

# **UNIVERSITY OF GHANA**

## **THE IMPACT OF CONTAINERISATION ON TAKORADI PORT**

**BY**

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**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN  
PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE M.A.  
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**DECLARATION**

I, GEORGE ANTI KWAKYE, hereby declare that this dissertation “THE IMPACT OF CONTAINERISATION ON TAKORADI PORT” consists entirely of my own research conducted under supervision and that no portion of this work has been submitted in support of an application for another degree or qualification to this or any other university or institution of learning, except for the permissible references from other sources, which have been duly acknowledged in the text.

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## DEDICATION

This dissertation is dedicated to the Glory of God, and my dear wife, Mrs. Phil Anti Kwakye



## ACKNOWLEDGEMENT

I would want to sincerely thank my family especially my wife, Mrs. Phil Anti Kwakye and my children for their prayers, encouragements and supports for me.

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## ABSTRACT

Containerisation has since the middle of the 20<sup>th</sup> century made container ports and terminals an essential component of the modern economy and its impact has touched all the three major maritime communities of vessels, ports and shore side activities. This phenomenon did not only change shipping but has caused the docks of some traditional maritime centres to decline into obsolescence. In order to survive in the port competition, Port Authorities are under colossal pressure to increase efficiency in their operations as well as fund port expansion projects.

The Port of Takoradi is export oriented and the nation strongly advocates for a change to export processed raw material (possibly in containers) yet lays much emphasis on the oil business in the current development project. The economic activities involving agricultural alone employs more than half of the workforce population but the proceeds from the oil business to the state does not yield up to 80% benefits and yet may not last more than three decades.

Probably, there is a misplacement of priority in developing the port. This study was therefore set to find out the operational and developmental impact of containerisation on Takoradi Port whilst examining and analysing the impact of the challenges of containerisation and the trend in container throughput of the port.

Both qualitative and quantitative research approaches were adopted with the use of questionnaires and personal interviews to help increase data validity and reliability.

The study revealed amongst others that under the merger of the two national ports under the common management of GPHA, Tema Port was developed to specialise more in handling the influx of containers traffic to relieve the increasing pressure on Takoradi Port. Among others, it was

concluded that the extensive impact of the advent of containerisation on the development can be inferred from the consequences of the container trade on the development of Tema Port. In the end, it was recommended that the container trade should be given equal or better priority as the oil and gas trade in the development of the Takoradi Port whilst GPHA allows independence to the ports to fairly compete for the traffic in containers.



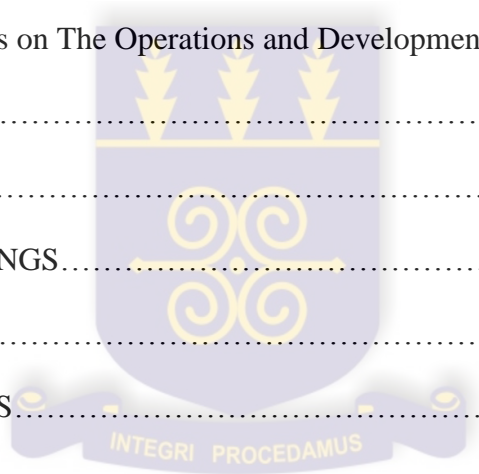
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## **DEFINITION OF ABBREVIATIONS**

CEPS	Customs Excise and Preventive Service
GDP	Gross Domestic Product
GGWP	Ghana Gateway Project
GPHA	Ghana Ports and Harbours Authority
GSS	Ghana Statistical Service
ISO	International Organisation for Standardisation
UNCTAD	United Nations Conference on Trade and Development

## CHAPTER ONE

### INTRODUCTION

#### 1.1 BACKGROUND

Containerisation is the term that encompasses the industrial shipping process of packing goods into a metal container at the point of production and transporting the container and its contents as a unit until it is unpacked at its final destination. Containerisation derives from two complementary technologies: unitization and intermodal transport. According to Liu (2010) containerisation has since the middle of the 20<sup>th</sup> century dramatically reduced the transport cost of international trade and therefore made container ports and terminals an essential component of the modern economy.

With the economic benefits derived from this method of cargo handling, it has been long reported by the Organisation for Economic Co-operation and Development (OECD) 1971 that essentially all containerisable cargo on the Transatlantic Route was being carried in containers (Rosenstein, 2000). According to El-Sahli (2013), containerisation did not only change shipping as we know it but also helped redraw the global maritime map. Traditional maritime centres such as New York, Liverpool, and London saw their docks decline into obsolescence.

Until the last quarter of 2008, the world economy has been experiencing an unprecedented explosion in trade. The volume of goods moving across borders increased exponentially due to the global integration of modern production systems, emergence of electronic commerce and the revolution that containerized transport has bestowed on international distribution of goods (Caesar, 2010). Between 1982 and 2005, containerised cargo trade grew three and a half times as fast as world GDP and 40% faster than international trade overall (Krugman 1995) as cited by (El-Sahli, 2013).

The increase in ship sizes to further take advantage of economies of scale has been predominant in the container trade with the largest container ship TEU capacity being 18,270 (Wikipedia, 2014). The phenomenon of the increase in ship sizes has impacted not only in the necessity to dredge for increased draft but has also led to the reformation of ports to make room for container terminals among others e.g. port of Antwerp becoming a container port to take advantage of the promises of containerisation. The consequences of containerisation in the conduct of shipping touched nearly every aspect of maritime life. Each of the three major communities: vessels, shoreside activity, and ports, were impacted (Rosenstein, 2000). In the era of globalisation, under the major influence of containerisation, there is colossal pressure on port authorities to increase efficiency in their operations as well as fund port expansion projects to keep up with the degree of competition in the system

In Ghana, the ports of Tema and Takoradi are similarly faced with the opportunities and threats offered by the increasing containerised trade. In no doubt the impacts of containerisation on ports have largely been seen in the forms of port projects or reforms that are being implemented.

Takoradi Port is currently undertaking developmental projects usually as a result of traffic forecast and the need to take advantage of some sort of opportunities or to overcome some port weakness or challenge. The expansion works at the Port of Takoradi (amongst other things) include the development of a container terminal. However, the main objective of Takoradi Port development is to safely take in modern, bigger and deep drafted vessels, reduce ship turnaround time, and also provide service and logistics base for the oilfield ([dailyguideghana.com](http://dailyguideghana.com)). Clearly, much emphasis is being laid on the oil business- a new opportunity in the country.

The port in 2012 handled 31% of Ghana's seaborne traffic, 66% of national Exports and Handled 19% national Imports. Leading exports include Manganese, Bauxite, Forest Products and bulk and bagged Cocoa beans, mining equipment; while leading imports include Clinker, Wheat, Petroleum Products and Containerized Cargo (GPHA, 2014a). The transit trade through Takoradi Port is made up of 90% bagged cargo- a clear loss of transit trade in container to competing ports (UNCTAD, 2013).

According to Ghana Statistical Service (GSS) (2013), cocoa and manufacturing constituted 2.8% and 6.3% of the GDP respectively in 2013 making a sum of 9.1% of the GDP compared to 6.1% recorded by crude oil. Obviously, cocoa and manufacturing have a higher tendency of being transported in containers. Mining also recorded 7.9% of the GDP in 2013. In all, however, the services sector (which does not constitute any of the above items) recorded the highest growth of 9.2% followed by the industrial sector which constitute the item crude oil in above with a projected growth rate of 9.1% and the Agriculture recording the lowest growth rate of 3.4%. It is however important to state that the Agricultural sector employs more than 50% of the workforce of the economy yet about 79% of the crude oil revenue goes to government with a lot of royalties to be deducted. This implies that, the economic activities that employs more than half of the workforce population has not received attention as the economic activity that does not yield up to 80% benefits to the people.

Whilst the nation has been threatening the shift from the export of raw commodities in bulk to the export of finished or semi-finished goods in possibly containerised forms, it is obvious that there may be a misplacement of priority in the development of the Takoradi Port as far as the performance of the economy and the trend of opportunities in the business of ports and shipping is concerned.

## 1.2 PROBLEM STATEMENT

The advent of containerisation and the discovery of oil (both) have demands on ports to restructure and situate well for efficient use by their operations. However, in terms of national ports, the fact cannot be denied that the most yielding payoff amongst any cargo trades can strongly influence the investment decision in its favour. In the case of Ghana, Takoradi Port which has been settled to be used more as the Gateway for exports has been met with the combination of the oil business and other cargo businesses including containerised cargo.

In the Ghana Gateway Project (GGP), whilst it is aimed at using the two seaports of the country to facilitate and reduce the cost of doing business through the ports, Caesar (2010) feared whether trade flows through the two main ports of Tema and Takoradi cannot be hindered by the oil business. There is no doubt that oil production places much pressure on port systems as well as facilities; and Ghana will be no exception. An example can be cited of what transpired in Nigeria during the early 1970s, as their ports were placed under serious pressure from congestion which was triggered by a booming oil trade (Caesar, 2010).

As the Takoradi Port undergoes upgrade with an impressive objective, it is still not clear to categorically situate the position of the container trade in the spirit of the upgrade. The focus of much attention on the oil business may present competing operations that may hinder the flow of cargo from or to neighbouring landlocked countries which over the years have recorded a significant decline. This may only further give meaning to the causes of the fall in transit trade as identified by Amoo-Bediako (2014) to include government policies.

No specific mention has however been made of the improving the container trade in the upgrade of the port which is more oil business bias and yet may not last more than 30 years. Consequently,

there has also not yet been any critical research work to unearth the impact of the new industry dynamics (containerisation) on Takoradi Port which according to El-Sahli (2013) has seen some of the world's great ports decline and disappear while insignificant towns found themselves among the great maritime centres.

This study is therefore aimed at finding out the impact of containerisation on Takoradi Port in the wake of the more attention currently being given to the emerging oil and gas trade (discovery).

### **1.3 RESEARCH OBJECTIVES**

The main objective of this research work is to study the impact of containerisation on Takoradi Port and the following are the specific objectives adopted towards the achievement of the stated general objective:

- ✓ To find out the impact of containerisation on the operations of Takoradi Port
- ✓ To find out the impact of containerisation on the development of Takoradi Port
- ✓ To examine the impact of the challenges of containerisation on Takoradi Port
- ✓ To analyse the trend in container throughput and to give appropriate recommendation on the best way forward for the effective competitiveness of Takoradi Port.

### **1.4 RESEARCH QUESTIONS**

The questions that inspire the researcher to seek the achievement of the set objectives include:

- How has containerisation impacted on the operations of Takoradi Port?
- To what extent has containerisation impacted on the development of Takoradi Port?
- What is the impact of the challenges of containerisation on Takoradi Port?
- How best can Takoradi Port take an edge in the competitive port market?

## **1.5 SIGNIFICANCE OF STUDY**

A successful completion of this dissertation will highlight the impact of containerisation on the operations of Takoradi Port, and also highlight the extent to which containerisation has impacted on the overall development of Takoradi Port.

Besides, a successful completion of this research will also put forward some recommendations on how best Takoradi Port can take an edge in the competitive port market

Moreover, the completion of this dissertation will serve as the basis for further research work in the academia as well as being a guide for policy making with respect to containerisation and port development.

## **1.6 SCOPE AND LIMITATION**

The research is particularly concerned with the impact of containerisation on Takoradi Port. As such the work shall be limited to the Takoradi Port however mention shall be made of other ports most especially Tema Port for a complementary analysis or for benchmark purpose to aid a reliable analyses and conclusion of the work.

The work shall also extend coverage to all the relevant players in the planning of the Takoradi Port and its development. This sector of the scope shall include the Ghana Ports and Harbours Authority, the ministry of transport, the Ghana Maritime Authority and the Takoradi City Authorities where information was gathered about the port plan and its development among others.

The research also contains the views of different principal users of the port and related services. This category shall cover the views from shippers, freight forwarders, liner shipping companies, logistics

service providers, hinterland users (Burkina Faso, Mali, etc.), ports and terminal operators and other stakeholders.

The work also contains the review of literature that relates to containerisation, port productivity and port development.

The study covers the period between 2000 (due to availability of data) till the completion of this work.

## **1.7 ORGANISATION OF WORK**

This research work was divided into five chapters:

Chapter one contains the introduction of the background to the study, the problem statement and the research questions, as well as the justification of the study and the organisation of the study;

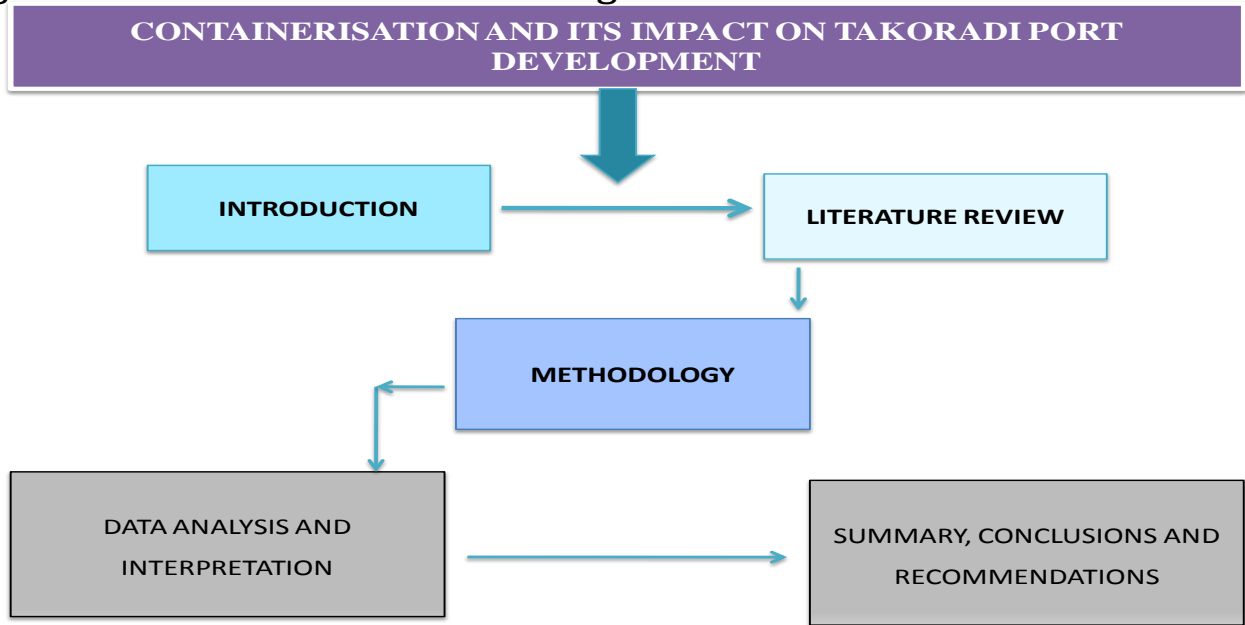
Chapter two deals with the review of literature related to the study.

