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Assessment of the Effect of the Implementation of International Ship and Port Facility Security (ISPS) Code on Port Operations (A Case Study of Tin Can Island Port Complex)

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Abstract
This paper was based on the assessment of the effect of ISPS code implementation on port operation using the Tin-can Island port as a case study. Data were mainly sourced from Tin-can Island Annual port report of port operational statistics. Sequence plots statistical tool was employed to depict the trend of vessel traffic flow, berth occupancy rate, cargo throughput and vessel turnaround from 1994-2013 which covered a period of 20 years representing both pre and post implementation era of ISPS code. Four hypotheses were formulated and tested using the t-test statistic of difference of means with the help of computer based software known as SPSS version 21. It was discovered that the implementation of ISPS code did not lead to decrease in vessel traffic, berth occupancy rate, and cargo throughput. However, there was decrease in vessel turnaround time. It was recommended that there should be more collaborative effort between NIMASA and relevant security agencies in ensuring full implementation of the ISPS code. Also it was recommended that there should be training for personnel involved in the implementation of ISPS code.
Keywords: ISPS code, Port operations, Ship, NIMASA and Port.

1 Introduction

Over the years, acts of insecurity, lack of safety consciousness and threat of terrorism have pervaded the maritime landscape of the world economy. The obvious dishonest outlook and fraud-like tendencies which over the years, have formed the most basic characteristics of the maritime industry have never helped matters either way, but has indeed complicated the issue of high insecurity of the port industries worldwide(Okoroji &Wilfred , 2011). There are a number of clearly identifiable criminal acts that threaten maritime peace and security. These acts, namely trafficking in narcotics, arms and persons, terrorism at sea, piracy and armed robbery at sea, collectively pose threats to the safety of navigation, human life and safety both at sea and on land, maritime trade, as well as to the social and economic fabrics of both coastal and land-locked States (Aleeza, 2009).

However, the terrorist attacks of September 11th, 2001 by Al Qaeda on US World trade Centre led to the development of ISPS code by International Maritime Organization (IMO) which was incorporated into the International Convention for the Safety of Life at Sea (SOLAS), 1974, Chapter XI-2.This was developed to provide measures and procedures to prevent acts of terrorism, which threaten the security of passengers, crew, the safety of ships and port facilities used in international trade. Therefore, in order to reduce the risk from the most obvious security gaps in the maritime transport network, governments have set in place series of actions aimed at reducing the risk. On 1st July, 2004(IMO, 2002) ISPS code became effective in which the adoption and implementation of the code was made mandatory for contracting governments. However, Ender and Yilmazel (2005) described the ISPS code as the first ever internationally and widely agreed proactive regulatory framework to safe guard the maritime industry, seaborne trade, and the world economy from terrorism.

Arsham (2008) stated that ISPS code has come to address the maritime problems relating to terrorism, however, the code has jurisdiction over several types of criminal acts, including smuggling, cargo theft, stowaways, illegal immigrant, piracy and collateral damage due to fires and explosion on ships and port facilities, whether intentional or otherwise. Institute of chartered ship brokers (2011) stated that the ISPS code is very much reaction to the terrorist attacks on New York in September 2001 but it does include elements of two other problems, piracy and stowaways, that has been of concern for many years.

Port can be defined as a geographic and economic entity, having a specific name, located on the seaside, a river or lakeside, serving ships, and where transfer of goods and passengers takes place from water to land transport and where facilities could be found on land and water to render complementary services required by

ships, goods and or developing international trade, industry and more generally the economy of the countries under the zone of influence of the port (Ankoma, 2014). In many ways ports can be seen as a window to a nation, reflecting the demands of the country and the products of its hinterland, also showing the wealth and power which a country and its populace can exert. Until traffic is able to move freely once more, free from the risk of attack, it will be difficult to see a country live up to its potential and it will seemingly be trapped in a downward spiral of terror ism, kidnapping, theft and piracy.

Port operators around the continent have not idly stood by but have strongly and vociferously voiced their concerns. Port operators across the African nations have decried the high level of piracy across the continent, noting that these activities are becoming a cankerworm that grossly militates against the growth of ports' operations (Steven, n.d.).

