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Physical Cargo Examination and Imperative of Port Automation in Nigeria: The Emerging Realities of Post COVID-19 Pandemic

Ogbuka, Josiah[1], Uzochukwu, I. Ozumba[2], Ijeoma, U. Camenus[3], & Paul C. Ezinna, Ph.D[4]

1 Institute of Maritime Studies, University of Nigeria, Enugu Campus.
2 Institute of Maritime Studies, University of Nigeria, Enugu Campus
3 Centre for Distance Learning & e-Learning, University of Nigeria, Nsukka.
4 Institute of Maritime Studies, University of Nigeria, Enugu Campus
Correspondence: paul.ezinna@unn.edu.ng

Abstract*: For years, there has been the huge debate about physical cargo examination and automation of port operations in Nigeria. The debate raged while the ports kept brimming over with cargo volumes, resulting in perennial congestion within the ports and their environs. The contending views are about trade facilitation, revenue generation, security and Nigeria Customs continued practice of 100 per cent physical examination of cargo. The practice continued despite the introduction of cargo scanners in Apapa and Tin Can Island ports of Lagos which are the hub of maritime business in Nigeria. Against this backdrop, the study focused on physical cargo examination and automation of port operations in Nigeria with particular attention on P**ost-**COVID-19 pandemic and the emerging realities about operations of the ports. The documentary method of research was adopted for the study while the Concept of Smart Port served as the framework for interpretation of the study. The study discovered that there is an increase in the digitalization of port operations and concludes that the expected digital revolution for automation of Nigerian ports must go hand-in-hand with human capital support and infrastructural development in order to reach its potential.*

Keywords: Physical cargo, Examination, Port, Automation, Covid-19.

1.1 Introduction

Seaports currently represent one of the most important logistic centres for each territory due to the fact that more than 80% of worldwide freight is transported using this method (Bilogistik, 2017). However, Nigerian ports have continued to contend with cargo delays and backlogs due to low levels of automation. Physical examination of cargoes, paper documentation and physical contact have often slowed down pace of development in the nation's ports (Agbota, 2020). Agbota further noted that "Nigeria is still struggling to acquire modern scanning machines and other technology apparatuses, while other maritime nations have adopted the use of technology through massive investment to turn their ports into "smart ports."

Physical examination of cargo in this context is the detailed manual inspection of containerized goods at the port to ensure that the goods do not pose health, safety and security risk, to the destination country. In Nigeria the lead agency for this purpose, among others, is the Nigeria Customs Service. The Seaport Terminal Operators Association of Nigeria (STOAN), "recently expressed worry at the continued manual examination of cargoes at the seaports even in the face of the current global health crisis" (Haastrup, 2020). According to Haastrup, "there is the need for Nigeria Customs Service (NCS) to deploy technology to drive the process. The situation where people must visit the port physically to do customs documentation and cargo examination before they can take delivery of their consignments is inefficient and not safe". To further facilitate the process, "stakeholders in the shipping industry have harped on the need to reduce the number of government agencies involved in cargo examination". According to Haastrup (2020), "there was the need to reduce the number of government agencies participating in cargo examination at the ports in addition to reducing the number of checks carried out on cleared cargoes both inside and outside the ports. Customs clearing process must become smart at this time". To be smart in this context implies to be automated. Port automation, according to Dauda (2020), "is the use of integrated technology to develop intelligent solutions for efficient control of traffic and trade flows at the port, thereby increasing capacity, efficiency and generate more revenue to boost the economy". It is argued that implementing automation in all the processes of port operations in Nigeria will facilitate timely clearance of cargo and address the intractable port congestion that has become the hallmark of Nigeria ports. According to Canadian Pacific Consulting Services-CPCS (2020), "6,000 idle trucks queue up at the ports at all times and Congestion costs Nigeria US$19 billion a year". Similarly, "Dynanmar, a Dutch consultancy firm, declared that "widespread congestion at the Nigerian ports costs the nation about $55 million (about N20.8 billion) per day (Salau, 2020)". While port congestion in Nigeria may not be attributed to a singular cause, the dominant factor is physical examination of cargo. According to Echenim (2020), "Nigeria is possibly the only port doing physical examination of cargoes. There is nowhere else in the world where physical examination of imports and exports are done. It is sad that for a container that could be scanned within five minutes, Customs officers spend hours to perform physical examination". As succinctly put by the ex-Executive Secretary of Nigeria Shippers Council (NSC):

> *"The way imports are processed at the port, with Customs doing physical examination of containers remained a potential source of corruption at the port, automation of port processes remains the way to go. It takes five minutes to examine a container and pass it when we have scanners. It is five hours when we do physical examination. At every stage there has to be some level of automation to reduce physical contacts when doing business at the port. Human interface or contact is a source of corruption and delay. Physical interference also breeds inefficiency (Echenim, 2020)".*

According to the Seaport Terminal Operators Association of Nigeria (STOAN), "the absence of functional scanners at the nation's ports and its consequent 100 percent physical examination of cargoes by Customs officials have thwarted gains of the government's Ease of Doing Business agenda" (Anagor, 2020). Hence, the essence of this study, is to examine the ongoing practice of physical cargo examination, the imperative of port automation and the emerging realities after COVID-19 Pandemic experience.