Chapter three discusses the methodologies used in collecting data and how the data shall be analysed.

Chapter four deals with data presentation and interpretation

Chapter five deals with the summary of findings, conclusion and recommendations.

Figure 1.0: overview of research organisation



• Source: Illustration of the author

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

This chapter presents a review of laid down literature on the development of containerisation and how it has impacted on the general being of ports with a more view on Takoradi Port. The major elements of port planning have also been discussed to bring to light the key determinants of how port plans are structured for development. A brief overview of Takoradi Port development and the economic activities of Ghana have also been assessed which led to the review of the GGP and the discussion of the performance of the Takoradi Port covering facilities available and how they have supported the volumes of cargo carried over the years.

#### **2.2 HISTORY OF CONTAINERISATION**

Before the advent of containerisation, all goods except bulk cargoes were transported in pieces in break bulk which according to Wu (2011) always caused damages and inefficiencies in handling and transportation. Besides the transportation inefficiencies, the era prior to the introduction of containerisation was also characterised by labour intensity and piece by piece method of loading and unloading of cargo. Following this, Rosenstein (2000) referred to containerisation as a new technology in the carriage of goods in which goods are packed into a metal box, transported as a unit and unloaded only at the destination (mostly final destination). He stated however that the effects were even more widely felt, since containerisation facilitated intermodal transport and so had far reaching impact on stevedoring, ship operations and ports.

The story of containerisation has widely been traced to the plans of Malcolm McLean and the departure of vessel Ideal X with a deck load of containers from Port Newark enroute to Houston in 1956. After a review of several historic and scholarly literatures regarding containerisation, Rosenstein (2000) admits that Malcolm McLean and his company Sea Land Service single handedly brought the theories regarding the economics of scale associated with Alfred Marshall and containerisation into fruition in the shipping business. This admission is partly influenced by the national and international recognition McLean had in the awards and prizes given him for the said achievements.

However, the original idea and practice of containerisation started in the late 18<sup>th</sup> century in the United Kingdom where wagons (similar to containers) were loaded from coal production centres and carried on by horses even to points where canal barges could take over the carriage of the wagons from the horses in the form of transshipment until final delivery at point of consumption (Wikipedia, 2014). Few years on, this practice of carriage was extended to include other modes notably the railroads. In order to speed the transportation of goods, the US army also advanced a similar system of carriage towards the end of the World War II. As many other writers subscribe, this system of transport gave probably a lot of inspiration to the crowned originator of containerisation.

Not entirely a novel idea and practice, McLean rather saw the beginning of the era of container standardization and intermodalism. According to Murray (2008), before his idea could gain grounds and acceptance in the shipping industry, he had to modify his container so that it could be removed from the chassis and be easily transshipped between different modes of transport. In the 1950s and the 1960s, the shipping companies practicing the use of containers for multimodal transport were each using their own standards of container types until ISO harmonized the anomaly with the recent

20, 40, etc. feet containers (Tomlinson, 2009). This standardization of container sizes to basically allow for common use of containers amongst shippers and the different modes led to a lot of industry rationalization. It required more space, different handling equipment, new skills, and even new ships. The development of the commercial use of containers has progressively seen the increase in the size of the specialised container ships. According to Schuler (2008), from the modest beginning of the Ideal X with 50 old boxes, the Emma Maersk launched in 2006 came with the carrying capacity of 13,500 containers. In recent times, the triple E class of container ships that thrives on the principles of Economic of Scale, Energy efficiency and environmental friendliness comes with a container capacity of 18, 340 TEU. Their sizes are too wide for the Panama Canal which has called for its expansion. Clearly, the implications for the dynamics of containerisation on ships have direct consequences for its places of transit or call (port).

### **2.3 IMPACT OF CONTAINERISATION ON PORTS**

As the commercial use of containers became widely acceptable mostly for economic reasons, various adjustments needed to take place to realise the full advantages from the new phenomenon. As a result, Tomlinson (2009) stated that because containers are their own storage facilities, they needed no warehouse but space to accommodate themselves. Following this, he gave examples including the relocation of major ports from city centres to less developed locations- the rise of Tilbury as the main container port for London and the relocation of cargo operation from New York's city piers to Elizabeth and other locations. Whilst this is an indication of containerisation making an existing port obsolete, in some cases it can lead to the expansion of the existing port for more space for container trade.

According to UNCTAD (2009), the advent of containerisation has led to the generation of third ports in which intermodalism becomes the core to meet growing requirements of international trade. These requirements may take the form of infrastructural, superstructural or environmental representing the aggregate development of a port (African Development Bank, 2010). In this era, the port and the city authorities do not operate in isolation as there was the need for the collaboration of these bodies to help develop the infrastructural requirements of intermodalism. In effect, containerisation has highlighted the need for ports to be integrated into the economy to enhance a perfect system of intermodalism. However, the analysis of the report by African Development Bank (2010) reveals that most ports in Africa have not been able to integrate well into their economies to guarantee a well-functioning multimodal (road, rail, inland water and air) transport links between ports and hinterland.

Perhaps, the most outstanding impact of containerisation on ports is the resultant need to increase the depth of the access channel and the berth to accommodate the increased container ship size. If the massive size of container ships directly challenges the efficiency of container ports as postulated by Liu (2010) then it follows that ports actively compete with the depth of their berths. Thus, in a competitive market, the deeper the depth the more likelihood to attract more traffic than the other with relatively less depth. Suffice therefore to conclude that containerisation has fueled the competition amongst ports in respect of who has the capacity to accommodate a particular vessel size.

Besides, containerisation has also led to the reduction in the number of port labour required. The efficient flow of port operations in the era of containerisation demands the automation of nearly all the port activities to handle the increased port traffic. In the dispensation of containerisation, more

than two thirds of all dry cargoes moving across container terminals by 1975 were containerised in sacks, boxes, cartons, bales, or barrels which were beyond the lifting capacity of an individual dock labour (Weir, 2004). Of course this phenomenon presented unfortunate labour reactions in the administration of ports as further discussed by Weir (2004) in his seamanship experience. Conversely, the situation of labour redundancy and led to the need for labour training and career development to match the sophistication in the contemporary port operations.

It is worth to state that amongst a lot of undesirable impact associated with the advent of containerisation, other writers discussed port security to be further threatened by the influx of containers in and out of the port. Bakshi, Flynn, & Gans (2011) commented that by using a container, terrorists can potentially achieve mass destruction of the global supply chain by virtue of the millions of containers used to transport goods in ocean going vessels. To prevent such threat from materialising, Bakshi et al (2011) undertook to evaluate the 100% scan requirement. Their evaluation revealed yet two major loop holes in the 100% scan security regime with more economic disadvantage of increases in transportation lead times resulting in higher inventory levels in supply chain and undoubtedly increases in cost for consumers.

## **2.4 ELEMENTS OF PORT PLANNING**

Port always plays a strategic role in the development of domestic and international trade of a country whether it is a developing or developed country. However, in a globalised world where distances are becoming virtually squeezed, ports play an active role in sustaining the economic growth of a country. In the modern world of technology, ports are playing the role of an industry not just a passive actor in transportation but also in complete supply chain management. That is why; ports are

gradually becoming more policy driven than just a construction of an interface. Various writers have provided variant views on the dimensions to the approach to port planning and development.

#### **2.4.1 Port Ownership Model**

A notable function that needs to be treated under port planning is the type of port ownership being operated in a particular state. According to the Port Reform Tool Kit of the World Bank, ports have emerged in four ownership styles, they include: Public Service Port, Tool Port, Land Lord Port and Fully Privatized Port

##### **2.4.1.1 Public Service Port**

Public Service Port has a predominantly public in character. The infrastructure and superstructure are owned by the public authorities – may be central or local government in some countries. Services are provided by the government institutions under the bureaucratic control. Ports are to be considered as strategic assets of a country and operated by a public authority.

##### **2.4.1.2 Tool Port**

Under this model, the Port Authority owns, develops and maintains the port infrastructure and superstructure while the cargo handling services are carried by private companies. But the problem in this model is conflicting of interests of the Port Authority and cargo-handling companies who do not own fixed assets. This model minimises the risk of the cargo handling company because it has only variable cost with negligible fixed cost.

#### **2.4.1.3 Land Lord Port**

This model is known as Public Private Partnership (PPP). Under this model the Port Authority acts as a regulatory body of port operations. The Port Authority leases the infrastructure to the port operating companies or industries. The lease to be paid is a fixed amount of money based on time and area to Port Authority. The private port operating company maintains its own superstructure, including equipment and machinery required to operate the port and terminals.

#### **2.4.1.4 Private Service Port**

These are fully privatized ports. All assets of ports including land, infrastructure, superstructure and services are owned and operated by private companies. They are operated on the commercial basis with the aim to maximize profits. Government only acts as monitoring agency to control the interests of public welfare in this model. Since they are self-regulating, there is high risk of converting the land use of port area to non-port activities.

These models are normally the basis to define the opportunity and the ability for the Port Authority to undertake what sought of development of its ports. In the case of Ghana under the Ghana Government Gateway Project, GPHA began a process of reverting to a landlord status responsible for the port infrastructure and assets while monitoring the operations of private port operations. In view of on-going changes, the new Landlord Port Bill has been considered. To enhance efficiency and competition, GPHA is undergoing restructuring to improve infrastructure and increase private sector participation in its operations especially cargo handling (GPHA, 2006) as cited by Asuliwonno (2011).

According to UNCTAD (1985), from the planning levels of ports, three main duties can be identified:

- National port planning: this leads to several policy decisions which define the role of each port (in the case of more than one port in a state), and ensure that national resources are used in the most economical manner;
- Port master planning: this gives the long-term pattern of development for a port, without specifying the time at which any one step in this development will take place. It also sets in motion *work* which will be needed later:
- Port project planning: this aims to turn each part of the master plan into reality at the right time, and in the right form.

Lee (1990) stressed the attitude of the government as also important for the development of the shipping industry especially to the planning of ports. A restrictive policy he stated, can therefore decrease the throughput of the port, while the introduction of the policies to encourage, can help the shipping industry to develop. The port is one of the basements of the national economics, so both the national government and the local government are taking it seriously, he emphasized.

As port development is subject to port planning initiatives, port authorities are faced by a dual problem; the availability of resources (land, labour and capital) that enable development, known as the 'spatial problem', and the difficulty of matching the supply and demand for port services, referred to as the 'temporary problem (Hoyle & Hilling, 1984).

Gaur (2005) discussed the development of a port directly from the economic point of view. In his argument from the economic perspective, he outlined five areas of interest including

- Institutional framework required for optimal condition of a port,
- The techniques of demand forecasting,
- Building of supply side along with demand,
- Capacity planning to achieve equilibrium in demand and supply and finally
- Project evaluation (financial and economic analysis).

He further stressed that the mission statement for a port and the port's objectives defines its economic functions. Citing two of the biggest ports of the world (Singapore and Rotterdam), he sought to lay the basis for any ports' intention to reform itself. From the two mission statements thus *"To develop and promote Singapore as a premier global hub port and an international maritime centre and to safeguard Singapore's strategic maritime interests"* and *"To develop in partnership the European port of world class"*, respectively, it shows again that these ports want to be the premier ports of the world. Mission statement in itself is a strategic tool for any organisation for its planning and further development (Gaur, 2005). He posited the use of demand and supply forecasts as strategic tools. Under demand forecasting, it was divided into two main areas as core and non-core or value added services. The core deals with the transfer of goods and services between various modes of transport whilst the second area of non-core services stressed on value addition especially in this era of trade deregulation, ports are becoming a hub of more industrial activities. The demand forecasting can depend on four factors viz., Planning and Policies of economy, International trade and commerce, trend in shipping industry and logistics requirements in supply chain management. Supply forecasting however, is more of engineering part but no planning can be complete without analysing port engineering since that is always related to port economics. It is divided in three parts begins with requirements of infrastructure and superstructure, physical aspects of a port again divided in man-made and natural factors. The Third part handles technology whereby availability

begins with the marine technology that is the back bone of port planning, but in the modern world one always needs information technology for capacity enhancement. In the modern transport, intelligent transport has to be applied for competitive advantages (Gaur, 2005).