1.2 Problem Statement

In view of the current security challenge in Nigeria, there is need to pay keen attention to level of security in ports as this has a great influence on port operations. Nigeria ports and terminals are characterized with security lapses which is caused as a result of lackadaisical attitude towards the implementation of ISPS code which Nigeria consented to as a contracting government. In a nutshell, the code has presented compliance challenges to maritime administration especially those of the developing countries. There are some criminal activities such as cargo theft, smuggling, piracy/armed robbery etc. in ports and its environ which are crippling operations in port and give the port a bad image in which the implementation of this will help to curb these criminal activities and in turn improve operations in port. On the other hand, the implementation of this code may mean additional security measures on ships entering, berthing loading or discharging cargo in port and these additional security measures put in place in compliance to ISPS code will either improve ports operations or otherwise. However, this research work seeks to assess the effects implementation of this code has on port operations.

1.3 Research Objectives

1. To determine the effect of ISPS code implementation on cargo throughput
2. To identify the effect of ISPS code implementation on the flow of ship traffic
3. To determine the berth occupancy rate with the implementation of ISPS code
4. To identify if vessel's turnaround time has improved by the implementation of ISPS code

1.4 Research Questions

1. What is the effect of ISPS code implementation on cargo throughput?
2. What is the effect of ISPS code implementation on the flow of ship traffic?
3. What is the influence of ISPS code implementation on berth occupancy rate?
4. Has vessel's turnaround time improved by the implementation of ISPS code?

1.5 Research Hypotheses

a. Ho: There is no significant increase in cargo throughput with the implementation of ISPS code
b. Ho: There is no significant increase in the flow of Ship Traffic with the implementation of ISPS code
c. Ho: There is no significant increase in berth occupancy rate with the implementation of ISPS code
d. Ho: There is no significant increase in vessel turnaround time with the implementation of ISPS code.

2 Literature Review

2. 1 BRIEF DESCRIPTION OF TINCAN ISLAND PORT COMPLEX

Tincan Island port is located in Apapa, the port for the city of Lagos, Nigeria. Tin Can Island Port is about seven kilometers due west of the city center of Lagos across Lagos Harbor. Apapa Port is the largest and busiest port in Nigeria followed by Tin can Island port. The RoRo Terminal was designated as part of the new Tin Can Island Port in 1977. In 1991, the Nigerian Ports Authority was given responsibility for operating Tin Can Island port, and they made it a modern functioning port.

Tin Can Island Port Complex today is an amalgam of what used to be RoRo and Tin Can Island Ports. This merger came with the concessioning of the terminals in May, 2006. But the various departments and their personnel were merged in September, 2006.

Terminal operators operating in Tincan Island port complex are:

- Josepdam Port Services
- Tincan Island container terminal limited
- Port & Cargo Handling Services Limited
- Five star Logistics Limited
- Ports and Terminal multiservices limited

2.2 OVERVIEW OF INTERNATIONAL SHIP AND PORT FACILITY SECURITY (ISPS) CODE

The adoption of the International Ship and Port Facility Security (ISPS) code by the International Maritime Organisation and other transport security related measures was to provide security measures that will seek to proffer solution to security challenges confronting maritime transport in order to prevent any potential negative impact of security lapses on the international transport and trading system. The code aims to ensure the security of ships and port facilities, defined as determined location where the ship/port interface takes place, from the perspective of a risk management approach, which implies the assessment of risks in each particular case and the consequent determination of security measures (christodou et al,2008) .Security in maritime transportation must be given more attention due to the fact that any lackadaisical attitude as regard security will bring about disruption to international trade and will negatively affect the world economy.

In 2002 the International Maritime Organization (IMO) addressed security threats to maritime transportation systems essentially by: (a) dividing the 1974 SOLAS Chapter XI into two parts, Chapter XI-1 for Special Measures to Enhance Maritime Safety and a new Chapter XI-2 for Special Measures to Enhance Maritime Security; and (b) establishing a new International Ship and Port Facility Security (ISPS) Code to support the security regulations incorporated in the SOLAS XI-2 regulations.

