

Customs Automation: The X-ray and Computerized Risk Management Systems Era

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Abstract: *Though established by the promulgation of the Customs and Excise Management Act of 1958, The Nigeria Customs Service (NCS) traces its origin to 1891 when the British colonial administration appointed the first Director-General of Customs, Mr. T.A. Wall. Having operated as a major Government revenue collection agency for decades, the customs formation formally embraced automation in 2006 when the Federal Government through the Federal Ministry of Finance entered into a 7-year build-own-operate-transfer contract with four private companies to provide computerized risk management system (CRMS) and X-ray cargo scanning services to modernize Customs operations, boost revenue generation, and protect the economy and lives of Nigerians. This paper reviews the state of the journey to automation and the current state of affairs in this very important revenue collection and enforcement agency. We also discussed the problems, challenges, prospects of computerized automation.*

Keywords: Nigeria Customs Service, Modernization, Automation, Policy, Risk management system, X-ray

1. Introduction

Customs administrations across the world have the unique mandate to provide increased security to the global supply chain and to contribute to socio-economic development through revenue collection and trade facilitation. Customs operations may be divided into: Trade and Tariff; Corporate Service & Economic Relations; Enforcement, Investigation and Inspection [1]. Operations of the Nigeria Customs Service could be divided into two eras: the Pre-2006 era and the Post-2006 era.

1.1 The Pre-2006 era

Prior to 2006, the inspection operations of the Nigeria Service which currently falls under the Enforcement, Investigation and Inspection department of the NCS, were basically pre-shipment inspection (PSI). The PSI era in Nigeria dates back to around 1979 and was a policy that affected the determination of the quality and dutiable nature of goods before they were shipped to Nigeria from the country of export or production. PSI consists of a set of tailor-made verification services, primarily designed to assist Customs authorities in combating capital flight and ensuring the correct collection of import duties and taxes. In a PSI scheme, shipments are inspected at the premises of the exporting firm or at the port of departure by an inspection company duly appointed by the government of the destination country (Nigeria in this case) where such shipments are to be exported to. The verification process usually involves:

- Physical inspection of goods
- Container examination and sealing
- Classification and valuation of goods
- Documentary checks

1.1.1 Physical inspection of goods

This is conducted by trained officers to ascertain that shipments:

- Conform to the relevant agreed contractual specifications
- Meet the relevant quality and quantity requirements

- Are adequately and accurately described all along the invoicing control process

1.1.2 Container inspection

This is done to guarantee that the goods loaded are safely stored and remain untampered with during travel including loading / discharge services. Inspection here involves:

- Empty container integrity checking
- Stuffing witnessing
- Sealing with tamper-resistant devices

1.1.3 Tariff classification and valuation

This involves the following activities:

- Detection of misclassification of goods and provide Customs with an independent opinion on the declared tariff codes thus indicating which duties and taxes should be paid.
- Valuation to provide Customs with an independent opinion on prices on the commercial invoices. The various price components are examined in order to ensure they correspond to those prevailing in the country of origin or on the international market and take into account commercial agreements.
- Duties and taxes calculation based on the assessed dutiable value and appropriate Customs classification, in accordance with the tariff rates applicable under the local Customs' tariff code.

1.1.4 Documentary check and investigation

This is often done to control transaction legality, contractual specifications of goods and document certification

Merits of the PSI scheme

- PSI maximizes duty collections. By undertaking duty assessment in the country of export, importers have no opportunity to pressurize customs to assign lower rates.
- Compliance with the World Trade Organization (WTO) Agreement on Customs Valuation [2] which is mandatory for all members is easily enforced.
- Without PSI, countries under the Agreement may experience a reduction in revenue collections.

