Master's degree thesis

LOG951 Logistics

The Future of Port Said East port

Ahmed Mehrem

Number of pages including this page: 62

Molde, 2011.05.24

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Preface

I would like to express my sincere thanks to professor Harald.Hjelle for his guidance and advises through the writing process of the thesis.

I would like to thank my family for supporting and helping me during the study in Norway.

I would to thank all the professors in Molde University College for sharing their knowledge during the master programme.

Summary

Egypt enjoys a unique strategic location in the center of the world, from its position overlooking the Red Sea and the Mediterranean. In addition the existence of one of the most important International maritime corridors "Suez Canal" which serves almost all the trade between Asia and Europe. All these advantages allow the country to be became an important point of shipping activity with the potential to play a vital role in regional and global integration.

The government of Egypt has allocated an area of 120 km east of Suez Canal for developing a modern port with industrial zone. The East Port Said project targets trade from Far East Asia, where companies currently suffer high lead times to deliver products to the Europe.

The aim of the thesis is to evaluate the potential of East Port Said port to become a major mega hub in the Mediterranean region. The thesis will investigate the current situation of which will serve as a as a basis for evaluating the future of the Port .

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1. Introduction

1. 1. Background

Maritime Transport is the most common mode of transport in international trade. With more than 80 per cent of world cargo trade by volume being carried by sea, maritime transport remains the backbone supporting international trade and globalization (UNICTAD, 2008).

Maritime transport depends on seaports for all its operations, since ports act as interfaces between maritime and inland modes of transport (railways, road or inland navigation). According to UNCTAD report, (1999) sea port "are multifunctional markets and industrial areas where goods are not only in transit, but they are also sorted, manufactured and distributed".

In globalised world were distances are becoming virtually squeezed maritime transport and sea ports plays are important elements in supporting the economic growth of any nation. The world has witnessed tremendous changes in field of maritime transport and port industry in the last decades. These changes include increasing in size of ships, increasing of the international trade and container throughput, advent of ultra-large container vessels, changing customer demands, developments in information technology and new handling equipment.

As a consequence of these changes, the role of the ports changed from being traditional connection between sea and land to providers of complete logistics networks that includes intermodality and value added activities. Modern ports became an integrated node in a logistic chain (Estrada, 2007). The ports that are unable to establish themselves as key players in the optimisation process unfolding within such logistic chains are in dangers of being disregarded as port of call on the international fright routes (Uitgeverij, De Boeck , 2002).

The port's business environment became more challenging. And this has lead to a strong competition between the advanced ports all over the world to secure their container throughput and strategic position as hub ports. In order to cope with this competitive

pressure, port managements are investing heavily in infrastructure and facilities, as well as improving their operation systems.

1.2 Area of study

In the 1990s, Far East Asian countries, especially China and India, have established their roles as major global production areas and economic and financial markets by increasing the rate of outsourcing of manufacturing capacity from mature industrialized countries. This had an enormous impact on the international maritime industry. As a result, the Far East Asian countries have determined a shift in the worldwide maritime routes and promoted traffic flows from Asia to Europe through Mediterranean basin (Yap et al, 2005).

This development has had a significant impact on the size of ships and on the seaport industry in many Mediterranean countries because of their strategic location on route between Far East and Europe. On one hand, the growth of container flows stimulated an increase in the tonnage of container ships. On the other hand, the structure of port facilities in the Mediterranean has been adapted to this growth through the expansion of existing ports and the creation of new ports targeted to container ships traffic.

The improvements in the Mediterranean ports combined with their geographically strategic location , have also encouraged modern container vessels to make short duration calls upon them (e.g. shipping lines operating along Asia - Europe route, Asia - Mediterranean route and Asia- US East Coast route.

Among these Mediterranean countries that have witnessed a remarkable development in its port industry is Egypt. The country enjoys a unique strategic location in the center of the world, from its position overlooking the Red Sea and the Mediterranean. In addition the existence of one of the most important International maritime corridors "Suez Canal" which serves almost all the trade between Asia and Europe. All these advantages allow Egypt to be became an important point of shipping activity with the potential to play a vital role in regional and global integration.

1.3 Purpose of the study

The government of Egypt has allocated an area of 120 km east of Suez Canal for developing a modern port with industrial zone. The East Port Said project targets trade from Far East Asia, where companies currently suffer high lead times to deliver products to the Europe. The aim of the thesis is to evaluate the potential of East Port Said port to become a major mega hub in the Mediterranean region.

The thesis will investigate the current situation of the port which includes; cargo volumes, port efficiency, infrastructures and new development .Moreover, the thesis will attempt to explore the strength, weakness, threats and opportunities of the port, which will serve as a as a basis for evaluating the future of the Port .

The thesis will aim to address the following objectives:

- Explore the change in the role of the port.
- Explore the role of modern logistics concepts and logistics center in supporting ports competitiveness.
- Analysis of the Mediterranean market and the flow of cargo via Suez Canal.
- Explore the strength, weakness, threats and opportunities of the port.
- Evaluate the future of the port.

1.4 Research Design

A research design is the main plan that directs the data collection and analysis phases of a research project. The framework provides the data collection methods, the sources of data and type of information to be collected. According to Yin (2003) "a research design is the logic that links the data to be collected and the conclusions to be drawn to the initial questions of the research". This thesis will conduct a descriptive case study. A descriptive research is designed to describe the present situation or the features of a group or users of a product (Kombrabail, 2003).

There are two main approaches to research; the quantitative and the qualitative method. Quantitative study depends upon data that can be quantified, which can described by numbers and figures (Blumberg et al, 2008). In contrast, qualitative study is based upon

the collection of a variety of empirical materials such as interviews and visual texts that describes routine and problematic moments(denzen,2000). However, Blumberg (2008) stated that, many research problems can - in the very same study - benefit from being investigated both qualitatively and quantitatively.

In this thesis, the two approaches quantitative and qualitative will be used. The quantitative approach will be used in analysing the current situation in port which includes the port infrastructures, operations and performance as well as the origin and destination of cargo. While the qualitative approach will be used to highlights the port's competitive advantages and identify the strength, weakness, threats and opportunities of the port.

1.5 Data collection

There are two types of data Primary and Secondary data. Primary data are those data that are collected by the author conducting the research, while Secondary data are collected in the past or by other parties.

In this thesis the methods of collecting primary data was through conducting interviews with the specialist employees working at the Port Authority, terminal operator, Suez Canal authority and Egyptian ministry of investments. Secondary data were collected from many sources; books, scientific papers, master thesis and articles. In addition to Internet sources such as ports websites. Both primary and secondary data have generated all the necessary information required for the thesis.

1.6 Terminology

The terminology that is used in the thesis is presented below. The definitions for the following terms are gathered from the "Terminology on combined transport" Economic Commission for Europe (2001).

- ***Container*** is a generic term for a box to carry freight, strong enough for repeated use, usually stackable and fitted with devices for transfer between modes. Most

maritime containers are ISO containers. Two main standards exist in terms of length: 20 and 40 feet (6.10 and 12.20 meters), and one and two TEUs (twenty feet equivalent unit), respectively.

- ***Intermodal transport****:* is the movement of goods in one and the same loading unit or road vehicle, which successively uses two or more traffic modes without handling the goods themselves in changing modes.

- ***Intermodality is*** used to describe a system of transport whereby two or more modes of transport are used to transport the same loading unit or truck in an integrated manner, without loading or unloading, in a [door to door] transport chain.

- ***TEU*** *is* a twenty-foot equivalent unit. A standard unit based on an ISO container of 20 feet in length (6.10 m) is used as a statistical measure of traffic flows or capacities. One standard 40' ISO Series 1 container equals 2 TEUs.

- ***Transhipment*** is the movement of TEUs from one means of transport to another.

- ***Feeder service*** is a short sea shipping service which connects at least two ports in order for the freight (generally containers) to be consolidated or redistributed to or from a deep-sea service in one of these ports.

- ***Logistics*** is the process of designing and managing the supply chain in the wider sense. The chain can extend from the delivery of supplies for manufacturing, through the management of materials at the plant, delivery to warehouses and distribution centres, sorting, handling, packaging and final distribution to point of consumption.

- ***Globalization*** describes the process by which regional economies, societies, and cultures have become integrated through communication, transportation, and trade (ww.wikipedia.org).

- ***Multimodal transport*** is the carriage of goods by two or more traffic modes.

- ***Shipper/Consignor/Sender*** is a person or company who puts goods in the care of others (forwarding agent/freight forwarder, carrier/transport operator) to be delivered to a consignee.

- ***SWOT Analysis*** is used as a basic tool in evaluation of the Strengths, Weaknesses, Opportunities and Threats of a specific strategy, project, company or a product (Griffin R. and Pustay).

1.7 Limitation

To keep research work consistent with the research domain, some issues were not in focus and therefore not included in this research.The thesis will only focus on the container, Ro - Ro and general cargo traffic within the Mediterranean region and from the east to the west which include Asia-Europe/Mediterranean trade and transpacific Asia America/Mediterranean trade. The thesis will not look at the other ways of transports, more specifically the bulk goods, passenger traffic (ferries), or any flow of cargo that is not unitised.

1.8 Research structure

The thesis is organized as follows:

- **Chapter 1:** is introduction and framework of the study.

- **Chapter 2: Theory review**
  The aim of chapter two is to provide a broad theoretical framework related to thesis study. This chapter highlights the emergence of hub and spoke network and the main development in the ports. Moreover, it explores conceptual role changes of ports and the concepts of logistics.

- **Chapter 3: Mediterranean region**

  The aim of Chapter 3 is to map the market in the Mediterranean region. It provides an analysis of the major container ports in respect with container traffic, characterises and future plan. Moreover it provides an analysis of cargo traffic through the Suez Canal and the Mediterranean.

- **Chapter 4**: **Port Said East Port**

  This chapter will present the case study of the thesis with a complete description.It will also explore the future master plan of the port.

- **Chapter 5** : **Analysis and recommendations**

  The last chapter attempt to analysis the data presented in the thesis and provides a recommendation on the way forward for the port of Port Said East

Chapter 2 Literature Review

The aim of chapter two is to provide a broad theoretical framework related to thesis study. Firstly, it highlights the emergence of the hub and spoke network and it will point out the type of hub ports. Secondly, it explores conceptual role changes of ports and the concepts of logistics. This section of the chapter illustrates the developments of the port and evaluation of the logistic center.

2.1 Introduction

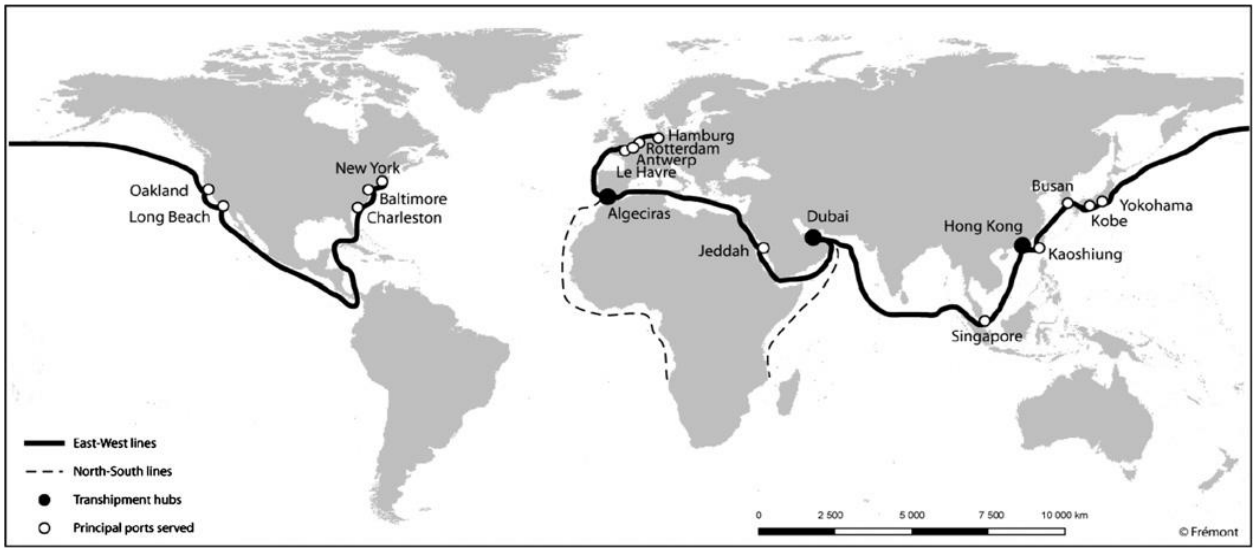
Increasing international trade, coupled with adoption of containerization as a standard transport unit for international transportation have fundamentally changed the maritime transport. Standardized containerization has efficiently reduced the transport cost and has led to the design and introduction of vessels of increasing size and capacity. As a consequence, the container throughput in the world has been increased with vast growing rates annually. The sustained growth of container trade has been accompanied by the globalization of container shipping market which indicated by emerging very large vessel, performing alliances, concentration in liner shipping, and restructuring container network lead to hub and spoke network (E. I. Syafi'i, 2008).

2.2 Hub and Spoke systems

With increasing container vessels sizes and the formation of global strategic alliances and merger between shipping lines, the economic advantage of reducing the number of port calls becomes an important issue. It is more profitable for large vessels to load and unload a large number of containers in a few ports rather than calling at several ports for small number of containers. This has to do with the high capital costs and the daily operational costs of the container ships (P.V. Vroegop, 2008). As consequence, the hub and spoke network configuration has been adopted by many shipping companies in container shipping, especially the long distance trade routes between several regions or continents.

