

An Evaluation of the Delay Factors in Nigeria's Seaports: A Study of the Apapa Port Complex

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ABSTRACT

This study examined the evaluation of delay factors at Nigeria's Apapa seaports. The specific study objective was to evaluate the various delay factors at Nigerian seaports and the specific delay factors affecting the Apapa seaports. The primary method of data collection was via questionnaire application and Taro Yamane's population sampling method while results were analyzed using the ANOVA statistics. The findings revealed a statistically significant effect of port delay factors at the seaports on national and economic output. The study concludes that port delay factors at the seaports significantly affect economic activities in Nigeria and there should be the creation of more evacuation corridors at the seaports to facilitate prompt service delivery and improve the country's ease of doing business among others.

Keywords: Ports; Operations, Apapa Seaports, Delay Factors, Congestions

JEL Classification: HE199, HE323, HE380, HE561, HE730

1. Introduction

Through globalization, the government realized that it lacked the resources and managerial abilities to drive a modern seaport successfully (Razak, 2005). Globally, governments and port authorities have withdrawn from port operations knowing that enterprise-based port services and operation would allow for greater flexibility, efficiency, and better services to port consumers (Notteboom, 2010). This vacated role from governments could be more efficiently handled by private corporations for the better of society.

In the maritime industry, time has been established as an expensive commodity. Ship voyage plans take account of time and its value. Voyage is a function of two variables, namely:

- (a) Transit Time
- (b) Port Time

With the technological development and improvement in speed, most modern ships' transit time have been reduced. This has helped to focus the voyage plan in relation to time in present port days (Konig, 2002). Similarly, the average waiting time of vessels in Nigerian ports has been drastically reduced as most berths remain empty, yet the average turn-round time of vessels remains high.

1.0 Statement of the Problem

Nigeria as a coastal nation depends heavily on the maritime industry for international trade in import/export and for its neighboring land-locked nations.

The ports have the important function of facilitating the transshipment of cargo from water to land and vice versa, and could lead to enormous losses to the nation's economy if its operations are hampered by delays at the port. The persistent port congestion in Nigeria has resulted in the following among other anomalies.

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1. The goods, when eventually produced at high production costs, are transferred to the final consumer at exorbitant prices.
2. The manufacturing factors are either slowed down or temporarily shut down as imported raw materials are stuck at the ports for months.
3. Exporters lose overseas customers to competitors due to their inability to make timely deliveries.
4. Nigerian importers lose millions of naira annually to unnecessary demurrage and related charges.
5. Nigeria, itself, loses billions of naira to neighboring countries' ports as vessels originally destined for Nigeria are diverted elsewhere.

The above factors prompt the investigation into this area of delay with Apapa Port Complex, Lagos as a case study and hence necessitate the research question: is there any relationship between delays and various causative delay factors in relation to Apapa Port Complex? The study attempts to address these anomalies and unwarranted port delays with the view to proffer solutions to correct and enhance the nation's economic development.

1.12 Objectives of the Study

The study is aimed at accomplishing the following:

- (a) Identify the key determinants of delays in Nigerian seaports.
- (b) Determine the causative delay factors specific to Apapa Port Complex.

1.13 Limitation of the Study

Some of the key challenges faced in this study were as follows:

- a) Difficulty in receiving objective assessment from the various categories of port workers due to the fear of sanctions from supervisors.
- b) Cost of administering and conducting the questionnaires including hiring and paying field research personnel.
- c) Time constraints due to given deadlines to complete the commissioned research.

1.1. Literature Review

The chapter examines the problems of delay in Nigerian ports, especially high turn-round times and some researchers' views with regards to the ports and their attendant efficiency (Ndikom, 2006).

1.1.1 Conceptual Framework

Port Efficiency and Productivity

A port is the life-line of maritime activities. Hence, the collapse of the port system would result in the collapse of the maritime industry and economy, especially in import-dependent nations like Nigeria. The port has strategic implications for the Nigerian economy, especially as the oil sector is threatened to collapse due to sharp falls in the prices of crude-oil in international markets (Ndikom, 2005). However, Nigeria's port system has been in dire need of reforms for the past two decades. It is pertinent to note that port productivity and performance are anchored on increase cargo throughput as the relevance and efficiency of any port are tied to the degree of its cargo traffic. Hence, Nigeria must develop a sustainable and viable heterogeneous maritime transport system which will automatically help to eradicate and tackle the problem of delays and congestions, thereby increasing port performance and productivity.