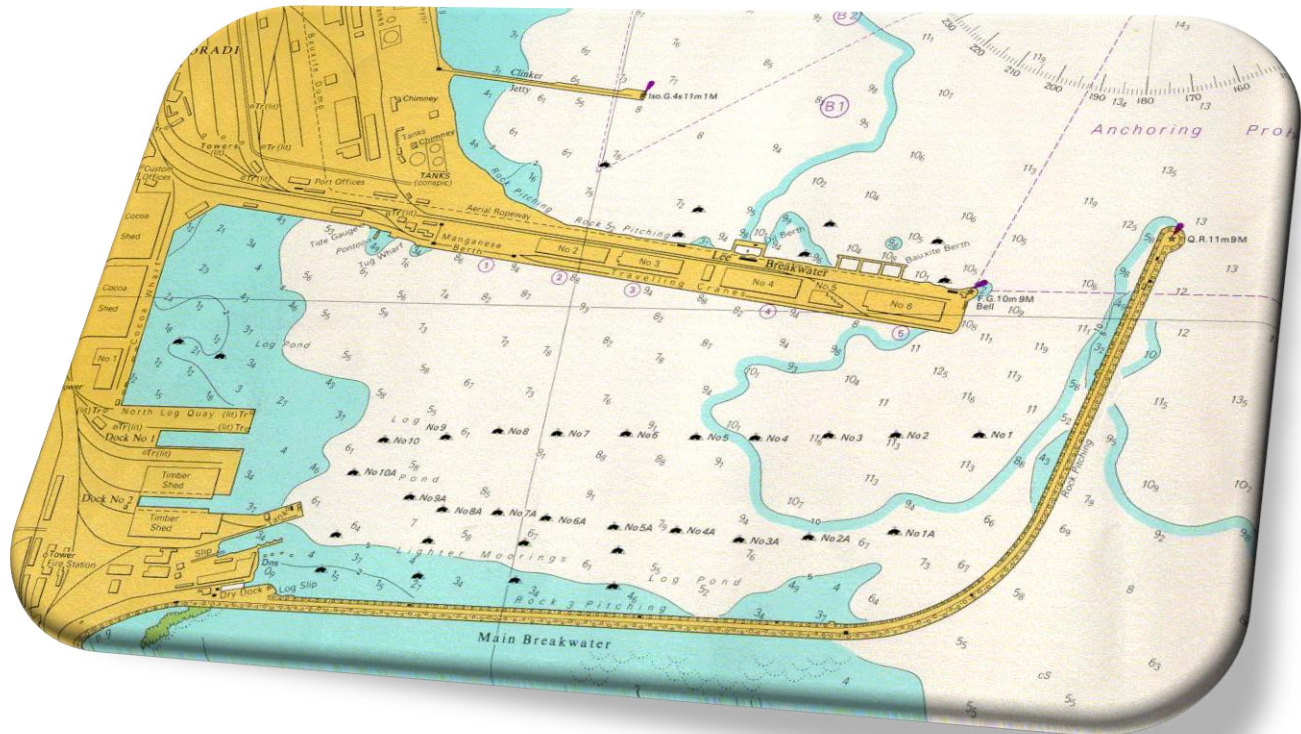
## **2.5 OEVRVIEW OF THE TAKORADI PORT AND ITS DEVELOPMENT**

The Ghana Ports and Harbours Authority (GPHA) was established under the PNDC Law 160 from the merger of three bodies thus Ghana Ports Authority (GPA), Ghana Cargo Handling Company (GCHC) and the Takoradi Litherage Company (TLC) in 1986. It is the statutory public corporation that is mandated to plan, manage and control ports in Ghana, in collaboration with other institutions. Key among these institutions are the Customs Excise and Preventive Service, Ghana Commercial Bank and Ecobank Ghana Limited (GPHA, 2014b). Since the establishment of the authority, it has operated two ports at Takoradi and Tema.

The development of seaports in Ghana began long before the 15th century when trade brought about the interaction with the outside world through which ships and sea vessels landed at the various sites along the coast. Evidence of this is the several forts and castles found in the coastal towns but the GPHA recognized however that, during the early part of the 16th century was when ports' operations started with the construction of breakwater in Accra (Oduro, 1999) as cited by (Broni, 2014).

According to Asuliwonno (2011) referring to GPHA (2002), between the 16<sup>th</sup> century and 1911, a Litherage port was started and completed in 1914. The first Ghanaian port was however completed in 1927 but was officially commissioned on the 3<sup>rd</sup> of April 1928. Figure 2.1 is a graphical illustration of the Takoradi Port before the commencement of the expansion works.

Fig. 2.1: Layout of the Takoradi Port (before the start of the expansion works)



Source: (GPHA, 2012)

The several problems confronting ports operations compelled the ports management through the Government of Ghana to embark on a number of policies and actions. In 1990, the management of the ports, as part of its efforts to ensure ports efficiency, restructured customs operations to conform to international standards by implementing an Automated System for Custom Data (ASYCUDA). Also, the Electronic Data Interchange (EDI) was introduced. These systems sought to integrate Information Communication Technology (ICT) into the operations of the ports (Asuliwonno, 2011). The management of the ports, between 2001 and 2002, undertook the Gateway Project to make Ghana's ports comparable to any ports worldwide (Owusu-Mensah, 2006) as cited by (Asuliwonno,

2011). This project contained the Ghana Community Network (GCNet) Services Limited which provides the platform for data sharing among the various stakeholders.

## **2.6 CURRENT AND EXPECTED DEVELOPMENT PROJECTS AT THE TAKORADI PORT**

The discovery of petroleum has resulted in the influx of supply vessels into Takoradi Port and thereby reduced the berthing capacity for traditional operation. Today 66% of the total 1,800 vessels calling at the port are supply vessels. These have created the need for the expansion of the Port of Takoradi to meet the short-to medium term needs of the oil and gas Industry (GPHA 2014c).

Currently, the Takoradi Port is undergoing construction works and work started in December 2013. Works at Takoradi are expected to be finished by 2016 and are part of a wider infrastructure programme in the Western region, the base for many oil companies operating in Ghana's offshore (McTernan, 2014 ). Roads and railways are being constructed to ease the transport of goods across the country and to serve as a more efficient transit point for neighbouring countries. The China Development Bank is providing \$450m for the Takoradi expansion. Another €197m translating into (\$267m) facility comes from Belgium's KBC Group. The Belgian company Jan De Nul Group is doing the construction works (McTernan, 2014 ).

Vital equipment has arrived at Ghana's Takoradi Port allowing expansion works to continue. The project is expected to take three years and when complete, it will position the port to receive bigger vessels, improve the turn-around time and eliminate double handling of cargoes. Work includes extending the breakwater northwards to 1.75km, it shall also include the construction of an oil services terminal, reclamation of 53,000 hectares of land, dredging a 16m deep access channel and

construction of a bulk terminal. The expansion will free the existing manganese terminal for the increasing demand of other sectors, including oil and gas, positioning the port to receive traffic from other countries. Works will include opening of a storage area for oil gas pipelines as well as plant and machinery needed for the oil and gas sector. Director of the Takoradi Port, Capt. James Owusu Koranteng (Port Technology International, 2013), said manganese, bauxite and other bulk cargo operations would be transferred to a new dedicated jetty. Negotiations are also underway with the Ghana Railway Company to convert the Sekondi Railway Station into a container terminal. Two construction firms, Messrs Jan-de-Dul from Belgium and China Harbour Engineering Company are executing the project utilising a number of Ghanaian companies and two consultancy firms, Sell Horn Engineering and Hamburg Port Consulting are supervising the development of the new facilities. The first and second phases of the project total \$344m. Last year the port received 1,664 vessels, a drop on 1,798 in 2011 (Port Technology International, 2013).

## **2.7 OVERVIEW OF GHANA'S ECONOMIC ACTIVITIES**

The overall development of every economy depends entirely on the production of goods and services (GSS, 2013). The population of Ghana is considered young with an annual growth rate of 2.5%. The 2010 population and housing census report indicate that the economic active population stands at 71.1% yet only 41.5% of them are employed. The unemployment rate therefore is almost 60%. The report also indicated that the proportion employed who had no formal education is 33%. Moreover, the analysed report of the population and housing census indicate that the two leading occupational categories of Skilled Agriculture, Forestry & Fishes and service and sales workers do not need require highly skilled and so less of formal education and training.

Whilst the Agriculture sector including forestry and fishing employs about 42% of the workforce aged 15 years and above, its contribution to the country's GDP continues to decline, with its share reducing from 23.0% in 2012 to GDP of 22.0% in 2013. However, Easterling, Fox & Sands (2008) argued that because agriculture is the bed rock of the Ghanaian economy the only way to achieving ultimate development goal is to modernise and transform the agricultural sector. They advanced in their work that there was the need to commercialise agriculture for both domestic and international markets. The international commercialization of agriculture is synonymous to the need for the use of the port.

The national income statistics produced by the GSS shows that the services industry which employs the second largest workforce of the country remains the largest sector, contributing about half, 49.5% of GDP in 2013 from 48.4% in 2012. It was however brought to light that the stated increase represents a growth rate decline of 2.1%. It is worth noting that the activities identified under the services sector including: Trade; Repair Of Vehicles, Household Goods, Hotels and Restaurants, Transport and Storage, Information and communication, Financial and Insurance Activities, Public Administration & Defence; Social Security, Education, Health And Social Work, Community, Social & Personal Service Activities are all economic activities that are highly at the mercy of container transportation and the use of the port. Therefore there may be the need to give a more favourable attention to the services sector in relation to the engagement of the port as it contributes relatively more to GDP and yet employs a sufficiently more of the workforce.

According to the national income statistics, the industry sector records as the second largest sector with the share GDP of 28.6% in 2013 (revised). In like manner, this sector of the economy also recorded a decline in growth rate of 4% between 2012 and 2013. However it was stated that without

the crude oil, there would have been a growth rate decline of about 1.6%. Meanwhile, it is very well indicated that the activities of crude oil production recorded the highest growth rate in the industry sector and competes favourably with other sub sector activities beyond the industry sector. This has been often cited as the justification of the recent development of the Takoradi Port to the priority of the oil and gas industry.

It is evidently clear from the above income statistics that every sector of the economy has experienced a decline in growth rate between the years 2012 and 2013. However, the government of Ghana had an economic vision which sought to achieve a GDP growth rate of 8%-9% by undertaking reforms and making sustained efforts to improve standard of living and reduce poverty levels under a programme called vision 2020.

## **2.8 THE GHANA GATEWAY PROJECT**

As part of efforts by the government of Ghana to realise its vision 2020 in relation to its macro-economic policy, the Ministry of Trade and Industry undertakes the Ghana Trade and Investment Gateway Programme (in 1998) which aims at attracting a critical mass of export-oriented firms to accelerate export-led growth, facilitate trade and create the environment to encourage private sector investment and reduce the cost of doing business in Ghana (World Bank, 1998). The project is scheduled to be executed through six-line governmental agencies including the Ghana Ports and Harbours Authority (GPHA), Customs Excise and Preventive Service (CEPS), and the Ghana Free Zones Board (GFZB). Interestingly, Ghana News Agency (2000) reports that the Gateway project stands as the first phase programme towards the realization of Ghana's Vision 2020. In this regard, a lot sub projects so far have been undertaken by the individual participating agencies. Originally the

GGP was segmented into two parts- part A involves the investment promotion and removal of administrative bottlenecks and part B constitutes infrastructure investment.

Some operational transformations have been achieved by the CEPS amongst which include the replacement of pre-shipment inspections to destination inspection to facilitate the fast clearance of imported goods at the port and the payment of appropriate duties by importers. Several other projects were initiated by all participants towards the completion of the tasks under the entire Gateway project.

Against the background that the Gateway project is to support the establishment of a privately-developed and managed Export Processing Zone (EPZ), it is expected of the GPHA amongst other things to engage the dual ports of the country as landlord ports to ensure a reduction in the cost of operation and shortening vessel turnaround and cargo clearance times (World Bank, 1998). Above all, GPHA was charged with the responsibility of developing the ports into a hub (to serve as a gateway) for the West Africa sub-region. In the implementation stage of the project the following are the indicators for the execution of the project in relation to the ports as identified by Luo (2013):

- Private sector participation in port operation and development
- The grant of greater autonomy to the ports and the landlord authority exercised by GPHA
- Reduction in the handling charges to the achievement of competitive charges
- Increase in the speed of unloading containers
- Reduction in the average dwell time for containers.

Because the project listed GPHA as part of the executing agencies, hardly can one eliminate the effect of any of the institutional change on Takoradi Port although Tema Port appears to receive relatively more attention in the infrastructure development part of the project and even in reports

regarding the GGP. However, it is stated by World Bank (1998) that the government of Ghana has acquired land also in Takoradi to develop the Free Zone. At this time, it is noted that possibly no consideration of the oil trade had yet taken place clearly indicating that the gateway project supported more of export other than oil. At this time containerised cargo was the major command of port development. No wonder therefore that the above indicators for the execution of the GGP in relation to the ports were more containers represented. Suffice therefore to mention that the GGP in making the ports of Ghana the gateway to Africa was more containers friendly hence any attempt to make the focus of any of the ports more directed to different sectors may eventually and possibly defeat the achievement and sustenance of the object of the GGP.

Already, the risk to the development outcome of the project is rate moderate (Luo, 2013). As the users are reported generally satisfied with the services by the developers, there is a growing concern about the limited availability of large plots of land to accommodate the growing volumes of trade passing through Tema Port. However, Luo (2013) reports also that the institutional reforms appear sustainable given the excellent performance of the GCNet.

## **2.9 TAKORADI PORT PERFORMANCE AND PRODUCTIVITY**

Before the Takoradi Port saw its major expansion works in 1956, the port initially handled approximately 1 million metric tonnes of cargo. Post 1956 expansion saw the port handle 1,153 vessels carrying 2.3 million tons of cargo in 1964. The port in 2012 handled 31% of national seaborne traffic, 17% of national seaborne imports and 66% of national seaborne exports. In the last decade, vessel calls to the port has increased from 485 in 2003 to 1,664 calls in the 2012. The increase is attributed to the calls from Oil Supply vessels servicing the Jubilee Oil Fields at Cape

Three Points. Since the discovery of oil in 2007, supply vessel calls have increased from 11% to 65% in 2012 of total vessel calls (GPHA, 2014c).

The total amount of traffic that passes through the port increased from 3.1 million tonnes in 2000 to 5.3 million tonnes in the year 2012. Within the period, both export and imports saw increases from 1.9 million tonnes to 2.9 million tonnes and 1.1 million tonnes to 2.3 million tonnes respectively (ibid).

According to African Business Magazine (2012), Takoradi handled 53,041 TEUs in 2010 up 9% from 47,828 TEUs in 2009. Container imports totaled 24,127 TEUs and exports 28,914 TEUs. Vessel movements jumped 33.6% to 1,277 in 2010 from 956 the previous year. Ship turnaround time in 2006 averaged 3.3 days but by 2010, it improved to the average of 2.1 days. Total cargo traffic rose 19% to 4.01m tons in 2010, up from 3.37m tons in 2009. Imports totaled 1.72m tons and exports 2.29m tons in 2010 up from 1.26m tons and 2.11m tons respectively in 2009.

The African Development Bank (2014) also has it that, an annual average of 600 vessels is handled at the Port of Takoradi. This constitutes 37% of the total national seaborne trade with 62% and 20% as the total exports and imports respectively. The main exports include Manganese, Bauxite, Cocoa and Forest products while key imports are Clinker, Containerized cargo, Oil products and Wheat. African Development Bank (2014) further stated that Takoradi Port has been handling large volumes of transit cargo for Burkina Faso, Mali and Niger. Many transit operators have found the Takoradi corridor fast and cost-effective and thus prefer to use this corridor.

