The Effectiveness of Container Inspection Systems (CIS) on Ports Management in Bangladesh

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ABSTRACT

Growing pressure of regional, bilateral and cross border trading culture is putting positive impact on increased domestic and international containerized trade volume in areas land and seaport areas in Bangladesh. The study is designed to measure effectiveness of container scanning system (CSS) to implement in both sea and land port areas and thus how operational dynamism can be ensured for faster operational activities in port areas due to demand pressure on digitalized commercial environment in future. Qualitative data collection applied by using Delphi method has been chosen to gauge the effectiveness of port performance using container inspection technology in many advance economy. And, it is becoming much important in emergence economy like Bangladesh. Data have been collected from respective seaports concerned two groups of government officials in three locations to captures their opinions in two separate sessions. Sea containerized data that is recorded in Govt. official websites on yearly export and import from last five years to the latest year has been gathered for the purpose of analysis. Study has successfully contributed that there is very positive responses on using CSS in port areas of Bangladesh to keep pace of growth rate of containerized trading. The users of port authority of Bangladesh will receive several benefits such as custom inspection and port security measure by using CIS. The study also delineates sustainable economic achievement and its growth prospect in a positive way from present to the forward in Bangladesh.

Keywords-- Containerized Trade, CIS effectiveness, Speed up Revenue, Port Security, Sustainable Commercial Environment

I. INTRODUCTION

In Bangladesh traditional way of containerized international trade and business operating arrangement is being impossible. Due to the change of socio-economic condition as well as paradigm shift of demand pattern and supply side especially pressures on the forward movement of the containerized trades from high end to low end countries. International trade has been increased tremendously during last few decades due to increased trade volume from country to country (Table: 1a & 1b). Adjustment is inevitable for such changes to be aligned with the increased international trade volume and its operational support tools. And failure to such adjustment by using CIS in the port areas will appear in the operational backward movement in the competitive edge as well as concurrent era. Kennedy states that the ubiquitous use and high importance of information technology to handle the transportation of goods and materials through seaports have added a new dimension to the national security and data security [1]. Author adds that CSS tracks and inspects cargoes to ensure materials that are potentially hazardous to safety and well-being.

Increasing pressure of globalization has waved the Bangladeshi economy as well. The potential threat of terrorists using containers as a way to smuggle a nuclear or radiological device inside a cargo container pose a large risk to our economies and to our societies [2]. Critics of anti-globalization are also perceived that country is also flourishing with the global trade and business and having very positive forward movement of globalized economy in many dimensions. The study of Czinkota & Ronkainen results in impact analysis of changes to the International business environment [3].

The volume of internationalization trade is increasing rapidly in recent past, statistical record reveals. It also implies that pace of such growth of trade volume will remain upward trend in coming years. For instance, trading of goods and services through containerized trade is increasing from country to country. Mass production and
customization of goods and services are the key reasons for such situation of internationalization trade to be appeared. Goods and services are demanded from the customers’ end that is putting the effect of supply side to function pressure on increased demand on containers handing for trading in the operations of land, air and sea port areas. Statistic evident that overall containerized sea port trade will increase 10 to 12 percent in near future. Globalizations, change of trade volume, proliferate from country to country and will simultaneously increase some sorts of illegal containerized trade like smuggling, channel of narcotics trafficking and containerized waste disposal activities. Illegal trade will not only tarnish the business confidence among the trading partners but also will shake negatively national and international port security that will trigger to act economy adversely eventually. Traditional way of container handling system poses in-transparent atmosphere in sea port areas in Bangladesh.

**Problem Statement**

Illegal trade practices such as evading customs’ duties and excises have been long hanging issues in Bangladesh. The national board of revenues (NBR) has their own detectives’ measures to prevent or mitigate such activities. Eradicating successfully such activities will generate more government revenue earning and business confidence among the trading partners will be enhanced. Traditional way of CIS has huge system loss and a variety of ways to support illegal traders evading customs duties and thus huge amount government revenue earning is being deprived. At the same time it endangers port security measure. CSS is a modern tool and technique that have positive and solid solution of the aforesaid problem that NBR and seaport have suffered for a long time. There is no way and means other than CSS implementation in the port areas.