Volume 6 Issue 4, April 2017

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- Trade facilitation: inefficient Customs administrations and the failure of importers to comply with import procedures can both delay trade. A certificate from an authorized inspection agent ensures rapid Customs clearance, by undertaking the necessary physical and documentary inspections before the consignment is dispatched.
- PSI deters capital flight in countries where exchange controls exist by preventing deliberately inflated invoicing. This can deplete foreign exchange reserves, which can also reduce the taxable income declared by multinational companies.
- PSI significantly reduces the incidence of illegal imports, such as radioactive waste, fire arms by inspecting shipments in the country of export before dispatch.
- PSI enables the development of a vast database of vital trade information which can be supplied to the Client Government in a variety of formats, as an aid to economic decision making and to induce confidence in donors.

Demerits of the PSI

- It created more jobs for foreign nationals than Nigerians.
- Foreign companies were usually the inspection agents as the inspection sector was not yet developed in Nigeria.
- PSI does not encourage or promote development of local infrastructure

1.2 Post-2006 era

This era is generally called the Destination Inspection Scheme (DIS) era. This era marked the commencement of Customs automation and modernization involving large scale computerization.

The DIS is a major bold step in the computerization and modernization of the Nigeria Customs Service. The scheme was re-introduced in Nigeria on January 1, 2006 after the first attempt in April 1999. It involves the inspection of goods on arrival in Nigeria as opposed to PSI regime, which involves inspection of goods at the exporting country which Nigeria practiced for about 27 years.

Objectives of the DIS

- The DI scheme aims at full computerization of import and clearing activities, which encourages timeliness, transparency and accountability;
- Forestalling capital flight, i.e. avenues for fraud/price discrimination, by identifying over-invoicing, under valuation and wrong classification;
- Ensuring National security, i.e. to strengthen security at the ports;
- Capacity building for Nigeria Customs Service/stakeholders;
- 100 percent inspection of goods imported into Nigeria will check the growing incidence smuggling, most specifically of arms and ammunitions.

The DI era may be divided into two sections:

- a. The Computerized Risk Assessment with Cargo Scanning period
- b. The Pre-arrival assessment with cargo scanning

2. The Computerized Risk Assessment with Cargo Scanning period

The World Customs Organization (WCO) defines Risk Management “as the systematic application of management procedures and practices providing Customs with the necessary information to address movements or consignments which present a risk” [3]. It is stressed across Customs formations across the world that risk management [4] is necessary owing to the fact that the task of the Customs in controlling the movements or consignments across national frontiers and ensuring compliance with national laws requires that it organizes its resources and deploy them in a manner that will improve its overall effectiveness and performance. It is in this light that the computerized risk management approach became a viable option. The conceptual risk management model for the Customs based on the Australian/New Zealand standard risk management [5] is as presented in Figure 1. The model has six(6) phases: establish the risk context; risk identification; risk analysis; risk assessment[6]; evaluation/control; monitoring, measurement and compliance[6].

Computerized Risk Management and High capacity X-ray cargo scanning of imported cargoes were introduced in 2006 as part of the Federal Government’s Customs automation effort and subsequent contract with the three Scanning Service and risk management service providers (SSPs) namely: SGS, COTECNA Inspection, and Global Scansystems. The SSPs had signed the contract with the Federal Government through the Federal Ministry of Finance to provide scanning/risk management services to augment the services of the Nigeria Customs Service (NCS). While the contract lasted, each SSP conducts non-intrusive cargo scanning at the assigned ports with the goal of managing risks associated with imported goods.

