



Integrated Port Security System: A Key Factor In Investment Protection

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Abstract

Port security is of immense significance to marine transport given that it is used extensively for conveyance and cargo transportation. This is so because maritime sector is confronted by threats such as, cargo theft, kidnapping, terrorism, smuggling, sea robbery and piracy. In Nigeria, the International Ship and Port Facility Security (ISPS) Code which is the international framework to detect and prevent acts that can lead to terrorism at port facilities and onboard ships, is being implemented in ports, however this does appear to be ineffective probably because security and the challenges it poses is seen as a low-priority issue by ports. This study therefore proposed the adoption of integrated port security system as a key factor in investment protection. The study adopted a descriptive research survey the sample size for the study was 100 port workers selected from the Apapa port in Lagos using snowballing sampling technique. Questionnaires were adopted for data collected and the data collected was analyzed using percentages and frequencies and the hypotheses were tested using chi square at 0.05 level of significance. The result of the study indicated a significant impact of poor port security system on port investment. The study also indicated that integration of port security system will enhance the protection of investments. Based on these results, the study recommended the adoption of integrated port security system for Nigerian maritime sector as a means to enhance maritime security and investment protection.

Keywords: Maritime, Port security, integrated port security system, investment protection

1 Background to the study

An essential aspect of maritime transportation system is security of the ports as it enhances commerce and trade development and extends beyond fixing modern infrastructure. Given the significance of port security to trade negotiations, industrial courses of action have to be organized in such a manner as to promote effective solutions. To achieve the coordination of various actions that will enhance port security, there is a need for port authorities to develop a method by which updated information and intelligence on port security can be exchanged and disseminated throughout the commercial industry. The rationale behind this method is to enable the security programs of various ports to be united into a national alliance to promote cooperation among the various aspects of the maritime industry.

Significant to the global economy, is the flow of shipping containers which contributes largely to the economy and facilitates trade. The shipping system is an essential infrastructure which is also vulnerable to attacks and risks of all sorts (Antony Pate; Bruce Taylor & Bruce Kubu, 2008). To this end, it becomes important for the maritime sector to invest in the protection of their infrastructure to ensure effective operations. Investment protection refers to the safeguard of one's means of investment and wealth from problems that could damage or eradicate it (Seaton, 2018). In maritime, port security is concerned with safeguard of the maritime assets of the nation, and practices from all forms of danger. It involves protecting the territorial integrity of the nation, while maintaining peace and order within the nation's maritime sphere by thwarting and tackling all forms of illegal activities via internal and external mechanisms.

In establishing port security, the main objective is to promote an environment in which trading transactions can be executed without any form of hindrance or criminal activity, as well as not being a channel for crime. Thus the development of a security program should be one aimed at deterrence and reduction of losses caused by criminal operations. Developing an effective port security system requires the coordination and intelligence of maritime security departments or companies and law enforcement agencies. The port security system must possess the ability of

intercepting any and all threats as well as the capability of responding and handling such threats. To aid effectiveness, intelligence information need to be gathered, awareness promoted within the port community, and trainings given in order to ensure preparedness and successful execution of formulated security plans (U. S. Department of Transportation, 1997)

2 Statement of research problem

Port security is of immense significance to marine transport given that it is used extensively for conveyance and cargo transportation. Globally, ports are confronted by threats such as, cargo theft, kidnapping, terrorism, smuggling, sea robbery and piracy (Zillur, 2019), and this situation is also experienced in Nigerian ports (Babatunde&Abdulsalm, 2021). In Nigeria, the International Ship and Port Facility Security (ISPS) Code which is the international framework to detect and prevent acts that can lead to terrorism at port facilities and onboard ships, is being implemented in ports (Anagor-Ewuzie, 2019), however this does appears to be ineffective probably because security and the challenges it poses is seen as a low-priority issue by ports. This poor perception of security could also be based on the view that the possibility of a terror threat to the ports is almost non-existent and that where such issues exist, it would be adequately addressed by the police and the military. All of this influences the reluctance of terminal operators to invest in security measures that does not directly protect their income.