According to Quayson (2012), the port is accessed by railroads which convey heavy raw materials such as timber and manganese ore by road. Quayson (2012) however noted that presently, due to oil activities, even the dry docks at the port have been filled and are being used as a receiving and

assembling point for heavy materials and oil pipes before they are conveyed to the oil rigs. Clearly, this is (no doubt) a manifestation of how oil activities can hinder normal operations of the port by causing congestion in the port.

In light of the cause for the recent increase in the vessel calls at the port with the attendant increase in port performance being cited to be mainly due to the discovery of oil with more calls from offshore supply vessels, it is worth noting that containerisation is yet to receive an assessed impact on Takoradi Port performance and productivity.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 INTRODUCTION**

In as much as there are much work to highlight the impact of containerisation on shipping and ports, a detailed work to unearth the unique case of the impact of containerisation on the productivity and development of Takoradi Port which has suddenly amongst many opportunities in the container trade turn to focus more attention on the oil and gas business is yet undone. This chapter presents an elaboration on the methods adopted and utilised in gathering, processing, analysing and the presentation of data as obtained in response to the research questions raised in chapter one. In doing this, the significance or relevance of every means adopted in the data acquisition and usage has been outlined with a provision for a highlight on field challenges.

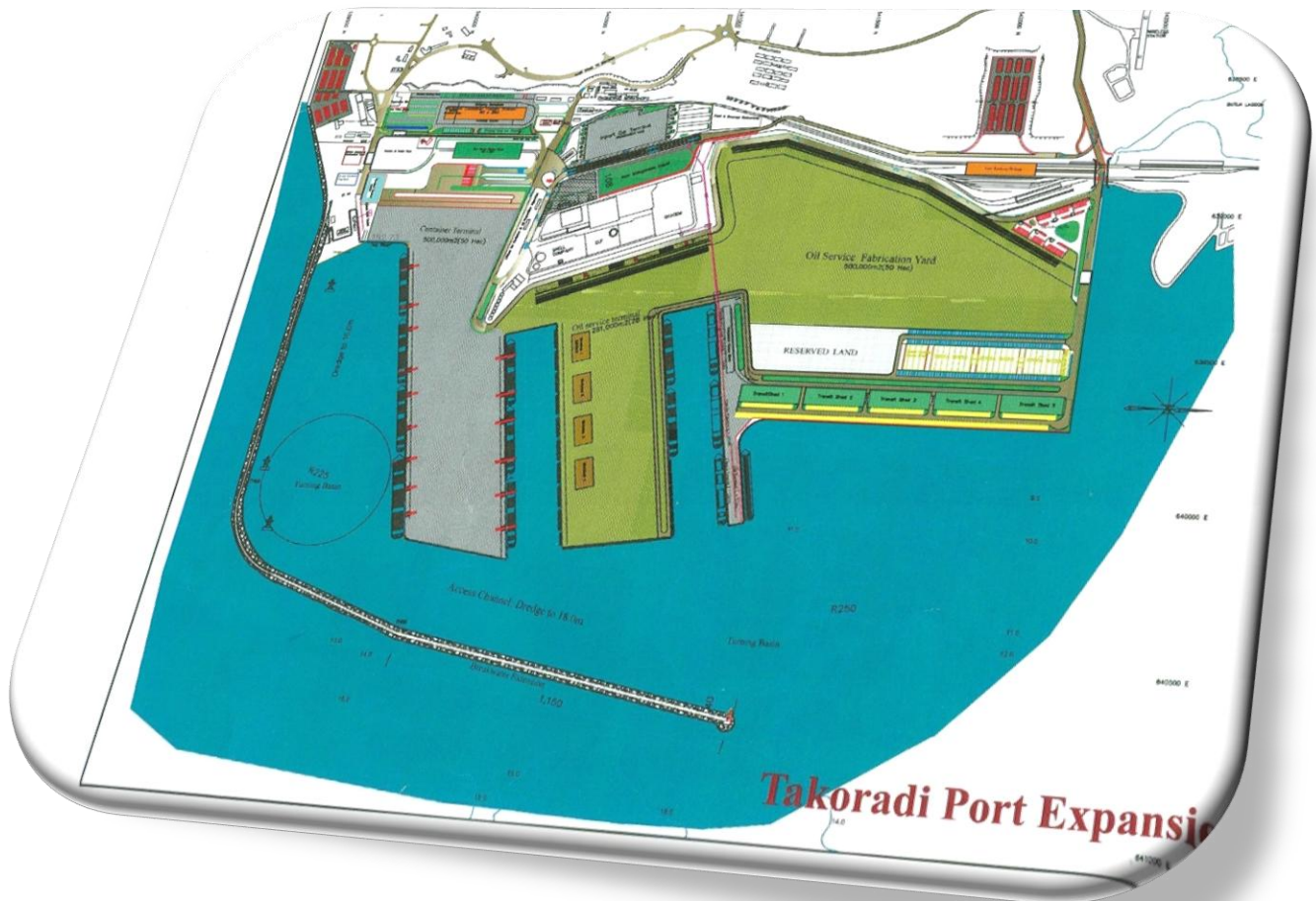
#### **3.2 STUDY AREA**

The research was carried out with a particular focus on the Port of Takoradi. The port is located in Ghana's twin city called Sekondi-Takoradi which is in the Western Region of Ghana (West Africa). According to STMA (2006) as cited by Quayson (2012), Sekondi-Takoradi covers 385km<sup>2</sup> and is the smallest and most developed out of 13 districts of Western Region. It is the third largest city in Ghana and is located along the Western coast of Ghana, about 242km west and 280km East of the Cote d' Ivoire border.

Takoradi Harbour was completed in 1927 and became the only harbour serving Ghana until the Tema Harbour was also completed in 1962 making it the second largest and only other commercial port in Ghana besides the Tema (ibid).

The choice of this study area is mainly inspired by the on-going expansion works at the Port of Takoradi which is rather more focused on the business of oil and gas under the circumstances that container business attains congestion status in the sister port at Tema. Figure 3.1 below shows the map of Takoradi Port indicating the expansion work

Figure 3.1: Map of the Study Area



Source: (Afitramp, 2014)

### 3.3 RESEARCH APPROACH AND DESIGN

This was the plan and structure purposely designed or chosen for obtaining, processing and presentation of data to meet the set objectives of this research work. According to Thomas (2010), research design can be seen as the “logic” or the “master” plan of the research work that shows how the research work is to be conducted. He further linked a research design to an “architectural outline” that shows how the samples or population, measures, treatment of data and mode of presentation of data relate together in attempt to solve the research problems or questions.

The research described in this document is based on both qualitative and quantitative research methods. In simple terms, the latter produces data that are stated in prose or textual forms while the former comes with data in the form of numbers. The combination of these two different approaches is what Borrego, Douglas & Amalink (2009) referred to as the “*third methodological movement*” and acknowledge that Denzin (1978) first used this mixed methods, which he called “*triangulation*” to describe bringing together complementary methods to offset differences in each. Following the perfect example set by Garbarino & Holland (2009) in their impact measurement, this combination of methods does not only (in like manner) help to take advantage of their unique strengths and overcome the weakness of any particular method.

The qualitative research approach may be described as using soft methods such as interviews, observations and focused group discussions to collect primary data such as text, sound, photo or video which do not assume any numeric figure unlike quantitative data. This approach also allowed for the use of analytic and descriptive methods to present field survey which are considered the best for a social research like this which seeks to find out the impact of containerisation on Takoradi Port

development and productivity and more importantly shall depend on the opinions, perceptions, personal characteristics, experience and attitude of respondents.

The qualitative approach adopted has therefore enabled the logical presentation of findings in words through the reflection of the lived experience, opinions, beliefs, understanding of the stakeholder of the port and the analyses of the facts about the performance of the port over the years. According to Morales (2006) qualitative research approach allows the researcher to present the understanding and meaning of a respondent and so facilitates the building of a complex, holistic picture and a detailed view of the informants and to conduct the research in a natural setting.

The adoption of the quantitative approach on the other side has also helped to back the analyses of the data with facts and figures as obtained statistically analysed from the statistics of port performance.

### **3.4 RESEARCH INSTRUMENT**

The research instrument refers to the data collection methods employed by the researcher that aided in a successful achievement of the objectives of the work. In order to carry out an evidence-based research, two (2) major sources of data have been utilised, namely the primary and secondary sources of data.

#### **3.4.1 Primary Data**

Primary source of data was gathered through the conduction of interviews and the administration of questionnaires to the sampled population. The personal interviews undertaken were in the form of in-depth interviews with key informants and focus group discussions. The interviews conducted

were mainly for the validation of the data obtained from the administration of questionnaires and the in-depth understanding of the turn of unfolding information.

#### **3.4.1.1 Interviews**

Research interview is a form of conversation in which the subjects not only answer questions prepared by an expert, but themselves formulate in a dialogue their own conceptions of their lived world. Semi-structured interview type was used for the personal interviews with the sampled key informants. Whilst this instrument was used to get in-depth explanation and opinions of the impact of containerisation on the development of the port, it was also to validate the information as presented by the structured questionnaires on the productivity of the port.

According to Kajornboon (2004), using the semi structured interview, the researcher has a list of key themes, issues, and questions to be covered. In this type of interview the order of the questions can be changed depending on the direction of the interview. An interview guide is also used, but additional questions can be asked which often were not anticipated initially.

Within each topic, the interviewer is free to conduct the conversation as he thinks fit, to ask the questions he deems appropriate in the words he considers best, to give explanation and ask for clarification if the answer is not clear, to prompt the respondent to elucidate further if necessary, and to establish his own style of conversation.

The strengths of semi-structured interviews are that the researcher can prompt and probe deeper into the given situation. This however is considered not extended to the benefit of interviewers who may not probe into situations and could also be time consuming when there are a large number of

respondents to interview. However, according to Sharma (2011), the use of interviews are the most appropriate when exploring *practitioners' perspective* for qualitative information.

#### **3.4.1.2 Questionnaires**

Questionnaire is a piece of paper or a document containing structured and standardised questions which is sent to the sampled population with the view of obtaining their input and opinions on the topic of the research study. According to Coetzee (2005), by means of questionnaires, the respondents are able to communicate their unique past and current behaviour, attitude and perceptions which cannot be observed by the researcher.

The structured questionnaires helped the researcher to direct questions in a more objective manner so as to get the right information needed for the study from the stakeholders of the industry. The questionnaires as exhibited in appendix 2 were mainly targeted at managers at operations who can give real time and statistical information regarding the trade in containers through the Port of Takoradi.

During the field itself, the questionnaires were administered directly to the respondents who were allowed a week duration to complete. This was to ensure that the respondents had ample time to provide the necessary information. After the stipulated time, the researcher made follow up to collect all the distributed questionnaires. 17 questionnaires were distributed among all the sampled population as illustrated in figure: 3.1.

#### **3.4.2 Secondary Data**

Secondary data source was also obtained from completed literature in books, academic publications, articles, reports, documentaries from the internet etc. Secondary data is therefore the name for all the

information discussed in chapter two of this research work. The secondary data created a smooth platform for the researcher to gather only unique and undiscussed data that remain pertinent to the achievement of the overall research objective.

### **3.5 POPULATION AND SAMPLE**

The research targeted the stakeholders of the maritime industry who directly or indirectly influence the development of Takoradi Port and also contribute to the productivity of the port. The target population also constitute the users of the container trade through Takoradi Port. The target population therefore include: GPHA and some port users or container traders e.g. Maersk, Super Maritime, and Anthrak.

#### **3.5.1 Sampling Procedure**

According to Caesar (2010), sampling is simply drawing part from a population (universal set) as a sample or subset which enables a researcher to obtain relevant about the whole group from the subgroup rather than from the whole group. The sample group identified should therefore always be able to give the necessary data on behalf of the entire group towards the achievement of the research objectives.

In view of the above, the researcher, using a purposive sampling method, identified the sample group as depicted in table 3.1 from the target population already discussed. The purposive sampling method is a form of non-probability sampling technique in which members are selected from the population in some non-random manner but in a convenient manner for a set from the population with some specific characteristics for the study. In this work, the specific characteristics used for the

sample is based on the managerial position and the ability to influence decision making in his line of organisation.

### 3.5.2 Population, Sample Size and Sampling Method

Table 3.1 is a presentation of the target population, sample size and method and the survey type used to obtain information from the respondents to the questionnaires, personal interviews and focus group discussions.

Table 3.1: Population, Sample Size and Sampling Method

Population/organisations	Position	Sample technique	Sample size	Research instrument	Sample percentage (%)
<b>GPHA</b>	Terminal Manager	Purposive	1	Interview	100
	Operations Manager	Purposive	1	Questionnaires	100
	Marketing Manager	Purposive	1	Interview	100
<b>SUPER MARITIME</b>	Operations Manager	Purposive	1	Interview	100
	Operational staff (10)	Simple random	8	Questionnaires	80
<b>MAERSK</b>	Operations Manager	Purposive	1	Interview	100
	Operational staff (10)	Simple random	8	Questionnaires	80

Source: Author

### 3.6 DATA PROCESSES AND ANALYSIS

This is where data collected on the field involving several sources is concerted into information so that it can serve as the real and factual basis for adducing conclusions, recommendations and

advising policy directions. According to Gray (2004) as cited by Radwan, Jones & Minoli (2008), there are two main approaches to analysing qualitative data, namely context and grounded approaches. The context approach is linked to a deductive approach in which the researcher identifies specific categories and criteria of selection before beginning the analysis process whilst using the grounded theory, no criteria are prepared in advance of the analysis processes and so also called the inductive approach.

In regards to this study, using the grounded theory, the researcher used the constant comparative system which comes from the grounded theory. In execution, the obtained data taking from the field (field notes, tape recordings and reflections) was transcribed, coded, categorised into different sets and compared with each other particularly the information from the questionnaires. Field notes and tape recordings (where permitted) were the basic means of keeping store of data during the personal interviews and the group discussions which was done immediately after the interviews.

Afterwards, the researcher critically analysed the similarities and deviations with the view of finding out the actual understanding of the data. The Microsoft Excel was used to assist the organisation of quantitative data into a presentable form for onward analyses. By so doing, the themes as presented in chapter four emerged.

