents the trend line for post-concession inward cargo. From 2006-2012 the trend experienced a drastic upward movement. This far overwhelmed the increase in inward cargo movement recorded during the pre-concession period (1997-2005). Table 3 above refers.

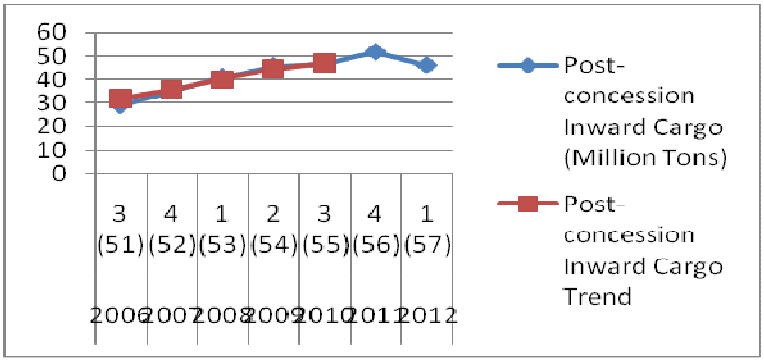

Figure 5. Post Concession Trend Line for Import Cargo

Figure 6 below shows the outward cargo trend of the pre concession period. From 1956-1970 the export trend was analogous which means there was no improvement in export activities. However, small improvement was recorded from 1971-1974 with a slight upward tilt of the trend line. The situation reversed to the parallel trend from 1975-1987. This means that there was a downward tilt of the trend line. The period 1988-1999 witnessed a slight improvement in export activities with a slight upward tilt of the trend line while the trend line experienced a sharp upward movement from 2000-2005. Table 3 above refers.

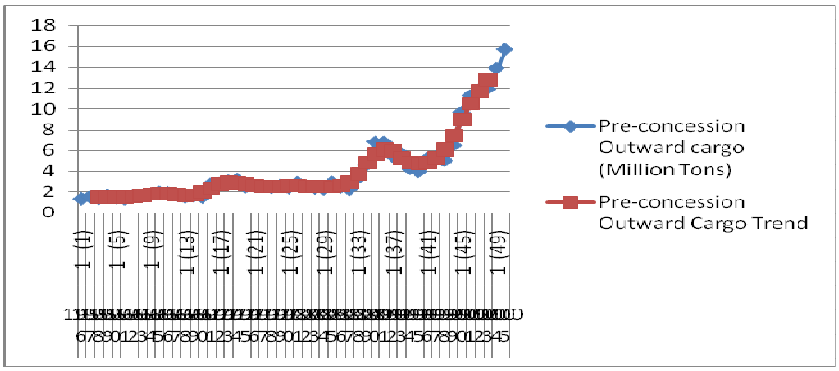

Figure6. Pre Concession Trend Line for Export Cargo

Figure 7 below shows the outward cargo trend of post concession period. There was a drastic upward movement of the trend line from 2006-2012. This was a clear departure from what obtained during the pre concession period. This entails that the reform program also impacts positively on export but the rate and degree is nothing to be compared to import. Table 3 above refers.