2.1 The Concept of Smart Port

The port and container shipping industry are often regarded as conservative and resistant to change. However, "the emerging new technologies, systems and solutions will alter this perception in the coming years, leading the entire sector to a brighter, more connected future" (Donnelly, 2021). Some of these emerging new technologies are necessities borne out of COVID-19 Pandemic lessons. Donnelly further stressed that "the need to evolve and become 'smart' is even more paramount today with the changing demands of global trade: ships are getting bigger; goods are moving faster; and geopolitical issues are creating new challenges for ports all around the world". As a recent concept, Smart Port lacks a generally accepted definition. According to Port Technology (2016), "opinions on smart ports are divided, but where these thought paths cross is when efficiency is taken into consideration. Whether ports rely on smarter practices or by implementing smart technology and physical infrastructure, the common denominator is achieving greater productivity and efficiency using both methods". According to Bilogistik (2017), "the Smart Port concept entails the use of technologies to transform the different public services at ports into interactive systems. And its purpose? To meet the needs of port users with a greater level efficiency, transparency, and value". A smart port according to Agbota (2020), "is one that uses automation and new technologies such as artificial intelligence, big data, Internet of Things (IoT) and blockchain to improve its performance. Smart port enhances efficiency, competitiveness and boosts revenue". In a smart port, "big data facilitates new planning guides and facilitates port logistics through the compilation and connection of information on ship positions as they arrive at or leave the port" (Agbota, 2020). For Bilogistik, "the concept revolves around two ideas that are as innovative as required in this new global and social context: efficiency and use of resources". In the view of Olaf Merk, Administrator for Ports and Shipping at the ITF of the OECD, "Smart mean: no waste of space, time, money and natural resources" (Port Technology, 2016). According to Donnelly (2021), "Smart Port is a port that uses automation and innovative technologies including Artificial Intelligence (AI), Big Data, Internet of Things (IoT) and Blockchain to improve its performance". "Through the IoT, ports are transformed into maritime information-network hubs. Relevant data about vehicles, ships and cargo movement are collected and used in real time to coordinate with shipping and logistics partners because everything has been automated" (Agbota, 2020). Agbota further noted, "that in a smart port, cost-effective sensors are installed in or along, quay walls, roads, railways and bridges, transmitting real-time data about operating conditions. This also enables the port to proactively identify needed maintenance or repairs and thereby avoid unplanned downtime". In light of this perspective Bliek (2021), posits thus:

> *A Smart Port is a port upgraded from being a physical port to a digital port. In such a digital port, the quay walls are to have digital twin and the digital twin enables the port to do predictive maintenance, predictive berthing and all sorts of other stuff that can't be done with just a physical quay wall. By that, the port can save money from dredging, maintenance, boat patrol, etc. It's really an efficiency of the port authority for now and future development in the industry, such as autonomous vessels. Being digitalized, the port will be able to communicate with such vessels that don't have people on board. That incentivizes the need to go digital and be a smart port.*

In a similar context, "the disintermediation witnessed in the shipping industry also demands the ports to be smart and for Port Authorities to be able to execute their authority, they also need to be digital" (Bliek, 2021). In Smart Port environment, "cargo handling is digitally connected, thereby helping ports to increase their handling capacity and productivity by ensuring that stacking cranes, straddle carriers, forklifts, and other equipment are correctly maintained and operate at peak efficiency. This also includes the automatic identification and detection of containers" (Agbota, 2020).

Nigeria as a country is still struggling to acquire scanners for cargo examination. So, "when you don't even have scanners to facilitate Customs examination, how can you be talking of smart ports? Unlike, the Port of Rotterdam, there are pieces of equipment to ensure that vehicles that are coming into the port are automatically captured, especially the ones that are coming in for cargo loading and all of that" (Agbota, 2020). However, the Nigerian Ports Authority (NPA) has "revealed that measures and investments are being undertaken to create a fully digital ecosystem in port locations across Nigeria by 2025" (Donnelly, 2021).