2.1 Characteristics of this period

- SSPs amidst other contract terms were to build human capacity for the NCS to enable the NCS take over the SSP’s functions at the expiration of the contract
- Each SSP is assigned a lot comprising three or more ports and border posts
- Each SSP is to procure, install and maintain mobile and fixed cargo scanners from a reputable manufacturer. This was on a ‘build own operate and transfer’ (BOOT) basis, that is, the ownership of the scanner equipment built by the SSP would be automatically transferred to NCS at the expiration of the contract.
- Each SSP is mandated to develop and use a certified computerized risk management system (CRMS) software to document and analyze all import declarations submitted to it by importers through their authorized dealer banks.
- A standard list of risks associated with imports is maintained and updated across the SSPs and each CRMS is to conduct its analysis based on the standard set of provisions which is subject to regular updates.
- Each CRMS is required to interface with the Automated System for Customs Data(ASYCUDA) installed at the

NCS headquarters (and accessed across all ports and border posts via a wide area computer network deployed by the United Nations Conference on Trade and Development (UNCTAD) personnel

- An Electronic Document Interface (EDI) is used to transmit electronic RAR and Form M messages in the form of XML (extended mark-up language) from the SSP's CRMS to ASYCUDA++ server at the NCS HQ
- ASYCUDA++ therefore constituted the bedrock system for harmonizing all data originating from the various SSP's CRMS and consolidating them to an operational database
- The SSP's CRMS is meant to interface with the Scanners at the ports/border posts allocated to the SSP
- The importer through his bank is to submit the various import documents such as Form M, Proforma Invoice (PFI), SONCAP certificate, NAFDAC certificate, Final Invoice/Combined Certificate of Value and Origin (CCVO), shipping documents (Airway bill/waybill/Bill of Lading), etc to the appropriate SSP covering the port of discharge (the port where the importer's goods are to be cleared from)
- Each SSP through its CRMS issues a Risk Assessment Report (RAR) after detailed assessment using the submitted documents by the importers
- Each SSP's CRMS is to transmit to ASYCUDA++ server the electronic version of the RAR in form of XML document whereas a hard copy is sent to the importer's bank, CBN/Ministry of Finance respectively.
- The RAR is an advisory document for NCS decision making
- From the RAR, the duty payable can be computed
- The RAR also contains an intervention data specifying whether the shipment has high risk (red channel), medium risk (yellow channel) or low risk (green and blue channels)
- When ASYCUDA++ server receives the RAR message for each shipment it matches it to its Form M (sent much earlier) using a data field common to both Form M and its associated RAR such as the 'BA number'; then performs its selectivity and may route the shipment to either of the intervention lanes (red, yellow, green).
- Where red is indicated, physical examination or scanning of the shipment may be done. Where yellow is indicated the shipment is subjected to scanning. Documentary checks are performed where green is indicated.
- The F.G. pays the SSPs monthly by computing 0.5% of the total FOB (free on board) value of all the RARs issued for that month.
- The 0.5% paid to SSPs was derived from the administrative charge of 1% of FOB value on the approved Form M.
- The administrative charge is automatically paid by the importer
- Contract with SSPs effectively lapsed in November 2013

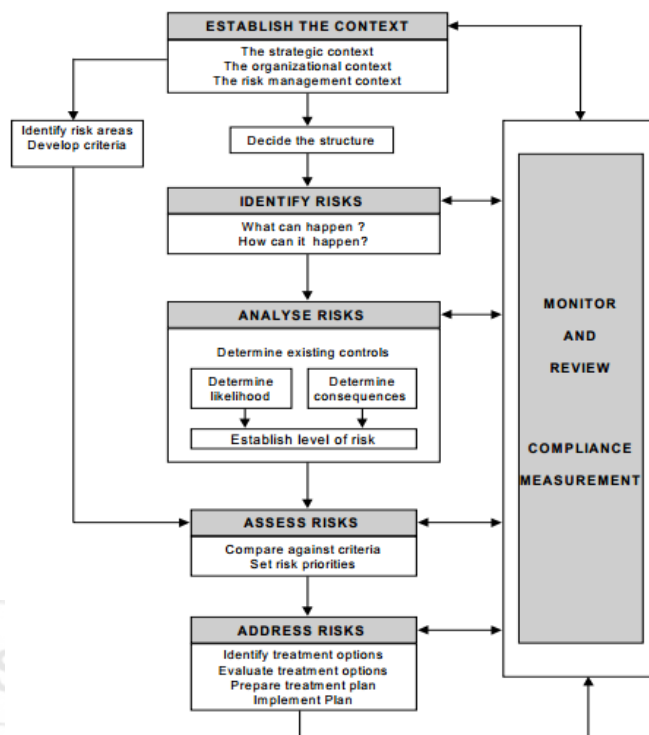


Figure 1: Risk management model [Source; AS/NZS 4360, 1995]

