



Assessment of Factors Causing Congestion and Nature of Cargo Clearance in Apapa Port, Lagos, Nigeria.

¹Yusuf Ndagi Baba
(babayusuf89@gmail.com)

¹Shekwobagwu Paul Galadima
(galadimapaul11@gmail.com)

¹Ibrahim Damana Abubakar
(ibrahimdamana@yahoo.com)

¹Abdulmalik Muhammad Mustapha
(fadlulmalik@gmail.com)

¹Department of Transport Management, IBB University Lapai, Niger State, Nigeria.

Abstract

Port congestion is a situation where there are obstacles in the shipyard, wharf as a result of huge shipments that needs to be offloaded thus, hindering the free flow of cargos in the port. This creates an unpleasant scenario that harms the economy, and hampers international trade. When port congestion occurs, it opens the door for more effective, efficient and technologically driven changes that include adequate planning, overhaul of existing routines and systematic modifications to be implemented. The study assessed the nature of cargo clearance and factors causing congestion in Apapa Port. The methodology for this research was based on cross-sectional survey research design, with questionnaire as the primary instrument of data collection. The simple random and convenience sampling technique was utilised in reaching the selected sample of Seventy (70) respondents from Apapa port, Lagos, Nigeria. Analysis was also carried out using descriptive statistical method. The study revealed that the nature of cargo clearance was very cumbersome in Apapa Port. Also, multiplication of security agents and demographic changes were factors causing the port congestion. The study recommended the need for the elimination of bureaucratic processes causing delays as well as a smart and seamless discharge of duties by desk officers. Also, the expansion of road networks around the port by the government at Federal and State levels was deemed necessary to encourage free flow of traffic in order to inhibit localized congestion.

Keywords: Port congestion, Cargo clearance, Factors of congestion, Vessel traffic

1. Introduction

The global trade is growing at a faster rate and as a result, vessel sizes, cargo volumes as well as traffic at the ports have increased, creating overwhelming pressure on the yards and the stakeholders involved in port operations (Global Ports and Terminal Operations Market Report, 2021). Due to this increased pressure, the internal efficiency at operational level gets affected at the ports. According to the Global Ports and Terminal Operations Market Report (2021), the European ports are smaller, but handle a large amount of cargo. However, European ports are not capable of competing on port size alone as ports with comparatively less size or capacity to handle as much traffic as large-sized ports in the Asia Pacific. In the African continent, countries like Nigeria is faced with transportation and



traffic problems particularly, traffic congestion, delays, parking space difficulties and environmental pollution which started to manifest in Lagos since the early 1980's have continued to increase at an alarming rate and have now reached an abominable stage in recent years (PwC & Panteia, 2013). Sea transportation is an effective and affordable way to transport cargo globally, it may lack timeliness but presents the advantage of transporting goods of all sizes at affordable rates. There is an increase in international trade amongst countries due to globalization, development, and technology, which is of the utmost advantage to humanity. However, it has brought with it some disadvantages which require rapid solutions, one of which is port congestion. World Bank (2012) analyzed performances from port congestion in notable African ports of Durban in South Africa, Lagos in Nigeria, Mombasa in Kenya and Port Said of the Suez Canal in Egypt and found the average cargo waiting time to be between 20 to 22 days. It concluded that more than half of the time needed to transport cargo from ports to hinterland cities in landlocked countries in sub-Saharan Africa is wasted because of the time cargoes spend in ports.

Researches have shown that the leading causes of port congestion are improper documentation procedures, port management and operation, ship traffic inputs, port structure, strategy and government relations (Bolat, Kayisoglu, Gunes, Kizilay, & Ozsogut, 2020). Ports are the gateway by which there is exchange of commodities from surplus regions to the deficit regions. Ports play a key role in the maritime nations like Nigeria especially in terms of economy and development as nearly 75% of the trade between Nigeria and the rest of the world is handled in ports (Oyatoye, Adebisi & Okoye, 2011). Over the years, the Nigeria's ports system, especially as reflected at Apapa port has witnessed a lot of challenges occasioned by government policy inconsistency and other major factors that have ignited a lot of delays in ports operational modalities resulting to inefficiency and lack of productivity and also reflecting in some form of negative infectiveness of the maritime industry. Port congestion harms the economy, and hampers international trade. It presents a situation where ships are prevented from berthing due to a backlog of ships at port caused by many delays experienced at the ports (Xchange, 2020). When port congestion occurs, it opens the door for more effective, efficient and technologically driven changes, adequate planning, an overhaul of existing systems and making room for more modern and effective modifications to be implemented (Oyatoye *et al.*, 2011).