Furthermore, "Port of Antwerp International (PAI), the Asian Pacific Economic Co-operation (APEC) maritime training center and Nigerian Ports Authority recently signed a collaborative agreement to further expand Nigeria's port development" (Donnelly, 2019).

2.2 Port Automation

One of the common evidences of modern port is less human traffic and loitering of persons. It is an evidence of a port that has transformed from mechanization to automation of port operations. For instance; "in the ports of Shanghai and Singapore, automation is the key word covering decision making (yard management), gates, tracking and tracing, yard cranes, quay cranes, freight forwarding and indeed trucking system. Everything works perfectly with no congestion and breakdown on the port environment. It is all trade facilitation at best" (Ugwoke, 2020). According to Nweke, "an automated port system is that which possesses the capacity for unhindered communication via Single Portal which provides for single lodgment process, validation of data, inbuilt security device, prompt business intelligence monitoring and responses, accommodate users templates, minimizes efforts for all parties via seamless net-workings" (Ugwuoke, 2020). According to Hokuyo (2021), "Port automation is the application of Artificial Intelligence (AI) or automated machinery to improve the efficiency of logistics operations – a typical port automation process refers to automated logistics operations within a distribution center or warehouse aided by supply chain engineering systems and Enterprise Resource Planning (ERP) systems". As it were, "a little hindsight can reveal the fact that from the steam engine, to the forklift, to present-day's robotic pickers and packers, the history of logistics also speaks a history of automation" (Hokuyo, 2021). Hokuyo, further acknowledged that "automation is driven by the two major trends: escalating shortage of labor and an ever-increasing demand from online retailers".

The Ports of Auckland case study emphasize that 'automation is first and foremost a significant investment, and achieving value is essential" (Donnelly, 2022). According to Alan Peterson in Donnelly (2022:12), "Automation is about consistency, efficiency, and ROI. For instance; if a terminal operator is going to invest $300 million to create an automated terminal, it's all about how quickly the operators can see the money returning to them". Port automation, according to Dauda (2020), "can be defined as the use of integrated technology to develop intelligent solutions for efficient control of traffic and trade flows at the port, thereby increasing capacity, efficiency and generate more revenue to boost the economy". As matter of fact, port automation is capital intensive, as such government or any private investor will invest proportionately to the capacity of the port and possible quick return on investment. The capacity of the port and the investor are fundamental to the demand of port automation. This is why the degree of automation differs from port to port. Shmgroup (2018), put it thus:

> *"The degree of automation differs from port to port, depending on the capacity of the port, its location, the amount of cargo it handles, and its economic value. With the growth of mega-ports, the scope of port automation has increased to an unprecedented level."*

In this regard, port automation is a function of the profile and financial muscle of the port. That's why it benefits mostly large ports otherwise known as 'Tier 1' ports that have the infrastructural and financial clout. Shmgroup (2018) revealed that "across the globe, there are only 30 (3%) terminals that can be considered fully automated, when it comes to container transportation". The remaining 97% of port terminals, according to Marom (2021), "are more vulnerable to major market-shocks such as the disruptions introduced by the COVID-19 pandemic and its aftermath". For Innovez One, a port management software provider, "of the 4,900 ports in the world, the majority are not yet using digital technology for even the most basic processes. In fact, 80% of ports continue to rely on manual, legacy solutions such as whiteboards or spreadsheets to manage critical marine services such as towage, pilotage and launch boats. This leaves many ports commercially vulnerable and less able to compete in an increasingly digital world" (Safety4sea Editorial Team,2021).

2.2.1 The Three Principal Areas of Port Automation

The three principal areas of port automation include: the gates, the Ship-to-Shore cranes, and the stacks.

Automation at port gates: Port gates are for identifying and recording of every form of entry and exit of the port. This involves automating the basic port gates processes otherwise done manually, such as entry and exit logs, verification and docking. For ships, "it also includes additional security checks, verification, customs, immigration, and quarantine. These are crucial tasks necessary to protect the integrity of the port and require implementation of stringent security measures" (Shmgroup, 2018). Automating the port gate processes ensures that as the volume of container traffic through the port increases, managing the flow becomes easier, better organized and prevents congestion.

Ship-to-shore cranes: This involves the use of manned and unmanned cranes to unload cargo from the ship to the shore. It makes "the containers handling systems stable, predictable, and highly efficient as the cranes are controlled by a computer. The planning

and execution processes become extremely smooth, achieving the required outcomes in the least possible time" (Shmgroup, 2018). Automated cranes, according to Maruf Animashaun in Dauda (2020) "are used to deliver the containers from the ships to the port by means of unmanned horizontal transportation or unmanned yard cranes. These are later classified by the type of cargo and stacked accordingly in the inventory".