The processed and organised data were finally presented using descriptive analysis by explaining the data as categorized, through the use of tables, charts and graphs.

### **3.7 DATA RELIABILITY AND VALIDITY**

Data reliability also has to do with the consistency in which research procedures produce their findings or results. It also relates to the repeatability of the research findings by different researchers

under similar conditions (Moonga, 2007). To achieve data reliability, the researcher adopted the triangulation method where both qualitative and quantitative data were collected. In collecting the numerical data about the performance of the port, further personal interviews were granted to purposively selected managers to probe further into the situation as presented by the numerical facts mainly from the questionnaires. Apart from statistical variations, in the changes of the number of respondents, it is highly certain that a similar study would yield no different results.

However, it must be considered that since this research is in the unique case of Takoradi Port and the recent opportunity of trade in the Ghanaian economy, the issue of generalisation of findings was not much emphasised.

Again, the use of the multiple modes is intended to compare and contrast data obtained to achieve reliability of data and its output of validity. According to Moonga (2007), data validity simply refers to the truthfulness or correctness of the measurement as planned or intended. He brought to light that the use of pre-testing questionnaires on both professionals and would be respondents is to guard against the threat of instrumentation. The similar use of this questionnaire pretesting by the researcher was inspired by its benefit of making the data as collected and analysed valid.

### **3.8 DATA COLLECTION OR FIELD CHALLENGES**

On the field to gather data from both the questionnaires and the personal interviews, the researcher confronted some challenges but with triangulation method and some efforts placed to eliminate or minimise their effects on the results of this research. However, the following challenges remained insurmountable as obviously nothing could be done about them.

In some few instances, it was noticed that besides the difficulties in reading some of the responses in the questionnaires, some of the answers given to the questions were totally a deviation from what is required. Others also did not attempt to respond to some of the questions

Also, despite the many visits to conduct the personal interviews with the operations manager at Maersk Line, their busy schedules did not allow a full time interviews with them. During the interviews especially with the managers at GPHA, their several calls and many visitors they had to attend to did not also allow the smooth flow of the discussions.

The challenges therefore made it very difficult and in some cases impossible for the researcher to gather some information that is felt would have augmented this study. In spite of the above field challenges, the researcher was able to meet all the objectives set for this study.

## **CHAPTER FOUR**

### **DATA PRESENTATION AND ANALYSIS**

#### **4.1 INTRODUCTION**

In this chapter, the analysis of the data gathered for the study through the methods discussed in the previous chapter is made. The deductive analysis approach and the relevant statistical techniques are applied to make interpretations that enabled conclusions to be drawn and the research objectives be accomplished. This chapter begins with a brief description of the respondents before the discussions of the findings.

#### **4.2 FINDINGS FROM QUESTIONNAIRES**

This section is a discussion and analysis of the responses from the questionnaires administered amongst the selected shipping lines and the Operations Manager at GPHA. The responses are presented in the order of the arrangement of the research objectives and directly in line with the questionnaires as attached in Appendix II and III.

##### **4.2.1 Rate of Responses to the Questionnaires**

In all, 17 questionnaires were distributed among 16 port users and 1 to the Operations Manager at GPHA as described in table 3.1 in chapter three (3). Out of the 17 questionnaires distributed, 14 were retrieved, representing a response rate of 82.35% including the response from the operations manager. Table 4.1 below is a summary of the rate of response to the questionnaires.

Table 4.1: Rate of Responses to Questionnaires

TARGET POPULATION	SAMPLE SIZE	NUMBER OF RESPONDENTS	PERCENTAGE OF RESPONDENTS PER TOTAL SAMPLE SIZE (%)	PERCENTAGE OF RESPONDENTS PER TOTAL RESPONDENTS (%)
<b>GPHA</b>	1	1	100.00	7.14
<b>SUPER MARITIME</b>	8	6	<b>75.00</b>	42.86
<b>MAERSK</b>	8	7	87.50	<b>50.00</b>
<b>TOTAL</b>	17	14	<b>82.35</b>	100.00

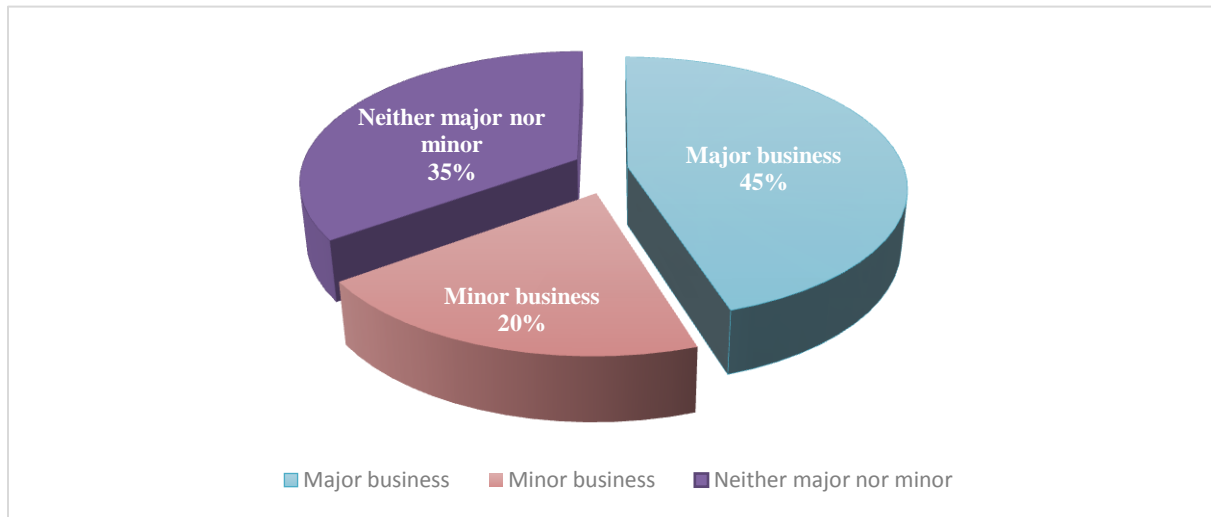
Source: Field data

From table 4.1, it can be seen clearly that, there was 82.35% total rate of response per the total sample size. The table also shows that there was a 100% response rate per its sample size of 8 from GPHA whilst Maersk has a response rate of 87.50% making it the highest respondents with 50.00% rate of response amongst all the respondents. Super Maritime however records a response rate of 75.00% per its sample size of 8 with a sector of 42% amongst all the 14 respondents. This therefore indicates a fair rate of response amongst all the respondents.

#### **4.2.2 Rate of Container Trade in the Businesses of Respondents**

In order to ascertain that the respondents and their organisations are into container business and thereby determine the relevance of their responses, they were asked to rate their container business in their entire trade in respect of being a major business or otherwise. The summary of the response is as depicted in figure 4.1 below:

Figure 4.1: Rate of Container Trade in Respondents' Business



Source: Field data

From figure 4.1 above, it can be seen that, 45% of the respondents said container trade is their major business whilst 20% indicated that it is their minor business. However, 35% of the respondents also mentioned that container trade in Takoradi Port is neither their major nor minor business.

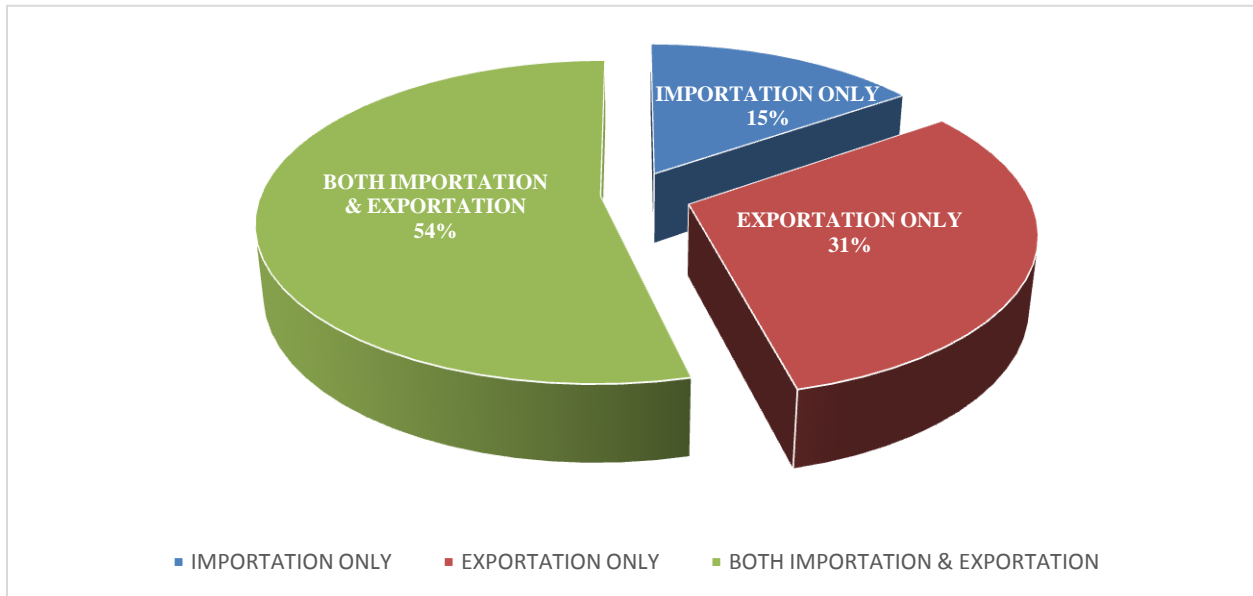
It can therefore be simply deduced from figure 4.1 that more of the respondents to the questionnaires trade predominantly in containers and can therefore be said that more of the respondents have a major stake in the container business of the Takoradi Port and their responses can be deemed significant to the subject under research.

#### 4.2.3 Nature of Container Business Run by the Respondents

The Port of Takoradi is mainly known for Ghana's exports and so, there was the need to know the nature of container business of the respondents with respect to imports or exports or both to ascertain

the fact the nature of container business run in the port. Figure 4.2 below is a summary of the responses about the nature of container business.

Figure 4.2: The Nature of Container Business Run by Respondents



Source: Field data

From figure 4.2 above, it is indicated that 31% of the respondents are into exports only whilst 15% of them are also into imports only. However, those doing the two are also 54%.

It can be inferred from figure 4.2 that very few of the respondents are into imports only while the chunk of the respondents exports and imports both containers.

Generally also, and all things being equal, it would be very valid to analyse from the figure 4.2 that Shipowners that call at Takoradi Port would not depart on ballast on the second leg of their sail hence very cost effective to call at Takoradi Port.

#### **4.2.4 The Beginning of Containerisation in Takoradi Port**

In order to trace the experience and exposure of the organisation of the respondents to ascertain their level of knowledge on the development of the port o suit the advent of containerisation, they were asked to state the year in which their organisations started container trade through the port.

The majority of the respondents from one organisation stated averagely years around the early 90's whilst the all the respondents from the other organisation also stated categorically in the late 95.

The respondents were also posed with the question of what cargoes they transport in containers in order to eventually ascertain which once has undergone changes in the methods of handling into containers.

The responses indicated that cocoa beans, cocoa shells, sawn timber, rice, rubber, alcohol, household commodities or personal effects including electrical equipment and furniture, vehicles and machineries are the main cargoes that were transported in containers through the Takoradi Port.

However, whilst 75% of the respondents indicated that trade in containers was not their first cargo handling method, the remaining began their trade in containers. Following this, it was stated that the following cargoes were once not handled in containers by them: cocoa beans, cocoa shells, sawn timber, and rice.

It can be clearly be deducted that the advent of containerisation brought cargo handling changes from bulk carriage of the above bulk cargoes into containerisation. This would of course mean that some changes would have taken place in the port to facilitate the new cargo handling technique.

#### **4.2.5 Impact of Containerisation on the Operations and Development of Takoradi Port**

The discussions under this sub section relate to the responses to the question of the changes that were made to the operations and development of the port in respect of the port infrastructure, superstructure, labour and regulations

##### **4.2.5.1 Impact of Containerisation on the Infrastructural Development of Takoradi Port**

The respondents were asked to mention the changes they noticed in the port with respect to infrastructural development to help the researcher ascertain how containerisation impacted on infrastructural development.

60% of the respondents indicated that following developmental projects were undertaken in the port.

- Extension of the break water
- Dredging of the port to increase the draft

It can be noted that all of the above developmental projects mentioned are generic projects that stand to benefit all the cargo handling methods or types of trades in the port. Some few respondents however stated that the increase in the port draft helped to accommodate increasing sizes of the container vessels.

##### **4.2.5.2 Impact of Containerisation on the Superstructural Development of Takoradi Port**

The respondents were also posed to mention the changes they noticed in the port with respect to the superstructural development to help the researcher ascertain how containerisation impacted on infrastructural development.

Nearly all of the responses to the questionnaires said that, they noticed both the allocation of container yard and the provision of container handling equipment such as reach stackers, mobile cranes, straddle carriers and forklifts.

The above superstructural development as mentioned by the port users are visibly noticed in the port area. Although, some of these handling equipment have multiple use, they are seen very frequently used for container handling in the port.

#### **4.2.5.3 Impact of Containerisation on Takoradi Port Labour**

The respondents were also requested to mention the changes they noticed in the port with respect to the changes in respect of the labour of the port to help the researcher ascertain how containerisation impacted on operation of port labour.

In respect of this, most of the port users mentioned that the use of containers have no much need of the gang during the stevedoring works and even the stuffing and unstuffing of the containers. Others also discussed that the phenomenon has also led the more mechanization of the port operations and more skilled labour force.

#### **4.2.5.4 Impact of Containerisation on the Regulations of the Port of Takoradi**

Lastly in respect of the impact on the regulations of the port, almost all the respondents were unable to specifically state any port regulation that can be associated with the advent of containerisation. However, less than 20% of the respondents indicated that the use of containers came with new forms of handling charges which were far less than other handling methods.