In hub and spoke systems, hubs or transhipment nodes are linked together to form a network where large numbers of direct connections are replaced with fewer indirect connections. Each hub in the network links several major regions by transferring traffic between different types of line (A. Fremont, 2007). The hub and spoke method of distribution involves the centralization of routes. In this system, the cargo to and from a certain region is collected first in a primary hub port then delivered to its final destination, by feeder shipping and /or by land transport. There are usually two characteristics that distinguish primary hubs than other ports in this system. Firstly, they tend to be geographically central in a region. Secondly they can accommodate larger ships than other ports in the region (Euro Med, 2008).

Figure 1: The emergence of a hub and spoke network at the end of the 1980s



Source: A. Fremont , Journal of Transport Geography 15 (2007).

In last three decades, the hub and spoke system in liner service has been introduced as larger container vessels have been adopted in major sea transport routes such as Europe – Far East -American West and East coast (E S C A P, 2005), see (figure 1). This system allows shipping lines to provide a global grid of east-west, north-south and regional services. The large ships on the east - west routes will call mainly at transhipment hubs where containers will be distributed to regional and diagonal routes by feeder network system (Notteboom, 2004).

Liner service network design depends on the balance of power between carriers and shippers. There are different views existing between carriers and shippers with respect to the hub and spoke system. From the carrier's perspective, economies of scale are a critical element in order to minimize costs, which can be obtained from operating larger vessels and having fewer ports of call. On the other hand, the total freight rates, service quality and time, including flexibility and frequency are the most critical elements for the shippers (Notteboom, 2004). Some shippers may prefer a lower transport cost with relatively long transport times, while some other shippers may be in favour of quick transport times with relatively higher payment. The carriers are responsible to arrange the most economic transport routes that will satisfy the shippers' needs after considering whole transport networks (ESCAP report, 2005).

According to ESCAP report to the UN (2005), hub and spoke system are related to the regional characteristics of the final destination, such as:

- The existence of major ports in the area of the final destination.
- The land transport networks and land transport cost from nearby major ports around the destination to the final delivery place.
- The existence of another hub port with lower total logistics costs close to the final destination, the amount of cargo volume available.

The development of the hub and spoke network has increased competition between ports to obtain the role of hub ports. Many ports have invested heavily in their infrastructure and equipments to maintain a high level of services. In addition, most ports have introduced incentives to reduce costs of transhipment in order to attract more shipping line. Examples for these incentives are lower terminal handling charges, longer free storage and reduction of port tariffs. Furthermore many shipping lines have been introducing vertical integration by transforming their role from shipping carriers to global logistics providers. Therefore, the role of shipping lines will not be just as carriers but as total logistics service providers with additional service activities increasing customer's value (ESCAP, 2005).

2.2.1 Hub ports

As mentioned before**,** ports in the past tended to be either simply large major ports dealing with international trade and smaller local ports serving the needs of their hinterland. The approach of the intermodal transport, which is moving goods from door to door using different transport moods and larger vessels, caused a change in the economics of international transport.

The key success factors for hub ports are strategic location, high level of operational efficiency, high port conductivity adequate infrastructure and wide range of port services (Tongzon ,2001).

Considering location, the port is said to be strategically located if it has at least one of the three characters: situated on main maritime route; situated near production or consumption areas; deep water harbours, big water front and land site development possibilities. In addition, convenient geographic location is also a significant need where favourable climate conditions prevail (Deveci,et,al 2004).

There are mainly two types of hub ports. The first type is called transhipment hub, which serves mainly as a transhipment hub and does not handle significant amount of import and export. While the second type which is a Gateway hub, has local cargo from its hinterland and also handle transhipment traffic (Kisi, kalkan, 2004).

Transhipment hub

According to Baird (2001), Transhipment hubs are a container port that provides terminal and marine services to handle and facilitate the transfer or transhipment of containers between feeder and mother vessels in the shortest possible time. Cargo is transferred from large mother ships at load centre ports into small “feeder ships" destined for smaller, regional ports.

According to Hall, Mccolla, Comtois, Slack, (2011), there are two types of transhipment hubs. First, are those whose function is to accommodate the largest vessels and tranship

container via smaller feeder vessels to other ports that either cannot accommodate the largest ships, or have insufficient traffic to justify a vessel call by a mother ship. Examples are Singapore that has achieved its status because of its intermediary between smaller markets of south East Asia. The second type of transhipment hub is a hub with an intermediate location where containers are exchanged between mother ships on different mainline services. These are sometimes called relay hubs.

Gateway hubs

Gateway hubs are those ports developed in areas that have access to large market. They attract the carriers because of the traffic volumes available to fill ships .Example include many of the big Asia ports, such as Shanghai and Shenzhen, as well as all the major ports in North America and Europe. The main characteristics of the gateway hub ports are; they are well linked to rail and road services. Moreover they have a container terminal with sufficient capacity and advanced handling equipments. They have advanced technology and modern information systems (Monsef,2007).

2.3 The Changing role of ports

Ports have been a nature sites for transhipment in order to transport cargo between different modes of transport. Historically they have provided the link between inland and maritime transport and the interface between sea roads and railways (Carbone and Martino, 2003). The changes in world economy due to process of globalization and integration of market, consumption and production together have affected the role of the ports. Ports have evolved from the traditional transport center into to complex industrial and logistics center (Estrada, 2007).

In the past the geographical location of the port, the depth of port's navigation channel and the handling operation were enough to gain comparative advantage. Now days, competitive advantages are obtained from providing better services to vessels and cargo using the ports. This can be accomplished by ports offering a wide range of service with super quality and lowest costs (UNCTAD, 1999). Studies shows that the most successful ports are those who have a combination of productivity advantages in cargo handling and offering wide range of value added services.

A number of ports have responded to the new trend in logistics environment by focusing on value added services as a means of gaining competitive advantages. Value added activities are defined as the difference between the value of the final product after an activity and the value of a product before this activity (craig2007). In other words, value added activities are the addition of new properties to a product, which increase its value.

The value added activities for the ports, range from the basic cargo handling and storage activities to the documentation and tracking of cargo. The value provided to the shippers result from the transfer of cargo between different modes of transport in a good conditions within a specific time. The port can increase this value by reducing the time for moving the cargo though the port without any damages or loss. The value provided to the carriers, is obtained from the speedy and careful handling of cargo to and from the vessel or vehicles within the required time. The port can increase this value by reducing the operation time needed for vessels or vehicles and by increasing the securities to their cargo. Ports can extend this value chain by providing other logistic services, such as inland storage and distribution center.

2.4 Evaluation of port

Since 1960s, the function of port has been changed tremendously. Major ports around the world have added new functions to their traditional role of transhipping and storing goods. After the Second World War, the industrial function grew rapidly. Some sea ports have grown out to become industrial complexes including a large number of related industrial activities. In recent years, the logistical function of sea ports has received more attention. Modern port has evolved from a pure transhipment centre to a function in a logistics system (IAPH, 1996). According to UNCTAD (1999), Marlow (2001), Paixao (2003), there are four types of port generations within the development of the port industry. Each generation reflects the different approaches adopted by the port operators in developing their activities through the years. These activities start with the traditional ones such as loading and discharging of cargo and end up with the development of wide range of logistics and value added activities. Not all ports pass through all stages. Some remain at

one stage, while others skip one or more in their development .Table 1 represents the four generation of the ports.

Table 1 : The four generations of the port.

	First generation	**Second generation**	**Third generation**	**Fourth generation**
Period of developments	Before 1960s	After 1960s	After 1980s	2000
Port functions	Transhipment Storage Trade	Transhipment Storage Trade Industry	Transhipment Storage Trade Distribution	Transhipment Storage Trade Distribution Logistic control
Type of cargo	Break bulk cargo	Break bulk and dry/liquid bulk	Bulk containerised cargo and unitised/	General cargo/containers information
Spatial expansion of port	Quay and waterfront area	Enlarged port area	Terminals and distribute towards landside	Network-related functional expansion
Principal location factors	Presence of market Availability of labour	Access to raw materials Access to sales market Availability of capital	Availability of transhipment facilities Access to sales market Space Flexibility and costs of labour	Availability of transhipment facilities Access to sales market Space Flexibility and costs of labour Available know-how Quality of life
Attitude & strategy	*Conservative* Port as changing point of transport	*Expansionist* Transport, industrial and commercial centre	*Commercial oriented* Integrated transport and logistic centre	*Commercial oriented* Integrated transport, logistic and information complex and network

Port authority's task	Nautical services	Nautical services. Development of grounds and infrastructure.	Nautical services. Development of grounds and infrastructure. Port marketing	Nautical services . Development of grounds and infrastructure. Port marketing. Network management.

Source: Willy Winkelmans & Eddy Van de Voorde (2001) land access to sea port, report by OECD.

2.4.1 First Generation

Until 1960, ports played a simple role as they were only the interface between sea and land transport. During that period, the main activities in port were loading, discharging and storing and navigation assistance. Other activities were not carried out in the port area .The superstructures were only designed to support the standard activities of the port (Ma Shauo, 2001). Moreover, the different parties in port's business were not concerned with the commercial business activities which were yet the basis of the ports activities .Ports marketing promotions were rarely considered. As a result, ports were isolated from the trade and transport activities (Ma Shauo, 2001).

Furthermore, the different port companies and activities were also isolated from each other. This means that their decisions were made independently. As a result, cargo movement was slow and productivity was low. The ship-owners were the actual clients of the port and not the international trade (Ma Shauo, 2001).

At that time, there were only investments in port facilities, while the important changes in transportation technology were neglected. There was a little cooperation taking place between the ports and the surrounding, as ports were only the interface between the maritime transport and the continental transport (Beresford, Garner, Pettit, 2003).

2.4.2 Second Generation

The ports of the second generation were built up between 1960 and 1980. They had a system comprising of government port authority and administration, so that port service providers could easily understand each other and cooperate for common interests (ESCAP report to UN, 2005). At that level of development, ports were recognized as a transport, industrial and commercial service center. The scope of activities was no longer limited to ships and commodity, but was expanded to industrial and commercial dimension such as packaging; labelling, physical distribution and marking (ESCAP report to UN, 2005).

Moreover, Industrial facilities were built up within the port area. The ports developed and expanded towards its hinterland with industries such as iron and steel, aluminum, petrochemicals and fertilizers. During the 1970s, many ports were evolved to large industrial complexes and due to this second generation ports are also called "industrial ports" (Ma Shauo, 2001). With this evolution there was an increase of raw material quantities that was imported into industrial countries and dry bulk carriers and large tankers were used in the maritime transport (Ma Shauo, 2001).

There is a big difference between the organization of the ports in the first and second generation. Compared to the ports of the first generation, where the activities of the enterprises were isolated, there was closer relationships between the enterprises in ports of the second generation .The companies that invested in the port area had a closer relationship with the whole port activities Ma Shauo, 2001). Also, the different activities inside the port organization became more integrated with the increase in quantity and the quick turn over of cargo throughput the port. Furthermore, the ports of the second generation had a closer relationship with the municipality since they were more dependent on the surrounding city regarding land, water, energy and man power (Ma Shauo, 2001).

2.4.3 Third Generation

The third generation of ports appeared in the 1980s. The development of the ports was influenced by the rapid development of containerization and intermodal transport system, as well as the growing of the world trade. In the third generation, ports played a significant role in the integrated transport chain, which was built up around distribution and

production. The port operators, manager and policy makers from the third generation ports have changed their management attitude from the rather passive offer of services and facilities to that of active concern and participation in the overall international trade processes (Ma Shauo, 2001).

At that stage of development, port services were handled by modern equipments and information technology became more important. The smooth flow of the information among the ship, commodities and the whole logistic transport chain, is one of the most important characteristics of the third generation ports (Ma Shauo, 2001). The activities of transportation and production have been linked together to form an international network. The former services and activities that appeared in the second generation have been extended to include logistics and distribution services. Compared to other port generations, third generation ports were focusing on efficiency rather than effectiveness (ESCAP report to UN, 2005).

2.4.4 The Fourth Generation

The development of logistics within the services industry and the development of strategies have led UNCTAD (1999), Marlow (2001) and Paixao (2003) to suggest the evolvement of the fourth generation. According to UNCTAD (1999), the fourth generation port consists of a network of physically separated ports or terminals linked through common operators or common administration. "Fact is that the UNCTAD definition of the fourth generation port is limited mainly to the spatial evolution whereas ports on the verge of the 21 century also went through further changes in operational and societal terms "(Verhoeven, 2009). The concept of the fourth generation is shown in table 2.

Table 2: The fourth generation multi-purpose gateway port concept.

Dimension	Sub-dimension	Key features
Operational	Ship-shore operations	Core port services: cargo-handling (loading, unloading, storage), technical- nautical services and ancillary services. Strong focus on containers.
	Value added logistics	Shift from core to non-core port activities (various paths possible).
	Industrial activities	Shift from traditional to sustainable industries (e.g. LNG installations, biofuel plants).
Spatial	Terminalisation	Multinational operators develop networks of terminals under corporate logic. Competitive emphasis shifts to terminal level, extending into the supply chain
	Port-city separation	Loosening of spatial relationship combined with the weakening of economic and societal ties (although first signs of re integration initiatives appear – see societal dimension
	Regionalisation	Network development beyond the port perimeter, involves co-operation with inland ports and dry ports (load centre development) as well as with other seaports in proximity
Societal	Ecosystems	Seaport is part of a wider (coastal) ecosystem where it has a variety of environmental interactions with the outside
	Human factor	Sustainable co-habitation with local communities, focus on avoiding negative (pollution, congestion) and stimulating positive externalities (soft values).