2.2 Levels of automation

Following the engagement of SSPs in early 2006, a new era ensued in which inspection of imported goods including documentation assumed a new dimension. The levels of automation in the NCS during this period are:

- Computerized Risk Management System (CRMS)
- X-ray cargo scanners
- Asycuda++ system

The CRMS software was wholly owned by the SSPs but was a prerequisite to the signing of the contract. The logical structure of an ideal CRMS as used by the SSPs is shown in Figure 2. Figure 3 shows the connectivity between the SSPs and the NCS.

2.2.1 The CRMS

The CRMS is akin to a hybrid of an enterprise resource planning (ERP) system and a transaction processing system (TPS). It is fully computerized software running on high-end usually a multi-processor hardware and accessible over the Internet. Each SSP owns its CRMS platform though importers and Customs officers do have access to the systems though controlled by the use of different security credentials. At the back of the CRMS is a powerful database server. The most sensitive component of the CRMS is the risk engine which is a complex suite of program modules that handle all aspects of risk detection, evaluation, profiling, channeling and reporting.

2.2.2 X-ray cargo scanners

The cargo scanners are hi-tech inspection machines usually based on x-ray imaging technology. They are of two main types: Mobile and fixed scanners. There is a third category called the gantry scanner. The mobile scanners are usually

motorized hence could be moved at will to any port or site where cargo scanning is to be done. One limitation of the mobile scanner is that the dimension of cargo or truck it can scan is restricted. In other words, over-sized trucks are often difficult to scan. The fixed scanners are complex fixed often customarily constructed and configured at a predefined location where scanning is to be done; every cargo to be inspected by way of scanning must be conveyed to that location where the fixed scanner is located.

2.2.3 The ASYCUDA system

The ASYCUDA++ system is a low-graphics (8-bit) based decision-support system with an Oracle database. The database receives data on imports and single goods declaration (SGD) from external independent systems (which may be CRMS of SSPs or other independent systems) usually through extended mark-up language-based documents. The choice of XML is obvious i.e. lightweight and platform independence. The ASYCUDA collates these data and

applies its risk logic in determining the level of risks on each import as well as the mode or channel of controlling that risk. The ASYCUDA provides a confirmatory response to the risk assessment conducted on any CRMS elsewhere where such is the practice. That is, the position of ASYCUDA as to any import declaration is what is used to determine the final channel of clearance of the goods. There are basically three (3) of such channels: green, yellow and red. Only cargoes marked red require physical inspection (with the scanners or human inspection where scanners are absent) prior to the release of such imports. The ASYCUDA is accessible only to authorized NCS personnel at the ports and border posts. One of the weaknesses of the ASYCUDA++ system is that it lacks graphics front-end hence not user friendly.