Stacks and inventory: This stage of operation in the automated port processes comes to bear as soon as the cargoes are unloaded from the ship. According to Shmgroup (2018), "Once the cargo has been offloaded on the port, …. cargo handlers and stacking cranes are used to stack the containers as per the category specified. The inventory is often managed by the date of departure inland. As the containers are to be dispatched for further transportation, robots are once again used to bring them to the designated station and prepare them for the road ahead. Furthermore, Shmgroup (2018), noted that "safety is one of the major concerns while designing the robotic equipment used to assist in cargo transportation. As such, a smart design takes into account the level of human-machine interaction involved, and the entire process is analyzed to optimize inventory flow and ensure that there is no friction between multiple processes".

2.3 Method of Study

The method of this study is documentary based. The data for the study were generated via the use of secondary sources of data such as books, journals, internet publications and publications from national and international organizations. Qualitative descriptive analysis was adopted for the analysis of the qualitative data.

3.1 Pre COVID-19 Pandemic Port Operations

The cargo clearance processes in Nigeria ports before COVID-19 Pandemic was nothing short of chaotic, archaic and primitive, due to overconcentration of agencies, manual and paper-based operations. For instance; "before COVID-19 crowd control was a major problem for Tin-can Island port" (Bivbere, 2020). "For a typical West African country, such as Nigeria, or Ghana, there are about 200 pieces of information to be provided by an importer/exporter at offices of about 14 government agencies, banks and insurance and some of these may require a return visit where mistakes occurred (Echenim, 2020)". According to the former Executive Secretary of Nigerian Shippers' Council (Hassan Bello), the process of goods clearance at the nation's seaports was archaic and "near primitive" (Ships & Ports, 2013). Bello also noted that "there were many institutions in the port each with specific responsibilities and there were no synergy and interchange for prompt cargo clearance among them". Acknowledging the fact, Echenim (2020), remarked that "too many agencies domiciling in the port have been an age-long cause of the widespread corruption and bureaucratic bottleneck in the port. Therefore, merely eliminating the agencies without exploring areas of automation and digitalization of trade processes by all port stakeholders will yield little or no results in easing up the country's trade processes". Added to the complexity of the scenario was the lack of port infrastructure and the practice of 100% physical examination of cargo. They gave rise to intractable port congestion. Conflicting interests, distrust and lack of collaboration among port Agencies constitute the cause factors for delay and congestion in the Ports. By estimation, "congestion costs Nigeria US$19 billion a year" (Canadian Pacific Consulting Services, 2020). According to the National Association of Government Approved Freight Forwarders (NAGAFF), "80 per cent of freight forwarders have developed hypertension due to the cumbersome cargo clearing process" (Oritse, 2020). To that effect, "the National President, Council of Managing Directors of Licensed Customs Agents (Lucky Amiwero) called for the declaration of a state of emergency in port operations in Lagos (i.e. Apapa and Tin Can island ports) to decongest the backlog of cargo" (Bivbere & Obiakor, 2020). According to Akinola, spokesperson of Seaport Terminal Operators Association of Nigeria (STOAN), "the absence of functional scanners at the nation's ports and its consequent 100 percent physical examination of cargoes by Customs officials have thwarted gains of the government's Ease of Doing Business agenda" (Anagor, 2020). The "International Monetary Fund (IMF), during its 2020 inspection of Nigeria ports, identified absence of a national single window platform, scanning machines for Customs operations and poor port access roads as the limitations. This was worsened by congestion inside the ports, occasioned by inadequate port infrastructure and poor management of empty containers" (Echenim 2020). The House of Representatives Committee on Nigeria Customs Service (NCS), expressed shock to "the non-functional scanners which were meant to detect arms and ammunition concealed in containerized cargoes rotting away at the ports, thereby further putting the country at risk of unrelenting insecurity" (Baiyewu, 2020). The "House of Representatives, also faulted physical inspection of cargoes at the seaports and land borders, and requested the Federal Government to install functional scanners to make for speed and efficiency". According to Okon (2020), "For the Customs Examining Officer, physical cargo inspection can be life threatening, many officers have sustained injury this way and some have even lost their lives". This reality, is against the fact that federal government in its attempt to modernize the operations of NCS in 2006, introduced scanners for seamless clearance of cargo in the ports and land boarders but were made unfunctional through internal sabotage within NCS for pecuniary reasons (Oseghale, 2019). As such,