Source: Patrick Verhoeven, 2009.

It is shown that the competitiveness and sustainability of a port is not only determined by operational features but also, depends on the integration of all three dimensions together.

2.5 Port as logistic system

Now days, ports play an important role in management of material and information flow, as the transport is an integral part of the whole supply chain (Carbone and Martino, 2003).

According to Bichou and Gray (2005), the integration of ports in the concept of logistics and supply chain management can be discovered from three perspectives. Firstly from the logistic channel perspective, the port serves as a node in the multimodal transport

intersection and operates as a logistics center for the flow of goods and passengers. Secondly for the trade prospective the ports is a key location where by channel control and ownership can be identified or traded .The third perspective is the supply channel, the ports not only links outside flows and process but also creates its own patterns and process . In this context ports can act as network working sites bring together the whole member in the supply chain (Panayides,2007).

2.5.1 Evaluation of Logistic center

The Logistic center concept was developed 30 years ago. During this period, the function and concept of logistics center have been changed significantly. Logistic centers can be classified into three different generations on evaluation basis. In the past, the typical function of logistic center were shipping receiving, storage, break bulk, containerization and freight consolidation (Rimiene and Grundey, 2007). Now days, due to technology, logistics centers have added a number of value added services to its operation .These services includes packaging, bar coding, repair and inventory control. Table 3 present the evaluation of logistics center through different categories.

Table 3 : Evaluation of logistics center.

1960s - 1970s	**1980s – early 1990s**	**Mid 1990s - present**
		Materials management Distribution services (national/global)
	Bonding	Import clearance Bonding Inbound transportation
Receiving	Receiving	Receiving
	Cross-docking	Cross-docking
Storage	Storage	Storage Inventory management and control Shipment scheduling
Order processing Reporting Picking	Order processing EDI* Reporting Picking	Order processing EDI* Reporting Picking
Order assembly	Order assembly	(Product) subassembly

(Re) packaging	(Re) packaging Stretch-shrinkwrapping	Order assembly (Re) packaging Stretch-shrink-wrapping
Shipping Documentation	Shipping Documentation Outbound Transportation	Shipping Documentation Outbound Transportation Export documentation FTZ* operation JIT/ECR/QR* services Freight rate negotiation Carriers/route selection Freight claims handling Freight audit/payment Safety audits/reviews Regulatory compliance review Performance measurement Returns from customers Customer invoicing

Source: Ernst F. Bolten, Managing time and space in the modern warehousing, Amacom,1997.

2.5.2 Functions of logistics centres

Within the logistics center at port's hinterland, logistics companies are able to carry out the basic value added activities such as storage, as well as value added logistics service such as assembly, labelling, customizing and semi manufacturing. Logistic centers combine logistics and industrial activities effectively in the major port areas to create country specific products.

When logistics centres are grouped together in a common dedicated area, are mainly called Distripark. According to Larissa, Nijdams and Dumay (2007), Distripark is "*A defined area within which all activities relating to transport, logistics and the distribution of goods both for national and international and international transit, are carried out by various operators on a commercial basis* ".

Most of advanced ports are trying to become international business, logistics and distribution centers in order to achieve a sustainable competitive advantage by attracting value added services. The ports of Rotterdam and Singapore are examples of this kind of arrangement. The Distriparks in these ports are advanced and have a strategic location in

order to react to logistics demands like 'Just In Time' delivery at low costs. The value added activities, warehousing and distribution are the main activities that take place at these Distriparks. (Kuipers and Eenhuizen, 2004).

2.5.3 The Factors influencing the site selection of logistics centres

As the trends of globalization and liberalization have progressed, the cross border movement of capital and technologies has increased substantially, on both global and regional basis. To cope with trend many countries are accelerating their effort to attract foreign capital and technology. However, global firms base location decisions on many critical factors**.** The table below is a detail summary of factors influencing location of logistics center and its related features**.**

Table 4. The Factors influencing the site selection of logistics centres .

Factors	**Main Features**
Port infrastructure	• Adequacy of port facilities • Spaciousness of port area • Availability of feeder vessels
Land/Land prices	• Availability of land • Affordability of land prices • Low rental fees for land
Labour	• Availability of English speaking port workers • Availability of specialized technicians • Availability of trained or nor-trained technical labours • Labour costs in distribution center
Technology/Information	• Level of port information service • Supply of information infrastructure
Market factors	• Distance between port and hinterlands • Distance between port and major cities
Related industries	• Ease of access to parts and raw materials • Distance between port and industrial complex
Back-up city	• Existence of large consumer city behind port areas • Quality of workers in DC
Institutional factors	• Incentive programmes offered by host country • Simplicity, ease and efficiency of administrative procedures needed

	in operating distribution centres • Financial assistance in constructing distribution centres • Free trade system and related law provided by the host countries
Connecting transport System	• Airport access to provide speedy linkage between the distribution centre and major markets • Effective land transport system • Establishment of feeder service (hub and spoke system)

Source: UNESCAP report, 2005.

For the companies operating logistics centers, the most frequent cited features are mainly central and strategic location in relation to the market, highly skilled and productive labour force with exceptional work ethic, developed logistics and transport infrastructure and excellent connections to foreign market.

2.6 Summary

The function of port has been changed tremendously over the past 50 years. The chapter explained the concept of hub and spoke network and highlighted two main types of hub port. The first type is transhipment hub, which serves mainly transhipment activities, the second type is a Gateway hubs, which handle local and transhipment cargo .Moreover, the chapter has shown four different generations within the port industry. Each generation reflects the different approaches adopted by port operators in developing their activities through the past decades. The role of port has been changed from the traditional transport center into to complex industrial and logistics center. Now days, Modern ports are developing logistics centers in their hinterland to gain competitive advantages. The next chapter will provide an analysis to the Mediterranean ports.

Chapter 3 Mediterranean Region

The overall aim of Chapter 3 is to map the container market in the Mediterranean region. First it provides an overview of the Mediterranean container ports. Then the chapter presents the major ports in the region with analysis to their container traffic, characterises and future plans. Finally, it provides an analysis of cargo tarffic through the Suez Canal and the Mediterranean.

3.1 Introduction

During the 1990s, Far East Asian countries, especially China and India, have determined a shift in the worldwide maritime routes after establishing their roles as major global production areas and economic and financial markets, especially by increasing the rate of outsourcing of manufacturing capacity from mature industrialized countries (Medda and Carbonaro, 2007). Before the 1990s, routes were based on links between Far East Asia, North America and Northern Europe, and were characterized by an origin–destination (port-to-port) system Medda and Carbonaro, 2007). The new oceanic routes, known as pendulum routes, take in the Mediterranean basin through a system of hubs and spokes, whereby network feeders distribute the quotas of traffic around different destinations in the region (Medda and Carbonaro, 2007).

3.2 Mediterranean Sea

The Mediterranean Sea is a gateway of the major international trade routes, which links maritime traffic to the Atlantic through the Strait of Gibraltar, to the Black Sea through the Turkish Straits and to the Indian Ocean through the Suez Canal, (see figure 2). A large number of the largest container vessels regularly pass through the Mediterranean. The region counts for 15 % of global shipping activity by number of calls and 10 % by vessel deadweight tonnes (DWT) (LIyod's, 2008). In volume, 30% of the world sea borne trade originates or is directed to Mediterranean ports or passes through the Mediterranean (Euro-Med report, 2008). Most of this trade takes place between the entire Europe, Asia and the Middle East.

Figure 2: Major shipping routes.

Source: Euro-Mediterranean Network of Investment Promotion Agencies (ANIMA), 2005.

3.3 Container ports in the Mediterranean

Over the years, the growth in the Mediterranean container port markets has been truly dynamic. This has been driven by the increase in containerization of maritime transport, the globalisation of the world economy, the changes in the operational strategies adopted by big shipping lines - such as transhipment activity - and the introduction of much larger vessels into deep sea trades (Ocean Shipping Consultants Ltd report, 2006). In 2009, the world container throughput was about 450 million TEU and it was estimated that Mediterranean ports accounts for more than 10 % of total number (Euro Med report, 2010). Overall vessel activity within the Mediterranean has been rising steadily over the past 10 years (Lloyd's report, 2008). To cope with this increase, Mediterranean Ports are creating additional capacity, increasing efficiency and attracting private sector involvement into port operations (Lawrence Henesey, 2006).

Twenty two countries in total surround the Mediterranean Sea. There are 480 ports and terminals in the region with recorded ship movements (Lloyd's report, 2008). In 2009, the country that handled the largest volume of containers in the region was Spain (10,192,642 TEU), followed by Italy (9,532,407 TEU), and then Egypt (6,249,668 TEU). The table below presents the largest five countries in container throughput in Mediterranean region.

Table 5:Top Mediterranean countries throughput capacity .

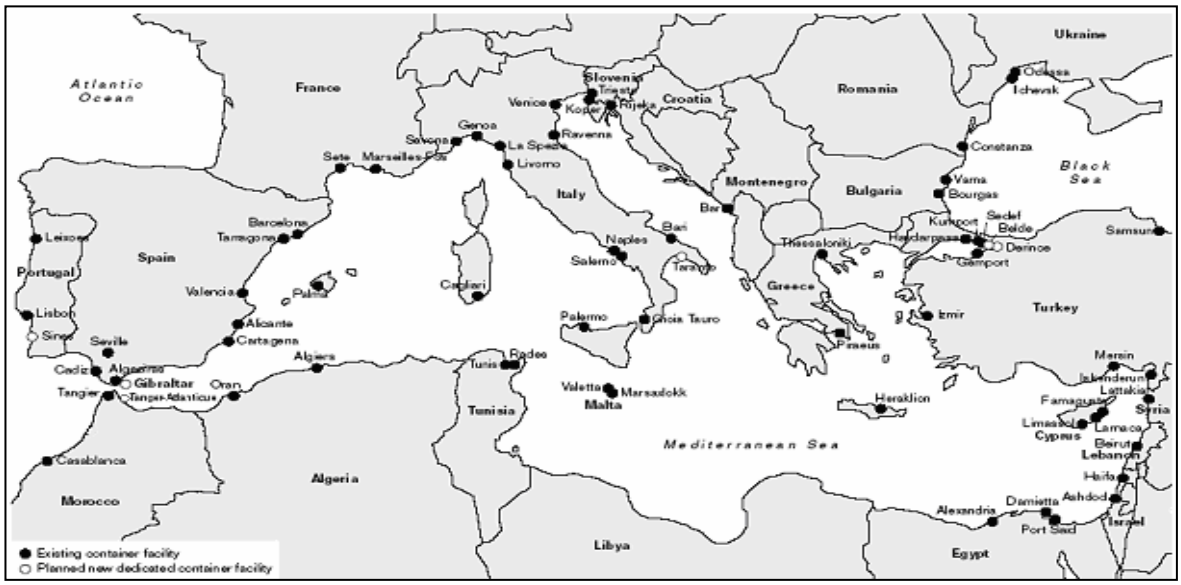
Med Rank 2009	country	TEU	World Rank
1	Spain	10,192,642	11
2	Italy	9,532,407	14
3	Egypt	6,249,668	17
4	Turkey	4,521,713	24
5	France	4,490,583	25

Source: data collected from international containerization year book, 2011.

3.2.1 Container ports volume

Within the Mediterranean region, container ports can be divided geographically into three part East ,West and Central Mediterranean .The main container ports in the Eastern Mediterranean are : Port Said East and West (Egypt) , Piraeus (Greece) , Istanbul and Izmir (Turkey) , Haifa (Israel) , while the main ports in Western Mediterranean are : Algeciras , Barcelona and Valencia (Spain) . In central Mediterranean the main ports are Gioia Tauro (Italy) Marrsaxlokk (Malta). Around 20 per cent of Mediterranean ports are in the Eastern Mediterranean, compared with 80 per cent in the West and Central Mediterranean (Lloyd's report, 2008). Figure 3 presents a map of the Mediterranean illustrating the largest ports in the area.

Figure 3: Ports in the Mediterranean region.



Source: Drewry Shipping Consultants Ltd.

Using the 2009 data, the port with the largest handling volume is Valencia (Spain) with 3653,890 TEU, followed by Algeciras (Spain) with 3,042,759 and then Gioia Tauro (Italy) with 2,857440 TEU. The table below shows the container throughputs of the major Mediterranean ports.

Table 6: Container throughput of the major Meditterranean ports in 2009.

Med Rank 2009	Port	Country	TEU 2009
1	**Valencia**	**Spain**	**3,653,890**
2	**Algeciras**	**Spain**	**3,042,759**
3	**Gioia Tauro**	**Italy**	**2,857,440**
4	**Port Said**	**Egypt**	**2,700,000**
5	**Marsaxlokk**	**Malta**	**2,260,000**
6	**Ambarli**	**Turkey**	**1836,030**
7	**Barcelona**	**Spain**	**1,800,213**
8	**Genoa**	**Italy**	**1,533,627**
9	**Damietta**	**Egypt**	**1,213,187**
10	**Haifa**	**Israel**	**1,140,000**

Source: Data collected from international containerization year book, 2011.