Port productivity is the level of efficiency, effectiveness, and vibrancy a particular port is operating at within the confines of the law (Ndikom, 2006). Ideally, the productivity and efficiency of a given port are measured with certain indications and Nigeria must develop a dependable, safe, and affordable maritime system that is efficient, accessible, competitive, and technologically advanced. Maritime transport needs to be promoted as a cost-effective, energy-efficient, and environmentally friendly mode (Ndikom, 2006).

1.1.2 Contributions by Other Authors

Ndikom and Emeghara (2012) describe a seaport as a subsystem of the maritime transportation system. It is an essential organ in a nation's transportation system. A seaport is also recognized as an entry point for goods leaving the country for other countries. There is a positive relationship existing between a ship and port. Esra and Walters (2002) described this relationship as

a servant/master relationship. That is, a port's main function is to provide all the necessary facilities to accumulate calling ships and enable them to load and offload cargoes.

Clerk et al. (2001) consequently described a port as an enterprise that must provide quality services to customers to survive economically. This is because shippers and shipowners demand efficient services from port operations for continuous patronage. Ugboma et al. (2004) see a port as needing to service its master efficiently if its usefulness and performance level is to be recognized. According to Ugboma (2006), just as the shipping industry's usefulness, efficiency and overall performance is evaluated in the light of services rendered to ships, therefore the usefulness of the seaport also relates to the economy.

The number of customers a commercial organization has determines its viability. Likewise, the volume of ship traffic a port has determines its property and life. Huybrechts et al. (2002) agree with Ugboma (2006) that a seaport is a center of attraction. As a service center its viability is measured by the volume of ship and cargo traffic attracted to it over a period of time; and so a survey evaluating the attractiveness of the port of Antwerp to shippers and shipowners was conducted. They were able to identify several factors that determine port choice in a competitive environment.

1.1.3 Relevant Models and Theories

Using China as a case study, Tiwan et al. (2003) applied stated preference choice models in assessing port selection behavior by shippers and shipowners.

Tongzon (2002) conducted a similar survey in Southeast Asia that used a survey questionnaire approach and targeted the relationship existing between shippers/shipowners and choice of ports or ports attractiveness.

These studies all concluded that service quality was very important in port attractiveness to customers. It must be emphasized that most of these determinants relate positively to delays in the ports. In conclusion, Tongzon (2002) identified time efficiency as the highest rated factor; high value-added products need to be delivered in time or cross ports quickly to avoid high charges accumulation. This is consistent with the global trend and practice of approaches like the "Just-in-time" delivery .

"Time in port" has always been an important determinant of port attraction to port users. Kio Yu (2006) assessed the attractiveness of ports in the north European container transshipping market and concluded that Hamburg and Rotterdam were the most attractive options. Consequently, they act as transshipping hubs with European markets.

Alpharliner (2005) assessed port attractiveness through soliciting the opinions of major and direct shipping lines. A targeted survey respondent was used consisting of various managers, maritime transport scholars, and shipping consultants. The study conclusion deviated slightly from the other views discussed earlier. Other studies that investigated port choice or attractiveness includes: Song and Yeo (2004), Begnon (2002), Chivolka and Raith (2001), etc.

Nigerian Ports Facilities and Services

The port system is vital for Nigerian imports/exports and production. Barring the oil sector, since 1984, the sea ports have accounted for approximately 99.2% by volume and 95% by value of the country's total imports and exports. Ndikom (2005) stressed the importance of the ports in the statement "the ports are a focus of a broad spectrum of maritime activities generating significant job creation and economic growth."

Nigeria has eight major ports, 11 oil terminals, and 27 private jetties within its port system. The various ports, excluding the oil terminals, have a cargo handling capacity of 35 million tons per annum; the port's berthing facilities include 93 general cargo berths, 11 liquid cargo berths, and 63 buoy berths alongside a large number of privately owned jetties.

Nigeria's cargo storage facilities are composed of 63 transit shades, 22 back shades, four carbon shades, and 40 warehouses all with a total storage of over 460,459 square meters, there are also a fleet of 54 operational labor crafts and 610 different types of cargo handling plants and equipment.

Including the above, there is the ultra-modern Federal Ocean Terminal near completion in Onne, River State. The new port, the largest of its kind in Africa, is expected to adequately export from the country's petrochemical complex industry. The port is designed to have a total of 1,590 meters with six berths: three for general cargo, and one each for container, RoRo, and bulk cargo berths, respectively. The bulk cargo berth is expected to accommodate vessels up to 55,000 dwt with a draft of 13 meters and several transit shades, warehouses, Lorry Park starting areas, service jetties, and control towers.