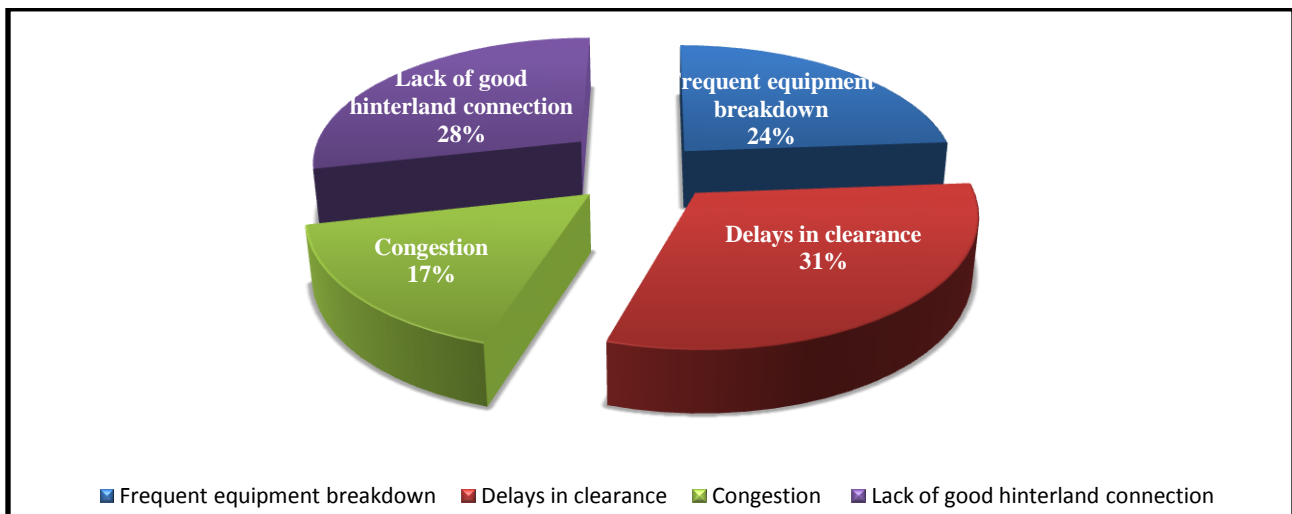
This at least is indicative that the trade in containers offered more reduced handling charges than the previous method of handling the same cargoes.

#### 4.2.6 Challenges Posed by Containerisation

The respondents were also asked to discuss the challenges posed by the trade in containers to enable their impact assessment by the researcher on the port.

In response, whilst almost all the responding port users (95%) indicated that their container trade at present is increasing mainly since 2008, they also mentioned the following challenges as shown in figure 4.3 they face in their containers business at the port.

Figure 4.3: Challenges Facing Port Users in the Container Trade



Source: Field data

The respondents further elaborated that the congestion challenged is caused as a result of the lack of a dedicated/suitable terminal for the container trade and the inefficient container handling equipment used in the port.

The Operations Manager at GPHA also confirmed the challenges as raised by the port users and also revealed that the port lacks the required draft to be able to accommodate larger vessels which

have become the dominant in the trade. The manager also stated that the port as well lacks the adequate container handling equipment as majority of them have become very weak to function effectively and efficiently and others appearing obsolete.

43% of the respondents also indicated that more often the facilities to handle containers in the port are not always available. However, the majority of the remaining respondents who indicated that the facilities are most often available rated their performance as averagely good.

#### **4.2.7 Impact of the Challenges on Port Operations**

To ascertain the impact of the challenges on the operations of the port from the perspectives of the port users, the shipping lines were posed to discuss the impact of the challenges they enumerated on the operations of the port.

More than 80% of the respondents excluding the Operations Manager at GPHA wrote that the challenges facing the container trade has compelled them to recently divert the trade to Tema Port in cases where the containers are not in transit otherwise to Ivory Coast who offer better services. Some also indicated that the challenges does not give them the opportunity to expand their container business in Takoradi Port.

This is an indicative that the challenges facing the majority of the ship agency companies are driving them away from the use of Takoradi Port for container business.

### **4.3 RESPONSES FROM PERSONAL INTERVIEWS**

The findings discussed under this section is the responses obtained from the personal interviews conducted with the managers at GPHA and the selected managers at ship agencies already elaborated in chapter two.

### 4.3.1 The Early Days of Containerisation in Takoradi Port

The trade in containers is generally held to commence in the 1960's which has had so much impact on maritime trade and development. The Takoradi Port, which was established before the era of containerisation, therefore, lived before the genesis of the trade in containers. However, while the GPHA Operations Manager could not state the exact year Takoradi Port started receiving containers in response to the questionnaires, the personal interviews with the Terminal and Marketing Managers could not also help the situation. Notwithstanding this, it is emphatically mentioned by both managers during the interviews that *“it largely started in the early 1990's when timber and cocoa were exported in containers”*.

In order to get factual information, the researcher made a request for the port statistics in archives. The statistics retrieved is relevantly summarized as shown in Table 4.2

Table 4.2: Container throughput of Takoradi Port from 1987-1997 (in 1000 metric tonnes)

<b>YEARS</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>
<b>Imports</b>	184.9	214.6	173.8	234.5	213.8	243.4	263.6	324	345.2	374.9	698.2
<b>Exports</b>	-	-	333.2	646.1	464.2	383.5	493.5	875.8	13411.2	15214.6	17613.5

Source: Field data

Table 4.2 above indicates clearly that Takoradi Port started receiving containerised imports in 1987 before containerised exports in 1989. The statistics may be misleading as far as the exact year of start of receiving containerised imports is concerned. However, the entire statistics does give good grounds to satisfy a deduction that the container trade started in Takoradi Port started in the 1980's

and was largely established in the late 90's as the containerised throughput increased much in volumes.

However, inasmuch as certain cargoes cannot simply be containerised, the Terminal Manager of GPHA indicated that certain cargoes like manganese, bauxite, clinker, etc. are still carried in hatches in bulk carriers.

The fact that containerisation in Takoradi Port started without any export from the kept and kept increasing significantly to affect the methods of handling some of the bulk cargoes, indicates clearly that certain adjustments in the port were made to be properly suited for the trade in containers. All of the respondents said that with the advent of containerisation, they indicated some changes in the port with regards to the infrastructure, superstructure, labour and legislation as discussed below.

#### **4.3.2 Impact of Containerisation on the Operations and Development Takoradi Port**

This sub section discusses the responses under the topic of the impact of containerisation during the interviews. The managers at the shipping lines had less take on this topic and so most of the discussions are from the perspectives of the GPHA managers.

##### **4.3.2.1 Impact of Containerisation on the Infrastructural and Superstructural Development of Takoradi Port**

The researcher also asked the question about the changes that were made with respect to the advent of containerisation in Takoradi Port to verify the responses as given by the respondents to the questionnaires whilst exploring other changes. This obviously brought out how containerisation impacted on the operations and development of the port.

The GPHA Terminal Manager confirmed that in 1991, the port under a rehabilitation project, increased the draft, constructed pavements at adjacent areas to the water and designated a berth for general cargo. He however, agreed that, these projects did not specifically target the container trade although some container imports were recorded. The Terminal Manager further explained that, the container handling at that time was basically the duty of the ship that came with its own handling equipment (ship crane) to do the lifting of the cargo from the quay to the ship or vice versa.

It was so until there was a designated container berth among the nine (9) berths of the port in 2004. The port has 5 multipurpose berths and 3 dedicated berths for oil, manganese and bauxite. When they were posed with the question why it took that long to designate a container berth, the GPHA Managers defended that because the two (2) ports of Ghana were merged to be under the same management (GPHA), Tema Port was strategically developed to mainly serve the needs of the container trade to relieve Takoradi Port from the pressure of the increase in trade volumes. Consequently, Tema Port was made to specialise more in the container business making Takoradi Port lack behind as far as container trade is concerned. However, the Operations Manager at GPHA explained that because the port still cannot do completely away with the trade in containers, some infrastructural projects are being put in place to ensure that the current draft of the container terminal is increased to be suited well to be able to accommodate larger container vessel.

It can be inferred from the above that, by management decision and tactics, instead of allowing the full consequences of the advent of containerisation (which had started to increase is traffic) to impact on Takoradi Port, Tema Port was rather made to specialise and handle the container trade which are dominantly imports. However, due to the indispensability of the trade in containers in the port, it has recently began receiving some amount of attention for its development.

In respect of the superstructure development, all the interviewees mentioned that the advent of containerisation has also led to the creation of offices to help in the administration of the containers that arrive and dispatch to and from the port. In 1986, there was a US\$35 million rehabilitation project that included the removal of the sunken vessels and other wrecks from the harbour basin, the purchase of cargo handling equipment and technical training of staff. Since it is presumed that containerisation started in the 80's, it suffice to say that the said project was more to raise the superstructures and the human capacity to operate efficiently the only new dynamics in the trade (containerisation).

#### **4.3.2.2 Impact of Containerisation on the Labour and Regulations of Takoradi Port**

The discussions on the topic of the impact of containerisation on port labour during the personal interviews did not stretch long at all as the only common comment made was about the need it brought for the upgrade of the skills of port workers to be able to effectively operate and handle all the container handling equipment and communication systems. It was also discussed that, with the advent of containerisation, it takes by far less than 24 hours to load and discharge vessels unlike with the use of gangs. This clearly is a confirmation that containerisation leads to higher port productivity.

Under the discussions of the port regulations and containerisation, Managers at GPHA, said that there has been no specific regulation that has been made in relation to containerisation but admitted that it brought the need to heighten security and safety measures in relation to the handling of the containers at the port. In the advent of containerisation, port users dealing with containers are prohibited from entering the port without putting on safety wears such as reflectors and foot-covering sandals.

The port regulations in regards to the port therefore took the form of handling charges and security and safety regulations.

#### 4.4 IMPACT OF CONTAINERISATION ON THE PRODUCTIVITY OF TAKORADI PORT

This section also relates to the analysis of the all the trends in the container throughput as obtained from the Marketing Manager at GPHA.

The following port statistics (in table 4.3) was obtained from the operations manager at GPHA to help ascertain the growth pattern of the container throughput though Takoradi Port.

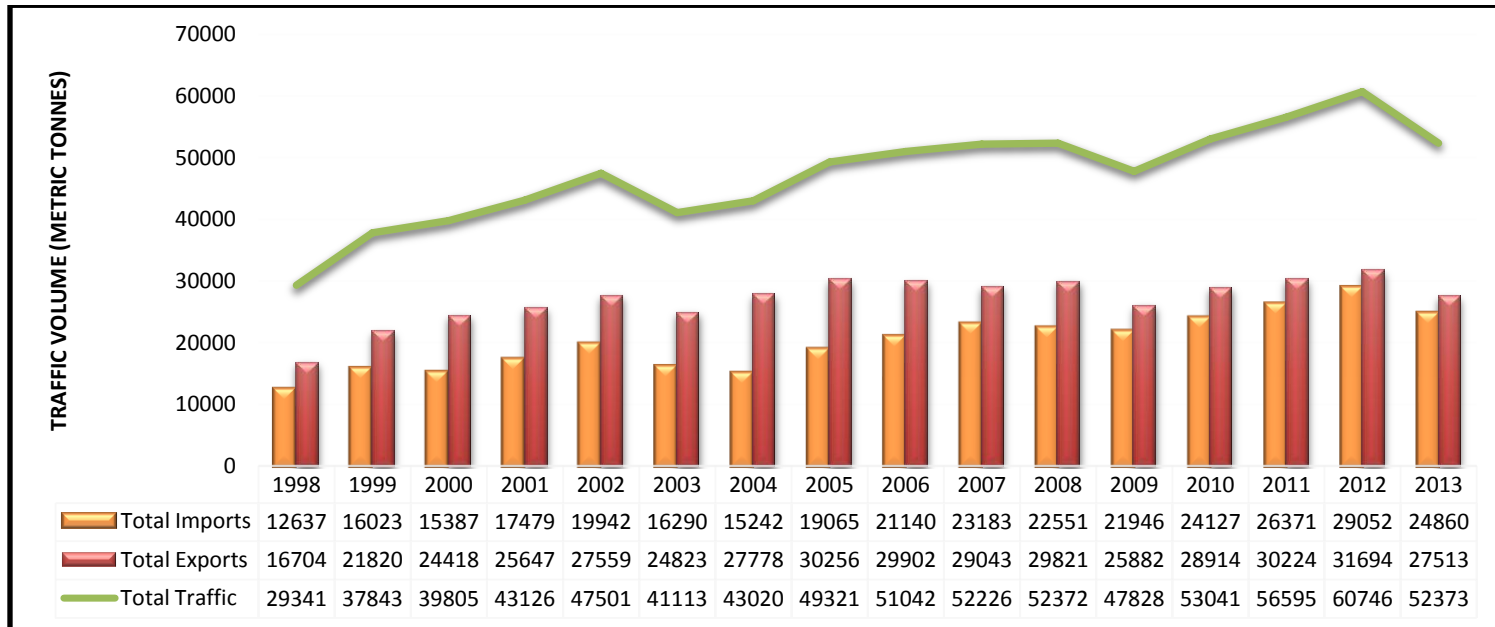
Table 4.3: Container Traffic through Takoradi Port: 1998-2013 (metric tonnes)

YEAR	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<b>Total Imports</b>	12637	16023	15387	17479	19942	16290	15242	19065	21140	23183	22551	21946	24127	26371	29052	24860
<b>Total Exports</b>	16704	21820	24418	25647	27559	24823	27778	30256	29902	29043	29821	25882	28914	30224	31694	27513
<b>Total Traffic</b>	29341	37843	39805	43126	47501	41113	43020	49321	51042	52226	52372	47828	53041	56595	60746	52373

Source: field data

Table 4.3 has been processed into the form as shown in figure 4.4 to help give a better trend in the container trade growth over the years.