Table 6, presents the container throughput of the largest ten ports in the Mediterranean region. Some of these ports are mainly operating container transhipment operations, with a transhipment amount of 75% or more (i.e. Port Said, Algeciras, Gioia Tauro, Marsaxlok,

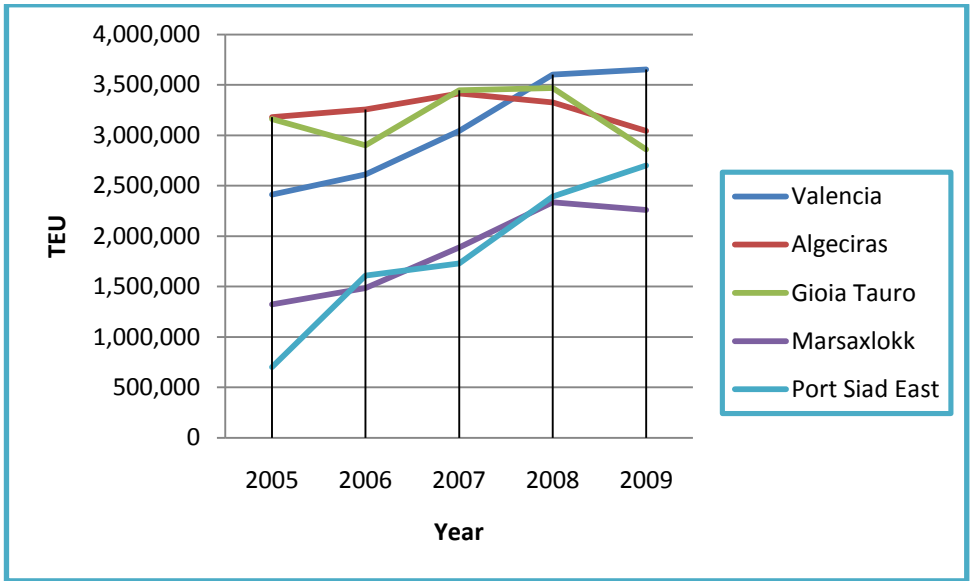
Damietta), while other ports can be considered as almost pure gateways ports serving hinterland (i.e. Valencia, Barcelona, Genoa).

The majority of the top ten Mediterranean ports were in East and central Meditterrean. This is due to the new trend for large container ships on the mainline east- west routes to call directly at the ports in the east and central Meditterrean whose trade was previously transhipped from ports in the west meditterrean (Lloyd's report, 2008).

3.2.2 Trends in container throughput

Most of the major container ports in the region have witnessed an increase in their volumes over the period 2005 - 2009. Figure 4 presents the container traffic of the major ports in the region from 2005 to 2009.

Figure 4: The first five ports in the Mediterranean for traffic TEU.



Source: Based on data collected from international containerization year book,2011.

In this figure, except for Valencia, all ports are mainly operating container transhipment operation. Before the economic crisis most ports had experienced tremendous increase in thier traffic. In this period, Port Said East, Valencia, Marsaxlokk and Gioia Tauro showed an increase of 27 %, 23 %, 18 % and 2 % respectively. The effect of the economic crisis is visible in the negative growth rates recorded by the majority of the ports. Only two ports in the top 5 were able to show an increase of their activity between 2008 and 2009, Port Said East and Valencia with 11% and 1.5 % respectively. Gioia Taura had a drop of 17 % from

2007 to 2009. This trend was a direct consequence of Gioia Tauro losing its share of transhipment to Port Said East. The reason for this decline was that many containers handled by Maresk line - one of the biggest shipping companies- were shifted from Giaio Tauro to Port Said East (2010).As we can see from figure 4 , Port Said East had the highest increase in its volumes over the period 2005 – 2009 with 285%. Other port with a strong increase was Marasxlokk (Malta) with 40 %. Table 7 illustrates the percentage change in the container throughput of the major five ports in the Mediterranean over the period 2005 – 2009.

Table 7: The percentage change in container port throughput (2005 – 2009).

Port	% change of container throughput (2005 - 2009)
Valencia	**+ 51 %**
Port said	**+285 %**
Algeciras	**- 5 %**
Gioa tora	**- 10 %**
Marasxlokk	**+ 70 %**

Source: self calculations based on data collected from international containerization yearbooks 2011, 2010, 2009, 2008.

Table 7 shows that the by far Port said east port had highest growth rate over this period (+285 %). If these growth rates prevail, Port Said can become the first Mediterranean port within few years. These different trends in growth among the major Mediterranean ports results from the specific management and control of the port as well the port's characteristics. The next paragraph will highlight the main characteristics that can influence the growth of the ports in the region.

3.2.3 Port characteristics

According to Medda and Carbonaro (2007), the introduction of bigger ships has forced shipping lines to examine ports from different operational points of view, mainly the physical characteristics of the ports such as draft, length, area dedicated for containers and their logistic systems as well as their distance from the pendulum route from the Suez Canal to Gibraltar. The combination of these elements with the strategies of the shipping lines has determined the rise of certain ports rather than others (Table 8).

Table 8: Characteristics of the main ports in the Mediterranean.

Port	Container terminal	Deviation from the Suez – Gibraltar route (nautical miles)	Maximum of Draught (meter)	Berths (meter)	Open Storage Area (TEU)
Gioia Tauro	Med center	66	18	3,011	2,409,000
Algeciras	APM	0	16	1,534	1193000
	Isla verda	0	14.5	1,324	54000
Marsaxlokk	Terminal 1	6	15,5	2,360	800,00
	Terminal 2	6	15.5	3,201	1,06,000
Valencia	Del Turia	250	15	2,635	778,000
	Muelle	250	12	3,564	1,114,000
	Valencia Public	250	16	3,700	1,190,000
Port Said	SCCT	0	14,5	1,200	960,000

Source: Data is collected from the ports official web sites and WCTR report(2010).

The growth of Mediterranean container ports will depend on their ability to keep pace with the equipment and depth at berth required to safely accept large ships. According to Euro - Meditterrean report (2008), a draught of about 15 metres enables ports to accommodate Post Panamax ships such as the Sovereign Maersk (8.400 TEU) that require a draught of 14 meters. However, a draught of 17 meters enables ports to handle the future ULCSs, such as Super Post Panamax /Suezmax (12,000 TEU). Moreover, the largest ships designed so far (Malacca-max-18.154 TEU) which need 21 metres draught a depth of 16 meters should accommodate the ship . As we can see from the table that most of container terminal in the major port have suffiecient depth to handle large vessels.

Another important factor that can affect the growth of the Mediterranean container ports - particularly those currently used as hubs for transhipment - is their deviation from the main trade route that directly crosses the Mediterranean from Suez to Gibraltar (Alga D. Foschi, 2003). If fuel prices continue to increase, it could be a cost incentive for carriers to minimise deviation of their large vessels from the main east - west navigation route between the Suez Canal and Gibraltar (Euro Med, 2008). We can see from the previous that Port Said and Algecries require zero deviation from the main trade route.

3.2.4 Mediterranean Ports future Developments

Most of the main container ports in the Mediterranean have development or expansion plans in order to cope with containership growth and operator requirements. The section below show the plans of the major container ports in the Mediterranean. It should be noted that ports will to some degree be competing for the same traffic, particularly in the transhipment sector. Due to competitive pressures, development of port infrastructure does not necessarily guarantee that additional capacity will be fully utilised at all ports.

- **Valencia**

  The port is currently expanding to be able to handle an extra of 4 million TEU.

- **Algeciras**

  A new terminal was developed in the port in August 2010. The new Total Terminal International Algeciras (TTIA), is owned and built by the South Korean group, T Hanjin Shipping company. The terminal has two quay lines of 550 m and 650 m and will increase capacity in the port by 1.5 million TEU (Algeciras Port Authority).

- **Giaio Tauro**

  The port recently completed a 70 meter canal enlargement. New quay with a draft of 16 meter is under construction.

- **Marsaxlokk**

  The port is constructing a new terminal with a capacity of 3.7 million and it is planned to be in operation by 2015. Moreover, the port is constructing a new railway station. In addition, the port is upgrading terminal two to be able to serve post – panamax vessels (www.porteconimices.eu).

The future developments for port said east will be explained in detatis in chapter 4. The next section will provide an analysis the flow of cargo via Suez Canal.

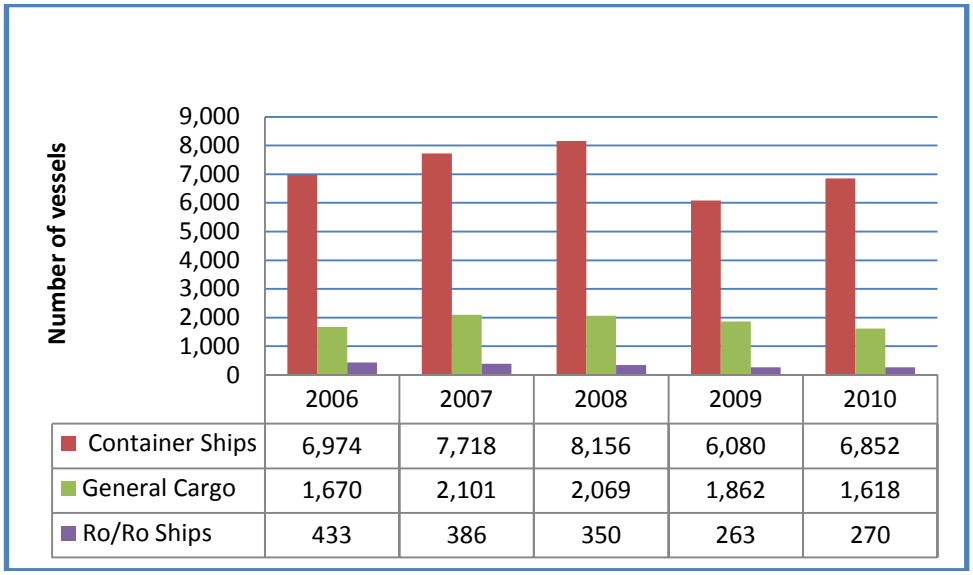
3.3 Review of cargo flow via Suez Canal

The routes through the Suez Canal and the Mediterranean are very important. The Suez Canal is the shortest trade route between Asia and Europe and between Asia and the east coast of the United States. Approximately 15 percent of the world containerized flow of goods passes through the canal. Virtually all of the Asia-Europe/Mediterranean (AE) container trade transits the Suez Canal. The AE trade comprises 40.6 % of the major East-West trade TEU volumes, second only to the 44.4 % contribution of the transpacific trade (CIMB Research, 2011). In a single flow , almost 12 million TEU on the Asia - Europe route and about 6 million TEUs on the Europe- Asia route in the year 2009 (Container Trade Statistics report,2009).

3.3.1 Cargo Vessels

According to Suez Canal Authority, 17993 vessels made full transits through the two directions of the canal in 2010, against 17228 vessels in 2009, registering an increase of 4.4 %. The number of container ships was 6852 with an increase of 11 % from the previous year and 1618 of general cargo with a decrease of 15 % and 270 Ro-Ro ships with a slight increase of 3 % (Suez Canal Authority report, 2010). The number of vessels passing through the Suez Canal over the period 2006 -2010 is presented in the figure below.

Figure 5: The types of vessels via Suez Canal 2006 – 2010).



	2006	2007	2008	2009	2010
Container Ships	6,974	7,718	8,156	6,080	6,852
General Cargo	1,670	2,101	2,069	1,862	1,618
Ro/Ro Ships	433	386	350	263	270

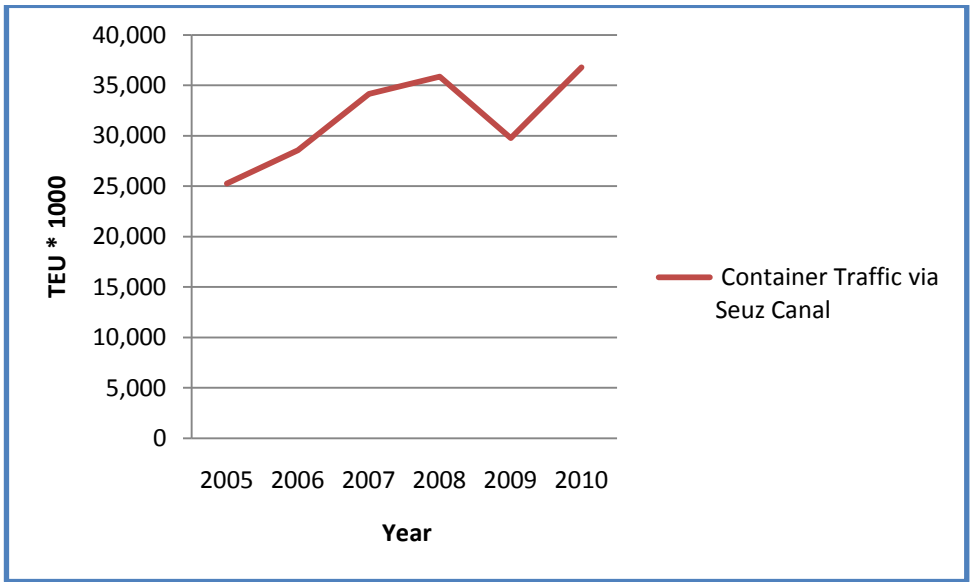
Source: Data collected from Suez Canal web site.