The term “port security” serves as shorthand for the broad effort to secure the entire maritime supply chain, from the factory gate in a foreign country to the final destination in the United States [4]. Container security is not primarily about port security; it is about everypace security.

**Objectives of the Study**

This study attempts to highlight the worthiness of using modern container scanning system (CSC) in seaport areas in Bangladesh and thus the said problems can be mitigated to be benefitted directly to the users group e.g. port custom authority and security personnel resulting sustainable national economy in the long run in Bangladesh.

The study seeks to examine cargo screening technologies at Bangladesh land and seaports of entry. The approach taken to data analysis is described as conceptual analysis by Busch, De Maret, Flynn, Kellum, Le, and Meyers [5]. This process provides a research tool which can be used to verify the presence of certain words or concepts within texts or sets of texts.

The purpose of this study is guided by two concepts provided by the Government Accountability Office (GAO). These include (a) to document the technologies currently being used in support of closed container inspections and (b) identify the companies and organizations leading research efforts on developing new technologies [6]. A third concept provided by Bakshi, Flynn and Gans is also used to guide the purpose of the study, which is (c) to examine the impact of technology deployment in relation to a set of pre-selected criteria, including the detection of dangerous and illegal cargo in closed container inspections [7].

**Research Question**

How do you feel about usefulness of CSS in port performance in Bangladesh? The basic idea was to congregate about degree of port security and custom authority’s responses that signify the study.

II. CONTAINER SCANNING SYSTEM

**Container Scanning Technology:** The term “scan” means utilizing nonintrusive imaging equipment, radiation detection equipment, or both, to capture data, including images of a container [8].

This technology supplies high resolution called penetration rate of ray technique on to the traded containers in a certain degree that can capture the entire image of inside of the container. Such picture will display in the port custom and security personnel monitor for their varieties of queries and inspectional purposes. It appears as a gray color image while system sends the image into the user’s PC and its monitors.

The container screening device (CSD) is the tool for checking for materials that can be used to build weapons of mass destruction, concealed contraband and illegal substances, and identifying fraudulently labeled containers [9].

**User Group**

Port custom authority and security personnel are the users of CIS technology. Security personnel may check it out by the naming of trade if any illegal lethal weapons, explosives and arms being carried or traded through container.

According to Banamyon, security measures are necessary to guarantee the protection of global supply chains against acts of terrorism or any possible unexpected threats [10].

Scanning equipment has enhanced security by enabling the detection of weapons at ports of entry, thereby preventing their transport onto the mainland by truck or train [4].

Customs authority used to inspect whether any undeclared goods and services are being traded through the container trading or shipment process. CIS also assists customs authority to assess custom duties, excises and VAT etc. by using modern software support.

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Feasibility of CSS in Land and Sea Port Areas

In Bangladesh, there is good prospect to set up CSS in both sea and land port areas. To boost up the business confidence among the parties can be strengthened more and more by setting up such modern system. In advanced countries, container handling using CSS is taking place since long to ensure port operational activities efficiently. However, in Bangladesh, lacking of initiative is there to implement CSS in both sea and land port areas. Feasibility studies have been conducted by both the authorities and result shows very positive impact to implement CSS to support the future growth of land and sea ports containerized trading volume and its expansion. The concept of bilateral trade agreement and regional cooperation is fueling the emerge implementation of the CSS system to support cross-border trading among the countries. Therefore, implementation of CSS both in land and sea port areas is having very positive utility on trade and economic growth for Bangladesh by both users e.g. both sea and land port authorities to ensure customs inspection and for security measures.

There are sixteen land ports and two seaports in Bangladesh by which covered pickup vehicles and container cargo are being traded. Port authorities are operating such trading in a traditional ways in Bangladesh. Stowsky gives emphasis in screening technology which is called “smart screening” systems [11]. The idea is to arm on the screening machines with software that can detect anomalies and then automatically alert human operators to the need for further inspection and, perhaps, the need to instigate countermeasures.