Recently, the need for maritime security has increased due to several factors, such as the use of the marine routes by terrorists to cause a lot of damage, as well as the inappropriate use of cargo containers which makes monitoring and mandatory inspection an essential aspect in port security (MI News Network, 2019). Security within the Nigerian ports is one that can be regarded as ineffective, as vandalism and stealing of imported vehicle parts awaiting clearance or goods is a regular occurrence. The activities of pirates are not left out as they tend to carry out their attacks in the course of transporting goods from the vessels to the terminals. These challenges call for security provided by the naval police and port police to guard against armed robbery and pilferage. Reducing criminal activities and increasing port productivity is subject to the use of modern operation equipment and computerized or automated systems (Igbokwe, 2018). It is important that governments address all of these risks with broad-based security policy responses, since simply responding to threats in isolation to one another can be both ineffective and costly (Maritime Transport Committee, 2003). Thus, it becomes important to incorporate a system that will preserve the security of the marine seas and the ports. To this end, this paper investigates the impact of an integrated Port Security system in investment Protection.

Research objectives

1. To determine the effect of poor port security system on port investment.
2. To determine the extent to which an integrated port security system would enhance the protection of investments.

Research questions

1. What is the impact of poor port security system on port investment?
2. To what extent will the integration of port security system enhance the protection of investments?

Hypotheses

H01. There is no significant impact of poor port security system on port investment

H02: Integration of port security system will not enhance the protection of investments

3 Literature review

Port security refers to the security measures applied in protecting a shipping port from unlawful or illegal activities and terrorism. These measures also ensure an appropriate enforcement of the agreements made with other countries. Port security also deals with securing marine commercial areas, beaches and coast lines. It concerns the eradication of all types of maritime crimes (Bueger & Edmunds, 2017).

Investment protection is the safeguarding of one's means of investment wealth from problems that could damage or eradicate it (Seaton, 2018). In maritime, port security is concerned with safeguard of the maritime assets of the nation, and practices from all forms of danger. It involves protecting the territorial integrity of the nation, while maintaining peace and order within the nation's maritime sphere by thwarting and tackling all forms of illegal activities via internal and external mechanisms.

In Nigeria, the International Ship and Port Facility Security (ISPS) Code which is the international framework to detect and prevent acts that can lead to terrorism at port facilities and onboard ships, is being implemented in ports (Anagor-Ewuzie, 2019). The ISPS Code is an important maritime regulation that provides precautionary measures for security and safety of ships, cargo, crew and ports.

Threats to port security

The main threats to maritime security include sea robbery, piracy (Zillur, 2019), and Illegal, Unreported and Unregulated (IUU) fishing with sea robbery and piracy being the most notorious threats (Babatunde&Abdulsalm, 2021). Other threats include cargo theft, illegal trade in psychotic substances and narcotics, kidnapping, maritime terrorism, stowaway, currency smuggling, etc.

Importance of port security

According to the Maritime Insight News Network (2019), port security is important because marine transport is a very thriving and extensively used form of transportation, especially for cargo and to avoid inappropriate use, ports should be monitored and inspected.

Ports are very large areas that are busy and as a result, some areas are inaccessible when making rounds leading to cargo being stolen from cargo containers and weapons being smuggled into a country. Port security solves the challenges of inaccessibility thus reducing the occurrence of cargo theft.

Port security prevents major disasters that can result from attacks on oil-carrying cargoes by terrorists or pirates which may cause spillage or even fire outbreaks.

Port security helps to protect the interest of ships in dangerous and conflicted waters where piracy thrives. It is effective in accounting for anti-piracy measures.

