ENVER YETKİLİ

EASTERN MEDITERRANEAN AND CONTAINERISATION

THE NEW SEA ROUTE OF THE SILK ROAD TRADE

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2015

EASTERN MEDITERRANEAN AND CONTAINERISATION THE NEW SEA ROUTE OF THE SILK ROAD TRADE

A THESIS SUBMITTED TO

THE GRADUATE SCHOOL OF APPLIED SCIENCES

OF

UNIVERSITY OF KYRENIA

By

ENVER YETKİLİ

In Partial Fulfillment of the Requirements for

the Degree of Master of Science

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

Increases realized in world trade after the years of 1950's; has led to the development and change of seaborne transportation. The most important development took place with the transition to the containerisation. Globalization could not have taken its current form without containerisation. Without the efficiencies and economies brought by containerisation; the development of the global manufacturing system and international trade expansion would not be possible. Suez Canal has important implications to the Eastern Mediterranean seaborne transportation. Although Suez Canal causes a performance bottleneck for tankers and bulk carriers, it offers significant opportunities in the transportation of containers between Far East and Europe trade areas. Container based transportation has facilitated and enabled transhipment operations. Eastern Mediterranean ports; provides significant gains due to the container transhipment operations from the container transportation between Far East and Europe. Cyprus is a natural transhipment centre for Far East-Europe trade. The various markets situated along the coasts of the Eastern Mediterranean, Black Sea, Adriatic Sea and Balkan countries can easily access from Cyprus. Cyprus is at a location with minimum diversion from the main arterial route. Northern Cyprus ports are also searching for grabbing a share from the container transhipment operations. The proposed container terminal at the Port of Gemikonağı is offering ideal conditions for grabbing a share from these activities. Turkey is the motherland for Northern Cyprus community, so hinterland container port traffic of Turkey, may count on behalf of the proposed Port of Gemikonağı. The Port of Gemikonağı may become a base for Turkey at container transhipment. Northern Cyprus should take all necessary measures and initiatives for developing its ports in this direction.

***Keywords**:* Suez Canal; container transhipment operations; Turkey; Northern Cyprus; Port of Gemikonağı

ÖZET

1950'li yıllardan sonra dünya ticaretinde gerçekleşen artışlar; deniz yolu ulaşımının gelişim ve değişimine yol açmıştır. En önemli gelişme konteynerciliğe geçiş ile gerçekleşmiştir. Konteynercilik olmadan, küreselleşme günümüzdeki biçimiyle yer almamış olurdu. Konteynerciliğin sağladığı etkinlik ve verimlilik olmadan; küresel üretim sisteminin geliştirilmesi ve uluslararası ticaretin genişlemesi mümkün olmazdı. Doğu Akdeniz deniz yolu ulaşımında, Süveyş Kanalının önemli sonuçları vardır. Süveyş Kanalı; tankerler ve dökme yük gemilerinde bir performans sorununa neden olsa da, Uzak Doğu ile Avrupa ticaret bölgeleri arasında yapılmakta olan konteyner taşımacılığına önemli fırsatlar sunmaktadır. Konteyner Taşımacılığı; transit taşımacılığına imkân sağlamış ve kolaylaştırmıştır. Doğu Akdeniz limanları; Uzak Doğu ve Avrupa arasında yapılmakta olan konteyner taşımacılığında, konteyner transit operasyonları nedeniyle önemli kazanımlar sağlamaktadırlar. Balkan ülkelerinin de dâhil olduğu, Doğu Akdeniz, Karadeniz, Adriyatik Denizi kıyıları boyunca yer alan birçok pazara Kıbrıs üzerinden kolayca ulaşılabilmektedir. Kıbrıs; Uzak Doğu-Avrupa konteyner taşımacılığı ana rotasından fazla bir sapma yapmadan ulaşılabilen bir konumdadır. Bu da; Uzak Doğu-Avrupa konteyner taşımacılığında, Kıbrıs'a transit merkezi olma yönünde önemli imkânlar sunmaktadır. Kuzey Kıbrıs da; konteyner taşımacılığı aktarma (transit) hizmetlerinden, bir pay kapmak için araştırmalarını sürdürmektedir. Gemikonağı Limanı'nda tasarlanan konteyner terminali konteyner taşımacılığı aktarma (transit) hizmetlerinden, pay kapma için ideal koşullar sunmaktadır. Konteyner taşımacılığı aktarma hizmetleri merkezi olabilmenin şartlarından bir tanesi de limanların hinterland'dıdır. Kıbrıs'ın bu yönden avantajı bulunmamaktadır ancak; Kuzey Kıbrıs'ın anavatanı olan Türkiye'nin hinterland'ı, Gemikonağı Limanı adına varsayılabilinir. Böylece Gemikonağı Limanı, Türkiye için, konteyner aktarma merkezi haline gelmiş olur. Kuzey Kıbrıs; limanlarını bu yönde geliştirmek için gerekli tüm planlamaları yapmalı ve Türkiye nezdinde girişimlerini sürdürmelidir.