With the introduction of over 10 approved inland container depots across the nation, owing to the recent port reforms and port decongestion strategies, Nigerian ports' capacity and facilities to handle cargo is bound to improve considerably.

Table 1. Nigeria's Ports and Facilities

S/N	Ports	Location	Max Depth of Berth (M)	Quay Length (M)
1	Apapa Port	Lagos	9.0	2459
2	Tincan Island	Lagos	11.5	2045
3	Roro Port	Lagos	11.5	705
4	Container Port	Lagos	10.5	1005
5	Delta Port	Warri	11.5	2506
6	Calabar Port	Calabar	11.0	1137
7	Port Harcourt	Port Harcourt	7.5	1877
8	Federal Light Terminal	Onne	5.7	1185

Source: NPA Handbook; 2018

A virile maritime industry depends on an efficient port system and availability of shipping vessels. Both are essential to international trade which is an important contributor to economic development.

Given the benefits and potentials associated with the nation's maritime industry/sector as enumerated above, it is quite revealing that no government will allow such a sub-selector that significantly contributes to the national economic development and revenue base to depreciate, deteriorate, or under-develop (Osadume and Okuoyibo, 2020).

The various forms of delays to ships ultimately lead to port congestions. Also, traffic congestion can occur as a result of poor traffic control, wrong driving, and lockage caused by broken down vehicles, port-holes, etc. (Gabriel, 2019). Congestion (Delay) therefore is an abnormal situation arising from an imbalance in the flow of service from a provider to the consumer. For instance, service facilities such as fuel pumps, traffic lights, road conditions, etc. not functioning could lead to various kinds of congestion (Emeghara, 2012).

Gabriel (2019) reports that in the 70s and 80s, Nigeria's seaports were usually a beehive of activities as a result of high level of importation. Shortly after the war and up to 1975, the Apapa Port was always congested, culminating to the setting up of a taskforce to clear congestion.

Delays in various ports which resulted to port congestion was first noticed in the 70s when Nigeria imported more cement than the ports could handle (cement Amada). During this era, vessels were reported to have waited up to 240 days at Apapa, Lagos before gaining access of allocated berths.

Nigeria experienced another round of port congestion at Apapa. This instance was traced to government policy inconsistencies in 2001 on issues of imports such as tokumbo cars, used fridges, air-conditioners, and other essential goods and in the frequent charge from destination inspection (PI) and back to DI over the years.

Prior to the policy charge on bared cargo, Nigerian importers had already placed orders for goods now seen as contraband which were subsequently abandoned for fear of prosecution thereby culminating into delays and congestion (Gabriel, 2019).

TYPES OF DELAYS/PORT CONGESTION

Port congestions and delays come in different forms, manifesting into inefficiency, unproductivity, and stagnation of terminal operations.

Ndikom (2006) stressed that on critical examination, the following types of congestion can be distinguished in ports as follows:

Ship/Vessel Types

Vessels are already berthed at the ports but encounter prolonged delay due to poor functioning of equipment and control. Vessels, therefore, spend longer time than necessary at the berths before being offloaded, thereby increasing the number of vessels waiting to be served.

Berthing Facility Type

Results from the lack of berthing facilities as vessels stay at a particular berth for too long without completing discharge due to nonfunctioning of plants and equipment. This usually has multiplier effects on vessels calling at the ports for berthing, thereby culminating in long waiting times.

Emeghara (2012) states that a delay is characterized by numerous vessels waiting for too long at high sea or fare-way buoy. High sea congestion is mostly responsible for the congestion surcharge by some shipowners for Nigerian band cargoes which later translates to high cost of goods.

This occurs when container outflows and inflows are not removed from the space and staking areas by importers and shipping agents. The remote cause of container traffic type of port congestion can be poor clearing/inspection procedures or nonfunctioning of plants and equipment required for the clearance of such containers from the ports. Container traffic type of congestion is currently experienced at the Apapa Container Terminal which has crippled functionality, productivity, and the performance of the industry.

There are many other problems which could cause a vessel to stay longer than expected at the berths such as, seizures of vessel, arrest, etc.

Quay Apron/Stacking Area Type

Results from quay Aprons and the stacking area being heavily loaded with uncleared goods by shipping agents or ports management, thereby making it difficult for vessels to further discharge due to space problem. Sometimes, it is caused by nonfunctioning plant cranes and other cargo handling equipment.