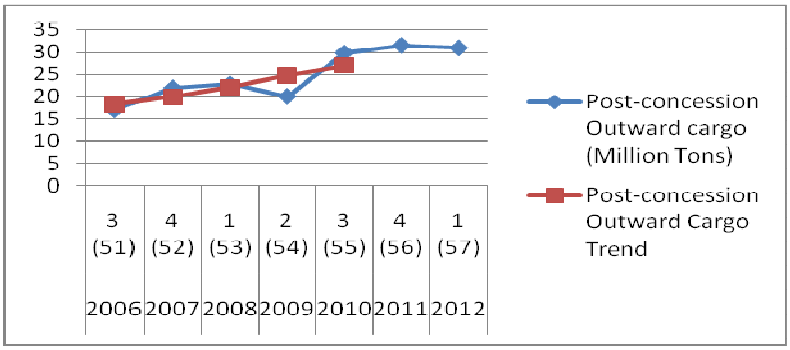

Figure 7. Post Concession Trend Line for Export Cargo

4.1 Analysis of the Indicator of Service and Utilization for Pre- Concession and Post Concession Periods

The indicator of service and utilization is explained with the aid of Awaiting Berth Time, Berth time, Vessel Turnaround Time and Berth Occupancy as shown in Table 4 below. According to Indicator of Utilization, high berth occupancy causes quality of service to decline and low berth occupancy of 50% or less indicates that resources are being under used. But, berth occupancy values within the range of 60% and 70% are the safest to aim at.

From table 4 below the average time Awaiting Berth for pre concession period (1996-2005) is 1.26 while the average waiting time for post concession period (2006 – 2012) is 1.2. This shows that there is no significant improvement in the average waiting time during the post concession period when compared with the pre concession period. The average time at Berth for pre concession period is 6.0 days while the average time at Berth for post concession period 4.0days. This shows that there is a significant improvement in the time spent at Berth in the post concession period when compared with the pre concession period – two days are saved at Berth. This is still high compared to the international standard. The average Turnaround time for pre concession period is 7.34days while the post concession period is 5.25days. This shows that there is improvement in turnaround time during the post concession period than the pre concession period. The pre-concession period shows longer turnaround time but the post concession period shows shorter turnaround time. This was made certain by the increase in the speed of service being provided by the new port operators. This is still high compared to the international standard of 48hrs. This also corroborated Ogunsiji (2011) view that there was no reliable relationship between turnaround time and berth occupancy rate, showing inconsistent inverse and direct relationships sporadically over the years. The Average Berth Occupancy is 45.10% for the pre concession period and 46.60%, for post concession period, the percentage difference is 1.5% over the pre concession period. Both the pre concession and post concession berth occupancy did not fall within the safe range of the indicator of utilization which implies that the capacity of our ports is not optimally utilized. From the above data analysis it is revealed that the post concession period is witnessing slight improvement in the Turnaround time and Berth occupancy is yet to experience a boost.

Table 4. Indicators of Service and Utilization for Pre and Post Concession Eras

Year	Awaiting Berth(Days)	At Berth(Days)	Turnaround Time (Days)	Berth Occupancy (%)
1995	0.47	5.7	6.17	27.76
1996	0.46	5.88	6.34	36.68
1997	0.47	6.24	6.71	36.73
1998	0.39	6.92	7.31	41.39
1999	0.36	5.95	6.31	47.09
2000	0.34	6.67	7.01	44.76
2001	1.27	6.64	7.91	51.78
2002	3.99	7.35	11.34	56.58
2003	2.17	5.72	7.89	52.75
2004	1.44	5.00	6.44	50.93
2005	2.60	4.80	7.40	49.70
2006	1.05	4.26	5.31	48.49
2007	0.36	3.39	3.75	44.95
2008	1.01	3.58	4.59	36.72
2009	1.95	4.6	6.55	47.46
2010	1.11	4.27	5.38	51.21
2011	1.21	4.27	5.48	51.45
2012	1.71	4.04	5.75	45.92

Source: Nigerian Ports Authority

4.2 Hypothesis Testing Using Chi-Square:

H_0: There is no significant difference between ports performances during pre and post concession periods.

H_1: There is a significant difference between ports performances during pre and post concession periods.

Observed Frequencies (Θ)

Periods	Export(Million Tons)	Import(Million Tons)	Total(Million Tons)
Pre-concession era	206.8	516.5	723.3
Post-concession era	173.9	296.7	470.6
Total	380.7	813.3	1194.0

Source: researchers

Expected Frequencies (E)

	X_1(Million Tons)	X_2(Million Tons)	Total(Million Tons)
	230.6	492.7	723.3
	150.0	320.6	470.6
Total	380.7	813.3	1194.0

Source: researchers

$$\textit{The result of the Chi.square} = X^2 = \frac{\Sigma(\Theta - E)^2}{E} = 2.45 + 1.14 + 3.80 + 1.78 = 9.17$$

From the evaluation, X^2 calculated is 9.17 and by using 5% significance at n-1 degree of freedom we have the theoretical X^2 to be 3.84 from the table value. Since, the X^2 calculated is greater than the table value i.e. $x^2_{cal} = 9.17 \geq x^2_{0.05}(1) = 3.84$. We reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1) and conclude that there is a significant difference between ports performances during pre and post concession periods.