As shown in the figure, the main vessels to use the canal are container ships, accounting for 38% of the total number of vessels passing through the canal in 2010 .There was a growth in the number of Container and General Cargo ships between 2006 and 2008 by 15 % and 19 % respectively. Although there was a decline in numbers for all types of ships passing throught the canal due to the economic crisis in 2009 , the numbers from 2010 shows that there is a potential increase in the number of vessels passing through Suez Canal in the next years.

3.3.2 Container Traffic

Over the past years, container traffic through Suez Canal had steadily increased each year, until the beginning of the 2008 - 2009 global financial crises. Container traffic through Suez Canal in 2009 has suffered an unexpected 17 % drop, due to the economic slowdown and a decline in world trade. However, the traffic has recovered in 2010 and increased by 19 %. Figure 4 below illustrates the container traffic over the period 2005 - 2010.

Figure 6: The container traffic via Suez Canal 2005 – 2010.



Source: Data collected from Suez Canal official web site

As shown in the figure, container traffic through Suez Canal was increasing each year over the period 2005 – 2009, except for the decline in 2009.With the increase in the container traffic, Suez Canal's share of world trade traffic has been also increasing over the same period. The world trade container traffic increased from 106 million TEU in 2005 to 137 million in 2010. At the same time, the market share of Suez Canal has also increased from 23.8 % to 26.3 % . The market share of Suez Canal from the world trade traffic over the period (2005 – 2010) is presented in the table below .

Table 9 : The container traffic in the world and Suez canal.

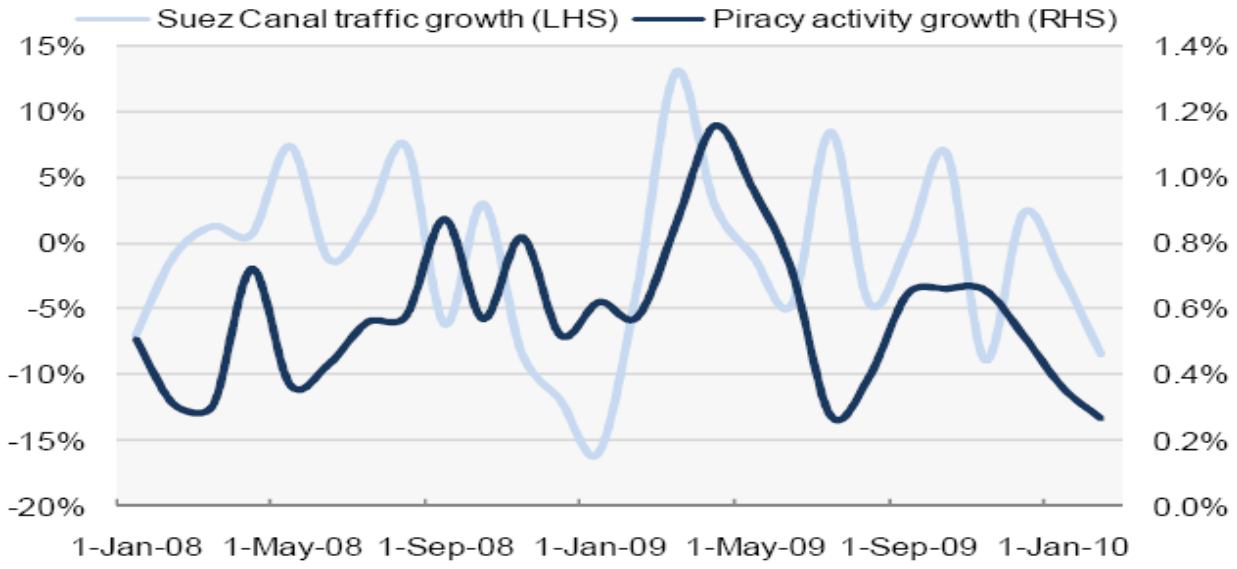
Year	**World Trade (TEU *1000)**	**Trade via Suez canal (TEU* 1000)**	**% of Suez to the world**
2005	106,000	25,257	23.8 %
2006	117,000	28,552	24.4 %
2007	129,000	34,140	26.4 %
2008	138,000	35,845	26 %
2009	122,000	29,767	23.7 %
*2010	135,000	36,774	26.3 %

*Source: Data is collected from Suez Canal Authority reports (2009, 2008, 2007, 2006, 2005) &World trade . *The number of world trade TEU in 2010 is based on* the annual growth rate of the year.

Table 9 shows the ratio of container traffic in Suez Canal to the world container traffic over the last five years. Before the economic crisis, Suez Canal had continues increase in its market share from year to another. Traffic share grew from 23 .8 % in 2005 to 26.4% in 2007. It can be argued that the growth in international trade and demand for products and containerisation had lead to an increase in the number of container vessels passing through the Suez Canal. However, the effect of the economic crisis is visible in the reduction of the market share in 2008 and 2009. In 2010 the share of the Suez Canal increase by 3 % and reached to 26.3 %.

Increasing frequent acts of piracy off the coast of Somalia- the main portal to Suez canal- are the major challenge facing international maritime trade. The greatest risk is that these kind of activities have resulted in some ship owners have considering rerouting their vessels via the Cape of a Good Hope. The impact of the pirates' activities on the Suez Canal is illustrated in the figure below.

Figure 7 : Privacy activity vs Suez canal traffic



Source : IMO and CICR data base

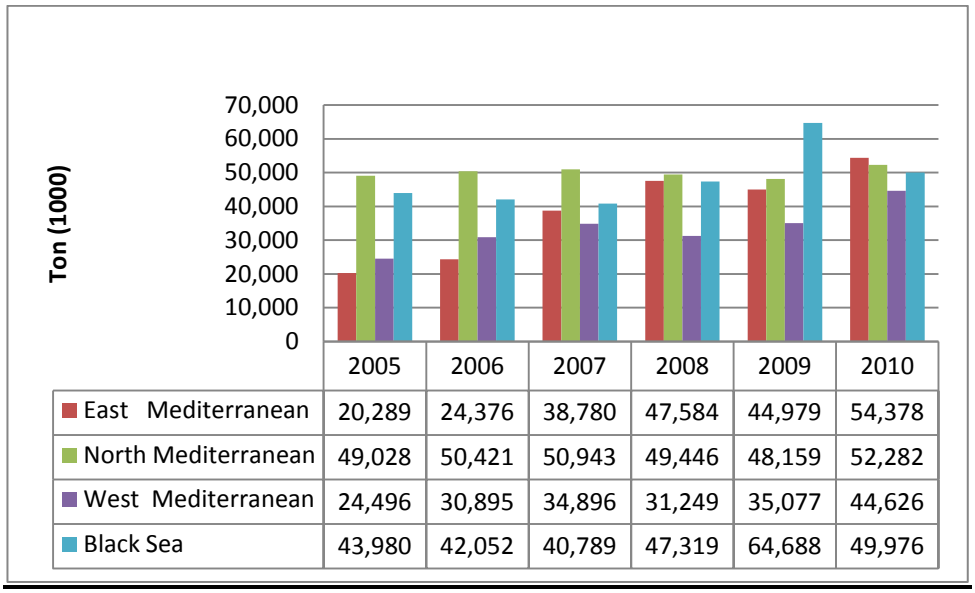
As shown in the figure, the impact of piracy activities has been minimal until now. The Suez Canal Authority has also declared that piracy in not at all a problem to the vessels using the Suez Canal.

3.3.3 Cargo Traffic

In 2010, transiting cargo traffic showed an increase of 15 % compared to 2009 with a total of 86.8 million tons. The Southbound cargo traffic was 22.7 million tons with an increase of 7.7 % from 2009.The northbound cargo traffic was 64.1 million tons with a growth of 24.3 % (Suez Canal Authority report, 2010). The most important areas for delivering cargo in the north traffic of the canal were; North and West Europe with 31 % and then East and South East Mediterranean with 19 %. The main area for delivering cargo in the south traffic was South East Asia with 31.4 % share

3.3.4 Cargo Ton by Region

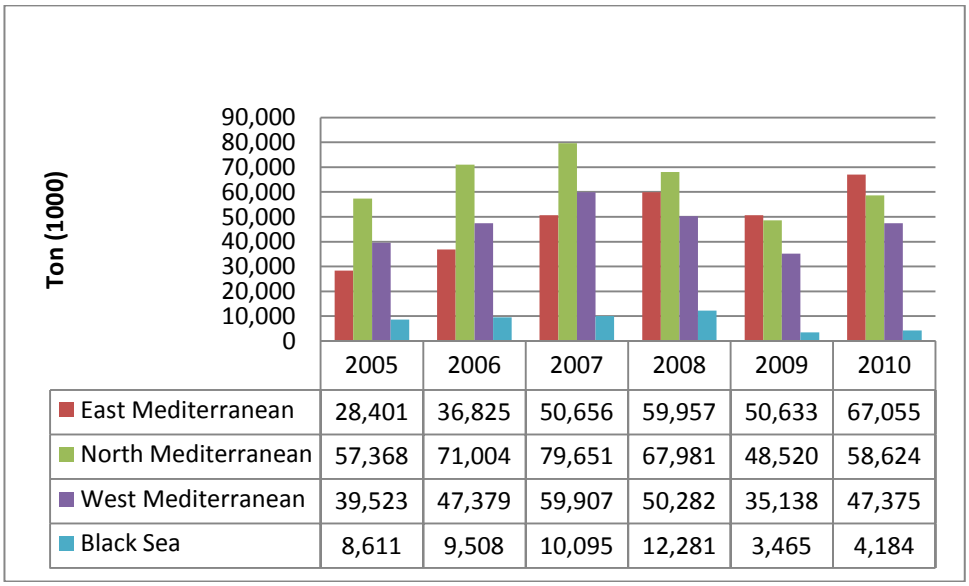
Figure 8 : The origin of North /south cargo (2006 – 2010).



	2005	2006	2007	2008	2009	2010
East Mediterranean	20,289	24,376	38,780	47,584	44,979	54,378
North Mediterranean	49,028	50,421	50,943	49,446	48,159	52,282
West Mediterranean	24,496	30,895	34,896	31,249	35,077	44,626
Black Sea	43,980	42,052	40,789	47,319	64,688	49,976

Source: Data collected from Suez Canal official web site

Figure 9 : The destination of South /North cargo (2006 – 2010).



	2005	2006	2007	2008	2009	2010
East Mediterranean	28,401	36,825	50,656	59,957	50,633	67,055
North Mediterranean	57,368	71,004	79,651	67,981	48,520	58,624
West Mediterranean	39,523	47,379	59,907	50,282	35,138	47,375
Black Sea	8,611	9,508	10,095	12,281	3,465	4,184

Source : Data collected from Suez Canal web site

Over the period of 2006-2010, the East Mediterranean has gained market share and increased by 58 %. This derived from expansion of the Turkish container port and rapid growth of Port Said east port. . Although the growth in the North and West Mediterranean was held back by economic crises in 2009 and declined by 40% and 43 % respectively, there was an increase of 17 % and 25 % in 2010.

3.4 Summary

The Mediterranean Sea is a gateway of the major international trade routes. Over the years, the growth in the Mediterranean container port markets has been truly dynamic. Within the region, container ports can be divided geographically into three parts East, West and Central Mediterranean. Most ports in top 5 are mainly operating container transhipment operations and most of them have witnessed an increase in their volumes over the period 2005 – 2009. During this period, Port Said East port had the highest growth rate. All of the major ports have development or expansion plans in order to cope with containership growth and operator requirements. Over the past five years, container traffic through Suez Canal had steadily increased each year, until the beginning of the 2008 - 2009 global financial crises. With the increase in the container traffic, Suez Canal's share of world trade traffic has been also growing.

Chapter 4 Port Said East port

The overall aim of chapter 4 is to present the case study of the thesis which is Port Said East port. The first section of the chapter provides a brief overview of the main Egyptian ports. The chapter goes on to provide a description of Port Said East port. It investigates the current situation of the port which includes the port infrastructures, performance and future developemnts. Furthermore, the chapter explores the future master plan of the port. The chapter is ended by presenting a SWOT analysis of the port, identifying the main strengths, weakness, threats and opportunities.

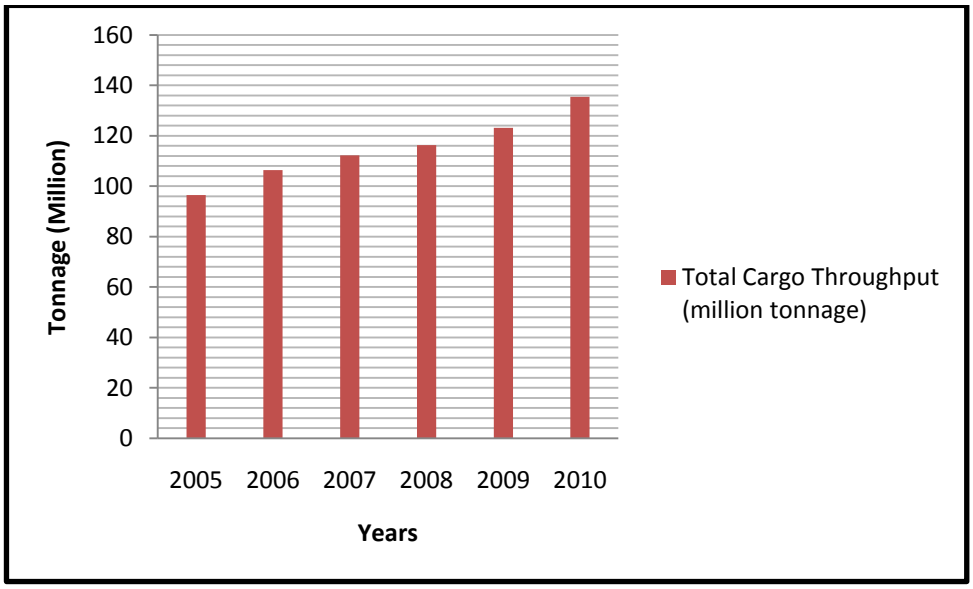
4.1 Overview of the Egyptian ports

Egypt is a maritime county that has a strategic location between the three continents Europe, Asia and Africa. The country coastlines comprise more than 3000 km along the Mediterranean and the Red Sea. With over 10 % of the world's maritime shipping passing through the Suez Canal each year, Egypt became an important point of shipping activities with potential to play a vital role in regional and global trade.