Figure 4.4: Container Traffic Flow through Takoradi Port: 1998-2013 (metric tonnes)



Source: Field data

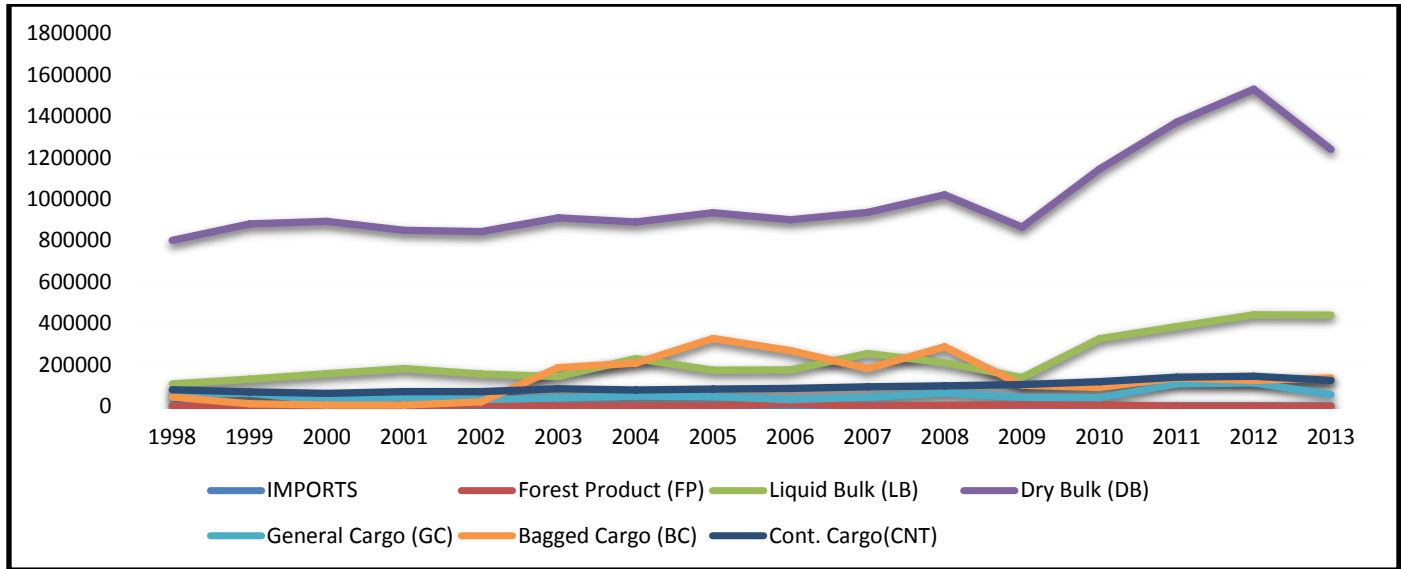
From figure 4.4 above, it can be clearly seen that the container throughput over the years has generally increased at a steady rate with sharp declines in 2003, 2009 and 2013. It is also evident that, the total container exports are always higher than the total container imports. However, it can also be seen that from 2007, the difference between the two have been reducing implying that the growth rate for the total imports is higher than the total imports.

#### 4.4.1 The Impact of Containerisation on the Import Traffic of Takoradi Port

The operations manager indicated that one of the key performance indicators in measuring the productivity of the port is cargo throughput of which the container traffic forms part. In order to clearly understand the impact of the steady growth of the container throughput and analyse the

impact of containerisation on the import productivity of the port, a further comprehensive port cargo throughput was acquired as shown in figure 4.5 and discussed below

Figure 4.5: Import Cargo Traffic Flow through Takoradi Port: 1998-2013 (metric tonnes)



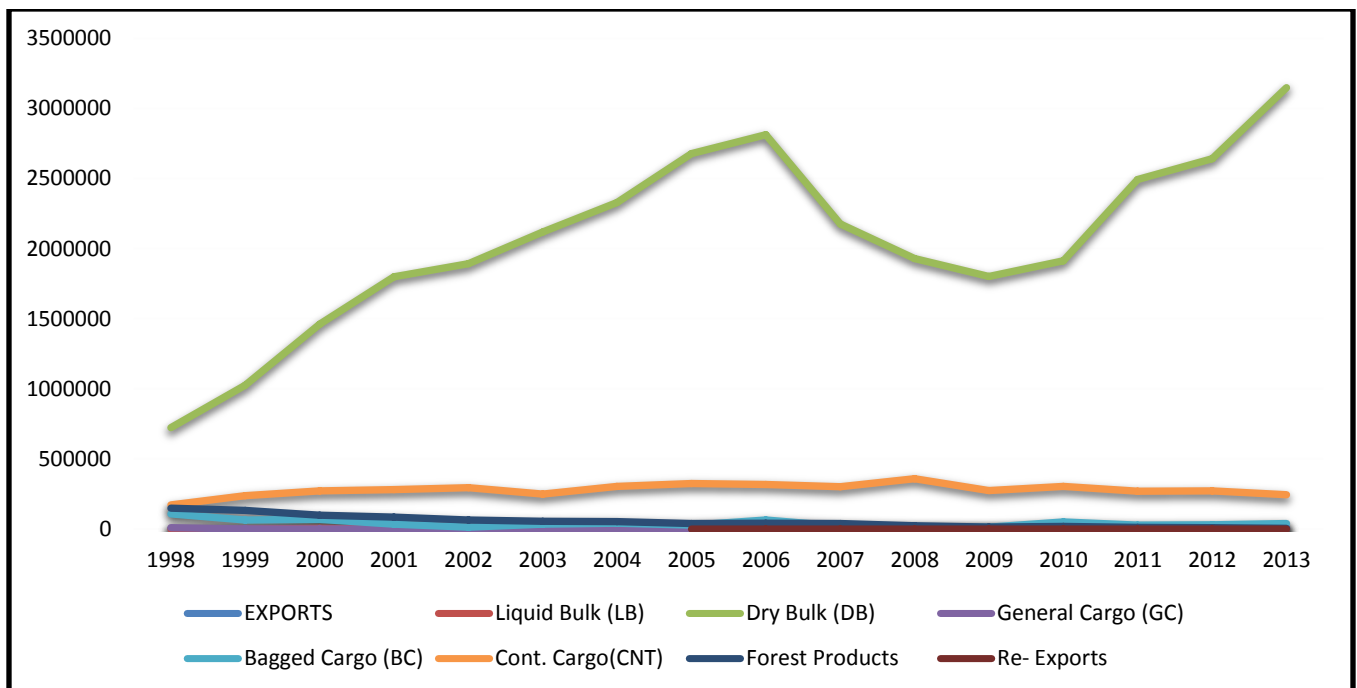
Source: Field data

From figure 4.5 above, it can be clearly seen that the trend in container trade over the years is just marginally above forest products and general cargo. Initially, it can be seen that the bagged cargo volume was below the containerised cargo volume but increased higher than the containerised cargo between 2002 and 2009. From 2009, the containerised cargo volume once again regained higher records than the bagged cargo until it slightly over turned in 2013. In all, however, the imports of dry bulk has always remained the overwhelmingly lead import cargo.

#### 4.4.2 The Impact of Containerisation on the Export Traffic of Takoradi Port

So as to also clearly understand the impact of the steady growth of the container throughput and analyse the impact of containerisation on the export productivity of the port, the statistics pertaining to export throughput was acquired as shown in figure 4.5 below:

Figure 4.6: Export Cargo Traffic Flow through Takoradi Port: 1998-2013 (metric tonnes)



Source: Field data

From figure 4.6 above, it can be clearly seen that the container cargo throughput has established a trend of dominance and higher volumes than the all the other cargo types except dry bulk cargo. The trend in the growth of the export container traffic has recorded a more stable growth with a recent marginal decline persistent from 2009.

#### 4.4.3 The Impact of Containerisation on the Total Cargo Traffic of Takoradi Port

Table 4.4 below is the total cargo traffic (both imports and exports) as recorded from 2002 to 2013.

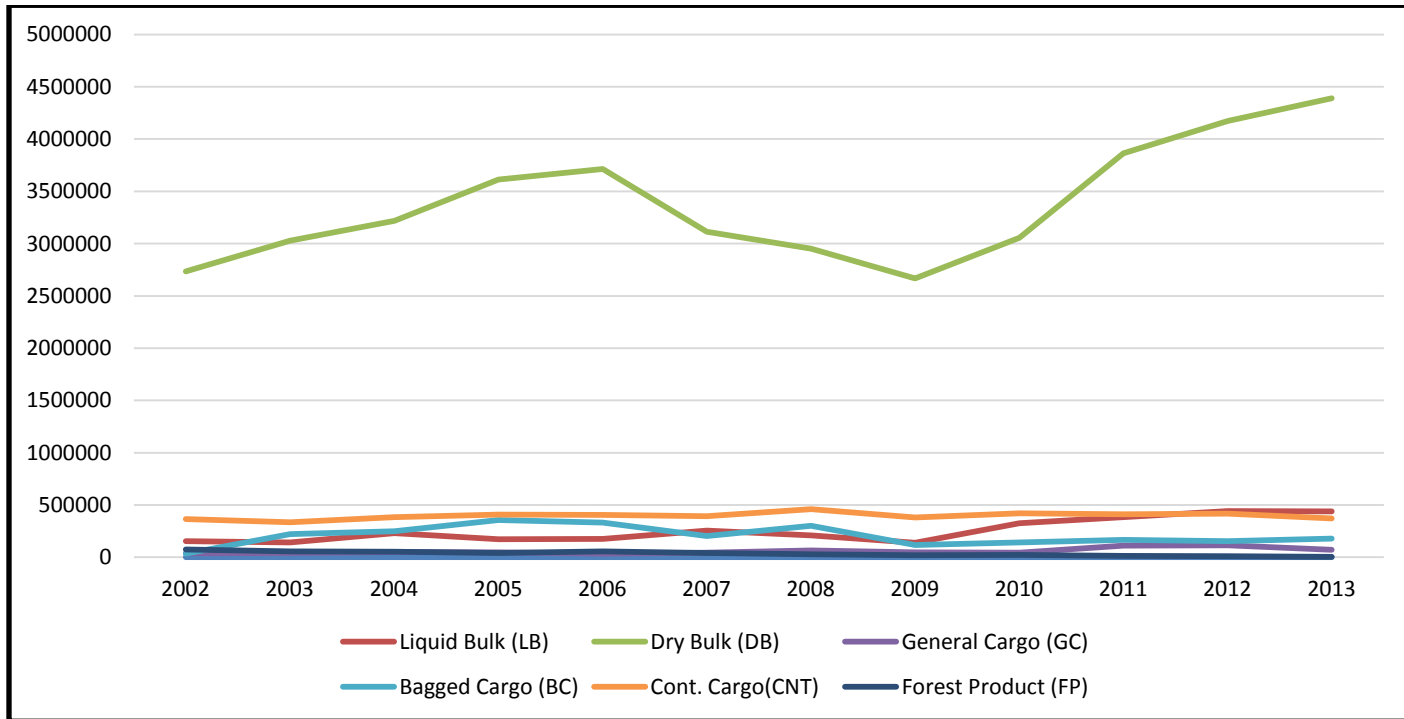
YEARS CARGO TRAFFIC	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Liquid Bulk (LB)	155,529	142,789	230,256	173,965	176,393	254,978	209,467	138,863	326,640	383,855	441,462	439,487
Dry Bulk (DB)	2,734,356	3,029,100	3,218,532	3,611,912	3,713,563	3,112,971	2,950,235	2,665,958	3,057,035	3,862,665	4,171,627	4,388,442
General Cargo (GC)	38,573	40,896	51,105	47,508	36,428	44,811	67,068	48,406	42,760	112,680	115,931	70,602
Bagged Cargo (BC)	34,258	221,511	249,601	354,816	332,997	204,286	302,605	118,236	140,731	165,751	154,868	177,561
Cont. Cargo (CNT)	364,764	334,590	382,487	407,268	404,841	394,461	458,852	379,615	421,161	410,408	417,053	370,381
Forest Product (FP)	73,424	56,390	52,403	40,264	55,395	42,145	28,586	20,902	23,832	13,174	9,756	5,552
<b>TOTAL CARGO TRAFFIC</b>	<b>3,400,904</b>	<b>3,825,276</b>	<b>4,184,384</b>	<b>4,635,733</b>	<b>4,719,617</b>	<b>4,053,652</b>	<b>4,016,813</b>	<b>3,371,980</b>	<b>4,012,159</b>	<b>4,948,533</b>	<b>5,310,697</b>	<b>5,452,025</b>

Table: 4.4: Total Cargo Traffic through Takoradi Port: 2002-2013 (metric tonnes)

Source: Field data

Figure 4.7 is a graphical representation of table 4.4 to give a clear pictorial view of the flow of each cargo type in relation to containerised cargo. It is however clear from the figures in table 4.4 that there is a general trend of increase in the total cargo traffic in the Port of Takoradi.

Figure 4.7: Total Cargo Traffic through Takoradi Port: 2002-2013 (metric tonnes)



Source: Field data

In aggregate, figure 4.7 above gives another vivid illustration that containerised cargo has been the lead cargo type that contributed so much to the general increase in the cargo handled with the exception of dry bulk cargo. It must be noted however that, in 2013, liquid bulk took a marginal increase over the containerised cargo.

#### 4.4.4 The Contribution of the Container Trade to the Total Cargo Traffic of Takoradi Port

Table 4.5 below, presents the productivity statistics for the containerised cargo as against the total cargo traffic which leads to the analysis on the impact it had on the productivity of the port with regards to cargo traffic through the port.

Table 4.5: Total Containerised Cargo Imports & Exports Traffic through Takoradi Port: 2002-2013

(metric tonnes)

YEAR	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CARGO TRAFFIC												
Cont. Cargo Imports	70377	84491	77904	82800	85825	93263	98927	104692	117730	140111	144370	125195
Cont. Cargo Exports	294387	250099	304583	324468	319016	301198	359925	274923	303431	270297	272683	245186
Total Cont. traffic	364,764	334,590	382,487	407,268	404,841	394,461	458,852	379,615	421,161	410,408	417,053	370,381
TOTAL CARGO TRAFFIC	3,400,904	3,825,276	4,184,384	4,635,733	4,719,617	4,053,652	4,016,813	3,371,980	4,012,159	4,948,533	5,310,697	5,452,025

Source: Field data

Table 4.5 above indicates a closely similar rate of increase and decrease between the total container traffic and the total cargo traffic. Table 4.6 below, establishes the percentage composition of the container traffic in the total cargo traffic.