5. Conclusion

It is observed from figures 1, 3, 5 and 7 above that there was higher cargo throughput in the industry in the post-concession era. The concession exercise has also led to the emergence of very large vessels with greater cost effectiveness, speed in delivery, improved cargo-handling technology and reduced unit freight cost. The initiative has brought on board international terminal operators with specialized technical efficiency in cargo handling.

Since the concession of the terminals, statistics have shown that cargo throughput has soared. The improvement in cargo throughput saw turnaround time of vessels coming down to 5.25days on the average in the terminals during the post concession period. The increased cargo throughput of this period is an indication of improvement in the output of the port industry. The implication of the above is that as traffic increases the need for port improvement and port expansion grows. This analysis also showed that the ship turnaround time in our ports is still high at the average of 5.25days as against the International Maritime Organization 48hrs stipulation. The berth occupancy at average of 46.6% in our ports is low. This implies under capacity utilization of our ports.

6. Policy Recommendations

Cargo throughput had witnessed remarkable upsurge during the post concession era than the pre concession era as a result of the ingenuity of the terminal operators. This tempo must be sustained. How can Nigeria sustain this tempo in the foreseeable future? To sustain this tempo the terminal operators should be mandated to give Nigerians ample opportunities in their employment policy. Apart from this, there must be adequate manpower training such that after the expiration of the terminal operators' contracts, Nigerians would have gain adequate technological and managerial acumen that will make them become effective terminal operators. Nigeria port should be made the hub port for the entire African sub region. It is worthy of note that a lot of port infrastructural facilities have been built in our ports therefore government must ensure that these facilities are properly maintained. Apart from the fact that adequate maintenance of the infrastructure will lead to greater productivity, Nigeria would have acquired adequate infrastructural foundations upon which her future port growth and development will be sustained.

Following the upsurge in cargo throughput in the post-concession era government should be proactive, knowing that this portend future port congestion problems and should use the present data to plan for the future development of the ports. Government should take legislative and policy measures to develop the port system. Nigeria waterways need to be properly dredged so as to encourage vessels of more TEUs to navigate our waterways. More river ports should be built along the River Niger and River Benue which will enhance inland water transportation and ease pressure on the existing ports. More so, additional dry ports should be established. It can aided partial relocation of activities from ports to the hinterland of the country thereby bringing to an end the issue of port congestion. Government should support more public ownership and private sector operations of the port system. Government should ensure that port tariffs are moderate to make our ports more competitive. This would probably bring to an end the issue of diversion of Nigerian bound cargo to our neighboring ports. Government should strive to reduce customs clearance for containers in the port to 24 hours. Kudos to the government for the port reform in Nigeria as well as the ingenuity of the operators but there is still wide gap between the present attainment and the expected performance. There is the need to develop our maritime infrastructure since it is the bedrock upon which the nation progress is laid. All the transport modes must be properly developed and fully integrated so as to facilitate intermodal through-transport and easier distribution of cargo. The latest cargo handling equipment such as Rubber - Tyre Gantry crane (RTG), Rail Mounted Gantry crane (RMG), Automated Guided Vehicle (AVG), Combi road for Automated Guided Vehicle, and the like should be installed in all the ports and the inland container depots. Furthermore, government should improve security measures to enhance safety of goods in ports and transit. The issue of insecurity of cargo in transit is one of the reasons landlocked countries like Niger and Chad do not patronize our ports for transshipment purposes.

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