Maritime transport and related logistics services are important elements in Egypt's economy. About 90% of Egypt's foreign trade is shipped through ports (MTS report, 2010), while the country's logistics capacity continues to expand hand-in-hand with the volume of trade.

The Egyptian ports achieved a significant increase in the total cargo throughput in the last five years (see figure 10). According to EMDB report (2011), Egyptian ports handled around 135.3 million tons in 2010 compared to 96.3 million tons in 2005, achieving a growth rate up to 40 %.

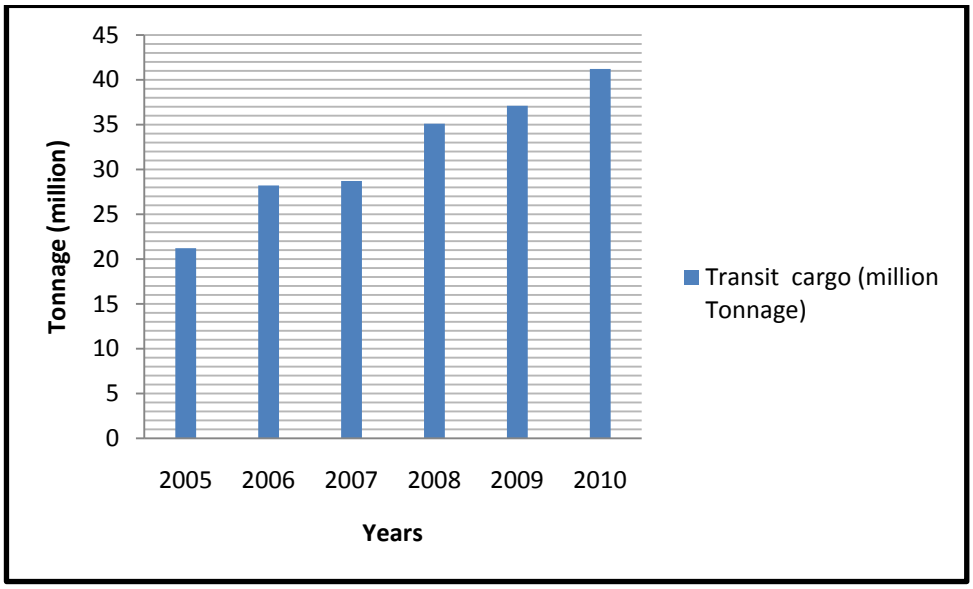
Figure 10: The Total cargo throughput of the Egyptian ports (2005 – 2010).



Source: Data collect from Egyptian Maritime Data Bank.

As show in the figure, Egyptian ports are achieving positive growth rates from one year to the other. These growth rates are due to the increase of local and transit container handling. The transit cargo represented 30 % of the total cargo. The growth of the transit values is illustrated in figure 11 .

Figure 11: The total transit cargo in Egyptian ports (2005 - 2010).

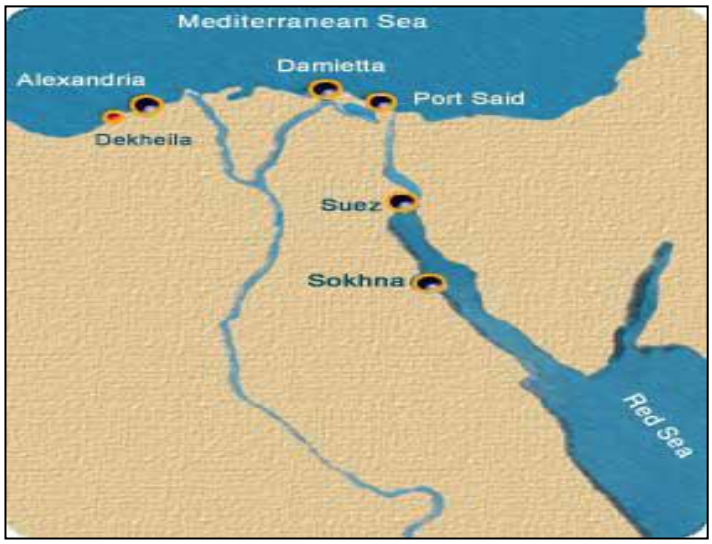


Source: Data collect from the Egyptian Maritime Data Bank.

Egyptian ports achieved a successive increase in the volume of transit cargo in the last five years. According to EMDB report (2011), transit cargo reached to 41.2 million ton in 2010 compared to 37.1 million ton in 2009 with an increase of 11 % and an increase up to 5.8% in 2009 compared to 2008 and 21.2% in 2008 compared to 2007, which is an important indicator that Egyptian ports occupies an important position in the region and also a proof of the development of the transit cargo throughput in the ports.

There are 41 ports in Egypt divided into commercial, Petroleum, Ore, and Fishing and Touristic ports. The most important international ports with respect to the container traffic are Alexandria, Dekhelle, Damietta, Port Said West, Port Said East (located on the Mediterranean Sea), and Sokhna (located on the red sea), see (figure 12) .

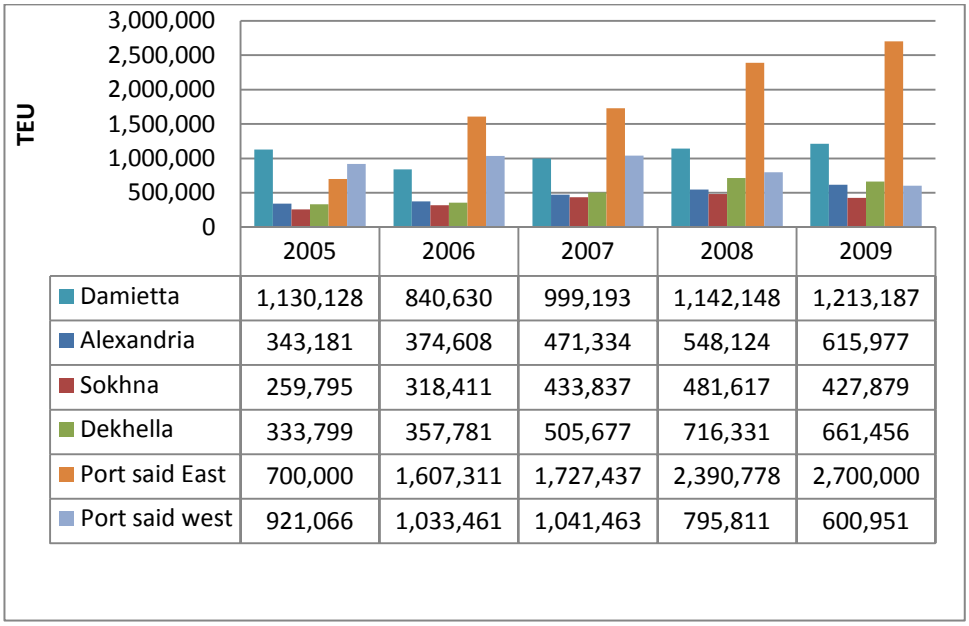
Figure 12: The major ports in Egypt.



Source : Web site of Egyptian Maritime Transport Sector (www.mts.gov.eg).

All of these major ports are stated owned except for Port Said East and Skhona. In 2009, they handled a total of 6.2 million TEU representing 90 % of the total number of containers handled by all Egyptian ports . Figure 13 presents the container throughput of major ports in Egypt from 2005 to 2009.

Figure 13. The container throughput of the major ports in Egypt.



	2005	2006	2007	2008	2009
Damietta	1,130,128	840,630	999,193	1,142,148	1,213,187
Alexandria	343,181	374,608	471,334	548,124	615,977
Sokhna	259,795	318,411	433,837	481,617	427,879
Dekhella	333,799	357,781	505,677	716,331	661,456
Port said East	700,000	1,607,311	1,727,437	2,390,778	2,700,000
Port said west	921,066	1,033,461	1,041,463	795,811	600,951

Source: data collect from the Egyptian Maritime Data Bank.

Figure 13, shows the growth of the container throughput of the major ports in Egypt over the period 2005 – 2009. Port Said East port had the highest growth in 2009 with 2.7 million TEU representing 45 % of the total container throughput. As shown in the figure, *all* ports have a positive trend in container throughput except for Port Said west which had a decline of 35% over the same period. The rson for this is that the potential expansion at the port of Port Said West is restricted by lack of space, a limited waterfront and the passage of the entrance channel to the Suez Canal directly through the port (Zachcial, 2006). As a consequence many companies have shifted their cargo to Port Said East.

In the next section, the chapter presents the Port Said East port.

4.2 Port Said East Port

4.2.1- Development of the port

In 1998, the Egyptian government has started the development of Free Zone area east of Suez Canal. The project compromises the construction of hub port and industrial free zone. The design of the port was 35 km^2, and includes about 12 $km^2$of quay walls with associated container and general cargo terminals. The industrial free zone was designed with 86.7 km^2 with the objective to develop export oriented industries.

The objective of constructing the port was to serve for import and export activities of the industrial free zone and to meet the expected growth of the Egyptian economy. Furthermore, to gain from the port unique geographical position's which can attract large quantities of transhipment captive cargo since most of the international trade between the East and the West have to pass through the Suez Canal (Port Said Authority).

4.2.2 Port Location

The port is located at the Northern entrance of the Suez Canal, at the confluence of three continents and at the crossroad of the most important world sea trade route between the East and the west .The port is bordered from the North by the Mediterranean Sea, from South by the industrial zone, from East by El Malaha Lake, and from the Western border of Suez Canal inside the frontiers of Port Said Province.

Port Said Province is located in north east of Egypt extending about 30 km along the coast of the Mediterranean Sea. It is located 200 km away from Cairo (capital of Egypt) and 220 km away from Alexandria the second largest city in Egypt. The total population of Port Said is about 5.7 million representing 7 % of Egypt's total population.

4.2.3 - Port Specifications

The specification of the port is listed in the table below.

Table 10 : Port Specification

Total Area	35 sq. km (35.000.000 m^2)
Water Area	1.5 sq. km (1.500.000 m^2)
Land Area	33.5 sq. km (33.500.000 m^2)
Total Customs Zone	33.5 sq. km (33.500.000 m^2)
Total Yards Area	0.6 sq. km (600.000 m^2).
Maximum Port Length	10 km (western port boundary)
Maximum Port Width	8 km (southern boundary)

Source: Port said East port web site

4.3 Port connection with hinterland

An integral component of the ports facilities is its access to road and rail services. The port is connected to the state's main network, railways and infrastructure. It's linked with the Coastal International Highway through Port Said / Ismailia desert road and El-Salam International Bridge passing through Suez Canal. The port area is also accessed through el Qantara Sharek EL Arish high way bordering the project area from the south. It is a two way double lane and stretches to 200 km. Moreover, the port is connected with the Egyptian national railway, Ismalia, Al Arish, and the rest of Egyptian cities. The Suez Canal ferry boats connect the east bank to west bank. In addition, the port is located about 10 km away from by Port Said Airport.

4.4 Container Terminal

In 1999, Suez Canal Container Terminal (SCCT) has signed a 47-year concession agreement with Port Said port Authority to build and operate the container terminal at the port. The Terminal has started operation in 2004 and now it is the largest container terminal in Egypt and the fourth in the Mediterranean region. The terminal provides services to major shipping lines such as Maersk Line, Hanjin, CMA-CGM, K-Line COSCO, and Yang Ming.

SCCT is an Egyptian joint venture company between private and public local and international investors .The majority shareholder of the terminal is APM Terminals (55 %), a leading global container terminal owner and operator with over 50 container terminals covering 31 countries and serving approximately 60 shipping lines (www.apmterminal.com).

The main markets for The Suez Canal Container Terminal (SCCT) are: East Mediterranean region (Cyprus, Turkey Jordan, Lebanon, Israel, and Syria), central Mediterranean region (Greece, Italy, Slovenia, Croatia) and Black Sea region, as well as North Africa (Egypt, Libya, Algeria).