> *"Nigerian seaports are still operating at a disadvantage to their West African neighbours. This is because there are numerous unsolved problems like the [impassable] port access roads which in turn cause a gridlock that stretches for many kilometres, grounding business and movement. That alone has made 48-hour cargo clearing impossible without factoring in other challenges. According to the Chairman, Seaport Terminal Operators Association of Nigeria (STOAN), more than N20 billion is lost to delays, illegal charges, insecurity and traffic jams now prevalent with Nigerian seaports. This amount is a good chunk of the country's Gross Domestic Product (GDP). This is unfortunate especially at a time Nigeria needs all the foreign exchange it can get due to plummeting oil prices" (Oseghale, 2019).*

Despite the fact that Nigeria controls 75 per cent of trade in the whole of West Africa Echenim (2020), Oseghale, further maintained that "Until Nigeria modernizes cargo examination in addition to resolving other challenges at its seaports, the loss of huge amounts of revenue to our West African neighbours will remain inevitable.

3.2 Port Operations During COVID-19 Pandemic

In the effort to curtail the spread of coronavirus, both federal and state governments instituted the policy of lockdown of social and commercial activities. However, the port as an essential gateway and life-line of the economy could not be locked down but there was drastic reduction of the usual vehicular and human traffic at the ports. According to Anaroke (2020), "Operations across most sectors of Nigeria's economy were suspended as part of efforts to curb the spread of coronavirus, but Nigerian ports remained operational to aid the evacuation of essential items such as food, petroleum products, medical equipment and safety materials to combat the pandemic". In this regard, the Nigeria Shippers Council (NSC) during the lockdown responded in a number of ways to ensure that the ports were open and operational. For instance, "as part of the general response, NSC set up a 'Maritime Task Team on COVID-19' composed of not just its own officers but also those of sister agencies, provided transportation to and fro the ports daily for freight forwarders, donated N10 million for specific and collective fight against COVID-19, ensured that operators evacuating cargoes from the ports reduced their charges by 30%, suspended demurrage charges and refunded charges collected during the lockdown, leveraged on Information Communication Technology to set up an online community so that certain port users can work from home, and adopted multi-modal cargo evacuation" (Echenim, 2020 & Nwamu, 2020) in (Ezinna & Ogunlela, 2020). These responses are simply to ensure seamless port operations and ameliorate the fiscal burden on port users much as it is widely believed that sustaining some of the responses will get the ports operating round the clock, even in the aftermath of COVID-19 Pandemic (Ezinna & Ogunlela, 2020).

In addition, the pandemic seemed to have unified the port stakeholders to act collectively and in unity of purpose to ensure orderly facilitation of trade. Anaroke (2020), captured the scenario thus:

> *"Unexpectedly, the pandemic opened up new vistas in the maritime industry, setting new standards that will help reshape the nation's port operations. It was a positive indication that the age-long dream of a new port order is possible with the possibilities of minimal disagreement for greater collective acquiescence by operators and stakeholders. From the terminal operators, government agencies, shippers, freight forwarders, bankers, shipping lines, trade unions to haulage operators, there was unity of purpose to facilitate trade".*

Three key developments of that period were: setting up of a virtual port community system; encouraging multi-modal evacuation of cargo via the road, rail and inland waterways; and making the ports work on public holidays and weekends (Anaroke, 2020). Whether these three keys of pandemic induced development were sustained remains a concern. In the absence of functional scanners and in attempt to reduce physical contact and enhance social distancing, the Nigeria Customs Service (NCS) as of then, "disclosed their intension to deploy endoscopic cameras for cargo examination at the nation's seaports" (.Foyeku, 2020). Furthermore, NCS, further stated that "it will decrease the number of containers that will go into physical examination while they try to increase the percentage of goods that go into green and blue lanes, because they cannot stop physical examination of cargo" (Foyeku, 2020).

3.3 Post COVID-19 Pandemic Emerging Realities about Port Operations

The Post COVID-19 emerging realities about Nigerian ports operations constitute experiences and practices in cargo clearing processes initiated or catalyzed as a result of COVID-19 disruption of global economy and supply chain. According to NigeriaMaritime360 (2020), "the Nigeria Customs no longer has any credible excuse not to embrace cargo scanners now that the automation of Port processes has become imperative due to the gaps exposed by the COVID-19 lockdown in the overtly manual procedures in cargo examination at the Ports". Abiodun (2020), captured the scenario thus:

> *"Following the hardship faced in clearing cargoes during the total lockdown ordered by the federal government to halt the spread of COVID-19, customs agents in the country have called on the federal government to order all the terminal*

operators, shipping companies and some relevant government agencies to automate all their processes and make them interactive, such that all transactions by cargo interests can be done online".