Several factors contribute to the traffic menace into and out of Apapa port complex. These include the lack of holding bays for empty containers, which is an unprofessional way of doing shipping business, unorganized parks by container trucks before proceeding to the port for loading and off-loading, effect of oil farms situated along this corridor, the narrow nature of the road especially in the trucking of heavy duty shipments, lack of alternative transport mode to road in this area which could have alleviated the current situation for better. Many shipping companies in Apapa area operate their businesses without having personal stemming port/holding bays for export shipments. Numerous research studies have indicated that port congestion is linked to port pricing problems (Gidado, 2015).



Some factors cause congestion, inclusive but not limited to; inadequate port and vessel facilities, inefficient port organization and administration, restraints resulting from stringent and unfavourable policies, inadequate transportation facilities, poor road network, and reliance on one major port. These factors hinder the efficient and effective running of the ports (Saeed & Larsen, 2016). There lies the problem that port congestion in berths results in delays, fines, gridlocks, accidents, queuing and extra costs. There is also an issue of pricing and other fees associated with the ports. It is in view of the forgoing background that this study seeks to assess the nature of cargo clearance and factors causing congestion in Apapa port, Lagos. To achieve this objective, the structure of this paper is classified into five (5) sections. Section one (1) looks at the introduction, section two (2) literature review, section three (3) materials and method, section four (4) results and discussions and section five (5) conclusion and recommendations.

2. Literature Review

Port congestion is a situation where there are obstacles in a shipyard, wharf as a result of huge port of shipments that needs to be offloaded thereby hindering the free flow of cargos in the port. Two important terms which cannot be ignored when conceptualizing congestion in a port are Terminals and Gateways (Rodrigue, 2020). The port area which harbours ships so as to offload its content is referred to as terminals. Various instruments are used in the port area such as cranes, lighters, forklifts etc. On the other hand, Gateways are channels linking shipment to their destinations either through the use of trains, cars or trucks. A seaport is always very important to the maritime authority as it helps generate income for the country as well as create employment to citizens.

When relating the port with trade, it represents the combination of a gateway and a terminal. It makes ship harbour connections like controlling, digging up, provision of berths and navigational channels care, interface of ship-port when stocking and unpacking cargo possible. (Ndikom, 2008, cited in Ndikom & Emeghara, 2012). As a maritime country, Nigeria has an extensive foreign trade base therefore most commodities are often imported/transported through the sea ports. Thus, one relevant mode of transportation that country transact foreign trade is by ocean shipping (Ndikom, 2008, cited in Ndikom & Emeghara, 2012). Several industries including the oil and gas industry rely on shipping to meet their transportation needs. They maritime industry is thus very important to the Nigerian government due to the economic role which it plays this therefore calls for improvement of the Nigerian port (Ndikom, 2008, cited in Ndikom & Emeghara, 2012).

Queuing Theory on Port Congestion

The queuing theory originated in the early 1900s by a Danish engineer, statistician and mathematician called Agner Krarup Erlang. The queuing theory mathematically examines the way congestion, and delays occur. It analyses every part of waiting on a queue, the number of servers and system places, number of customers and customers appearing in different forms, like people, cars and so on. Queuing theory covers a wide range of applications that are beneficial to businesses, from effective customer care, elimination of