Causes Of Port Delay/Congestion

Numerous factors cause delays and congestion. Emeghara (2012) suggests factors such as: strikes, severe weather, or seasonally high numbers of cargo for port congestion. In the Nigerian context, the causes seem to expand and deviate toward man-made/managerial inefficiency. The endemic port congestion bouts in the Nigerian ports are traceable to a number of factors as follows.

Good Functioning Cargo Handling Equipment/Plant:

Required for quick loading, off-loading, and transferring of cargoes from one point to the other in ports. Scholars believe that the lack of plants and equipment creates room for corruption as the shortfall results in the rationing of the few available equipment. In line with this, Maduka (2000) stressed the importance of maintaining infrastructural facilities as the level of efficiency in ports generally relies on the availability of plants and equipment; in 1999, Nigeria had less than 300 functioning plants and equipment in various ports, whereby in 2005 only 20% of about 569 plants and equipment recorded from 2002 were functioning after the private terminal operator took over. Emeghara (2012) noted that in Apapa Container Terminal, it was discovered that the two cranes used in loading and discharging cargoes from ships during port congestion are the same cranes used in bringing containers for custom examination. This implies that when the equipment were working on the ships, importers which were ready for inspection had to wait. This story was not much different from other ports in Nigeria.

Space:

Enormous space is required for temporal storage of cargo customs inspection, trailer parks, maneuvering of cranes and cargo handling equipment, and for container operations. Gabriel (2019) observed that at a stage in Apapa Container Terminal in 2005, more than 200 cargo ships were waiting to berth and those that had already could not find space to offload their cargo as block-stacked containers took over the available space. In most Nigerian ports manufacturing industries occupy up to 60% of available space that should be dedicated to containers and other cargo storage. Port Harcourt, which also harbors the Dangote cement/depot, suffers congestion to the extent that lorries waiting to load cement take up available spaces in ports and along major roads nearby, causing port and road congestion.

Mutiple Agencies:

Ndikom and Emeghara (2012) stated that the presence of statutory agencies in ports could be traced back to 1913, when the colonial government set up the maritime department primarily to provide platform for the evacuation of produce to the United Kingdom.

The authors further noted that agencies such as police personnel, for instance, have no role to play in the examination or clearance of goods unless the Nigerian customs service needs their attention. These parties extort huge sums of money from importers and

cause delays for victims, thereby encouraging port congestion. There are more than 17 agencies and 13 different customs units that importers must settle or pass through before goods are released. These agencies include, among others, the: National Drug Law Enforcement Agency, National Agency for Food and Drug Administration and Control, Nigeria Police Force, Nigerian Navy, etc. The agencies often duplicate offices and obstruct trade facilitation (Oyatoye, Adebisi, & Okoye, 2011). Studies further point out that the agencies involved in the clearance of cargo obstruct the concept of selectivity and introduce procedures which are not in consonance with facilitation of trade.

Inconsistent Policies:

Government policies in the transport sector should be geared toward increased participation of the private sector for efficiency and productivity. As Ndikom (2013) explained, deregulation entails the general principle of limited intervention by the government and the principle of allowing free market forces to play dominant roles in the determination of demand and supply.

Emeghara (2012) stated that the government must ensure that the maritime industry is given impetus and favorable condition to strive through the enactment of law and consistent policies with legal frame work. But the reverse is the case as the government's trade and fiscal policies have progressively had devastating effects on the operational functionality of the ports. Buttressing the importance of consistent policy, the author further asserts that for the transport department to be functional, however, the organization must build their transport policy around issues such as the economy and efficiency in transport operations. Cost-effectiveness of operations and improved standards, of which include maintenance and higher standard of management.

The habitual shift from destination inspection to pre-shipment inspection and back to destination inspection through the period 1976–2001 is a good example of policy inconsistency leading to a clog in operational functionality.

Reacting to the port congestion that resulted from the changes from pre-shipment inspection to destination inspection, Onwuegbuchunam (2013) remarked that it is fraud for anybody to suggest that destination inspection can be done immediately; time is required to put the infrastructures in place which will also reduce contacts among operations with customs officers to eliminate corruption at the ports. It took Ghana, a smaller country, over six years to have a successful transfer from pre-shipment inspection to destination inspection.

