

# The Impact of Private Container Terminals on the Operations of Tema Port

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## **Abstract**

*The Impact of Private Container Terminals on the Operations of Tema Port was the topic researched. Data analysis involved compiling, selecting and entering data into computer files, inspecting it for errors and running tabulations and various statistical tests to derive proper findings for this study. The statistical package for the social sciences (SPSS) and Microsoft excel were used to analyze data. There are adequate resources available for private container terminals to operate. Despite the adequacy of the resources at the port, it has no effect on the efficiency since the resources alone could not reduce the inefficiency at the port unless more private container terminals are allowed to operate. There is a high rate of loading and unloading of container cargoes by private terminals at the port. The present turnaround time by private container terminals is far better than before. In addition, the current rate of documentation by private container terminals compared to the previous is better. It was suggested that optimization of yard should be practiced. Also container deliveries should be evacuated in an even manner and at same line and there should be education for both documentation officials and cargo owners in order to reduce wrong documentation.*

**Keywords:** Tema Port Operation, Private Container Operation

## **I. INTRODUCTION**

A container terminal is a depot where cargo containers are transhipped by different modes of transport. The transshipment may be between ships and land vehicles, such as trucks or trains, in such a case the terminal is described as a maritime container terminal. Alternatively the transshipment may be between land vehicles, typically between train and truck, in which case the terminal is described as an inland container terminal.

Containers have undoubtedly become the most common means of carrying cargo by maritime transport in the twenty first century. The ports being basically servants of shipping have accordingly responded in the provision of the necessary facilities for the container trade. The port of Tema is of no exception to this development and has seriously embarked upon the provision of the necessary infrastructure and superstructure to facilitate the container trade. However, the port's capacity to solely handle this situation is not adequate. There is the need for capital to provide equipment, terminals and technical knowhow etc. The need for container terminals in the realization of the port's mission is being considered as a viable option.

## **II. LITERATURE REVIEW**

This chapter reviews the extant literature on the Impact of Private Container Terminals on the Operations of Tema Port. The section primarily deals with what other authors have done with regard to this subject matter.

### **A. Evolution of the Port Concept**

Verhoeven (2009) reported that UNCTAD (1992) framed the way the port concept evolved throughout the second half of the 20th century into three successive "generations". However, this approach has been criticized by many authors (Beresford *et al.* 2004; Bichou and Gray 2005). Their criticisms stem from the fact that ports would evolve continuously rather than in discrete steps; and because the composite reality of ports whereby several streams of evolution can be observed simultaneously in one and the same port would be ignored. Indeed, although the generational approach cannot pretend to provide more than a series of snapshots, it does provide some useful insights in the evolution of larger multi-purpose gateway ports.

According to Verhoeven (2009) rather than analyzing the conceptual approach itself, the key features of each generation need to be looked at more critically. For instance, UNCTAD (1999) intimated that the claim that third generation ports would see strengthened links with cities seems exactly opposite to what is happening in reality. Also the fourth generation port, which would consist of a network of physically separated ports (terminals) linked through common operators or through a common administration seems to be interpreted quite differently in literature (e.g.

Chlomoudis *et al.* 2003; Marlow and Paixão 2003; Perez-Labajos *et al.* 2004). Verhoeven (2009) indicated that the fact is that the UNCTAD definition of the fourth generation port is limited mainly to the spatial evolution whereas ports on the verge of the 21st century also went through further changes in operational and societal terms.

### ***B. History of Ports Development in Ghana***

Oduro, (1999) revealed that the development of seaports in Ghana began long before the 15th century when trade brought about the interaction of Ghanaians with the outside world through which ships and sea vessels landed at the various sites along the coast. He indicated that evidence of this is the several forts and castles found in the coastal towns. The GPHA, (1991) however, posited that it was during the early part of the 16th century that ports operations started with the construction of breakwater in Accra.

#### ***i. Historical Development of Tema Port***

According to Asuliwonno (2011) in 1949, the colonial administration ordered Sir William Halcrow and partners of the United Kingdom to examine a proposal to set up an aluminum industry powered by hydro-electric station on the Volta River basin. Attention was drawn to the need for deep water port at the eastern part of the country leading to the selection of Tema. Works on the construction of the port began in 1954 with the first cargo entry in 1958. The port was opened in January, 1962 to regular traffic with the opening of the ceremonial declaration on the 10th of February, 1962.