Table 4.6: Percentage Rates of Contribution of Containerised Cargo to Total Cargo Traffic

CARGO TRAFFIC	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Cont. Cargo Imports (%)	2.07	2.21	1.86	1.79	1.82	2.30	2.46	3.10	2.93	2.83	2.72	2.30
Cont. Cargo Exports (%)	8.66	6.54	7.28	7.00	6.76	7.43	8.96	8.15	7.56	5.46	5.13	4.50
Total Cont. traffic (%)	10.73	8.75	9.14	8.79	8.58	9.73	11.42	11.26	10.50	8.29	7.85	6.79
<b>AVERAGE PERCENTAGE SHARE OF THE CONTAINERISED CARGO TRAFFIC</b>	<b>6.51%</b>											

Source: Field data

From table 4.6 above, it is evident that the impact of the export containerised cargo has constituted more to the total container traffic than the import containerised cargo in all the previous years. It has also been given that, on the average, the total container traffic contributes 6.51% of the total cargo traffic which is the next highest contributor after the dry bulk cargo traffic.

#### **4.5 CHALLENGES POSED BY CONTAINERISATION ON THE OPERATIONS AND DEVELOPMENT OF TAKORADI PORT**

The interviews conducted with the managers of GPHA confirmed the challenges as raised by the port users and also revealed that the port lacks the required draft to be able to accommodate larger vessels which have become the dominant in the trade. The managers also stated that the port as well lacks the adequate container handling equipment as majority of them have become very weak to function effectively and efficiently and others appearing obsolete.

#### **4.5.1 Impact of the Challenges on the Operations and Development of Takoradi Port**

The personal interview with some of the ship agents also revealed that the problem of lack of a dedicated container terminal and the lack of a deeper draft threatens the relationship between the ship agents and their shipping lines. However, the GPHA manager in this respect indicated that the challenges of the container trade has influenced the need to develop the port to increase its capacity to handle modern larger vessel.

All the responses from the container traders indicates a very strong need to develop the port to be more container friendly to help widen the growth of the container business. However, in their opinion, majority indicated that the current development projects undergoing in the port will somehow meet the exact needs of the container traffic. In explaining why they hold such pessimist view of the current development projects, the interviews with the ship Agencies indicate that the port development has so much projected the oil trade and so neglected the need to ensure a proper hinterland connection to facilitate the total supply activities of the container trade. It is feared that although some significant development to deal with the current needs of the container trade, the necessary attention needed from the authorities to boost the container trade will hardly be received.

To this end, it can be deducted that, in the wake of the development of the oil business, the trade in containers beginning to realise some specific and suitable developments.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 INTRODUCTION**

This chapter marks the end of the entire research into the impact of containerisation on Takoradi Port. It presents a summary of the analysed findings discussed in the previous chapter. The research questions early discussed were reflected upon and based on the findings, the researcher presented a conclusion of the work in this chapter to satisfy the research questions. What is more, this chapter discusses the recommendations to help mitigate the challenges identified and concluded on, in respect of the research matter.

#### **5.2 SUMMARY OF FINDINGS**

The research questions sought to be answered as data were gathered included but not limited to; what are the impact of containerisation on port operations, the port development and what the impact of the challenges of containerisation has been on Takoradi Port.

The findings revealed that the Takoradi Port started trading in container imports before export in 1987 and 1989 respectively and since then has changed the handling methods of mainly cocoa produce and sawn timber. However, it was also identified that mostly dry bulk cargoes have never undergone changes in methods of handling in the advent of containerisation such as manganese, bauxite, etc.

It has also been brought to light that initially container handling in the port was the responsibility of the ship owner who came with his own cranes inbuilt in the ship. Although, there were some

infrastructural development in the early days of containerisation in the port, the study did not reveal that it was specifically to enhance the trade in containers. However, the findings indicated that the merger of the two national ports under the common management of GPHA, Tema Port was developed to specialise more in handling the influx of containers traffic to relieve the increasing pressure on Takoradi Port.

Again, the findings revealed that because the Takoradi Port could hardly do without containerisation, few infrastructural changes were made to benefit the container trade including the designation of a container berth. The study also indicated that the port also has purchased some container handling equipment and the creation of the necessary offices to facilitate the container trade.

The findings also confirmed that in respect of port labour, the advent of containerisation has reduced the number of gang required, the need to train specialist for the trade and brought about efficiency in the handling of the containerised cargo. Apart from the safety regulations and the changes in the handling charges, the study did not reveal much impact of containerisation on the port regulations.

Moreover, the finding brought to light that the container traffic has over the years generally increased at a steady rate with a record of sharp declines in 2003, 2009, and 2013. It was also evident in the findings that the total container exports are always higher than the total container imports. However, it was also discussed that in recent times, the growth rate for the total imports is higher than the total exports.

Furthermore, the study also revealed that with the exception of bulk cargo traffic, containerised cargo traffic has been predominantly higher than all the other types of cargoes handled by the port. However, it was also found out that the total imports of containerised cargo traffic has not been as predominant as the exports of containerised cargo traffic.

More importantly the study also revealed that, as a key cargo type, the containerised cargo traffic has over the years contributed averagely 6.51% to the total cargo traffic. It was indicated also that the highest share of the container trade to the total cargo traffic was in 2008 and has since been declining steadily to 6.79% in 2013.

Lastly, the findings indicated that the container trade is mainly faced with the challenges of delays in clearance, congestion, lack of good hinterland connection and equipment breakdown. It was also revealed that that challenges in the container trade has led to the diversion of the trade to other ports and seriously threaten the continuous existence of some shipping lines or agents in the port.

### **5.3 CONCLUSIONS**

Drawing from the findings and in consideration of the research purpose of this research, it can be concluded that:

- ❖ The advent of containerisation has not had a radical change in the operations of the port as most types of the cargoes have not undergone any change into containerisation
- ❖ The extensive impact of the advent of containerisation on the development can be inferred from the consequences of the container trade on the development of Tema Port. However, it can also be concluded also that because of the designation of the port of Tema as mainly for container trade, the impact of containerisation on the development of Takoradi Port is been very marginal and very negligible until the ongoing development project is completed.
- ❖ If GPHA must achieve its mandate to use the national ports to make Ghana the gateway of Africa, then the container trade through Takoradi which handles mainly exports both from home and landlocked countries, then it is worth to prioritise the and check to protect the container business from its current threats.

#### 5.4 RECOMMENDATIONS

So as to make the port of Takoradi Port function well in the sub region in respect of the container business considering the findings and the conclusions drawn, the researcher recommends that:

- ✓ The container trade should be given equal or better priority as the oil and gas trade in the development of the Takoradi Port. In this regard, the ongoing developmental projects should be reconsidered to make room for more designated container terminals and the draft be increased to equal depth as Tema Port. This would create equal opportunities for both ports to share common ability in accommodating similar vessel sizes and be able to collectively handle any congestion problems in either ports. Besides this, a greater opportunity would be made available to ports users to opt for the port that will offer them the shortest distance to their destinations as it will boost the competitive advantage of the ports under GPHA.
- ✓ In respect of the container trade, GPHA who manages the two ports should allow independence to the ports to compete for the trade fairly for the traffic in containers. This implies that, Takoradi Port should also be given equal opportunity as Tema Port to develop in suitable respects to effectively and efficiently handle the trade in containers.
- ✓ A careful consideration to develop the hinterland connections particularly the construction of the railway lines should be done as soon as possible. To this end, it is recommended that all the impediments to the construction of the inland port at Boankra including the lack of rail connection be quickly resolved to ensure the running and completion of the delayed project.

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**APPENDIX I**

**QUESTIONAIRES FOR GPHA, TAKORADI**

**SECTION A: INTRODUCTION**

I am a student of the Regional Maritime University studying MA, Ports and Shipping Administration. I am researching on the topic “**Impact of containerisation on Takoradi Port**” as part of my requirement for the award of the master’s degree stated above.

I shall be very grateful if you can find time to fill this questionnaire to enable me to successfully complete this research.

I hereby assure that all information given shall be treated as confidential and shall only be used for academic purposes.

Contact: [george.k.anti@gmail.com](mailto:george.k.anti@gmail.com)

**SECTION B: QUESTIONAIRES**

1. Which year did the port start (trading) receiving and handling containerised cargo?  
.....
2. Have there been some of the cargoes that were once not handled in containers? YES [ ] or NO [ ]
3. Mention some of the cargoes that have undergone changes in methods of handling due to containerisation?  
.....  
.....  
.....
4. How did the changes to the use of containers affect the productivity of the port?  
Increase [ ] No effect [ ] Decrease [ ]
5. To what extent do you think containerisation resulted into an increase in the overall productivity of the port?  
Very much [ ] Much [ ] Not much [ ] Not at all
6. Were there any changes you noticed in the port as a result of the use of containers with respect to  
a. Infrastructure? YES [ ] or NO [ ]

- b. Superstructure? YES  or NO
- c. Labour? YES  or NO
- d. Legislation? YES  or NO

7. Briefly describe the exact form of changes in all the areas ticked as YES in Question 4, above

a. Infrastructure?

.....  
.....

b. Superstructure?

.....  
.....

c. Labour?

.....  
.....

d. Legislation?

.....  
.....

8. What is the state of growth of the container throughput at present?

Increasing  Static  Deceasing

9. Explain the growth pattern in the exact rate of occurrence as provided below.

- a. 2000: Increasing  Static  Deceasing
- b. 2004: Increasing  Static  Deceasing
- c. 2008: Increasing  Static  Deceasing
- d. 2012: Increasing  Static  Deceasing

10. What do you think accounts for the above state of growth pattern as you have ticked in question 9?

.....  
.....  
.....

11. State some of the challenges posed by the operation of containers in the port

.....  
.....  
.....

12. How have these challenges impacted on the need to develop the container trade or otherwise?

.....  
.....  
.....

13. Is there any need for the port to invest in the development of the container trade through the port? Very much  Much  Not much  Not at all

14. Why that opinion in question 9, above?

.....  
.....  
.....

15. In your, opinion do you think the current development projects undergoing in the port will meet the exact needs of the container trade? YES [ ] or NO [ ]?

16. To extent do you think meet the needs of the container trade?

Very much [ ] Much [ ] Not much [ ] Not at all

17. Explain that extent as ticked in question 13 or no if so ticked in question 12, above?

.....  
.....  
.....

18. Any other comment?

.....  
.....  
.....

*Thank you very much!!!*

**APPENDIX II**

**QUESTIONNAIRES FOR PORT USERS**

**SECTION A: INTRODUCTION**

I am a student of the Regional Maritime University studying MA, Ports and Shipping Administration. I am researching on the topic “**Impact of containerisation on Takoradi Port**” as part of my requirement for the award of the master’s degree stated above.

I shall be very grateful if you can find time to fill this questionnaire to enable me to successfully complete this research.

I hereby assure that all information given shall be treated as confidential and shall only be used for academic purposes.

Contact: [george.k.anti@gmail.com](mailto:george.k.anti@gmail.com)

**SECTION B: QUESTIONNAIRES**

Name of organisation: .....

1. Do you trade in containers? YES or NO
2. If YES, how do you comparatively categorise your container trade in terms of  
Major business [ ] Minor business [ ] neither Major nor Minor business [ ]
3. What is the nature of your container business? Exports [ ] Imports [ ] Both [ ]
4. State the commodities or goods involved in of your container business

.....  
.....

5. In which year did you start the container business?

.....  
.....

6. Was the use of containers the first method used to handle some of your commodities or goods YES [ ] or NO [ ]
7. Were there any changes you noticed in the port as a result of the use of containers with respect to
  - a. Infrastructure? YES [ ] or NO [ ]
  - b. Superstructure? YES [ ] or NO [ ]
  - c. Labour? YES [ ] or NO [ ]
  - d. Legislation? YES [ ] or NO [ ]
8. Briefly describe the exact form of changes in all the areas ticked as YES in Question 4, above
  - a. Infrastructure?  
.....  
.....
  - b. Superstructure?  
.....  
.....
  - c. Labour?  
.....  
.....
  - d. Legislation?  
.....  
.....
9. What is the state of growth of your container trade at present?  
Increasing [ ] Static [ ] Deceasing
10. Explain the growth pattern in the exact rate of occurrence as provided below.
  - a. 2000: Increasing [ ] Static [ ] Deceasing
  - b. 2004: Increasing [ ] Static [ ] Deceasing
  - c. 2008: Increasing [ ] Static [ ] Deceasing
  - d. 2012: Increasing [ ] Static [ ] Deceasing
11. State some of the challenges posed by the operation of containers in the port  
.....  
.....  
.....
12. Are the facilities that handle containers in the port always available? YES [ ] or NO [ ]
13. How would you rate the general performance of the facilities used in handling containers in the port? Excellent [ ] Very good [ ] Good [ ] Average [ ] Poor [ ]
14. State some of the challenges posed by the operation of containers in the port  
.....  
.....  
.....

15. How have these challenges impacted on the need to develop the container trade or otherwise?

.....  
.....  
.....

16. Do you think there any need for the port to invest in the development of the container trade through the port? Very much  Much  Somehow  Not at all

17. Why do you hold such opinion as ticked in question 9, above?

.....  
.....  
.....

18. In your, opinion do you think the current development projects undergoing in the port will meet the needs of the container trade? YES  or NO ?

19. To extent do you think meet the needs of the container trade?

Very much  Much  Not much  Not at all

20. Explain that extent as ticked in question 13 or no if so ticked in question 12, above?

.....  
.....  
.....

21. Do you also trade in containers through the Tema Port? YES  or NO

22. Briefly explain why your containers must pass through the Takoradi port?

.....  
.....  
.....

Any other comment?

.....  
.....  
.....

***Thank you very much!!!***

### **APPENDIX III**

#### **INTERVIEW GUIDE FOR GPHA MANAGERS**

1. How can you trace the history of the arrival of containerisation in the operations of Takoradi port?
2. Which cargoes are now traded in containers through the port?
3. How did the changes to the use of containers affect the productivity of the port?
4. To what extent do you think containerisation resulted into an increase in the overall productivity of the port?
5. How do you think containerisation boosted the operations of the port or otherwise?
6. Were there any changes port had undergone in order to fit into the dynamics of containerisation?
7. Briefly describe the exact of changes that there have been
8. What is the state of growth of the container throughput at present?
9. What do you think accounts for the state of growth pattern?
10. What are some of the challenges posed by the operation of containers in the port
11. How have these challenges impacted on the need to develop the container trade or otherwise?
12. Do you think the current development projects undergoing in the port will meet the exact needs of the container trade and why?