In a similar vein, the Minister of Finance maintained that the recently approved $3.1 billion (about N1.2 trillion) for the Nigerian Customs Service automation contract, "is to completely automate every aspect of the customs business and to institutionalize the use of smart and emerging technologies that will enhance the statutory function of the Nigerian Customs Service in the areas of revenue generation as well as trade facilitation and enhancement of security" (Oritse, Bivbere & Eguono, 2020). For Bello, ex-Nigeria Shippers Council boss, "the modernization of laws and trade facilitation means that full automation of trade and port processes must be in place in Nigerian ports. This will not only save time and cost, but will also eliminate too much human contact which is blamed for the wanton corruption in the country's ports today" (Echenim, 2020). According to Uche, President of National Association of Government Approved Freight Forwarders (NAGAFF), "the ravaging COVID-19 pandemic experience should be the major reason why the "single national window" implementation must be put into motion to promote automation" (Ugwoke, 2020). Uche recalled that in 2006 when the ports were concessioned, "automation worked for some months with the introduction of Automated System for Customs Data (ASYCUDA 2.7) by the Customs Service before being scuttled by some unscrupulous customs officials who felt that they were not making personal money as a result of automation" (Ugwuoke, 2020).

The sabotage notwithstanding, Bello, ex- National Shippers Council boss, "noted that digitization in Nigerian ports currently stands at 65 per cent. However, he expressed concerns that certain transactions, such as bill of lading and invoicing were not carried out online, but consultations are on with shipping companies, terminal operators and commercial banks to harmonize the process for effective online integration" (Agbedo, 2020). According to the President of National Association of Government Approved Freight Forwarders (NAGAFF), **"**automation has become very necessary in all facets of ports operation especially against the backdrop of the outbreak of Coronavirus pandemic" (Agbedo, 2020). According to the former National Shippers Council boss, "the Council, in collaboration with other sister agencies, has developed a three-point agenda of ensuring the realization of a virtual port system and multimodal transportation to enhance efficiency at the ports" (Foyeku, 2020).

4.1 Findings and Discussion

i. **Increased digitalization:** Digitization and digitalization are preliminary processes of automation. With COVID-19 induced restrictions of human contact, the only way the restrictions were circumvented and shipping business kept moving especially at the ports was increased digitalization of the port processes to facilitate hitch-free movement of cargo and curtailment of port congestion. Although port congestion is still a global challenge, increased digitalization is probably the only positive aspect of the pandemic. To industry operators, "Nigeria needs to move towards smart ports with high level of automation where cranes deliver containers from ships to the port through unmanned yard cranes" (Ugwoke, 2020).

ii. **Physical Cargo Examination is Sustained by Corruption**

Physical cargo examination has been described as dangerous and difficult practice that is injurious and life snuffing to examination officers; causes port congestion; yet the practice has remained persistent. Stakeholders have argued that ending the practice of physical cargo examination at the seaports is not supposed to be that defying except for the pecuniary interest of officers involved. According to Oseghale (2019), "In a country notorious for sabotaging well-meaning efforts geared towards national development, one must not rule out the possibility of sabotage from within the government agencies. This is because physical examination of cargo provides an avenue for officials of the government to extort importers and customs agents for money and other valuable items in their containers".

iii. **Automation of Nigeria ports has three-part distinct significance: Revenue generation, Trade facilitation and enhancement of security**.

In this regard, Agbakwuru (2020) maintained that with "Unified Customs Management System, e-Port, Logistic Monitoring, electronic-Cargo Tracking, and Mobile Enforcement Systems, which all imports and exports would go through; will eradicate tax and duties' evasion towards increasing revenue generation". Beyond revenue generation, the digital systems will enhance both trade facilitation and security.

iv. **Automation is about Human Capital**

We say that automation is about human capital because the technologies involved are manipulated by individuals who could choose to operate the devices in the interest of their nation or personal ulterior motive, thereby scuttling organizational and national interests. For instance, "in 2006 when the ports were concessioned, automation worked for some months with the

introduction of ASYCUDA 2.7 by the Customs Service before being scuttled by some unscrupulous officials who felt that they were not making personal money as a result of automation" (Agbedo, 2020). That reminds one of the nexus between corruption and development. Corruption is antithetical to development. For a country like Nigeria that is bedevilled by public corruption, poverty, deep religious and ethnic divides, growing secessionist agitation and declining nationalism, scuttling national interest is sometimes an adaptive and survival strategy. However, technological application checkmates corruption and increases efficiency and productivity which Nigeria Port Authority and other stakeholders in the port community hope to achieve in the operations of the ports.