4 Theoretical framework

System Theoretic Accident Model and Process (STAMP)

This study is based on System Theoretic Accident Model and Process (STAMP) which is defined as a system of interrelated components that achieves its objectives by using information and feedback loops to sustain dynamic equilibrium via internal and external disturbances. Intolerable losses happen when the system penetrates a hazardous state and encounters a worst-case scenario (Leveson, 2012) and these losses can stem from defective interactions between physical components, operational mission, engineering activities, organizational structures and other factors. Safety is seen as an emergent system that helps to avoid these losses.

A port's security vulnerabilities make it vulnerable to loss due to an undesired event and a port security loss happens with the collaboration of a vulnerable state and a worst case set of scenarios including adversary actions (Williams, 2015). STAMP detects high level losses as stemming from safety hazards (Leveson, 2012) and as such, the STAMP causality model converts high level losses into related vulnerable system states.

Methodology

The study adopted a descriptive research survey in assessing the effect of integrated port security system in investment protection. The population of the study comprised of port workers in Lagos state. Thus, using random sampling method, 100 port workers were selected from the Apapa port in Lagos. Questionnaires structured on a four point likert scale format were used in obtaining data from these respondents. The data was descriptively analyzed using percentages and frequencies and the hypotheses was tested using chi square at 0.05 level of significance.

Data Presentation

Table 1: The effect of poor port security system on port investment

| RQ1 | What is the effect of poor port security system on port investment? | SA | A | D | SD | % in agreement | |
|-----|--|----|------|------|-----|----------------|-----|
| 1 | Poor port security system hinders commercial development within the ports | F | 39 | 59 | 0 | 2 | 98 |
| | | % | 39.0 | 59.0 | 0.0 | 2.0 | |
| 2 | Poor port security system yields poor economic growth | F | 69 | 30 | 1 | 0 | 99 |
| | | % | 69.0 | 30.0 | 1.0 | 0.0 | |
| 3 | Revenue generation will be minimized | F | 79 | 21 | 0 | 0 | 100 |
| | | % | 79.0 | 21.0 | 0.0 | 0.0 | |
| 4 | Poor port security system causes bottleneck in port operations | F | 55 | 44 | 0 | 1 | 99 |
| | | % | 55.0 | 44.0 | 0.0 | 1.0 | |
| 5 | Poor port security system causes malfunctioning of port system | F | 19 | 77 | 1 | 3 | 96 |
| | | % | 19.0 | 77.0 | 1.0 | 3.0 | |
| 6 | Insecurity in port activities causes most seaborne trade to arrive in relatively few terminals | F | 69 | 30 | 0 | 1 | 99 |
| | | % | 69.0 | 30.0 | 0.0 | 1.0 | |

Source: Field survey (2021)

Table 1 above presents the respondents response on the effect of poor port security system on port investment. As indicated in the Table, 98% of the respondents are in agreement to the statement that: "Poor port security system hinders commercial development within the ports." 99% supports that "Poor port security system yields poor economic growth." 100% are in agreement that "Revenue generation will be minimized." 99% are of the view that "Poor port security system causes bottleneck in port operations"; 96% support that "Poor port security system causes malfunctioning of port system". Finally 99% are in agreement to the statement that "Insecurity in port activities causes most seaborne trade to arrive in relatively few terminals."

RQ2: To what extent will the integration of port security system enhance the protection of investments?**Table 2: The extent to which integrated port security system enhances the protection of investment**