Advantages of using CSS

Martonosi, Ortiz and Willis explain that complete scanning and subsequent inspection of containers at ports would most likely deter terrorists and smugglers under particular circumstances[12]. Security, robustness, and to establish a business confidence among the stakeholders the CSS is a permanent apparatus donated by modern science and technological advancement to lead the future business effectively. Security measures are the key to ensure business confidence among the parties surrounding the business. Such business confidence will increase and enable the long term relationship that will stimulate economic growth and prosper in the long run. In Bangladesh, illegal price volatility is a common phenomenon for almost all types of goods and services from essential to industrial types, and uneven fluctuation of them will be stopped by using CSS and its effective implementation. Since containers scanned imported goods and other items will be recorded by software support that produce different types of tax, duties, excises and VAT assessment which is fundamental base of export-import elements of cost to settle the prices, government will be able to monitor the pricing system by e-governance or digitally.

Instability of pricing situation is taking place causing a bad shape of Bangladesh market economy due to not having such modern techniques. Such advanced technology will work as a key to guard against unstable pricing situation eventually and propel to the international business to the way forward of smooth long term sustainable economic growth in Bangladesh.

Applicability and Potential of CSS

Containers arriving at a port-of-entry are inspected to prevent entry of undesired cargo such as illegal weapons, drugs, and dangerous material. Each container has several attributes and the presence of one or more of the attributes may lead to additional inspection that may require examining the contents of the container manually. However, modern sophisticated Container inspection systems have ability to examine and inspect the container automatically.

Increasing pressure of international business is triggering to increase the containerized trade volume in sea and land port areas all over the world. Such situation is increasing complexity of containerized shipments for trading process worldwide. Thus for the purpose of ease handing of container, CIS modern technology is applied in many port areas around the globe. This system can provide faster operational activities.

In Bangladesh, industries and its market have positive growth in dimensions. Therefore, CSS implementation in port areas will facilitate to smooth containerized shipments process to support the future business growth potentially.

Patterns of Container Scanner System

Container Inspection System: The container/vehicle inspection systems comprise three major series: the fixed, the mobile and the reloable systems. They are designed for the customs service to inspect cargo containers without opening them.

According to the pattern of needs for the users, the following categories of CIS have been designed:

Fixed Container Scanner: For the purpose of Investigation such types of CSS generates high degree of resolution to capture the image as output of the insider goods that eventually portray a handsome image of the containerized inside goods and services to the users’ PC to be appeared in their monitors.

Moveable Container Scanner System: It is a moveable container type product category of moveable container scanner technology. Movable container scanner equipment move from one place to another place where user have doubled a certain container that to be inspected and then moveable container scanner collect the desired image by scanning process by using this type. Basically such container is considered as user friendly while immediate inspection is required in large array of container dumping areas Inland Containers Depot (ICD).

Flexible Container Scanner: This container scanner system is full-fledging mechanism of flexible set
up for the purpose of inspection by the group of users. At any convenient place such flexible type of container inspection system can be set up. Short span of inspection of such CSS type is very useful.

### III. METHODOLOGY

#### Conceptual Framework

Figure 1 shows the conceptual framework upon which the present study is based. It focuses on the investigation that will eventually answer the research question in the port operational point of view. Does the ports operational performance increase in using modern container CSS in Bangladesh-based ports?

The approach of the study is Delphi technique. Gregory J. Skulmoski vowed that it is a well suited research instrument when there is incomplete knowledge about the problems and phenomenon [13]. It is also used when operational goal is to be improved. It is applicable in understanding of problem at present port authorities are facing especially seaport areas in Bangladesh. The questionnaires are designed to focus on problems, opportunities, solutions, or forecasts on the basis situation of Bangladesh case.

It is noted that a good number of target audiences of the ports authorities of Bangladesh Govt. have not much knowledge and know how about the container inspection technology except few top operational authority. Custom authorities e.g. members custom in Bangladesh National Board of Revenue (NBR) have been found no prior knowledge about such technology.

A structured set of questionnaire were developed to measure relationship between the independent to the dependent variable. The operational functions of the independent variables were explained to the two groups of port users. The groups were oriented about the CSS and upon realizing the usefulness of such technology they admitted that the ports performance will increase. And instead of such orientation and practice of it the port performance will remain poor. Delphi techniques are used to capture the opinions of the key target groups directly and indirectly involved in port operations and are homogenous in their respective port related job duties and responsibilities. According to the study, the mode of interaction was face to face interview session on group basis.