The ISPS Code itself is divided into two parts: part A is a mandatory section, while part B is a non-compulsory guidance detailing procedures to be undertaken when implementing the provisions of Part A and of SOLAS XI-2.

Part A

Part A of the ISPS code contains 19 sections and 2 appendixes. The sections contain definitions, applications, responsibilities of in charged parties and technical information about the requirements of the Code (Vahide, 2011). It defines:

1- The obligations of the company, ship, port facility and of the contracting government
2- The necessary requirements which risk assessments and security plans must have,
3- The way that the records must be provided and be kept,
4- The information about training and exercising of the crew and staff
5- The requirements about the certification and verification for ships

Part B

Like part A of the ISPS code, part B of the code contains 19 sections and 2 appendices as well. More details and guidelines about the mentioned subjects in part A are included in part B. In some ways, applying part A without taking part B into account seems a vain effort. Also the different interpretation of the code, which is one of the main weaknesses of the ISPS code, could be ineffective in many ways, if all the parties bear part B in mind while implementing part A of the code.

In the appendices of part B, the Declaration of Security (DOS) form and Statement of Compliance form for port facility have been provided.

3 Port Operations

Port operations can be defined as all policies, reforms and regulations that influence the infrastructure and operations of port facilities including shipping services. Also, Ndikom (2011) stated that port operations include all activities for ensuring the movement of cargo (including the processing of cargo documentation) from the arrival of a vessel at the port, discharging of the goods and internal mobility, to the eventual movement of the same cargo out of the port by a known mode of transport, to its final destination.

With increasing sea-born cargo volume in the world, the problem of congestion is one of the many aftermaths already hitting many ports today. Global transportation will continue to grow in importance due to the increase of manufacturing and merchandising, overseas sourcing and marketing.

The duty of a port operator (port authority and terminal operator) include managing the movement of cargo to and from ships and from ships to rail or road on lorries or train, berth allocation, the documentation process that lead to the discharge of cargo and release to consignee, optimizing the flow of goods through custom control to minimize the time spent by ships in ports. These entire activities require the proper and efficient use of port facility, equipment for cargo handling, berth facilities, waterways and roads. It also entails the use of effective communications system, storage facilities, and dockworkers. The whole activities mentioned above form the bulk of port operations. The aspiration of port operator is to get cargo through the gateway of ports as fast as possible on to other modes of transport (rail or road) with a minimal cost to them and to the cargo owners.

Arsham (2008) stated that the activities that a port normally does are highly dependent on port's specialty and its size. For instance, the activities that a container port will do are different from the activities of an oil port; or a small harbor might not offer some services that larger ones do. Therefore it is quite hard to say what exactly port activities are. However, in general, most of the ports normally offer some of the following services:

1- Handling, which previously were being done by porters and stevedores and nowadays they are being done mostly by cranes and forklift trucks,

2- Storing and warehousing, which are done for goods that are not immediately needed; or for some companies, who do not own enough space to store their received cargos,
3- Value adding, which mostly are done by distribution centers. They can be categorized as stuffing and stripping, assembling, packaging, labeling, testing, consolidation and deconsolidation,
4- Hinterland transportation (inter-modal), which is done by pipelines, trucks, trains, or even vessels for short sea distances,
5- Maritime services like pilots, tugboats, boatmen, vessel traffic control,
6- Other services like foodstuff preparation, power supplying, ship repairing, recycling and oil refinery,

Also, Osaretin (2006) stated that typical port operations from the perspective of imports and export transaction activities take the form of the movement of cargo between ships and the gate of terminal depot or wharf; the movement of cargo between the customer (consignee/shipper) and the gate of terminal, depot or wharf. The following cycle are observed;

- Reporting the ship. (Ship's arrival),
- Berthing the ships,
- Stevedoring the ship (loading and unloading of cargo),
- Clearing the ship (ship's departure),
- Clearing the cargo: importers, customs agent,
- Clearing the cargo: ships agent, NVOCC (container),
- Consigning the cargo, and
- Road transport.

3.1 Effects of the ISPS Code on Port Operations

Isabelle (2009) stated that security rules have a direct influence on the international trade, as well international, in the European Union, as on the national scene. Moreover it is important to remark that over 98% of the world's international fleet falls within the scope of the ISPS Code, and have to fulfil the mandatory part. It is very important to understand the value of the security rules on the different levels.