Nze and Onyemachi (2018) argued that partial reasons for delays and congestion in Nigeria's ports is that destination inspection took off while customs computation project is yet to be completed, resulting in that documentation processing is still done manually which usually takes time. Once more, government policy on band cargo contributed to the congestion of years 2001–2006 as over 60% of imported cargoes were affected with importers abandoning and fleeing for fear of possible prosecution. The antics of these multiple examiners is well explained by Ndikom (2005) where, unfortunately, the so-called "joint examination" of cargo by the multiplicity goods from the ports because cargo examiners have means to compel freight forwarders to seek for settlement. This causes delays as the importers and their agents often source for more funds to grease the palms of the multiple security agencies.

The reintroduction of destination inspection and the use of ASYCUDA +++ were promoted by government eagerness to expedite the clearing procedures, but owing to poor implementation and operation it has led to increased congestion, particularly in Apapa ports. Ndikom (2006). The merit of automated clearing procedure is seen in the reduction of documentation, as Soludo (2017) declares; a single good declaration form C 2010, have come to displace the various bills of entry formally used in Nigeria normally filled by freight forwarding agents and presented to custom with other documents. The federal government contracted Cotecna inspection S.A of Switzerland to handle the destination inspection in the western axis where congestion has paralyzed activities and society general surveillance to handle Warri and Port Harcourt (Soludo, 2017). The study further indicated that importers and clearing agents were complaining that Cotecna did not have enough scanners to do the job. The report indicated that, apart from the scanning procedures being rather cumbersome and time consuming, Cotecna has only two scanners doing its job instead of 30 scanners needed given the high volume of business in the western axis.

This implies that thousands of containers are queued up to be scanned by each scanner at any point in time. The obvious result is increased congestion/delays and staff of AP Mollar (one of the private terminal operators at the Apapa Container Terminal). In the past, it took between 2–3 weeks to clear goods on arrival in the ports, but now an importer or agent would consider themselves lucky if consignment is cleared in 3–4 months. This becomes more intolerable when compared with ports of neighboring countries where consignments are cleared between 5–7 days of arrival. The use of untrained personnel in the ports also accounts for a high percentage of the cause of port congestion. The inability of the Authority to co-ordinate the inflow and outflows of containerized cargo in and out of our ports are extra reasons for port congestion, Ndikom (2006).

Ogwude (1997) submits that for ports to be profitable, they have to be managed like enterprises; Nigerian ports need technical managers, port planners, and port economists.

Effects Of Delays/Port Congestion

The negative effects of port congestion on the Nigerian economy are enormous and multidirectional. Port congestion seems to hinder maritime transport, which, in turn, affects international trade. The stakeholders in the maritime industry submit that the losses incurred are unquantifiable as it cuts across through federal government, port authority, importers, exporters, bakers, consumers, etc. (Onwuegbuchunam, 2013).

However, the resultant effect of delay/port congestion can be further buttressed in the following ways.

Due to the delays importers experienced in getting their goods cleared in the peak of port congestions in Nigeria, they now divert their goods to more efficient and freer ports of Cotonou and Togo. This threatens the Nigerian maritime industry (Onwuegbuchunam, 2013). Ogwude (1997) explained the emerging role of ports as a regional load center, was due to their geographical position, developed infrastructures, and efficient services.

It is therefore a little wonder that the European/West African trade agreement, effect from 1st October, 2005, states that all Apapa bond containers be surcharged an extra 200–300 Euros on 20/40 feet containers, respectively. The shipping agencies also increased their fees from \$2500 to \$2600 owing to delay suffered in Nigeria's ports. The importers, who divert their consignments to neighboring ports, transfer much revenue that should have accrued to the coffers of the government to better the lots of such neighboring countries' economies. Importers pay for the period that containers and vessels remain in the ports even for no fault of theirs. Shipping companies are charging 20 Euros for the first nine days and 25 Euros after nine days on every 20-foot container for demurrage per day. When this figure is multiplied by the number of days the containers remain in the ports and by the numbers of containers, we get an insight as to what an importer pays for demurrage while his consignments are not cleared within five days (Ugboma, Ibe, & Ogwude, 2004).

Most importers obtain facilities from banks and due to port congestions and delays they either do not pay back at all or payment is delayed. In effect, the banks are also impacted by port congestions as some banks, for instance, are holding seminars to x-ray the challenges posed by the reintroduction of destination inspections (Emegbara, 2012).

Ndikom (2013) pointed out that delays/congestions have led to revenue losses to both consignment owners and funding banks. Onyema, Obinna, Emenyonu, & Emeghara (2015), Ugboma, Ibe, & Ogwude (2004), and Ndikom (2013) agreed that port clearing delays and congestions will result to losses for both consignment owners and the economy.