| RQ2 | To what extent will the integration of port security system enhance the protection of investments? | | % | A | D | SD | % in agreement |
|-----|---|---|------|------|------|-----|----------------|
| 7 | Integration of port security system enhance the ability of port security managers to execute their risk management | F | 45 | 50 | 5 | 0 | 95 |
| | | % | 45.0 | 50.0 | 5.0 | 0.0 | |
| 8 | Integration of port security system increase trade flow through channels | F | 20 | 70 | 5 | 5 | 90 |
| | | % | 20.0 | 70.0 | 5.0 | 5.0 | |
| 9 | Integration of port security system help ports to operate more efficiently, whilst becoming more resilient to crime and terror threats, without the additional burden of significant security investments | F | 44 | 52 | 2 | 2 | 96 |
| | | % | 44.0 | 52.0 | 2.0 | 2.0 | |
| 10 | Integration of port security system accelerates the flow of goods through ports. | F | 39 | 50 | 5 | 6 | 89 |
| | | % | 39.0 | 50.0 | 5.0 | 6.0 | |
| 11 | Integration of port security system will provide facilities that can be harnessed to increase the effectiveness of port protection | F | 55 | 30 | 11 | 4 | 85 |
| | | % | 55.0 | 30.0 | 11.0 | 4.0 | |
| 12 | Integration of port security system will ensure provision of better security, at lower costs, and without putting people at risk. | F | 67 | 24 | 6 | 3 | 91 |
| | | % | 67.0 | 24.0 | 6.0 | 3.0 | |
| 13 | Integration of port security system can facilitate a more secure and efficient operation of Nigerian ports, without stakeholders having to further invest in expensive security systems. | F | 62 | 30 | 3 | 5 | 92 |
| | | % | 62.0 | 30.0 | 3.0 | 5.0 | |

Source: Field Survey (2021)

The second research question investigated the extent to which the integration of port security system enhances the protection of investments. The result presented in the table indicated that 95% are in agreement to the statement that: "Integration of port security system enhance the ability of port security managers to execute their risk management". Similarly, 90% supports that "Integration of port security system increase trade flow through channels"; 96% of the respondents agreed that "Integration of port security system help ports to operate more efficiently, whilst becoming more resilient to crime and terror threats, without the additional burden of significant security investments". 98% are in agreement that: "Integration of port security system accelerates the flow of goods through ports." 85% agreed that "Integration of port security system will provide facilities that can be harnessed to increase the effectiveness of port protection"; 91% are in support to the statement that: "Integration of port security system will ensure provision of better security, at lower costs, and without putting people at risk." While 92% agreed that "Integration of port security system can facilitate a more secure and efficient operation of Nigerian ports, without stakeholders having to further invest in expensive security systems"

Test of Hypotheses and Discussion

Chi-Square was adopted in testing the hypothesis at $p < 0.05$ level of significance and the results are presented below;

H01. There is no significant impact of poor port security system on port investment

Table 3: There is no significant impact of poor port security system on port investment

| Chi-Square Test | Value | Df | Asymptotic significance (2-sided) |
|------------------------------|--------------------|----|-----------------------------------|
| Pearson Chi-Square | | | |
| Likelihood Ratio | 3.172 ^a | 2 | .001 |
| Linear-by-linear association | 3.134 | 3 | .001 |
| N of Valid cases | 1.202 | 5 | .001 |
| | 100 | | |

1. 0 cells (0.0%) have expected count less than 5.

The minimum expected count is 20.0

The association between poor port security system and port investment was determined by means of Chi-square. The result as indicated in table 3 above showed a P-value of 0.001 which is below the level of significance ($\alpha = 0.05$) [$p < 0.05$] proposed in this study. By this result, the null hypothesis was rejected indicating that there is a significant impact of poor port security system on port investment. Security is every man's business. It is one of the major factors that demand individual decisions to invest in any company. In other words, without adequate security guarantee, no individual is willing to risk investing on business that has not prospered. In maritime, port security embodies all activities meant to safeguard maritime assets from any form of danger. It involves protecting the territorial integrity of the nation, while maintaining peace and order within the nation's maritime sphere by thwarting and tackling all forms of illegal activities via internal and external mechanisms. Once security is guaranteed, it encourages investors in the sector. Consequently, the port security system must possess the ability of intercepting any and all threats as well as the capability of responding and handling such threats. The result from this study has clearly indicated the importance of security to investment. According to this study, a poor security system in port will lead to hinder commercial development within the sector, results in poor economic growth, minimizes revenue generation, causes bottleneck in port operations, results in malfunctioning of port system as well as causes the most seaborne trade to arrive in relatively few terminals. All these impede returns on investment which no investor wishes to experience. The result from this study supports Babatunde and Abdulsalm (2021), Zillur (2019), and Burns (2013) who see security as the primary challenges in maritime whose consequences lead to massive loss in the sector.