The location of the Tema port is on the Greenwich Meridian and latitude 5.4 degrees north of the equator. It is about 30km east of the national capital, Accra. The port occupies a total land area of 3,904,754 m<sup>2</sup> and the quay length is 2,196 m<sup>2</sup>. The port has a coverage storage area of 53,270m and 97,200m of open storage. Plug-in refrigerated containers are found at the reefers at the port. Owusu-Mensah, (2007) revealed that there are bunkering services and dry dock facilities available at the port and about 80 percent of imported goods in Ghana are handled by the Tema port. Gyebi-Donkor, (2006) also revealed that clinker, oil products, aluminum, vehicles, container cargo, rice, wheat and alumina are the major commodities handled by the ports.

Meanwhile, the GPHA, (2006) posited that the efficiency and tendency of ports to play their roles and execute their duties well depend on the relationship among ports authorities, service providers and agencies responsible for the various roles in port operations and management. With regard to operations at the ports, there are several departments and they include the materials, engineering, marketing and customer service, port personnel and administration, stevedoring, port security, finance and port audit departments. The functions of these departments are coordinated directly under the director of ports.

### ***C. Ports As Market Oriented Businesses***

The restructured port model has addressed efficiency issues and, undoubtedly, has improved productivity and efficiency significantly (Hayes 1995). Downsizing, outsourcing and/or closing down of unprofitable port assets all have led to increased efficiency. Furthermore, the introduction of a more equitable accounting system, a more efficient pricing structure with community service obligations now funded by Treasury rather than being cross-subsidized by other commercial operators in the port, and the selling off of unprofitable operations all have led to improvements in the bottom line.

Meanwhile, Haarmeyer and Yorke (1993) opined that operational efficiency, however, is a necessary but not sufficient condition for business success. The purpose of corporatization has been to enable government owned businesses to operate as efficient and effective businesses. The effective transformation from a traditional public sector utility to a commercially focused company requires more than a name change, however. If business success and commercial viability is the aim of corporatization then, like effective operations in any business, an appropriate business model and structure is required with a constitution which focuses on these objectives and a regulatory and legislative regime set in place which ensures that constitutional issues are not violated.

Bottomley (1994) points out that there are some fundamental differences between a Government Owned Company (GOC) and a Statutory State Owned Corporation. He argues that a GOC is a body corporate that is incorporated either under Corporations Law or under one of the state or territory Associations Incorporations Act, and in which

government has a controlling or substantial interest. Under this model a GOC is no different to any private sector company in so far as it is subject to identical regulatory and legal requirements.

### III. METHODOLOGY

#### A. *Data Envelopment Analysis Method*

Data Envelopment Analysis (DEA) involves the use of linear programming methods to construct a non-parametric frontier over the data. Efficiency levels are then calculated relative to this frontier. The conception of this method was advocated by Farrell (1957), but only a few scholars paid attention to this paper in the following two decades. Mathematical programming methods, suggested by Boles (1966) and Afriat (1972) to achieve the task, did not receive much attention until the term data envelopment analysis (DEA) initially appeared in the paper by Charnes, Cooper and Rhodes (1978).

The application of Data Envelopment Analysis (DEA) in port industry to measure port efficiency and performance was first proposed by Roll and Hayuth (1993). They thought that seaports are complex service organizations and there is a long list of outputs and inputs characterizing the operations of ports. Due to this complexity of factors affecting port efficiency, it is difficult to determine the efficiency and the extent to which a port's resources are fully exploited in achieving the goals. Roll and Hayuth (1993) revealed that DEA has some advantages compared with traditional approaches. For example, it enables coinstantaneous analysis of multiple outputs and multiple inputs and enables the inclusion of environmental and other qualitative factors, which are highly important to evaluate performance; it can recognize the possibility of different but equally efficient combinations of outputs and inputs (in different proportions); and it does not require an explicit a priori determination of relationships between outputs and inputs, or the setting of rigid importance weights for the various factors.

In order to demonstrate the applicability of the DEA technique in port industry, Roll and Hayuth (1993) constructed a hypothetical numerical example data with four outputs and three inputs where the performances of 20 ports are compared. They showed that DEA is a promising and easily adaptable method for obtaining the relative efficiency ratings of port and it is possible for a series of secondary research to provide a deeper insight into port performance and point out potentials for improvement.

Martines, Diaz, Navarro, and Ravelo (1999) and Tongzon (2001) built on the work of Roll and Hayuth (1993) through applying the DEA approach to actual performance data from selected ports. Martines et al. (1999) studied the relative efficiency of the 26 Spanish Port Authorities during the period of 1993-1997. In order to reach conclusive results from the application of the DEA approach, they divided all the ports into three homogeneous categories in accordance with a complexity criterion given by port size and the composition of the output vectors.