However, scholars such as Gong et al. (2015) disagree that port congestions affect consignment owners and the economy at large. They argue that port congestions are caused by factors such as market dynamics and government regulations. Similarly, Smith (2014) and Zhang (2015) disagree that port congestions adversely affect consignment owners and the economy at large. Smith (2014) contended that port congestions were not a major factor in the economy's decline and that other factors such as global recession had more impact. Zhang (2015) argued that port congestions were a result of external forces such as global trade, and not a result of inefficient port operations. Same viewpoints are held by Gazzano, Navarra, and Toffoletto (2012), who argued that port congestion, had a minimal effect on consignment owners and the economy.

2. METHODS

2.1. Research Design

A descriptive survey design was chosen for this study. The study comprises of the 426 companies located in Apapa Seaport Complex that are doing business in the Apapa Wharf. The population sample was made up 2,130 maritime related workers from the target population located in the seaport complex in Lagos State.

Simple random sampling was used to select 337 participants with a 5% level of significance from the population using Taro Yamane's formula: $n = \frac{N}{1 + (e)^2}$

The questionnaire comprised three sections: A, B, and C. Section A contained items which elicited responses to questions on respondents' demographic data, while Section B contained questions to objective one. Section C dealt with questions to objectives two and three which were relevant in testing the stated hypotheses.

To ascertain the extent of our research instrument's reliability, a pilot study was conducted on 60 persons, which was separate from the main study. The administration of the questionnaires was carried out six times within an interval of two months and the outcome of the survey was correlated using Cronbach alpha and a reliability coefficient of 87% was obtained. Thus, the instrument was adjudged reliable.

Of the 337 questionnaires sent out, 92% were returned. Microsoft Excel software was used to enter the data while the SPSS software was used for analysis. Tables were used to show some of the required data. Thus, the researcher adopted the percentage

method of data analysis to analyze the generated data from the field work. Items on “yes” or “no” point scale will be analyzed using mean scale. The cut off mean will be derived as: $5 + 4 + 3 + 2 + 1/4 = 15/5 = 3$ (approximately).

Decision rule:

Items with a mean of 3 and above are accepted while items with a mean below 3 are rejected. Thereafter, simple regression in SPSS version 28 was applied based on the following rule: in order to validate (accept) or nullify (reject) any stated hypothesis tested with the multiple regression, major attention was paid to the P- values of the tested constructs. Therefore, we will reject the null hypotheses where the SPSS p-values are less than alpha (0.05) and the alternative hypotheses accepted.

2.2. Description of Study Area

The service providers of the Apapa Port Complex consist of staff from the Nigerian Port Authority (former port operators), the private terminal operators, and the dockworkers as presently managed by the Nigeria Maritime Administration and Safety Agency. The port users consist of the staff of all the shipping companies including clearing and forwarding companies.

It was not easy to have the staff of these organizations present, and the assumption here is that the population is large. Consequently, the adoption of a judgment or purposeful technique was used to arrive or determine those to be interviewed (sample size).

2.3. Sources of Data

Both primary and secondary sources of data will be utilized. Secondary instruments will include text books, published materials, journals, and the internet, while primary instruments will be the collection of data through use of the questionnaire. Also, the method used in this research will include the collation of port statistics data that relate to port delay/congestion from the ports’ statistician office at Apapa Ports Complex.

2.4. Procedure for Data Collection and Analysis

From the discussion so far, the following research questions relative to Apapa Ports Complex operation including the ones earlier raised are identified. These research questions form the basis for the selection of tools for data analysis.

1. Are there key determinants of delay in Nigerian Ports?
2. What are the causative delay factors specific to Apapa Port Complex, Lagos?

Answering these questions require the application of multiregression models and the Kaiser’s measure of sampling adequacy of factor analysis. The multiregression technique helps in performing correlation analysis on the relationship between delay determinants and delay values. In other words, the techniques looked at the delay causative factors at disaggregate level. Customers suffer unaccountable demurrage costs as a result of delays in clearing goods.

Multiregression techniques believe that there are critical factors that determine delays in ports and the list of these factors is inexhaustible.