On the international scene, it must be noted that the IMO as organization is a pioneer to enhance the maritime security. But these measures have operational and commercial consequences. The manning of the ship and other personnel in the port facilities will all feel the consequences of the security rules. Because of the widespread of measures that have to be taken, a delay in the whole supply chain is inevitably. The loading and unloading, the deployment of personnel on the ship and in the port facility will be delayed (Isabelle, 2009).

According to the study based on the set of questionnaires designed by UNCTAD (2007), the result presented in relation to port performance showed that the ISPS code compliance enhanced market standing, increased truck turnaround and ship-owners' confidence and also led to more ships calling at the port. It was also gathered that such factors such as additional security personnel, new access control measures at gates, screening measures, the introduction of port worker passes , better planning of container yards and better internal organization contributed to increasing efficiency , although these security measures are very demanding and resulted in transport cost increase especially in developing countries.

As regard throughput, it was gathered that 76% stated that there was no change in throughput handled while 24% reported an increase, although in the case of throughput, whether this may be directly and solely attributed to the implementation of the ISPS code. In addition, UNCTAD (2007) stated that in respect to the code's impact on various port performance measures such as efficiency, use of information and communication technologies (ICTs) and throughput growth, respondent ports' perceptions appeared positive although some respondents however, reported experiencing increased delays.

Compliance with the requirements of the ISPS code incurs additional costs at ports such as the ones associated with the risk assessment, training and physical improvements. Similarly, shippers have to make changes to their operating procedures such as how they document the cargo, transmit it, and how they interface with ships at port (Vahide, 2011).

On the other hand, the additional security that comes with the implementation of ISPS code has direct measurable and indirect effects upon the port community. Physical security measures such as fencing, lighting and video monitoring have the effect of controlling access/movement within the port areas allowing better management of people and activities. In addition to serving as a deterrent to terrorism, these port area improvements curb looting and prevent unauthorized access to restricted areas. Additionally, through the identification of risks and the countermeasures as well as the technological improvements, the local port capacity is significantly improved (Vahide, 2011).

In summary, the implementation of the ISPS code, in spite of being costly, has proven to be successful in the Caribbean region and it has even been shown to improve local port productivity (Vahide, 2011).

3.2 Nigeria Maritime Administration and Safety Agency (NIMASA) and ISPS Code Implementation

Presidential Implementation Committee on Maritime Safety and Security (PICoMSS) was inaugurated in 2004 by the government of President Olusegun Obasanjo to act as the country's Designated Agency (DA) and to ensure the nation's compliance as required by the ISPS code. PICoMSS continued to function as the DA until the committee was formally wound down late 2012. However, PICoMSS spent 8years as the Nation's DA pretending to implement the ISPS code when in actual fact it was not after which the mandate was officially transferred to NIMASA on May 21, 2013. (Godwin, 2013).

The DA, NIMASA upon assumption encountered numerous challenges one of which was December 2012 expiration of all Statement of Compliance for Port Facility (SoCPF) which is a mandatory annual certification every Port Facilities (PFs) must have in order to be deemed compliant by the International Maritime Organization (IMO).However, to provide a temporary solution to this problem the agency proactively issued a Marine Notice extending the validity of these certificates till July 2013. Issuance of US Diplomatic note indicting some Port Facilities in the country for having deficient security measures was another challenge confronted by NIMASA. The report issued a 90- day ultimatum within which the country must have addressed the observed deficiencies.it must be noted that the USCG inspection exercise that led to this report was carried out months and in some cases years before NIMASA was appointed DA. Nevertheless NIMASA took up the challenge in ensuring that the country does not suffer the embarrassment of such sanctions as contained in the report. Consequently, steps were taken to adequately close the reported gaps, which include dispatching of competent recognized security organizations to conduct surveys and assessments aimed at identifying and correcting these deficiencies and any observed vulnerabilities.