H02: Integration of port security system will not enhance the protection of investments

Table 4: Integration of port security system will not enhance the protection of investments

| Chi-Square Tests | Value | Df | Asymptotic significance (2-sided) |
|------------------------------|-----------------------|----|-----------------------------------|
| Pearson Chi-Square | 3.291.30 ^a | 2 | .031 |
| Likelihood Ratio | 3.223 | 3 | .030 |
| Linear-by-linear association | 1.216 | 5 | .013 |
| N of Valid cases | 100 | | |

- i. 0 cells (0.0%) have expected count less than 5.
The minimum expected count is 20.0

The result of the chi square test as shown in table 4 above indicated a Pearson Chi-Square statistic, $X^2 = 3.291.30$, and $\alpha < 0.05$ and a p-value of 0.031 which is less than the significant level proposed in this study ($\alpha < 0.05$). As a result, we reject the null hypothesis which states that Integration of port security system will not enhance the protection of investments. Every investor desires to safeguard his or her investment and wealth from problems that could damage or eradicate it (Seaton, 2018). It is without doubt that every investment decision considers the security of the investment as essential. As indicated in the result from testing of the first hypothesis that poor security system has negative impact on maritime investment, it becomes imperative to enhance the security system by all means. The result from this hypothesis indicates that by adopting integrated port security system, investment in maritime will be protected. Integration and connectivity are now considered central while fighting insecurity in port. It is no longer a question of individual fight or using a sole means to fight insecurity, rather, this is an era where both technologies, combine with other non-technical means to enhance security. It is a period where countries unite forces to ensure the security of maritime (ISO 9001:2008). In this sense multiple infrastructure are combine to ensure security. This result agrees with Sirajuddin, Zagloel and Sunaryo (2019) who also found strength in unity and suggested combine forces against maritime criminal. In same vein, the study supports Cronje (2014) who pointed out that "Security systems can no longer be viewed as individual silos as was previously the case, but it is essential that all security elements are integrated." Thus proposing the adoption of integrated security system (ISS) will enhance data availability, authentication, and authorization as well as accountability of all necessary information meant to improve the maritime system.

5 Conclusion and recommendations

The study has revealed that security remain a major challenge in maritime sector and thus affect investment. To enhance investment in the sector, there is a need to adopt a more robust security system that will not only enhance efficiency but also boost the confidence of investor into investing in the sector. For this reason, this paper recommends the adoption of integrated port security system. This is essential because improving port security is essential in promoting an environment in which trading transactions can be executed without any form of hindrance or criminal activity, as well as not being a channel for crime. Thus the development of a security program should be one aimed at deterrence and reduction of losses caused by criminal operations. Developing an effective port security system requires the coordination and intelligence of maritime security departments or companies and law enforcement agencies. This can be achieved through integrated port security. In Cronje

(2014) proposition of integrated security system, the system is expected to have the following features: CCTV for facial detection, number plate recognition and analytics, electronic scanning, Weighbridges for access control, fire detection, Technology supporting mobile security staff, Intruder alarm systems, PA systems with full bi-directional audio, Hard wired alarms, Physical Security Information Management (PSIM), asset tracking, Port management software, Holding cells, Visitor management systems, Search facilities and Radar services, among others.