delays, and efficient refund structure and fast logistics and so on. Queuing theory is also concerned with delivering the best possible service at the best and most affordable price (Kenton, 2020). This theory has two components: first, it involves someone or something requesting a service, and second, it involves someone or something delivering a service. The ports, on the other hand, receive these items, reload them onto trucks or container trucks, buses, cars and so on while collecting various fees to ensure that these items get to their final destination. The onus lies on the ports to deliver efficient and effective handing over for these items to the businesses or individuals who have made these purchases (Oyatoye, Adebisi & Okoye, 2011). Queuing theory has also been applied to the problem of port congestion highlighted by Oyatoye *et al.* (2011) who opined that it is a standardized method to port outline and management in order to have various movement of shipments, cargoes, and international merchandises under control. Moreover, this theoretical standard leverages on the ideals of “First come, first served” in the process of optimally conducting port supervision of merchandize in the berth.

Several factors exist as observed by this study which gives rise to congestion in Apapa Port, they include: *Structural influences*: This includes both physical and operational influences that affects the ports activities which tend towards congestion especially when supply is high. Also, at times there are scenarios where ships are unable to berth or cargoes are left at the port for days by shippers (Oyetayo, 2011; Nze & Onyemechi, 2018). Delays by port officials also bring about more expenditure to importers as well as final consumers making commodity price constantly be on the rise. Inefficiency and lack of control of port workers has brought a rise in tribalism, and corruption thus increasing port congestion. *Physical environment*: This covers the visible surrounding of the port. When the immediate surrounding of the sea port has an unfavourable weather condition, malfunctioning port equipment, high influx of imported and exported goods, etc. these are examples of physical environmental factors causing more congestion at the terminus of the port. *Organizational factors*: This entails the challenges in the implementation of policies by the government on port decongestion due to inadequate definition of policies, over-ambitious policies, lack of policy continuity and encouragement in the utilization of other ports in other parts of the country, lack of clear definition in responsibility and coordination, inadequate governmental sensitivities that lead to industrial strike action which usually leads to a stall in the work processes at the seaport and corrupt practices like issues of theft, misappropriation of government funds which is substantively dangerous to the development of the sector and invariably, to the investment from foreigners/international traders. *Demographic changes*: This entails the inadequacy of some seaports to measure the rapid modernization trends in the developmental process of society towards an increasingly integrated global economy to achieve all-around capacity and subsequently, human capital problems. This leads to the accumulation of shipments, which should necessitate broadening the areas around the seaport to relieve port congestion without unnecessary amplifications (Hellenic Shipping News, 2021).



Empirical Review

Casmier, *et al.* (2017) in their study on the factorial analysis of delay causative factors in Nigerian ports opined that, among factors influencing congestion in Nigerian ports, lack of storage facilities was top on the list, showing a factor loading of 0.708 and a percentage rate of 71%. The factor loading test also showed the decision associated with administrative bottle neck as the next most important, followed by organizational classification. The two had a factor loading of 0.707 and 0.611 respectively. Nze and Onyemechi, (2018) in their study on port congestion determinants and impacts on logistics and supply chain network of five African ports (including Lagos port) revealed that the bane of congestion in African ports is entirely due to poor planning, regulation, capacity, efficiency or a combination of these. Ibeawuchi and Chinedum (2018) presented a paper on port congestion determinants and impacts on logistics and supply chain network of five African ports, in which the authors used a ranking concept to evaluate the variations in ship turnaround time to identify the factors that cause port congestion in African ports, according to their results port congestion is caused by a lack of planning, regulation, capacity and efficiency. According to an article written by Lam *et al.* (2015) on disruption risks and mitigation strategies an analysis of Asian ports, the purpose of this paper was to analyse and categorize the disruptions that have occurred in Asian ports, the result of this research identified labour strikes and natural disasters as the leading causes to port disruption. Loh, *et al.* (2017) in an article on a fuzzy comprehensive evaluation of port centric supply chain disruption threats, the authors evaluated and identified port centric supply chain disruption threats, the result of their research showed that the major contribution to the disruption at the port pertains to planning and infrastructure.