However, implementation framework in form of a handbook to enable the public understand its agenda with respect to the new implementation regime was outlined by the DA.ISPS code implementation committee was approved by the Management of NIMASA to oversee the implementation mandate. In addition to key NIMASA personnel who form part of this committee, membership was also drawn from other key government stakeholder agencies such as the Nigerian Navy, Nigeria Port Authority, NNPC, Nigeria Police, State security Service, Customs and Immigration among others.

NIMASA commissioned a stocktaking of nation's Coastal Maritime assets in order to establish the number, location and nature of all PFs and jetties in the country. This audit extensively helped the DA to capture and catalogue all port/berthing facilities as well as verify their ISPS code compliance status. All port facilities including those mentioned in the US Diplomatic Note to Nigeria undergone security assessments. The DA Verification Inspection Exercises (VIE) on all shore based Port facilities in the country revealed some facilities which were not ISPS code compliance. The federal government ordered that port and terminal facility across the country having security deficiencies be shut down following the arrival of the United States Coast Guards in Nigeria to carry out a second verification exercise to test compliance level. However operators of such Facilities were seen running helter-skelter putting last minutes measures in place to avoid sanction.

Moreover, one of the problems that had plagued Port Facilities, jetties and terminals was observed to be lack of understanding of the ISPS code, its relevance and application as thus was captured in the US Diplomatic Note that security personnel were found to be ignorant of the code. In order to address this problem, policies and measures were being put in place to ensure more training and capacity building among security personnel and all personnel in the maritime sector as it is crystal clear that everybody has a role to play in the sustainable implementation of the ISPS code. Security companies that provide guard force personnel to companies operating in the maritime domain were required to provide ISPS training for their personnel due to the significant role they play in the issue of security. These security companies as well as the infrastructure service providers in the maritime sector undergone registration with the DA in order to streamline their activities in the maritime security arena.

It was observed that compliance was a huge issue because the previous Designated Agency lacked capacity to strictly enforce its mandate having lacked constitutional powers to do so .However, with the emergence of NIMASA as the DA which is duly established by law and possessing enforcement powers, there is hope that NIMASA will ensure that all stakeholders and particularly the Port Facilities owners/operators remain compliant.

It was reported that the US government declaration was based on the United States Coast Guard (USCG) reports per the several visits and assessments carried out within the last six years, because the USCG did not find a worthwhile or effective anti-terrorism measures in place, especially in many of the ports, with the exception of some notable port Facilities.

However, effort of NIMASA is duly acknowledge by the US authorities in raising the security levels of ships and port facilities in Nigeria and assured of its commitment to continue to partner with Nigeria to improve security measures, especially as it was also aware of NIMASA's effort to improve its oversight of Nigerian port facilities.

3.3 The level of Compliance of Port Facilities to ISPS Code in Nigeria

Nigeria currently has 127 port facilities mostly jetties in which only 22 port facilities are confirmed to have met the requirement stipulated in the ISPS code i.e. fully compliant. According to a Diplomatic Note signed on behalf of the department of homeland security by the deputy commandant for operations of the US Coast Guard, Vice Admiral Neffenger, 13 port facilities in Nigeria are now fully compliant with the ISPS code, bringing the total number of compliant port facilities in the country to 22 up from 9 since the last visit of US agency (Samson, 2014). However, the 22 port facilities that have maintained effective anti-terrorism measures are:

Table 3.3.1: Port facilities that have maintained effective anti-terrorism (United States Coast Guard, 2014)

Ports/Terminals	IMO Port Number
APP Apapa Bulk Terminal	NGAPP-0009
APP AP Moller Terminal	NGAPP-0001
APP Greenview Terminal	NGAPP-0004
BON Bonny River Terminal	NGBON-0001
BON NLGN Bonny Terminal	NGBON-0002
BON SPDC Bonny Offshore Terminal	NG663-001
CBQ FSO YOHO (Exxon Mobile)	NG638-0001
CBQ Logistics Base	NGCBQ-0001
CBQ McIver Wharf	NGCBQ-0004
CBQ Port Terminal A	NGCBQ-0002
CBQ QIT BOP	NGOBO-0001
ESC Escra BOP	NGESC-0001
ESC LPG-FSO	NGESC-0003
FOR Forcados Offshore Terminal	NGFOR-0001
ONN FLT	NGONN-0005
ONN FOT	NGONN-0006
TIN Dantata MRS Terminal	NGTIN-0003
TIN FSL	NGTIN-0013
TIN P&CH Terminal C	NGTIN-0011
TIN Snake Island Integrated Free Zone	NGTIN-0001
TIN PTML Terminal E	NGTIN-0010
TIN TICT Terminal B	NGTIN-0009