In multiregression analyses, the coefficient of each delay variable X_1, X_2, \dots, X_n determines the weight or influence of each causative factor. Consequently, a partial analysis on each causative factor is conducted to determine the change in Y (time in port) the determinant variable relative to X_1 when X_2, X_n are held constant. To determine the value of a, b_1 , etc., which represent the coefficient of the independent variable (causative factors), calls for the solving of three multiregression equations simultaneously. Also, factor analysis was employed to analyze the data using Kaiser’s measure of sampling adequacy as an index of ranking the factors. The higher Kaiser’s value, the more significant the factor becomes.

$$\sum y = na + b_1 \sum X_1 + b_2 \sum X_2$$

$$\sum xy_1 = a \sum X_1 + b_1 \sum X_1 + b_2 \sum X_1 X_2$$

$$\sum X_2 y = a \sum X_2 + b_1 \sum X_1 X_2 + b_2 \sum X_2$$

2.5. Models Applied

One of the major outputs expected from the study is the overall delay model for Apapa Ports Complex respondents were asked to show their perception on each delay’s causative location. This was modeled using a multivariate regression analysis that links

delay to causative factors. This is a very useful tool in dealing with variable relative to many explanatory variables to establish the relationship between each explanatory variable and the turn-round time of ships in the port.

The basic model will look like this:

$$Y_{1t} = A_0 + b_1X_1 + b_2X_2 + b_3X_3$$

Where $X_{11}, X_{21}, X_{31}, \dots, X_n$ delay variable

i = any port, e = error, t = time.

3. Results

Our distributed questionnaires experienced a 92% return rate, translating to 310 questionnaires.

Table 2. Demographic Factors

Gender	Frequency	Percentage
Male	209	67.42
Female	101	32.58
Total	310	100
Marital status		
Single	139	44.84
Married	161	51.94
Divorced	10	3.23
Total	310	100
Age		
Below 25 years	38	12.26
25–34 years	135	43.55
35–44 years	102	32.90
45 years and above	35	11.29
Total	310	100
Highest level of education		
O Level certificate	99	31.94
Diploma	81	26.13
Graduate	130	41.94
Total	310	100

Authors’ field work questions, 2022

Objective one: identify the key determinants of delays in Nigerian seaports

The result in Table 3 indicates that majority of respondents were of the opinion that there are key determinants of delays in Nigeria’s seaports.

From Table 4, the mean record showed that all variables had positive impacts and were therefore accepted. All of the variables identified played a role in affecting delays and congestions across Nigeria’s ports.

Table 3. Key determinants of delays in Nigerian seaports

n = 310		
Is there any determinant of delay in Nigerian Seaport?	frequency	Percentage
Yes	300	96.77
No	10	3.23

Authors' field work questions, 2022

Table 4. Key determinants of delays in Nigerian seaports

n = 310						
Statements	SA	A	SD	D	Mean	Decision rule
Poor infrastructure is responsible for delays in Nigeria's Seaports	76	141	13	63	2.74	Accepted
Increase in cargo traffic is a major cause of port delays	91	128	39	52	2.83	Accepted
Inefficient clearing procedures causes delays at seaports	109	96	12	86	2.73	Accepted
Reduced Productivity by port workers cause delays at the Nigeria's seaports	109	145	33	25	3.09	Accepted
Consignee attitude affects the rate of cargo release at the seaports in Nigeria	114	146	26	21	3.14	Accepted
Poor Terminals and poor delivery plans cause delays at Nigeria's seaports	110	95	13	85	2.73	Accepted

Authors' field work questions, 2022

Objective two: determine the causative delay factors specific to Apapa Port Complex, Lagos

Table 5. The causative delay factors specific to Apapa Port Complex, Lagos

Statement	Yes	No	Total
Does shoddy implementation of Port reform programs at the Apapa Seaport Complex, including no stacking area reserved for the Nigeria Custom Services, create delays in the clearing of consignments?	293	17	310
Do terminal operators' inefficiencies and the imposition of unreasonably high port dues affect speed of consignment release from the Apapa seaports?	197	113	310
Do inadequate port facilities at the Apapa seaports cause delay in discharge of consignments from the seaport?	279	31	310
Do government policies at the wharf result in clearing delays at the Apapa seaports?	195	115	310
Are inadequate transport network systems linked to ports responsible for delays at the Apapa Seaport Complex?	244	66	310
Do high costs of demurrage and cumbersome procedures for clearing goods result in delays to consignment clearing at the Apapa Seaport Complex?	291	19	310

Authors' field work questions, 2022

Building on the variables of Table 4, Table 5 indicates that a majority of respondents feel the issues listed are factors specific to the Apapa Seaport Complex.

H01: Delay factors do not significantly affect seaport performance in Nigeria. **HA1:** Delay factors significantly affect seaport performance in Nigeria.