3. Methodology

The methodology for this research was based on the research design. The cross sectional survey research design, which involves the use of questionnaire, was adopted in this study to find out the existing situation at Apapa port using simple random and convenience sampling technique. A total of Seventy (70) respondents were drawn and sampled from Apapa port, Lagos, Nigeria by means of convenience sampling. The design was chosen because it provides appropriate methodology for opinion and perception of human behaviour. The test-retest method: is a method of establishing a correlation between the quality of (primary) data obtained by the researcher, which is determined by comparing the results of the same determining method administered to the same participants on two (2) different occasions. By deliberately, comparing the analysis results over time, it allows the researcher to see how stable and suitable the investigation is within a time frame.

Prior to the distribution of the questionnaires, the email of staff of the Apapa port were sought and gotten by the researcher from the Port HR department and seventy-six (76) Google form questionnaires were administered through the collected email. A significant proportion, (73) of the Google form-based questionnaires dispatched via email were submitted, thoroughly filled out but three (3) of the submitted forms were not completely filled and were expunged from the investigation. This made the total valid submitted



questionnaires be Seventy (70), signifying a 92.1% completion rate and deemed very reasonable enough for further analysis. The seventy (70) questionnaires were later analysed in the Statistical Package for Social Science (SPSS) IBM 20 software. Before going ahead to carry out the analysis, two (2) tests were conducted on the collected data and they included; reliability and normality tests.

The purpose of conducting reliability test was to check for error in interpretation of the instruments as well as for respondents' bias in the course of responding to the questions, meanwhile, normality test was conducted to ascertain the distribution of the data collected and thereby establishing the appropriate method of analysing the data. The result of the reliability displayed a strong Cronbach alpha coefficient of 0.809 (see table 1), an indication that the responses to the instruments of the questionnaire were to a great extent, devoid of the error in interpretation and devoid of bias. Meanwhile, result of the normality showed that the data had a normal distribution. Descriptive statistical analysis was adopted for the analysis of the collected data.

4. Results

Table 1: SPSS Result of the Reliability Test

Cronbach's Alpha	N of Items
.809	12

Table 2: Socio-demographic Characteristics.

Variables	Frequency	Percentage
<i>Gender</i>		
Male	62	88.6
Female	8	11.4
<i>Age group (years)</i>		
Less than 25	8	11.4
25 – 34	36	51.4
35 – 44	14	20.0
45 – 54	8	11.4
55 above	4	5.7
<i>Type of organization</i>		
Terminal operator	12	17.1
Shipping company	18	25.7
Hauler	14	20.0
Freight forwarder	8	11.4
Customs	4	5.7
Stevedore	14	20.0
Other	0	0.0
<i>Role in the organization</i>		
Admin.	4	5.7
Technical	38	54.3
Security personnel	16	22.9
Other	12	17.1

Source: Authors' online survey, 2022.



Table 2 above reveals the socio-demographic characteristics of respondents. From the analysis it is seen that males were 62 (88.6%) while females were 8 (11.4%) indicating that majority of respondents are male. The age group reveals that respondents who are less than 25 years are 8(11.4%), 25-34 years were 36 (51.45), 35-44 were 14 (20.0%), 45-54 years were 8 (11.4%) and 55 above were 4 (5.7%). This is an indication that majority of respondents are aged 25-34 years of age.

In examining the type of organization which respondents belong to, terminal operators had 12 (7.1%), shipping companies were 18 (25.7%), haulers were 14 (20.0%), freight forwarders were 8 (11.4%), customs were 4 (5.7%), stevedores were 14 (20.0%) and others were zero. This indicates that respondents working with shipping company are the majority. The role which respondent play in their various organization reveals that 4 (5.7%) were admin, 38 (54.3%) were technical, 16 (22.9%) were security personnel and others were 12 (17%). This indicates that majority of respondents were technical personnel.

Table 3: Factors Causing Port Congestion.