The audiences were individuals engaged in inspecting inbound cargo containers, and those involved in the field of import- export, logistics, freight forwarding and customs brokerages. This study was limited only direct audiences as explained.

Drafting and structure of the standard questionnaire were developed by university of Le Havre French Custom in Le Havre, SOGET and Normandy Business School established a methodology for collection of qualitative data by means of standard questionnaire through structure of 6 (six ) key items -port dynamics, technology, governance, human resource, financial and procedure [14]. However, for the purpose of the present study, questions have been modified in seven numbers in the context of emerging economy in Bangladesh.

### IV. RESULTS AND DISCUSSION

After conducting the meetings with the audiences, it has been found that all groups of audiences have remarkable gap in understanding and know how about this modern technology and its usability in ports areas. Then the team of investigation, started a well-structured orientation concerning this modern technology and able to acquaint them with the concept, application of this modern technology and its usability. It is noted that on the basis of their service experiences and the well-structured orientation session about modern container scanner technology, all respondents agreed that sea ports of Bangladesh are becoming dynamic more and more compared to preceding years in container handing for both export of import (see Table). There were thirty questionnaires distributed to collect qualitative opinions from the audiences in which 97 percent of them responded positively which is directly related to the port performance. The way of capturing such data tools and instruments are depicted below:

Rate your answer about degree effectiveness in port dynamic point of view

Q. 1 Do you think port becoming dynamic and to support its CIS is:

<table>
<thead>
<tr>
<th>(-) Less Effective</th>
<th>Extreme Effective (+)</th>
</tr>
</thead>
</table>

Q. 2 Do you think using Container Inspection Technology port authority be able to handle port operations:

<table>
<thead>
<tr>
<th>(-) Less Effective</th>
<th>Extreme Effective (+)</th>
</tr>
</thead>
</table>

Q. 3 Do you think port becoming dynamic and to support the degree of governance Container Scanning Technology is:

<table>
<thead>
<tr>
<th>(-) Less Effective</th>
<th>Extreme Effective (+)</th>
</tr>
</thead>
</table>

Q. 4 Do you think port becoming dynamic and to support it concerned Container Scanning Technology related HR skill gap filling process will be ensured:
Q. 5 Do you think port becoming dynamic and to protect the illegal trades for increasing Govt. International trade performance, Container Scanning Technology is:

(-)Less Effective  Extreme Effective (+)

Q. 6 Do you think port becoming dynamic and to ensure speed up revenue generation for Govt. Container Scanning Technology is:

(-)Less Effective  Extreme Effective (+)

Q. 7 Do you think port becoming dynamic and to support it procedures Container Scanning Technology is fast-forward:

(-)Less Effective  Extreme Effective (+)

The Tables 1a and 1b show that the volume of import and export containers handling is increasing as the years ahead due the demand pressure and diversified of needs of customers.

V. SUMMARY AND CONCLUSION

To aid the Govt. authorities and private corporations across the world in predicting to mitigating the addressed problems as defined, we do propose the study model that introduces the concept of usefulness of the container inspection system approach in ports areas for the direct users’ beneficiary groups as well as different indirect stakeholders of the concerned study. The study has highlighted the degree of usefulness that has created awareness to the concerned authority to be practiced container scanner technology into the port areas. The study shows the direction of adjustment into the forthcoming automated commercial environment that demands in the near future of the emerging economy like Bangladesh. The application and adaptability of such technology will enable to all concerned parties on to the digital fast forwarding era that country is entering. Contemporary pressure on demand and supply sides and to managing them with due adjustment to gain operational effectiveness, modern CIS is the best option to implement immediately.

However, the study will contribute the policy direction for the betterment of system proceedings in ports areas performance to lead the economic growth.

Adapting CSS will enhance port security measure and improve custom inspection significantly in an effective way. Modern CIS technology is a key to economic sustainability.

The study is the constraint of more time and cost. However, the study will lead the future researcher in many dimensions.

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