Model Summary^b

Model	R	R-Square	Adjusted R-square	Std. Error of the Estimate	Durbin-Watson
1	0.851 ^a	0.761	0.752	-0.31979	2.168

- a. Predictors: (Constant), Nigeria Seaport Delay Factors
- b. Dependent Variable: Seaport Performance

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig
1	Regression	47.954	2	47.954	48.914	0.000 ^b
	Residual	12.681	270	0.102		
	Total	60.635	272			

- a. Dependent Variable: Nigeria Seaport Delay Factors
- b. Predictors: (Constant), Nigeria Seaport Performance

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig
		B	Std. Error	Beta		
	(Constant)	2.149	0.106		20.364	0.000
1	Nigeria Seaport Delay Factors	0.559	0.026	0.889	21.654	0.000

- a. Dependent variable: Nigeria Seaport Delay factors

The results show that Nigeria Seaport Delay Factors will result to 75.2% fall in Nigeria Seaport Performance with adjusted R-square value of 0.752.

H02: Delay factors do not significantly affect Apapa Seaport performance.

.HA2: Delay factors significantly affect Apapa Seaport performance.

.Model Summary^b

Model	R	R-Square	Adjusted R-square	Std. Error of the Estimate	Durbin-Watson
1	0.706 ^a	0.687	0.614	-0.31979	1.928

- a. Predictors: (Constant), Apapa Seaport delay factors
- b. Dependent Variable: Apapa Seaport Performance

ANOVA^a

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	47.954	2	40.154	51.914	0.000 ^b
1 Residual	12.681	269	0.102		
Total	60.635	271			

a. Dependent Variable: Apapa Seaport delay factors

b. Predictors: (Constant), Apapa Seaport Performance

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.149	0.106		22.364	0.000
	Apapa seaport delay factors	0.659	0.066	0.789	24.654	0.000

a. Dependent Variable: Apapa Seaport delay factors

The results show that Apapa seaport delay factors will result in 61.4% decline in performance with adjusted R-square value of 0.614.

4. DISCUSSIONS

The results show that Nigeria's seaport delay factors will result to a 75.2% fall in seaport performance with an adjusted R-square value of 0.752. Besides, the beta value of 0.559 and p-value that is less than 0.05, it is established that there is a significant influence of delay factors on seaport performance in Nigeria. Therefore, the null hypothesis is rejected and we accept the alternate hypothesis that there is significant effect of port delays on port performance in Nigeria. This complements the results of Onyema, Obinna, Emenyonu, & Emeghara (2015), Ugboma, Ibe, & Ogwude (2004), and Ndikom (2013) who all agreed that port clearing delays and congestions result to losses for both consignment owners and the government/economy. The study outcomes, however, disagree with Gong et al. (2015), Smith (2014), Zhang (2015), and Gazzano, Navarra, and Toffoletto (2012) who argued that port congestions do not result in losses for both consignment owners, the economy, and the government.

The results show that Apapa seaports delay factors will result in a 61.4% decline in performance with an adjusted R-square value of 0.614. Besides, the beta value of 0.659 and p-value that is less than 0.05, it is established that there is a significant influence of entrepreneurship on employment creation. Therefore, the null hypothesis is rejected and the alternate hypothesis is accepted. This result agrees with Ndikom (2006) and Emeghara (2012), who both agreed that delay factors at the Apapa seaports significantly affected its performance. Again, the study outcomes disagree with Gong et al. (2015), Smith (2014), Zhang (2015), and Gazzano, Navarra, and Toffoletto (2012) regarding port congestions not resulting to losses for both consignment owners, the economy, and the government.

5. CONCLUSION

This study set out to evaluate the delay factors at Nigeria's seaports with particularly interest in the Apapa seaports. The study used primary data through the administration of questionnaires to a port sample of 337 and received respondent feedback of 310. The resulting responses were analyzed and tested using the ANOVA statistic and the results of the tests indicate a significant effect of the delay factors on the port outputs in Nigeria and at the Apapa seaports.

Based on the forgoing, we recommend the following:

1. The federal government should endeavor to create more evacuation corridors to the seaports, particularly the Apapa seaports, as this will facilitate prompt service delivery in the seaport complexes and improve the ease of doing business.
2. The government should create functional and efficient evacuation infrastructures at the Apapa seaports including reducing multiplicity of agencies in the seaport to combat unhealthy competition and clear bureaucratic bottlenecks.

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