Factors	SD	D	N	A	SA
Ranking	1	2	3	4	5
Legal Instrument	9(12.9)	13(18.6)	6(8.6)	16(22.9)	26(37.1)
Bureaucracy/Documentation	6(8.6)	12(17.1)	4(5.7)	20(28.6)	28(40.0)
Multiplication of security agents	5(7.1)	11(15.7)	6(8.6)	22(31.4)	26(37.1)
Inadequate space and infrastructure	17(24.3)	18(25.7)	2(2.9)	16(22.9)	17(24.3)
Lack of rail transportation	8(11.4)	11(15.7)	6(8.6)	14(20.0)	31(44.3)
Malpractices/Corruption	12(17.1)	19(27.1)	0(0.0)	16(22.9)	23(32.9)
Demographic Changes	2(2.9)	8(11.4)	4(5.7)	23(32.9)	33(47.1)

*Note: SA is Strongly Agree, A is Agree, D is Disagree, SD is strongly Disagree, and N is Neutral.
 Source: Authors' online survey, 2022.*

Table 3 reveals factors causing port congestion. 9 (12.9%) strongly agreed that Legal instrument causes port congestion, 13 (18.6%) disagreed, 6 (8.6%) were neutral, 16 (22.9%) agreed and 26 (37.1%) strongly agreed. This indicates that most respondents strongly agreed that legal instrument cause port congestion. Bureaucracy/ documentation; 6 (8.6%) strongly disagreed, 12 (17%) disagreed, 4(5.7%) were neutral, 20(28.6%) agreed and 28(40.0%) strongly agreed indicating that most respondents strongly agreed that bureaucracy/documentation is a factor causing port congestion.

Multiplication of security agents; 5(7.1%) strongly agreed, 11 (15.7%) disagreed, 6(8.6%) were neutral, 22(31.4%) agreed and 26(37.1%) strongly agreed indicating that majority of respondents strongly agreed that multiplication of security agents is a factor causing port congestion. Inadequate space and infrastructure; 17(24.3%) strongly agreed, 18 (25.7%) disagreed, 6(2.9%) were neutral, 16(22.9%) agreed and 17(24.3%) strongly agreed indicating that majority of respondents strongly agreed that inadequate space and infrastructure is a factor causing port congestion.

Lack of rail transportation; 8(11.4%) strongly agreed, 11 (15.7%) disagreed, 6(8.6%) were neutral, 14(20.0%) agreed and 31(44.3%) strongly agreed indicating that majority of



respondents strongly agreed that Lack of rail transportation is a factor causing port congestion. Malpractices/Corruption; 12(17.1%) strongly agreed, 19(27.1%) disagreed, 0(0.0%) were neutral, 16(22.9%) agreed and 23(32.9%) strongly agreed indicating that majority of respondents strongly agreed that Malpractices/Corruption is a factor causing port congestion.

Demographic Changes; 2(2.9%) strongly agreed, 8 (11.4%) disagreed, 4(5.7%) were neutral, 23(32.9%) agreed and 44(47.1%) strongly agreed indicating that majority of respondents strongly agreed that Demographic Changes is a factor causing port congestion.

Table 4: Nature of Cargo Clearance Process

Nature	Frequency	Percentage
Very cumbersome	34	48.6
Cumbersome	24	34.3
Not Cumbersome	12	17.1
Total	70	100.0

Source: Authors' online survey, 2022.

Table 4 shows the nature of cargo clearance process; very cumbersome 34 (48.6%), 24 (34.3%) cumbersome and 12(17.1%) not cumbersome. This indicate that the nature of cargo clearance process is mostly very cumbersome.

Table 5: Descriptive Statistical Analysis of the Factors Causing Port Congestion

Factors	Mean	Median/cut-off	Minimum	Maximum
Legal Instrument	3.52	4.00	1.00	5.00
Bureaucracy/Documentation	3.74	4.00	1.00	5.00
Multiplication of security agents	3.75	4.00	1.00	5.00
Inadequate space and infrastructure	2.97	2.50	1.00	5.00
Lack of rail transportation	3.70	4.00	1.00	5.00
Malpractices/Corruption	3.27	4.00	1.00	5.00
Demographic Changes	4.10	4.00	1.00	5.00

Source: Authors' online survey, 2022.