Conclusion

The manual and mechanical stage of the Nigeria port operation is the main cause of the port crisis expressed in the form of congestion, under-declaration of cargo, extortion, loss of revenue, over-bureaucratization, duplicity of functions among numerous agencies in the port, corruption and delay in clearing of cargo. Successful and timely automation of the ports is the sure way to address these anomalies.

Until this is achieved, our port will remain a chaotic environment where individuals, public and private organizations flux to for economic hunting, driven by myriads of interest. A situation in which international shipping companies sometimes capitalize on to exploit users of Nigerian ports to the advantage of neighbouring ports. For instance; it is on record that importers in the country at some time suffered huge surcharge of about $1,025 on cargoes imported from across the world into the country, imposed on them by the international shipping firms; predicated on the challenges of infrastructure deficiency and cumbersome shipping process at the ports. The surcharge, without doubt, was discriminatory and economically sabotaging Nigeria ports in favour of West African neighbouring ports; and above all, adds to the high cost of doing business in Nigerian ports. Therefore, the expected digital revolution for automation of Nigerian ports must go hand-in-hand with human capital support and infrastructural development in order to reach its potential.

Deriving from the study and findings, we recommend as follows:

i. **The Automation of Nigerian Ports has to continue and be completed:** It will curtail sharp practices, corruption and improve the security of the port and maritime sector in general. This will prevent leakages as well as improve government revenue generation. It is at this point that Nigeria ports can be described as being smart and competitive with other West African ports.

ii. **Ease of doing Business in the Ports**
The single window policy should be fully implemented to discourage physical examination of cargo and congestion, and facilitate quick and timely clearing of cargo in the ports. Records have shown that the Single Window reduces time of doing business by 50 per cent and can bring down cost of doing business by 25 per cent.

iii. **Due process and Standardization of Port Operations**
Automation processes in the port will also bring about due process and standardization of cargo clearing process and consequently address the poor cargo management plan associated with Nigeria Port Authority.

iv. **Effective Intermodal Evacuation of Cargo**

This involves the use different transportation system, such as rail, inland waters and road, in the evacuation cargo from the ports. It will aid port decongestion and ensure efficiency of port operations.

v. **Urgent and Compulsory Installation of Functional Scanners at the Ports by Nigeria Customs Service**

Nigeria Customs Service should as a matter of urgency do everything within their power to install functional scanners at the ports to end physical examination of cargo and drastically minimize human contacts at the ports.

References

Abiodun, E. (2020). FG Urged to Direct Automation of Invoicing, Payments at Ports. Thisday. https://www.thisdaylive.com/index.php/2020/05/08/fg-urged-to-direct-automation-of-invoicing-payments- at-ports/

Agbakwuru, J. (2020, September 2). FEC ratifies $3.1bn Customs Modernization Project. Vanguard. https://www.vanguardngr.com/2020/09/fec-ratifies-3-1bn-customs-modernization-project/

Agbedo, A. (2020, August, 22). Why Shippers' Council is pushing for integrated automation of port services. Guardian. https://guardian.ng/saturday-magazine/why-shippers-council-is-pushing-for-integrated-automation-of-port-services/

Agbota, S. (2020, 2 September). How Nigeria can use smart port technology to enhance efficiency. Sunnews. https://www.sunnewsonline.com/how-nigeria-can-use-smart-port-technology-to-enhance-efficiency/

Anagor, A. (2020, June 2). Terminal operators ready to provide scanners at port for seamless operations – Akinola. BusinessDay. https://businessday.ng/maritime/article/terminal-operators-ready-to-provide-scanners-at-port-for-seamless-operations-akinola/

Anaroke, K. (2020, April 29). How COVID-19 ushers' new opportunities in port operations.Vanguard. https://www.vanguardngr.com/2020/04/how-covid-19-ushers- new-opportunities-in-port-operations/

Baiyewu, L. (2020, December 18). Reps decry abandoned scanners at ports, borders, begin probe. Punch. https://punchng.com/reps-decry-abandoned-scanners-at-ports-borders- begin- probe/

Bliek, J. (2021). Watch "What is a Smart Port? https://youtu.be/xYQmfbsVNmM

Bilogistik (2017). Smart Ports: the ports of the future. https://www.bilogistik.com/en/blog/smart-ports/

Bivbere, G. & Obiakor, S. (2020, February 12). Customs Brokers proffer solution to congestion at Lagos port. Vanguar. https://www.vanguardngr.com/2020/02/customs-brokers-proffer-solution-to-congestion-at-lagos-ports/