The Diplomatic Note from US Embassy further stated that apart from the ports facilities mentioned above the US Coast Guard does not find ports in Nigeria maintain effective anti-terrorism measure with certain exceptions and that Nigeria's Legal regime, Designated Authority oversight, access control and cargo control are all deficient.

Furthermore, judging from the total number of port facilities that are fully compliant (22) out of the total number of existing 127 port facilities in Nigeria, it can be concluded that the level of compliance of port facilities to ISPS code was very poor(Aponjolosun,2015).

4 Methodology

Hypothesis testing is also known as significance testing. A hypothesis is a testable belief or opinion, and hypothesis testing is the process by which the belief is tested by statistical means (T. Lucey, 2002). T – test which is one of the mostly used statistical methods for testing the difference between means was used to test the stated hypothesis in this thesis with 95% confidence level.

Data collected were presented in a tabular form and analysis and interpretation of data collected were adequately and effectively dealt with. The research hypotheses formulated were presented in order in which they were stated and data from secondary source were carefully analysed.

Data were analysed with the use of computer based SPSS version 21. The flow of ship traffic, cargo throughput, berth occupancy rate and vessel turnaround time from 1994 to 2013 which covers the pre and post implementation era of ISPS code were presented on a sequence plots. The difference of mean using the t-test statistic was employed to test formulated hypothesis.

5 Test of hypotheses

The hypotheses formulated in chapter one were tested using the computer based statistical tool known as SPSS version 21 in which t- student distribution test for difference of mean was employed to analyse the relevant data and make decisions on the hypotheses formulated.

However, table 1 and 2 gives cargo throughput, number of ships, berth occupancy rate and average turnaround time for both pre and post implementation era respectively

Table 5. 1: Pre-implementation era of ISPS code

Pre-implementation Years	Cargo throughput(in million)	Number of ships	Berth occupancy rate	Average turnaround time
1994	2.79	380	38	6.02
1995	3.04	393	39.8	6.17
1996	3.10	420	42	6.33
1997	3.26	466	41.9	6.44
1998	3.31	479	38.21	6.01
1999	3.46	510	75.33	9.73
2000	3.93	674	56.78	6.60
2001	3.97	718	57.41	8.11
2002	4.75	633	68.00	10.43
2003	5.29	804	71.76	8.18

Table 5.2: Post implementation era of ISPS code

post - implementation	Cargo throughput	Number of ships	Berth occupancy rate	Average turnaround time
2004	4.69	696	47	6.83
2005	5.46	671	58	6.85
2006	7.37	903	73	3.45
2007	10.30	1185	86.56	3.77
2008	11.51	1367	61	5.2
2009	13.54	1583	71.7	6.6
2010	14.47	1583	72.69	5.07
2011	16.23	1667	64.6	4.27
2012	15.21	1627	70	5.27
2013	16.06	1726	68	4.35

Test for first hypothesis.

The first hypothesis was stated as follows:

Ho: There is no significant increase in cargo throughput with the implementation ISPS code

To test this hypothesis using the SPSS version 21, the data in table 5.1and 5.2 in relation to cargo throughput was inputted into the software for the computer base analysis where a t-test was conducted.

The result of the computer based analysis is shown in table 5.3 to 5.5

Table 5.3 :Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre	3.6900	10	.80155	.25347
	Post	15.0840	10	13.35805	4.22419

Table 5.4 :Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	pre & post	10	.664	.036

Table 5.5 :Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 pre – post	-11.39400	12.84004	4.06038	-20.57921	-2.20879	-2.806	9	.021

Descriptive statistics for cargo throughput in Tin can Island port were shown in table 5.3 to 5.5 for both pre and post implementation era. Their mean were 3.6900 and 15.0840 respectively with a standard deviation of 0.80155 and 13.35805 for both respectively. The last column showed the standard error of the mean for each of the two variables.