The decision rule is: If median is higher than mean, this is a factor, if median is less than mean, it is not a factor.

Table 5 shows the descriptive statistical analysis of factor causing port congestion. For legal instrument, a mean value of 3.52 was derived median value of 4.00 which is greater than the mean, therefore this is not a factor. Bureaucracy/documentation had a mean value of 3.74 and a median value of 4.00 which is higher than the mean. Thus, this is not a factor. For multiplication of security agents, a mean value of 3.75 and median value of 4.00 which is greater than the mean that was observed. Thus, this is not a factor. For inadequate space and infrastructure, a mean value of 2.97 which is greater than the median value of 2.50 indicating that this is a factor causing port congestion.

Lack of rail transportation had a mean value of 3.70 which is less than the median value of 4.00 indicating that this is not a factor. Malpractices/corruption had a mean value of 3.27



which is less than the median value of 4.00. Indicating that this is not a factor. Demographic changes had a mean value of 4.10 which is greater than the median value of 4.00. Thus, demographic change is a factor causing port congestion. Therefore, inadequate space and infrastructure, and demographic changes are the key factors causing congestion in Apapa port.

Discussion of Findings.

The study discovered that cargo clearance process is very cumbersome. The study also discovered that inadequate space and infrastructure, and demographic changes are factors causing congestion in Apapa port. This study disagrees with the findings of Nze and Onyemечи, (2018) who discovered that inadequate planning, capacity, regulation, and efficiency are factors which causes congestion in the Lagos port. The number of containers arriving at the Apapa wharf daily are large and due to the uniqueness of each item as well as the value of each products, the port attendants take their time to ensure that due process has been followed, for example, the type of contract signed between the seller and buyer, the taxes to be paid must be paid etc. Sometimes, cargo clearance may take days or even weeks to get done making users of the port experience so much stress going back and forth to clear their goods. This turns out to be very cumbersome for users. The logistics ring of the Apapa port can only handle 2,400 trucks daily, whereas 7,000 trucks need to pass through every day (Hellenic Shipping News, 2021). These trucks can sometime go through various security processes before they eventually get moved into the main city. For every stoppage for security checks, time is spent thus causing delays. Also, going by the queuing theory which leverages on the ideals of “First come, first served” which is intended to bring about orderliness and due process in the conduction of port supervision of merchandize, there is a sense of disorderliness, lawlessness and corruption among many Nigerian drivers and port officials which often leads to anarchy and unwarranted delays in a bid to “hasten” the clearance processes through such sharp practices, thereby subjecting most individual to this unpleasant process of poor service delivery and limited movement around the port which culminates in making cargo clearance process very cumbersome. Demographic change causes port congestion when the population of people living within the port environment increases drastically more than it was at the inception of the port services. More vehicles begin to ply the port route more regularly comprising residents, privates and commercials going to clear their imported goods. Looking at Nigeria’s growing population as well as the density of population living in Lagos, it can easily be deduced that the high population associated with these geographic regions will definitely affect the free flow of traffic thus leading to congestion in the port.

5. Conclusion and Recommendations

Conclusively, it can be said that the nature of cargo clearance is very cumbersome in Apapa port, Lagos. Also, inadequate space and infrastructure, and demographic changes are factors causing port congestion. Port congestion can be reduced if necessary steps are taken to reduce it.



It is therefore, recommended that the processes involved in clearing cargo be reduced and only the most important steps should be taken when clearing cargos i.e. bureaucratic processes that brings about delay must be eliminated and every staff who needs to sign one document or the other needs to always be available to discharge their duties. Although security agents are important within the port, however activities of security agents should be conducted swiftly to avoid unnecessary delays.

Also, the deployment of technology is essential for faster cargo clearance. This is very important to eliminate the need for keeping goods longer than necessary. Demographic change causes port congestion when the population of people living within the port environment increases drastically more than it was at the inception of the port services. More vehicles begin to ply the port route more regularly comprising residents, privates and commercials going to clear their imported goods. Hence, the need for the government to expand the road network in and around the port to encourage free flow of traffic.

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