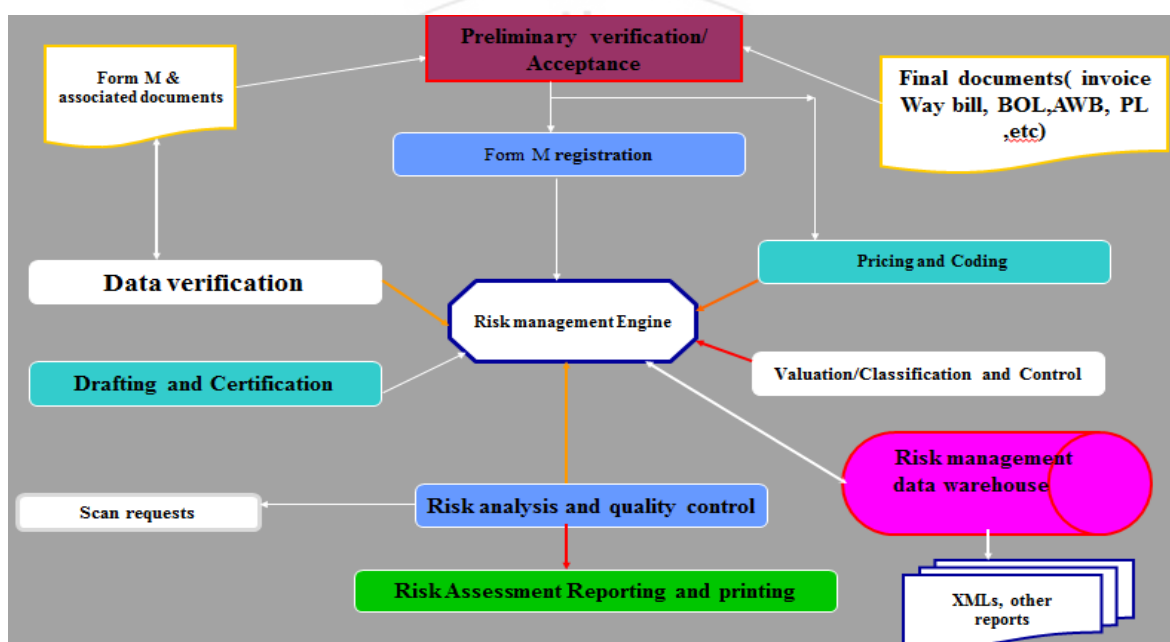


Figure 2: Logical structure of a CRMS

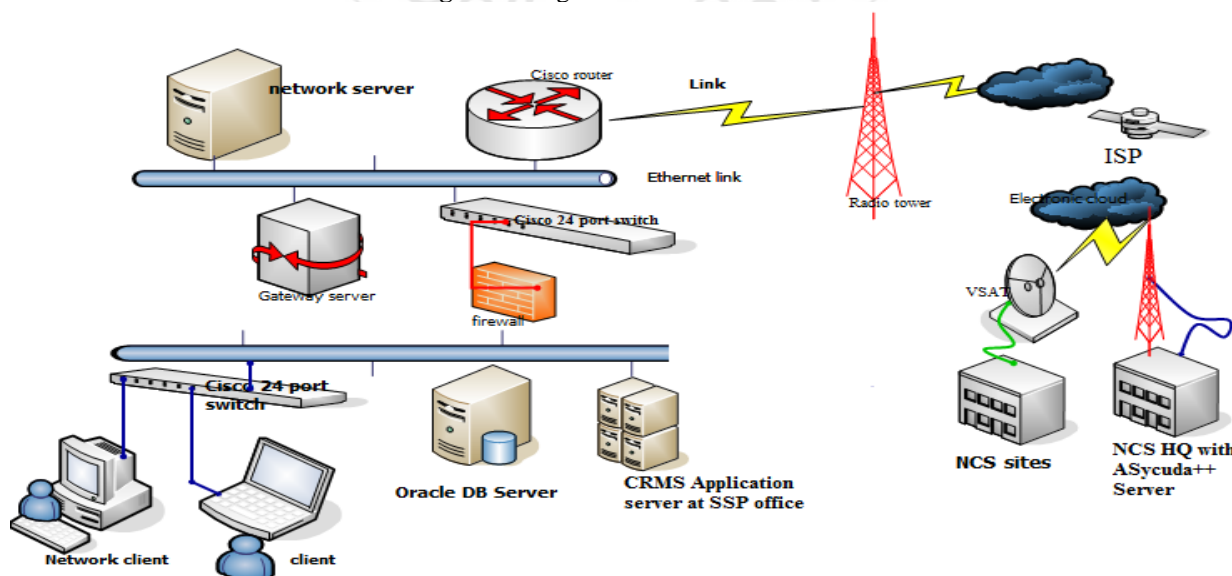


Figure 3: Connectivity between SSPs and NCS offices

2.3 Responsibilities of the Federal Government during this period

The roles and responsibilities of the Federal government during this period are summarized below:

- Take all necessary measures to facilitate the prompt and effective implementation of the services by SSPs
- Issue legal notices and any other similar regulations whenever necessary and shall notify SSPs of all such rules and regulations, arrangements and any change thereto, so as to enable SSPs to implement the services, especially for the use of the X-Ray Verification System.
- Facilitate the provision of water, electricity, telecommunications and access roads to SSPs in the Ports and Posts.
- Provide SSPs the necessary office space and a sufficient allocation of constructive land at all the sites. To accommodate the container X-Ray Scanning Services, free from rent or any other charges or encumbrances for the duration of this agreement.
- Assist SSPs to process all necessary licenses for the operation of SSPs offices, as well as immigration and work permits for any expatriate staff.
- All cargo scanners are exempted from the payment of import duties and taxes
- Provide adequate security on all sites to SSPs's own staff and to subcontractors' staff appointed directly or indirectly by SSPs during construction and installation of all items of equipment.
- Exempt income of SSPs from all taxes

3. The Pre-arrival Risk Assessment with X-ray cargo scanning period

3.1 Pre-Arrival Assessment (PAA): What does it mean?

Pre-arrival assessment of risks associated with declared goods to be imported is the current practice in the NCS across all ports and border posts in Nigeria. It commenced following the takeover of scanning operations and risk management by the Nigeria Customs Service. The process is based on the existing Electronic Form M and submission of relevant import documents by the banks and importers.

From our observations an study of these risk assessment models, Pre-arrival risk assessment is just another way of re-inventing the wheel. Contextually, pre-arrival assessment of risks associated with import declarations means no more than the detection and evaluation of goods declared by an importer in the import documents such as 'Form M', Combined certificate of value and origin (CCVO), Proforma Invoice, Final Invoice, etc. in relation to some predefined set of risks, each of which carries a risk weight, prior to the actual arrival of the cargoes to Nigeria. This technique on close examination does not differ from what the Risk management service providers were doing with their CRMS and its documentary product, the 'Risk Assessment Report'. However, the new platform runs not on any of the SSP's CRMS but on a PAA system that was designed by the West Blue Consulting for the NCS using the data it collected from the SSPs. The features of PAA are summarized below:

- It is modeled after the preceding RAR system which it purports to replace;
- It commenced effectively on January 2014 at the expiration of the Destination Inspection contract with SSPs on November 2013;
- The process of issuing RAR is sustained except that no SSP's CRMS is involved and that the term RAR is replaced by the PAAR(pre-arrival assessment report);
- Importer establishes a Form M electronically through his bank using the single window for trade application available through the website; <https://www.trade.gov.ng>
- The PAAR is issued by NCS after receiving the various import documents such as final invoice/CCVO, shipping documents, packing list, etc from the importer's bank;
- Customs duty computation is based on the PAAR;
- No independent advisory/confirmatory report is involved in the process;
- No third party Inspection/Scanning company is involved;
- The Scanners and PAAR application (NICIS/CRMS) are managed by NCS.

3.2 Scanning at the ports and border posts

Following its takeover in later 2013, the NCS retained one of the SSPs who provided rudimentary maintenance and supervision on scanners and scanning activities across all the ports and border posts. This was necessary as immediate transition and handover to the NCS without expert assistance might have been counterproductive owing to the lag in technical experience and knowledge in the area of X-ray cargo scanners among the officers and men of the NCS. However, the scanning operations which followed the same procedures as it were during the era of the SSPs did not last any longer than early 2015 following the breach of contractual terms by NCS with the SSP it retained (Messrs. Global Scansystems Limited) and the subsequent termination of the contract. At the time of this study, all the expensive x-ray cargo scanning machines at the various ports and border posts which are meant to facilitate trade and enhance security have become functionally moribund and unusable. Many of these highly sensitive pieces of equipment have been vandalized and there is a high degree of uncertainty regarding any rehabilitation that could resuscitate these devices.