References

- Anagor-Ewuzie, A. (2019, April 17). Port security: STOAN says Nigerian port terminals now ISPS code compliant. Business day. <https://businessday.ng/maritime/article/port-security-stoan-says-nigerian-port-terminals-now-isps-code-compliant/>
- Babatunde, E. & Abdulsalam, M. (2021) Towards Maintaining Peacefulness of the Sea: Legal Regime Governing Maritime Safety and Security in Nigeria. *Beijing Law Review*, 12, 529-559. doi: [10.4236/blr.2021.122029](https://doi.org/10.4236/blr.2021.122029).
- Bueger, C. & Edmunds, T. (2017). Beyond Sea-Blindness: A New Agenda for Maritime Security Studies. *International Affairs*, 93, 1293-1294. <https://doi.org/10.1093/ia/iix174>
- Burns, M. G. (2013). Estimating the impact of maritime security: financial tradeoffs between security and efficiency. *J Transp Secur*. DOI 10.1007/s12198-013-0119-x
- MI News network (2019, October 11). The importance of port security. Maritime Insight. <https://www.marineinsight.com/maritime-law/the-importance-of-port-security/>
- Seaton, D. (2018, August 31). What is investment protection and why do you need it? Solera Assets Managers. <https://soleraam.com/2018/08/what-is-investment-protection-and-why-do-you-need-it/>
- Sirajuddin, T. Yuri Zagloel & Sunaryo L. (2019) Effect of strategic alliance based on port characteristic and integrated global supply chain for enhancing industrial port performance, *Cogent Business & Management*, 6:1, 1567893, DOI: 10.1080/23311975.2019.1567893
- U. S. Department of Transportation (1997) National Planning Guide .Accessed from <https://www.hsdl.org/?view&did=437492>
- Williams, A. D. (2015). Beyond a series of security nets: applying STAMP & STPA to port security. *Journal of Transportation Security: Norwell* 8, 3-4, pp 139-157. DOI:10.1007/s12198-015-0161-y
- Zillur, R. B. (2019). Shipping and port security: Challenges and legal aspects. *The Business and Management Review*, Volume 10 Number 5.

Appendix**INTEGRATED PORT SECURITY SYSTEM: A KEY FACTOR IN INVESTMENT PROTECTION
REQUEST FOR INFORMATION**

Dear Respondent,

I am carrying out a study on “Integrated Port Security system: a key factor in investment Protection” and you have been chosen to be part of the study. This questionnaire is only for academic purposes. Kindly select the response which applies to you and all information will be kept confidential

SECTION A:

Instructions: Please tick (√) as appropriate where

SA = Strongly Agree (SA), A = Agree, D = Disagree (D), SD = Strongly Disagree (SD)

Key: Strongly agree (4), Agree (3), Disagree (2), and strongly disagree (1).

| S/N | ITEMS | SA | A | D | SD |
|------------|---|----|---|---|----|
| RQ1 | What is the effect of poor port security system on port investment? | | | | |
| 1 | Poor port security system hinders commercial development within the ports | | | | |
| 2 | Poor port security system yields poor economic growth | | | | |
| 3 | Revenue generation will be minimized | | | | |
| 4 | Poor port security system causes bottleneck in port operations | | | | |
| 5 | Poor port security system causes malfunctioning of port system | | | | |
| 6 | Insecurity in port activities causes most seaborne trade to arrive in relatively few terminals | | | | |
| RQ2 | To what extent will the integration of port security system enhance the protection of investments? | | | | |
| 7 | Integration of port security system enhance the ability of port security managers to execute their risk management | | | | |
| 8 | Integration of port security system increase trade flow through channels | | | | |
| 9 | Integration of port security system help ports to operate more efficiently, whilst becoming more resilient to crime and terror threats, without the additional burden of significant security investments | | | | |
| 10 | Integration of port security system accelerates the flow of goods through ports. | | | | |
| 11 | Integration of port security system will provide facilities that can be harnessed to increase the effectiveness of port protection | | | | |
| 12 | Integration of port security system will ensure provision of better security, at lower costs, and without putting people at risk. | | | | |
| 13 | Integration of port security system can facilitate a more secure and efficient operation of Nigerian ports, without stakeholders having to further invest in expensive security systems. | | | | |