Paired samples test analysis for the two groups were analysed in table 5.5. It showed a paired mean of -11.39400, standard deviation 0f 12.84004 and standard error mean of 4.06038. The last column showed that the

analysis was done at 95% confidence interval of difference which gave at lower-20.57921 and -2.20879 at the upper.

Finally, the result of t-test analysis for both the pre and post implementation era was shown in the table with the degree freedom stated as 9 and the t- test value was -2.806. However, from the t- distribution table (see appendix) the critical t-value when the degree of freedom is 9 at 95% confidence interval is 2.263

Decision Rule: Reject the Ho if the computed is less than the table value and does not fall within the acceptance region, otherwise accept Ho.

It was obvious that the computed t -value was less than the critical t-value, therefore, the null hypothesis Ho was rejected while the alternative hypothesis was accepted which brought us to the conclusion that:

There is significant increase in Cargo throughput with the implementation of ISPS code.

Test for second Hypothesis

The second hypothesis was stated as:

Ho: There is no significant increase in the flow of ship traffic with the implementation of ISPS code

To test this hypothesis using the SPSS version 21, the data in table 5.1and 5.2 in relation to number of ships was inputted into the software for the computer base analysis where a t-test was conducted.

The result of the computer based analysis is shown in table 5.6 to 5.8

Table 5.6 :Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-implementation	547.70	10	148.735	47.034
	Post-Implementation	1328.20	10	439.856	139.095

Table 5.7 Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pre-implementation & Post-Implementation	10	.886	.001

Table 5.8 :Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pre-post	-780.500	315.692	99.830	-1006.332	-554.668	-7.818	9	.000

Descriptive statistics for ship traffic in Tincan Island port were shown 5.6 to 5.8 for both pre and post implementation era. Their mean were 547.70 and 1328.20 respectively with a standard deviation of 148.735 and 439.856 for both respectively. The last column showed the standard error of the mean for each of the two variables.

Paired samples test analysis for the two groups were analysed in table 5.8 it showed a paired mean of -780.500, standard deviation 0f 315.692 and standard error mean of 99.830. The last column showed that the analysis was done at 95% confidence interval of difference which gave -1006.332 at lower and -554.668 at the upper.

Finally, the result t-test analysis for both the pre and post implementation era was shown in the table with the degree freedom stated as 9 and the t- test value was -7.818.

However, from the t- distribution table (see appendix) the critical t-value when the degree of freedom is 9 at 95% confidence interval is 2.263

Decision Rule: Reject the Ho if the computed is less than the table value and does not fall within the acceptance region, otherwise accept Ho.

It was obvious that the computed t value was less than the critical t-value, therefore, the null hypothesis Ho was rejected while the alternative hypothesis was accepted which brought us to the conclusion that:

There is significant increase in the flow of ship traffic with the implementation of ISPS code

Test for third hypothesis

Ho: There is no significant increase in berth occupancy rate with the implementation of ISPS code

To test this hypothesis using the SPSS version 21, the data in table 5.1and 5.2 in relation to berth occupancy rate was inputted into the software for the computer base analysis where a t-test was conducted.

The result of the computer based analysis is shown in table 5.9 to 5.11

Table 5.9: Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre	52.9190	10	14.80027	4.68026
	post	67.2550	10	10.56814	3.34194

Table 5.10 :Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	pre & post	10	.287	.421

Table 5.11 :Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pre – post	-14.33600	15.52084	4.90812	-25.43894	-3.23306	-2.921	9	.017

Descriptive statistics for berth occupancy rate in Tin can Island port were shown in table 5.9 to 5.11 for both pre and post implementation era. The mean of both pre and post implementation of were 52.9190 and 67.2550 respectively. This means 14.3 increment in post implementation of ISPS code. High berth occupancy is a sign of congestion (>70%) which causes quality of service to decline, while low berth occupancy signifies underutilisation of resources (<50%). It must be noted berth occupancy values within the range of 60% and 70% are the safest to aim at. From the mean value of 67.2 of post implementation era of ISPS code, it can be categorically stated that there was a positive increment of berth occupancy. The standard deviation of pre and post implementation were 14.80027 and 10.56814. The last column showed the standard error of the mean for each of the two variables.