Bivbere, G. (2020, June 17). Illegal release of trucks undermining new Apapa traffic management system —Umar, former Tin-Can Port boss. Vanguard. https://www.vanguardngr.com/2020/06/illegal-release-of-trucks-undermining-new-apapa-traffic- management- system-umar-former-tin-can-port-boss/

Canadian Pacific Consulting Services (2020). How can we solve port congestion in Nigeria? https://cpcs.ca/nigeria-lagos-port-congestion/

Dauda, O. (2020, September 25). Pros, cons of ports automation. The Nation. https://thenationonlineng.net/pros-cons-of-ports-automation/

Donnelly, J. (ed) (2022). Automation Trends. *The E-Journal of Ports and Terminals.* https://wpassets.porttechnology.org/wpcontent/uploads/2022/07/18165615/PTI_122_v3.pdf

Donnelly, J. (2021, December 13). Nigerian Ports Authority aims to become fully digital by 2025. Port Technology. https://www.porttechnology.org/news/nigerian-ports-authority-aims-to- become-fully-digital-by-2025/

Donnelly, J. (2019, November 29), Nigeria Ports Authority signs collaborative agreement with Antwerp. Port Technology. https://www.porttechnology.org/news/nigeria-ports-authority-signs-collaborative-agreement-with-antwerp/

Echenim, S. (2020). Nigerian ports' poor performance during IMF inspection. Busuness. a.m., 11 Febuary. https://www.businessamlive.com/nigerian-ports-poor-performance-during- imf- inspection/

Ezinna, P.C. & Ogunlela, Y.I. (2020). Nigeria port authority and impact of COVID-19 disruption on port operations. *Economics And Social Sciences Academic Journal*, Vol.2, No.12.

Foyeku, S. (2020, June 12). COVID-19: customs to deploy cameras for cargo examination. Ship & Ports. https://shipsandports.com.ng/covid-19-customs-to-deploy-cameras-for-cargo- examination/

Haastrup, V. (2020). COVID-19: Terminal operators decry continued physical examination of cargoes. PMnews, 21 June. https://www.pmnewsnigeria.com/2020/06/21/covid-19- terminal-operators-decry- continued-physical-examination-of-cargoes/

Hokuyo (2021). An overview and key benefits of port automation. https://hokuyo-usa.com/resources/blog/overview-and-key-benefits-port-automation

Marom, O. (2021). The three pillars of modern container terminal-automation https://www.linkedin.com/pulse/three-pillars-modern-container-terminal-automation-ori-marom/

Nigeriamaritime360 (2020). Why Nigeria Customs should embrace Cargo Scanners https://nigeriamaritime360.com/why-nigeria-customs-should-embrace-cargo-scanners/

Okon, A. (2020, January 23). Nigeria's analogue seaports and physical cargo examination. Punch. https://punchng.com/nigerias-analogue-seaports-and- physical-cargo-examination/

Oritse, G. (2020). 80% of freight forwarders now hypertensive. Vanguard, 23 September. https://www.vanguardngr.com/2020/09/80-of-freight-forwarders-now-hypertensive/

Oritse, G., Bivbere, G. & Eguono, O. (2020, September 13). Customs automation contract draws the ire of stakeholders. Vanguard. https://www.vanguardngr.com/2020/09/customs- automation-contract-draws-the-ire-of-stakeholders/

Oseghale, C. (2019, January 14). Cargo examination and the scanner dilemma. Ships & Ports. https://shipsandports.com.ng/cargo-examination-scanner-dilemma/

Port Technology (2016). What is a Smart Port? https://www.porttechnology.org/news/what_is_a_smart_port/

Safety4sea Editorial Team (2021). 80% of ports do not reap the benefits of digitalization. https://safety4sea.com/80-of-ports-do-not-reap-the-benefits-of-digitalisation/

Salau,S. (2020). Nigeria loses $55 million daily to port congestion. TheGuardian, 2 September. https://guardian.ng/business-services/nigeria-loses-55-million-daily-to-port-congestion/

SHIPS & PORTS (2013). Shippers' council boss, Bello, labels Nigeria's cargo clearing 'near-primitive. https://shipsandports.com.ng/shippers-council-boss-bello-labels-nigerias-cargo-clearing-near-primitive/

Shmgroup (2018). Everything you need to know about port automation. https://www.shmgroup.com/blog/everything-need-know-port automation/

Ugwoke, F. (2020). Ports Economic Regulator and Automation Project. ThisDay, 4 August. https://www.thisdaylive.com/index.php/2020/08/04/ports-economic-regulator-and-automation-project/