4. The Risk Assessment and the Pre-Arrival Assessment periods in comparison: What it means for the nation

There is no gainsaying that the era of SSPs created room for capital flight as both local and foreign companies earned much money from the contract even though not all contractual obligations were fulfilled by the SSPs. As the manner of non-indigenous companies is, these monies were not re-invested locally but sent to the foreign countries where some of the companies were based. That notwithstanding, there are other factors that must be stressed. For clarity, we have divided the bulk into two periods and for each of these periods we have captured the factors mentioned earlier under strengths and weaknesses.

4.1 Strengths and weaknesses of the Risk Assessment with X-ray scanning period

The following advantages were quite glaring during this period:

- Promotion of the development of hi-technology infrastructure for NCS;
- Continued modernization of NCS operations;
- Elimination of the need to make budgetary allocations for the development of modern infrastructure for NCS operations by exploiting the benefits of private public partnership policy and the 'build own operate and transfer' principle;
- Continued capacity building for NCS;
- Encourages local participation in the inspection business;
- Creates more jobs for Nigerians unlike the PSI
- Reduces corruption by reducing human intervention in the documentation and clearance processes;
- Promotes transparency and accountability;
- Boosts revenue generation and collection;
- The use of scanners reduced safety risks which may encountered during physical inspection of dangerous materials/goods;
- The use of scanners contributed greatly to risk management by enhancing inspection and de-concealment of concealed/undeclared goods (including products that could be harmful if inspected by human unaided) thereby increasing revenue generation;
- Empowerment of citizens through the acquisition of knowledge and skills on modern technology and technology transfer.

Problems and challenges of this period

Though the period in question recorded tremendous growth in revenue generation and in the deployment of state-of-the-art technologies, it also had its weaknesses:

- The Risk Assessment Report (RAR) issued by Scanning Service Providers(SSPs) was only advisory hence could be set aside during the actual clearance process;
- The presence of SSPs was seen as a usurpation of the functions of NCS hence cooperation was not total;
- Lack of political will led to the discontinued participation of UNCTAD which would have ensured the upgrade of ASYCUDA++ to a more robust ASYCUDA World platform (used in more than 50 countries) thereby saving the cost of developing new system(s) by NCS.
- High degree of corruption among the NCS officers

4.2 Strengths and weaknesses of the Pre-Arrival Assessment with X-ray Scanning period

Risks accompanying cargoes is classified into pre-arrival, arrival, and post-arrival [6] when the object of classification is the location and access to the cargo in question. Among the three classes of risks in this context, the local Customs does not have absolute control over the pre-arrival risk group. This lack of control over pre-arrival risks is what may have precipitated to the conversion of existing risk assessment report as issued formerly by the SSPs to the pre-arrival assessment report. Like its predecessor, the PARR as it is called also has its limitations.

The strengths and weaknesses of this period are discussed below.

Strengths

- The use of a single risk assessment platform enables the issuance of a uniform report at all times for all importers. In other words, variation does not exist when goods or cargoes of similar risk characteristics are assessed on the system.
- Huge Tax exemptions for SSPs are no longer necessary as their services are no longer required;
- The CISS fund contributed by importers which is a reasonable amount could be channeled to the development of capital projects;
- Builds on the gains of the RAR era;
- No need for an initial investment on procurement of new cargo scanners;
- Both risk management and scanning operations are purportedly manned by NCS;
- The 1% administrative charge from which SSPs were paid is now directed to NCS development.