Paired samples test analysis for the two groups were analysed in table 5.11 it showed a paired mean of -14.33600, standard deviation 0f 15.52084 and standard error mean of 4.90812. The last column showed that the analysis was done at 95% confidence interval of difference which gave at lower-25.43894 and-3.23306 at the upper.

Finally, the result t-test analysis for both the pre and post implementation era was shown in the table with the degree freedom stated as 9 and the t- test value was -2.921

However, from the t- distribution table (see appendix) the critical t-value when the degree of freedom is 9 at 95% confidence interval is 2.263

Decision Rule: Reject the Ho if the computed is less than the table value and does not fall within the acceptance region, otherwise accept Ho.

It was obvious that the computed t -value was less than the critical t-value, therefore, the null hypothesis Ho was rejected while the alternative hypothesis was accepted which brought us to the conclusion that:

There is significant increase in berth occupancy rate with the implementation of ISPS code

Test for the fourth Hypothesis

Ho: The vessel turnaround time has significantly decreased with the implementation of ISPS code

To test this hypothesis using the SPSS version 21, the data in table 4.5.1and 4.5.2 in relation to vessel turnaround time was inputted into the software for the computer base analysis where a t-test was conducted.

The result of the computer based analysis is shown in table 5.12 to 5.14

Table 5.12 :Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre	7.4020	10	1.62543	.51401
	Post	5.1660	10	1.24920	.39503

Table 5.13 :Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	pre & post	10	.067	.854

Table 5.14 :Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 pre – post	2.23600	1.98267	.62698	.81768	3.65432	3.566	9	.006

Descriptive statistics for vessel turnaround time in Tin can Island port were shown in table 5.12 to 5.14 for both pre and post implementation era. Their mean were 7.4020 and 5.1660 respectively with a standard deviation of 1.62543 and 1.24920 for both respectively. The next column showed the standard error of the mean for each of the two variables.

Paired samples test analysis for the two groups were analysed in table 5.14. It showed a paired mean of 2.23600, standard deviation 0f 1.98267 and standard error mean of .62698. The next column showed that the analysis was done at 95% confidence interval of difference which gave at lower .81768 and 3.65432 at the upper.

Finally, the result of t-test analysis for both the pre and post implementation era was shown in the table with the degree freedom stated as 9 and the t-

test value was 3.566. However, from the t- distribution table (see appendix) the critical t-value when the degree of freedom is 9 at 95% confidence interval is 2.263

Decision Rule: Reject the Ho if the computed is less than the table value and does not fall within the acceptance region, otherwise accept Ho.

It was obvious that the computed t -value was greater than the critical t-value, therefore, the null hypothesis Ho was accepted which brought us to the conclusion that:

There is no significant increase in vessel turnaround time with the implementation of ISPS code

CONCLUSION/RECCOMENDATION

The world economy relies on the security of terminals and ports to effectively and efficiently deliver cargo and passengers safely from the point origin to the destination. However, it must be carefully noted that a serious attack or security breach in ports could have a devastating consequences on the entire economy of a region. Authorities and companies involved in international commerce need to pay keen attention to ports and terminals security. Also, ports, shippers and terminal operators must be duly aware of the threats and have the detailed understanding of the relevance of the ISPS code in eliminating or minimizing of these threats.

Implementation of ISPS code has enhanced better environment for port operations. It has helped in the elimination of wharf rats, hawking, touting, and other illicit activities in Nigeria maritime domain which has led to the increase patronage of the port by port users.

However, there is need to ensure that the non –compliant terminals/jetties complied by ensuring that implementation of this code by NIMASA is a major priority as it is very obvious that the number of non-compliant ports are still more than the compliant ones. Also, there should be more collaborative effort with relevant security agencies.

In addition, in order to ensure full compliance of this code the concerned personnel must be properly trained and well sensitized about the applications of the code.

To ensure effective implementation of ISPS code, Part A, Section 18.3 must be strictly adhere to, which instructs ports facilities to carry out appropriate drills and exercises that are in concordance with the types of operation of the port facility, the type of ship, the facility its serving and other relevant circumstances.

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