#### B. *Stochastic Frontier Model*

Aigner, Lovell and Schmidt (1977) and Meeusen and van den Broeck (1977) independently proposed the stochastic frontier production function in which an additional random variable characterizing the measurement error is added to the non-negative random variable that represents inefficiency. The Stochastic Frontier Production method employs econometric techniques where efficiency is measured relative to a frontier production function, which is statistically estimated. Liu (1995) based on the stochastic production function to calculate technical efficiency and compare the influence of public and private ownership on inter-port efficiency differences. Basing on the observations of output and inputs for 28 ports in the UK, he found that there is no correlation between the inefficiency term and independent variables, capital (total turnover) and labor (total wage payment).

Coto, Banos, and Rodriguez (2000) covered the efficiency problem in port industry by using a stochastic frontier cost function to estimate the economic efficiency of Spanish ports through a panel of data of 27 Spanish ports from 1985-1989. In order to study the effect of port size and the type of management on the efficiency, they ran a regression of the indices of economic efficiency on a dummy variable, which takes one if the ports are autonomous, and zero otherwise, and on the number of linear meters of depth over 4m of the quays as an indicator of the size of each port. The result indicates that the size is insignificant when explaining economic efficiency and the ports in the category of autonomous ports is less efficient than the rest.

Notteboom, Coeck and van den Broeck (2000) used the Bayesian Stochastic Frontier Model, developed by van den Broeck, Koop, Osiewalski and Steel (1994), to compare the efficiency level of a set of 36 European container

terminals, supplemented with four Asian container ports. After comparing the efficiency levels among the studied terminals, they found that very large terminals seem to have efficiency levels of at least 0.75 and smaller container terminals situated in large ports attain also relatively high efficiency levels. The analysis also showed that container terminals located in hub ports are on average more efficient than those in feeder ports and that no relationship is found between the type of ownership, operations of a terminal and the efficiency level.

#### IV. CONCLUSION

This study sought to assess the bottlenecks in freight forwarding in Ghana and what could be done to mitigate their impact on the industry. To achieve this main objective, descriptive statistics was used to describe the socioeconomic characteristics of the respondents and the results shows that the demographic age profile of the study participants shows that the industry is dominated by youthful population. The data also shows that both males and females were nearly equally represented in the sample size of this study and the distribution of the level of education and occupation were widely varied. This might have been as a result of the time and venues of data collection.

It was revealed that freight forwarders do not offer varieties of services apart from to a larger extent clearing and to a minimum extent forwarding goods. Only a few of them who are striving to attempt multimodalism have added transportation to their functions. It was also realized that the industry is uncompetitive resulting from the inefficiencies and ineffectiveness in the systems and sometimes from their own end thereby making them unproductive. Indeed it is important to note here that one of the determinants of how competitive an organization is how productive its operations are.

The Impact of Private Container Terminals on the Operations of Tema Port was the topic researched. This was based on two sources of data, primary and secondary. The primary data sources included collection of data from Management and Staff of Tema Port (GPHA, MPS, TCT, and ACS). Data collection was through the use of a structured questionnaire. Secondary data were obtained through libraries, newspapers and the Internet.

It was found out from the research that, 33.8% of the respondents were within the ages of 26 and 35 while 16.2% of them were within the ages of 36 and 45. In addition, majority (50.0%) of the respondents were above the age of 45. The number of male workers at the port was far more than that of the females. This was because, out of the 74 respondents, 60 representing 81.1 percent were males while 14 representing 18.9 percent was females. Majority (50%) of the respondents graduated from the Tertiary institutions while 33.8% were Senior High School (S.H.S) graduates. Only 16.2% of them were Junior High School (J.H.S) graduates. Majority (21.7) of them have within 20-24 years of working experience. 14 of them representing 18.9 percent have within 1-4 years of working experience. 13.5% of the respondents have more than 25 years of working experience. Majority of the respondents are Shipping Agents (43.3%) while 16.2% are Private Container Owners. The others are Drivers, Financial Analysts, Engineers, Asst. Operation Managers, Security Officers and Financial Controllers.

There is a chance for private container terminals to operate because all the respondents agreed that, there are adequate resources available for private container terminals to operate. However, majority of the respondents disagreed with the fact that the effectiveness of the resources is reducing inefficiency at the port. This is because, despite the adequacy of the resources at the port, it has no effect on the efficiency since the resources alone could not reduce the inefficiency at the port unless more private container terminals are allowed to operate. There is a high rate of loading and unloading of container cargoes by private terminals at the port. This therefore means that, the encouragement of private container terminals in operation could reduce inefficiency at the port. It was also agreed that, the present turnaround time by private container terminals is far better than before; which means that, the introduction of private container terminals have helped to improve upon the turnaround time. In addition, the current rate of documentation by private container terminals compared to the previous is better.

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