Weaknesses and challenges

The takeover of scanning and risk management by NCS though plausible effort on the part of the NCS, it has not seemingly worked as expected as the following problems are currently affecting the Customs operations and the Nigerian nation at large:

- The Pre-arrival Assessment Report issued by the NCS is often delayed longer than necessary thereby causing more economic losses to importers as a result of demurrage;
- Poor maintenance culture: this has led to the total collapse of the multi-million dollar Cargo Scanning Infrastructure which the nation especially the importers paid to build through the SSPs. This has resulted to grievous port congestion as the NCS authorities had resumed the ancient practice of physically inspecting all cargoes. It is interesting to note that the fund that financed the services of the SSPs was not from the Government purse but was from the pooled Compulsory Imports Supervision Scheme(CISS) fund(managed by the Central Bank of Nigeria) and derived from the 1% FOB (free on board) value which every importer contributes during every import activity. Figure 3 shows the list of all cargo scanners deployed during the period SSPs were in operation. None of these high technology inspection devices is operational at the point of this writing. Majority have been vandalized under the watch of the NCS;
- The CRMS it uses i.e. the NICIS platform is a composite system and not integrated as claimed in some quarters;
- NCS does not seem to be in control of the software platform in its entirety as Webb Fontaine, a third party company was retained from 2013 to 2016 when another company was contracted to manage the system. Webb Fontaine had provided support for NICIS(a component system which it developed to replace UNCTAD's ASYCUDA++) which interfaces with the PAAR(pre-arrival assessment report) software;
- Revenue leakages and losses from multiple sources including the use of physical inspection during the clearance process;

- The objective of eliminating or reducing intrusion in the clearance process seems defeated;
 - Job losses as most Nigerian employees employed by SSPs were disengaged;
 - Increased human intervention in the clearance process
 - Pricing and valuation challenges that lower duty computation;
 - Selectivity scanning issues;
 - Corruption and lack of transparency in the clearance process;
 - Poor valuation of imports leading to revenue losses: valuation is confined to the HS code (tariff classification) which is not detailed and can easily be manipulated to evade duty;
 - Under-utilization of scanners when they are fully operational;
 - Installed scanners not adequate to tackle the growing security concerns.
- Implement proper pre-scanning documentation so as to capture the true declarations;
 - Regular preventive maintenance to forestall equipment breakdown;
 - Install more scanners where necessary;
 - Enforce mandatory training and re-training of personnel of NCS.

5. Conclusion and Recommendation

This paper is an expository study aimed at providing a concise but detailed coverage of Customs automation as it affects the use of Scanners and CRMS in the operations of the Service since its modernization programme commenced in 2006. The NCS has witnessed two periods of automation: the period of SSPs and currently an era in which every automation process could be said to be 'independently' manned and controlled by the NCS. Having x-rayed these periods objectively we have identified problems and setbacks accompanying each era and by extension we may conclude that whereas automation in NCS is a novel idea, more is desired to see such innovations produce the expected results. Poor maintenance culture and policy somersault must be tackled for there to be any meaningful sustenance of such innovations.

Currently, Nigeria is in dire need of revenue and security both of which the NCS is a key player hence patriotism demands that appropriate measures be taken to contribute towards improving the present scheme of things. To this end we make the following recommendations:

- Increased commitment from NCS personnel: officers and men of integrity, honesty and zeal should be rewarded;
- There should be enforcement of compliance with trade policies and bilateral agreements;
- Reduce/eliminate human intervention in the clearance process which is becoming a norm;
- Enhance the existing Pricing and Valuation system by implementing efficient check strategies and development of intelligent profiles or alternatively, create an independent valuation/classification system to do a parallel risk management using same documents submitted by importers. This system should be manned by pricing and valuation experts who will work with pricing research analysts in various continents to obtain the correct prices of goods that will be used to validate the pricing data in the existing valuation database;
- Instill practical risk management into the system;
- Subject all imports to pre-scanning from source;

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Author Profile



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