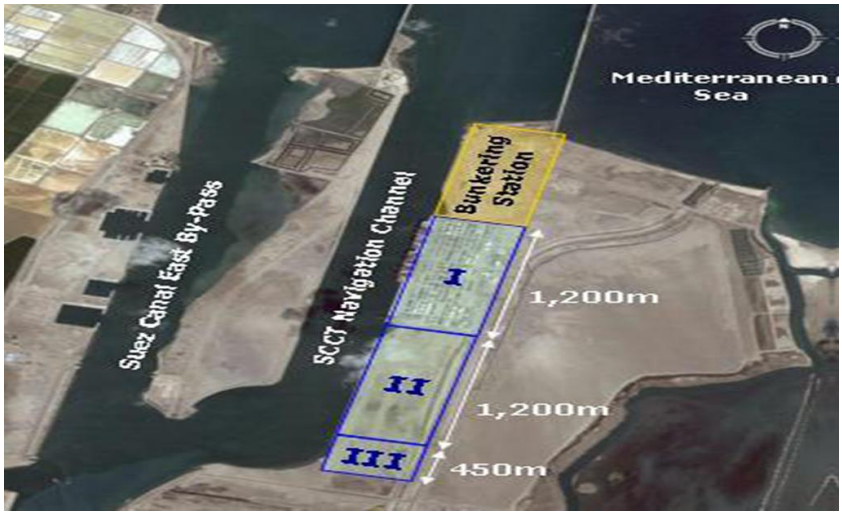
4.4.1 Phase One

Phase one has quay length of 1,200 meters and an overall area of 60 hectares. The Terminal consists of 4 berths with 12 Super Post Panamax Cranes and 1655 refer plugs. The water draft is 14.5 m and Terminal capacity is 2.7 million TEU. Moreover, the number of employees is 1350 and Total investments of the terminal were about 240 mills USD. The port operates 24 hours per day, possesses modern handling facilities and adopts up-to-date customs EDI and vessel traffic management system.

4.5 Future developments

To accommodate increasing traffic, port adapt by increasing the size of their operations and by increasing the efficiency of their existing space. In 2007, (SCCT) has signed a Concession Agreement with the port authority to build and operate a second phase (Phase II) of the container terminal 1. Phase II is scheduled to be in operation by the end of 2012. It will add four more berths to reach a total of 8 berths in the terminal (figure 14).

Figure 14: The development plan of SCCT Terminal



Source: presentation by Suez Canal Container terminal

The expansion of phase II will increase the Terminal Area from 1,200 m^2 to 1,200,000 m^2 and it will increase annual capacity from 2.7 million TEUs to 5.4 million TEUs, making it the largest container terminal in the Mediterranean Sea in 2012. In addition to expansion works, a dredging project at the port will give the terminal an increased draught of 17m, allowing it to accommodate the larger class of container vessels now being launched. A total of 24 super post Panamax cranes will also be delivered to the terminal, ensuring that it has the most efficient unloading technology. The expanded terminal will have an annual capacity of 5.4mn twenty-foot equivalent units (TEUs).The total investments for Phase II are considered to be around 730Mills USD. Table presents the development of the two phase of the container terminal. Table 4.2 summarize the expansion projects in the terminal.

Table 11 .The description of Phase 1 and 2 of the container terminal

	Phase I	Phase I + II
Berth number	1,2,3,4	1,2,3,4,5,6,7,8
No of cranes	12 Super Post Panamax Cranes	24 Super Post Panamax Cranes
Quay length	1200 m	2400
Draft	14.5 m	15.5 m
Terminal capacity	2.7 million TEU s	5.4 million TEUs
Terminal Area	600,000 sqm	1,200,200 sqm
Reefer plugs	1655 plugs	2300 - 2500 plugs
Total investments	240 million USD	730 million USD

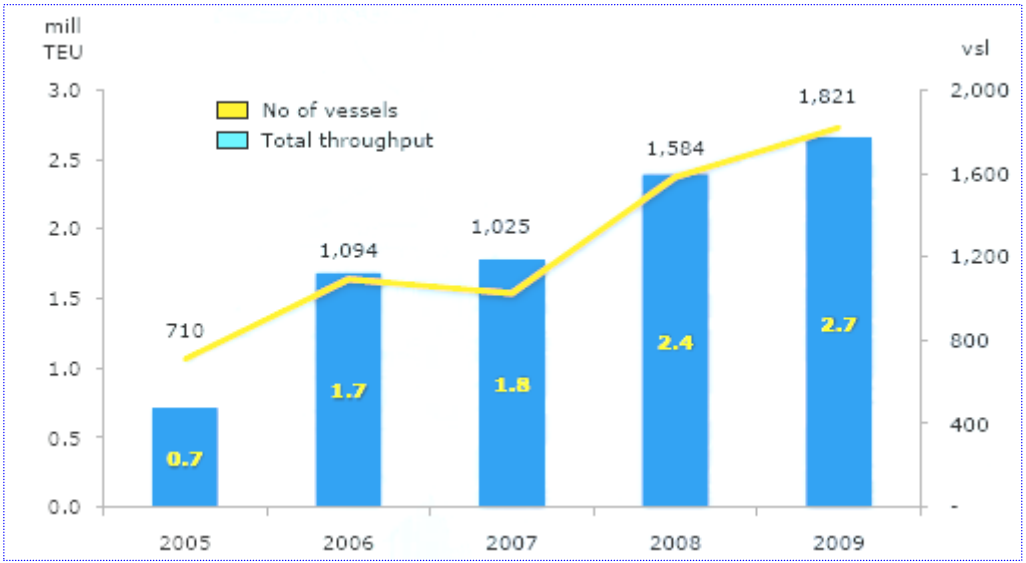
Source: based on own data collection.

To be competitive, a port must be able not only to accommodate larger ships, but also have quick access to intermodal transportation to deliver cargo from incoming ships to the market or to deliver goods to the ship for export. As a consequence, a railway line connecting the port with Cairo (capital of Egypt) is under construction.

In addition to these developments, the port authority is proposing a new entrance channel to the Suez Canal, in order to ease access to port from the Mediterranean Sea. At present, entry to and exit from the port is restricted for some hours of the day as the convoys pass through the old canal entrance and a subsequent bypass, see the pervious (figure 11). The work for the project has started in 2010 and it is planned to be operational in 2012. The channel will meet the requirements of the latest generation of containerships, with draughts of up to 15 m.

4.6 Container Traffic volume

Figure 15: The container throughput of Port Said east port over the period (2005 - 2009).



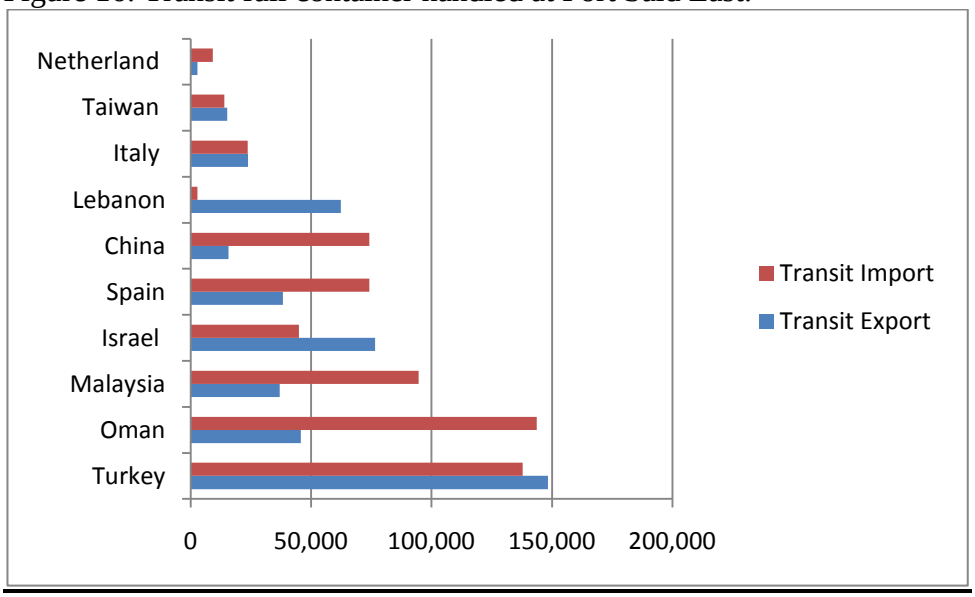
Source: presentation by Suez Canal container terminal.

As shown in the figure, there was a continuous growth of container throughput over the period 2005 to 2009. An explanation for this could be that SCCT has invested in the container terminal that was commenced in 2004. This terminal was equipped to handle containers efficiently and could therefore be a factor in the continuous growing container traffic volumes .In 2006, SCCT recorded an amazing growth and reached to 1.7 million TEU only after two years of operations. In 2007, there was a drop in the number of vessels visiting the port by 6 %, but at the same time throughput increased by 58 % and reach to 1.8 million TEU. In 2008, SCCT throughput increased by 33 % and reached to 2.4 million TEUs and this was due to the increase in the transit cargo traded at the port. Despite the economic crisis in 2009 that had declined overall global container throughput by approximately 10%, and had reduced the total number of vessels transiting the Suez Canal by 20%. SCCT has reported growth of 11% to a record 2.7 million TEU. The number of vessels that visited the port that year was up to 1821 vessels compared to 1584 vessels in 2008 with an increase of 14 % .In 2010, container throughput increased by 5 % and brought total volume to 2.8 million TEUs (Suez Canal container terminal).

4.6.2 Transit Container

In 2010, the total number of transit full container handled at the port was 836481 TEUs (Transit export) and 837307 TEUs (transit import). The total number of local export was 29193 TEUs and local import was 6097 TEUs. The origin and destination of transit cargo is shown in figure 16.

Figure 16: Transit full container handled at Port Said East.



Source: data collected from Suez Canal container terminal.

Figure 16 shows the main destination of the transit cargo handled at the port in 2010.The main transhipment market for SCCT is the East Meditterrean. Turkey had the highest export transit cargo, while Oman had the highest transit import.

4.6.3 Performance

The number of containers handled is affected by the quality and quantity of support infrastructure provided at the terminal such as the number of container berths and gantry cranes. The gross crane productivity is related to crane moves per hour. The port has achieved impressive productivity in 2009 and 2010 (figure 17). The gross crane productivity has an average of 35.83 moves per hour per crane for mainliners and an average of 35.8 moves per hour per crane for feeders. The standard gross crane moves is from 27 to 30 moves per hour. In 2010, the total number of the arrived vessels at the port was 1796 vessels. The average rate of vessel‘s staying at the port was 0.7 day for container Vessels and 1.2 day for General cargo vessels.

Figure 17 : Gross crane Productivity 2009-2010

Source : data collected Suez canal container terminal .

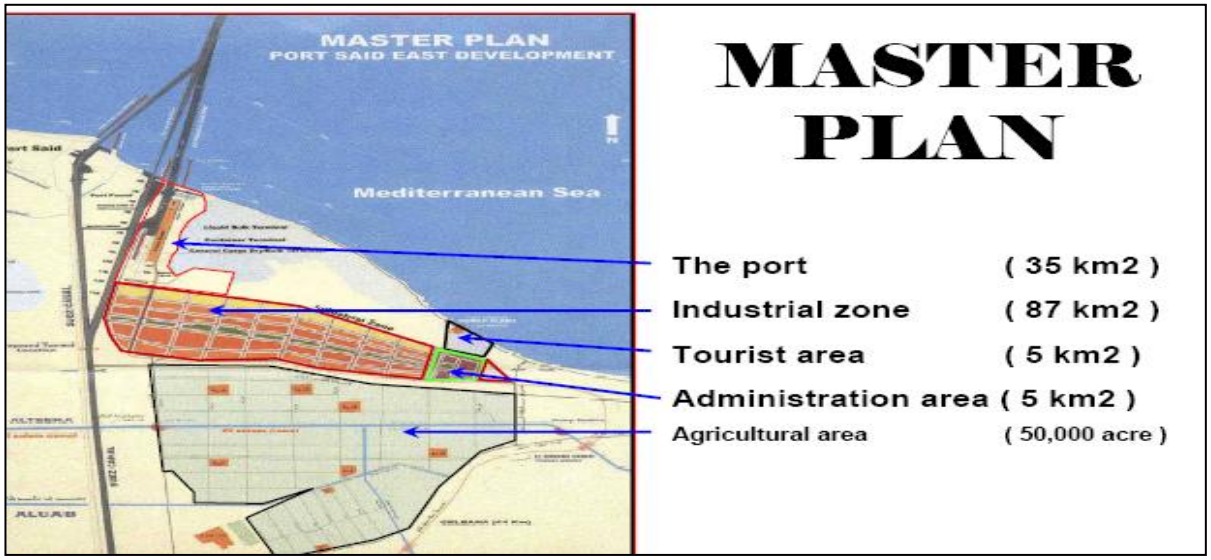
In the next section the master plan of the port is presented.

4 .7 Master plan of the port

In September 2007, Port Said Port Authority (PSPA) commissioned The Dutch Consultancy and Engineering Group DHV to develop a master plan for the development of the total port and industry complex.

The master plan divided the area into several industry specific clusters; Mega international hub with port related industries included on an area of 35 km2 , the industrial zone on an area 87 km2, Agriculture zone 50,000 acre , Administrative zone 5 km and a Tourism zone on an area of 5 km. The total area to be developed covers 120 square kilometres, see figure below.

Figure 18: The master plan of Port Said East Port



Source: Port Said Port Authority.

The plan includes the three phase development of East Port Said Port over the next 30 years :

First phase

The first stage of the development plan is scheduled to start in 2009 and to be completed by 2015. It includes the addition of 12 square kilometres to the current 35 square kilometres that make up the port. It will include the building of container terminals, general goods stations, ship bunkering stations, dry and floating dockyards, and oil storages and logistics services area. The total investments are expected to be 2 billion US $.

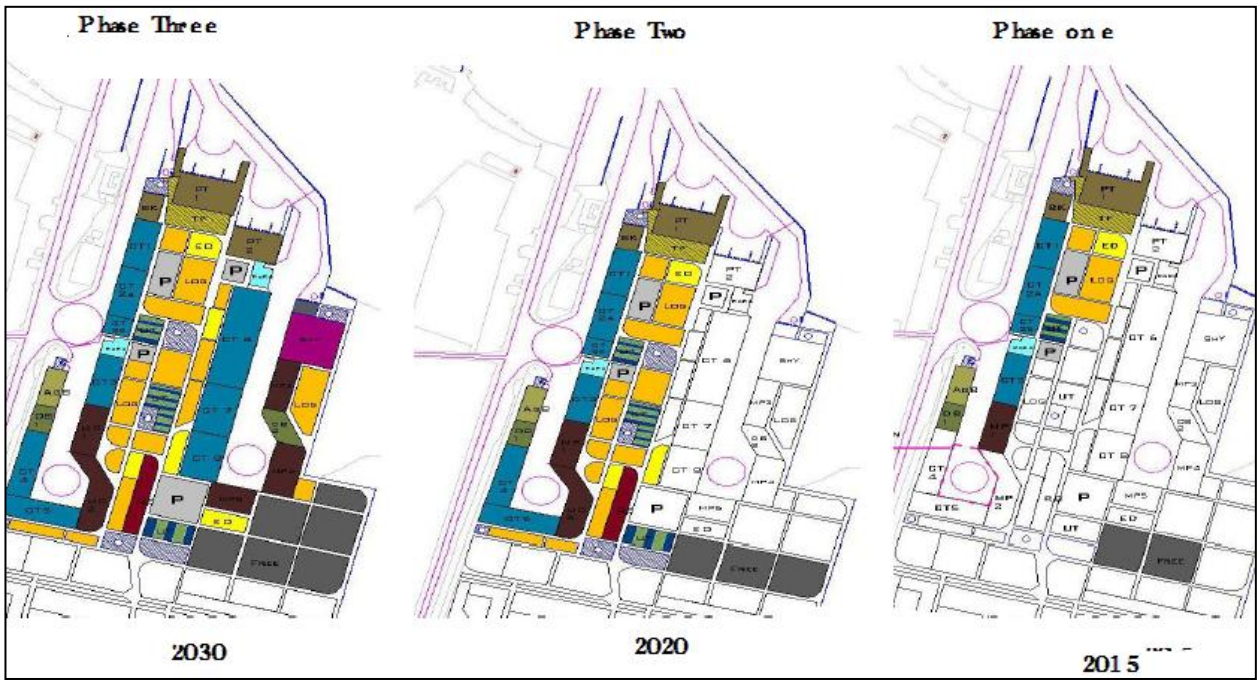
Second phase

The second stage is scheduled for 2020. Fifteen additional terminals will be constructed including container terminals, Ro-Ro terminals, floating dock yards, ship bunking and multi-purpose terminals. Similar to the phase one a logistic service area will be also developed in the second phase. The total investments are expected to be 1.6 billion US $.

Third Phase

The third phase is scheduled for 2030.In this stage. Twenty one terminals is planned to be developed, which will also include containers terminals, Ro-Ro terminals, dry and floating dock yards, and ship bunking. The total investments are expected to be 1.6 billion US $.

Figure 19 : The master plan of Port Said East port



Source : Port Said port Authority

The aim of this project is develop a gateway port for the world trade with value added logistics infrastructure, services and facilities, utilizing its strategic geographic position to take full advantage of the trade flows on the Mediterranean and Suez Canal. The port targets trade from Far East Asia, where companies currently suffer high lead times to deliver products to the Europe.

According to Hassan Mohamed the chairmen of the broad of Port Said Authority, the possible activities to be integrated in the project include ship container repair, manufacturing of cranes, warehousing and value added activities. The examples of value added activities *are* labelling, kitting and re-packaging for products that are highly labour intensive and low in value.These include activities such as assembling electronics and automotive components, customizing semi-finished textile goods and processing food commodities.

4.8 Swot analysis

SWOT analysis is a tool for auditing an organization and its environment. It is the first stage of planning and helps strategy makers to focus on key issues. SWOT stands for strengths, weaknesses, opportunities, and threats. Strengths and weaknesses are internal factors. Opportunities and threats are external factors. The swot analysis for the port is based on the information gathered from interviews with the employees at Port Said authority and SCCT container terminal in addition to the author research. The swot analysis of the current status of Port Said East port is illustrated in the table below.

Table 12 : Swot analysis for Port Said East port.

Strength	**Weakness**
• Strategic geographical location. • Zero deviation from the international route. • Network advantages for feeder services. • Availability of land. • Water Depth. • Low cost labour. • State of the art Services • Fine climate	• Insufficient hinterland connections. • Shortage of skilled and experienced logistics professionals.
Opportunities	**Threats**
• Unique location. • Huge Area and the Possibility of Expansion for any investors. • Large market.	• Competition from regional ports. • Impact of Somali piracy. • Global recession.

• Growth in container traffic at the port. • Trade growth between Asia and Europe. • Favourable political terrain.	

Source : Based on own data collection

4.8.1 Strength

- Strategic geographical location.

As mentioned before, East Port Said port is distinguished by its strategic geographical position at the junction of the Mediterranean with the northern entrance of Suez Canal. The Suez Canal serves as one of shipping's largest crossroads. It connects the Mediterranean and the Red Sea through its 190km passageway. It is one of the busiest waterways in the world as it is the shortest route between East & west as compared with the Cape of Good Hope. About 10% of the world seaborne trade passes through the Suez Canal. In 2010, 17,993 vessels crossed the canal, with an average of 50 vessels per day.

- Zero deviation from the international route.

Compared to other ports in the Mediterranean region, East Port Said port is located along the main South - North navigation route requiring virtually zero degrees path divergence to enter the terminal, which means that vessels do not need to deviate from the international route, the matter that is translated into a reduction in transportation expenses for vessels.

- Network advantages for feeder services

In fact, the unique location of the port offers a major network advantages to ocean carriers due to nearness of the port to the East Mediterranean and Black Sea markets. And this reduces the transit times to these major emerging markets, in particular to and from Asia.

- Availability of land

The Port has a huge area of around 35 km^2 which makes it geographically dynamic and expandable at any time. The total area of the port and the hinterland together covers about

120 square km^2, making it comparable in size to the port site at Rotterdam, one of the largest ports in the world.

- State-of-the-art container terminal

As described earlier, the port is equipped with state-of-the-art handling equipments, controlled by high performance IT applications. This produces efficient and reliable terminal operations, which leads to low waiting time for port users and ship turnaround time. The present of Fast cargo handlers like the super post panamax cranes is one of the major strength of the port.

- Water depth**.**

After completing the dredging project the terminal draft will increase from 14.5 meters to 15.5 meters. This will allow the port will be able to comfortably accommodate largest containerships in the global container fleet.

4.8.2 Weakness

- Inadequate supporting Inland Infrastructure

Port Said East lacks a goods hinterland connection. The port handles almost all the goods through road transport and this has several weaknesses. First, the inland infrastructure linked to the port is in poor condition. Second, the problem of congestion is a serious threat to the port. Moreover, the train transport is in poor condition .The inland infrastructure linked to the port is in poor condition. Despite the significant development in port facilities, more investment is indeed for an efficient, competitive, safe and sustainable multimodal land (rail and road).The inland infrastructure are mainly funded by public sector investment..

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- Weak cooperation between port authority and their intermodal partners in order to improve supply chain performance.

- Complex and Lengthy Customs Procedures

This is due to the fact that customs require that the value of the cargo be covered by a letter of guarantee and linked to only one mode of transport. If the cargo is to change modes, then another letter of guarantee is to be issued. This leads to extra costs and extra loss of time.

4.8.3 Threats

- Competition from regional ports

The port faces severe competition from the major hub ports in Mediterranean region. In central Mediterranean, the port of Gioa Tauro (Italy) and Marsaxlokk (Malta) are the main competitors to Port Said east port. In eastern Mediterranean Turkish ports and are the main competitors.

- Impact of Somali piracy

Pirates activities off the coast of Somalia are growing at an alarming rate threaten the safety and securities of international vessels passing through the Suez Canal, which is the primary trade route between Asia and Europe because it is the shortest and the most economical trade route. Somalia pirates attract all types of ships and tankers along the northern Somali coast in the Gulf of Aden and southern red sea. These kind of activities have resulted in some ship owners have considering rerouting their vessels via the Cape of a Good Hope. Such a shift will reduce the number of ships passing via the Suez and will negatively affect the port activities.

4.8.4 Opportunities

- Large market

There is a large market for the port. The population estimate of the country is approximately 80 million, and it is expected to reach 94 million by 2020 (EMDB report, 2008). The high population factor creates a large consumer potential for foreign products, since a very large percentage of the trade is sea borne, this is a great potential for the port. There is also a thriving agricultural sector that forms a large export pool of cargoes.

- Huge Area and the Possibility of Expansion for any investors

As mentioned before, the port has a large expanse of land for facility expansion to cope with future capacity need. Morover the government plans to offer affordability prices to attract investors. Possible activities to be integrated in the project include ship/container repair, manufacturing of cranes, warehousing and value-added activities, general logistics services, logistics chain integration services and the provision of value-added facilities.

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- Country's strategic location

The geographical location of the country places it at borders with North African countries Libya and Tunisia as well as Middle East counties Saudi Arabia and Jordan. If the country's inland infrastructure is improved and rail connections with these counties is developed, the port stands to improve it cargo throughput.

- Trade growth between Asia and Europe.

The trade growth between Asia and Europe will always be an opportunity for the port due to its strategic location on the main trade route between these two contents.

- Favourable political terrain

As a consequence of Egyptian revolution that started in the beginning of the year, a shift in the polity of the country from a dictatorial regime to democratic administration will create a better investment climate in the medium and long term

4.9 Conclusions

Port Said East port is biggest port in Egypt in terms of land and container handling. The port is located at the Northern entrance of the Suez Canal, at the confluence of three continents and at the crossroad of the most important world sea trade route between the East and the west. The port‘s geographical position has several competitive advantages. Nevertheless, the last five years have shown a continuously growing volume of container traffic. The future plan of the port is to develop a vital gateway port for the world trade

Chapter 5 Final Analysis and Conclusion

The aim of this chapter is to provide a final analysis on the major findings from the previous chapter in line with previous knowledge gained from the literature review in chapter 2 and the Mediterranean market chapter 3.

5.1 Final analysis

The thesis highlighted some of the critical factors required for the port to become a transhipment hub. One such important factor is the geographical location of the port whether the port lies along the main trade routes measure in terms of deviation from these routes. In the meditterrean there is a strong competition between ports to attract transhipment traffic.

Analysis of the data showed that Port Said East port can play a role as regional transhipment hub. The port has a potential to become the first transhipment port in the region with in the coming few years due to the following reasons :

* The port is located along the main South - North navigation route requiring virtually zero deviation of the deep sea vessels. This means that vessels do not need to deviate from the international route, the matter that is translated into reducing transportation expenses for vessels.Through analyzing the cargo traffic passing through the Suez Canal in last five years, we can see that there is a potential for the cargo to increase in the future, the fact that will enhance the growth of the port.

* The unique location of the port offers a major network advantages to ocean carriers due to nearness of the port to the East Mediterranean and Black Sea markets. ia. Analysis of data showed there was continuous increase of the cargo traffic to East Meditterrean in the last year 5 years.So if these growth rates prevail, Port Said can increase its market share.

Port Said ambition to become a logistic hub is a realistic aspiration that can be achieved with combination of government planning and private sector. Port said's main challenge now is attract global firms to set up their logistics center into the region.

The following table presents an overall analysis of the current Port Said in contrast with the govenerment future plan. The analysis is based on the current situation of the port, the future master plan of the port and the review of the literature on the factors influence the site selection of logistic centers. The factors listed below are not intended to be prescriptive models for all ports to follow.

Table 12. Analysis of the c the current Port Said in contrast with the govenerment future plan.

Critical factor	**Port Said East port**	**Future Master plan**
Strategic location	Enjoys a unique strategic location	
Land/Land prices	Availability of land	The government plan is offer affordability prices to attract investors.
Labour	Low labour cost. Shortage of skilled and experienced logistics professionals.	No plans yet for improving logistic and technical training.
Port Infrastructure	State of art container terminal	Government plan is to improve the port infrastructure
Infrastructure	Inadequate supporting Inland Infrastructure	Improving and developing the infrastructure.
Related industries	No industrial	Plans for developing a wide range of industrial activities

In order to develop a logistic cluster the interaction of these factors is needed.

Strategic Location

The port unique location provides a lot of potential for development of logistics and value added activities.

Labour

In general ,the labour cost in Egypt is low, however there is shortage of the skilled and technical lab. There are no plans yet for improving logistic and technical training.

Infrastructure

Inadequate supporting Inland Infrastructure is one of the main weaknesses of the port. The government plans to invest heavily to improve and upgrade the infrastructure.

Port Infrastructure

The port has state-of-the-art container terminal equipped with modern handling equipment. The government plan is to develop gateway port .

Infrastructure

Port lacks a goods hinterland connection. The road and train transports are in poor conditions. The government plan is to upgrade and develop a multimodal network.

Related industries

Yet there is no industrial activities at the port, however the government aim to develop industries area of 35 km2 , the industrial zone on an area 87 km2

5.2 Conclusion

Logistics industry plays an important role in development of any country. A well integrated and coordinated logistics system will move the country into desired direction. The unique location of the port combined with the establishment of logistics centers in the hinterland the port will turn into a vital gate way hub in the region.

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