Anahtar Sözcükler: Süveyş Kanalı; konteyner aktarma (transit) hizmetleri, Türkiye; Kuzey Kıbrıs; Gemikonağı Limanı

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LIST OF ABBREVIATIONS

BD: Business Dictionary

CAGR: Compound Average Growth Rate

CRS: Clarkson Research Services

DR: The Divergence of Regionalization

DWT: Dead Weight Ton

EMTP: Euro Mediterranean Transport Project

GCM: The Global Container Market

GDP: Gross Domestic Product

GETR: The Global Enabling Trade Report

GCMIO: The Global Container Market, Industry Overview

IAPH: International Association of Ports and Harbours

MEDA: Euro Mediterranean Partners Project

OCDI: The Overseas Coastal Area Development Institute of Japan

PFI: Port Finance International

SCCT: Suez Canal Container Terminal

SCT&EO: Sea Container Trade & Economic Outlook

TEU: Twenty-foot Equivalent Unit

UNCTAD: United Nations Conference on Trade and Development

WTR: World Trade Report

WSC: World Shipping Council

MEDA Countries: Morocco, Algeria, Tunisia, Egypt, Palestine, Jordan, Israel, Syria, Lebanon, Turkey, Cyprus and Malta

CHAPTER 1
INTRODUCTION

The purpose of this thesis; is to analyse the productivity of maritime transportation and show the improvements and advantages of Containerisation in the Eastern Mediterranean and to study how to improve transhipment operations of containers at Northern Cyprus ports by building and operating a "Container Hub Port" at Northern Cyprus.

Before the opening of the Suez Canal; the Eastern Mediterranean, was off the beaten track in terms of maritime transportation. With the Suez Canal, the far reaches of Asia became more accessible. Far East-Europe maritime transportation route distance has been significantly shortened.

The impressive growth of Far East-Europe trade, transiting through the Suez Canal has a substantial opportunity for the Eastern Mediterranean ports.

The Suez Canal had a visible impact on the economic and political standing of nations. Suez Canal; like other countries, affected Cyprus economically and politically.

Increases realized in world trade after the years of 1950s; brought in the specialization of the transportation systems and in parallel with it the integration of the transport modes (land, sea, air, rail transportations). The name of the new transportation systems is "Containerisation".

Challenges of conventional transport and handling systems, operating conditions, security of cargo, the difficulties of transferring cargo between the transport modes and a waste of time caused by all this, especially with general cargo transportation, has brought the containerisation on the agenda.

In a continuous development of the container transportation, gradually would lead to all of the general cargo to be moved to containerisation. This has brought in the modernization to both ships and ports.

Containerisation; actually is nothing than the "Modern Silk Road Trade" for the Eastern Mediterranean. Far East-Europe trade, passes the Eastern Mediterranean through the Suez Canal is carried out by large transoceanic ships. Large transoceanic ships, after reaching the Eastern Mediterranean are discharging containers to the Hub Ports. Containers later are distributed by smaller feeder service ships to their final destination ports.

Some of the features of container transportation have encouraged the transhipment operations and ports adapted to these developments, has become "Regional Relay Hubs".

Providing large revenues by selling their services at the transhipment operations; has increased competition between ports and has encouraged them to make investments in becoming a Regional Relay Hub. Eastern Mediterranean is one of the regions that are experiencing the most intense competition in the world due to its location beside the Suez Canal.

Being located in a very good position geographically in the middle of the Eastern Mediterranean, the Island of Cyprus has substantial opportunities for the container transhipment operations. Northern Cyprus ports by making the necessary investments in establishing a container terminal will join the race as a Hub Port.

CHAPTER 2
WORLD SEABORNE TRANSPORTATION

2.1 World Merchandise Trade

Since World War II, a tremendous growth has been realized in world merchandise trade. World merchandise trade volume was 500 million tons in 1950. Nowadays; World merchandise trade volume increased by 18 times totalling 9.6 billion tons. The total monetary value of world merchandise trade in the year 2012 was 18.3 trillion US Dollars.

> "Growth in world merchandise trade remained subdued in 2013 at 2.2%, nearly identical to the previous year's increase of 2.3%. The increases in both 2012 and 2013 were less than the 20-year average of 5.3% in 1993–2013, and were also well below the 6.0% average for the 20 years preceding the 2008–09 crisis. The volume of world merchandise trade continued to climb slowly in the opening months of 2014, with an increase of 2.1% in the first quarter compared with the same period in 2013. The increase for the year as a whole is expected to be greater than in 2013 as the global economy picks up momentum" (WTR, 2014).

There has been always a relation between the World Gross Domestic Product (GDP) and World Merchandise Trade. The annual growth rate of GDP and world merchandise trade (2004-2013) is given below in the Figure 2.1 below.

Figure 2.1: Annual growth rate of GDP and merchandise trade (2004-2013)
(Authors' own compilation based on UNCTAD statistics (2004-2013))

2.2 Comparison of Transportation Modes

After the 1970's under the name of globalization of the world economy as a result of the restructuring of the foreign trade between countries have substantially increased in quantity. Increasing of foreign trade creates demand for transport activity with it.

Today's transport systems; seaborne transport, road, rail, air, pipelines, is using at least two of the transport modes. Among these transport systems seaborne transport has the maximum share. This rate of seaborne transportation is due to, the economies of scale and other benefits.

These advantages of seaborne transportation are as follows: being safe comparing other modes, moving big amounts of cargo, using of open seas without borders, are the main reasons. Also seaborne transportation is; 15-20 times cheaper than air transportation, 7-10 times cheaper than road transportation and 3-4 times cheaper than railroads.

The differentiation of the structure of the demand, the growing world population, and the importance of transporting large quantities of cargo at the same time; alters from the port to port transport mode (unimodalism), to the door to door (intermodalism) transportation.

2.3 World Seaborne Trade

Sea transportation is a type of transportation that people have been used since the ancient times. With the developments in technology and the demands of the markets, changes started to be seen in sea transportation. This is called the industrialization of sea transportation.

"7.125 billion tons of world trade, which is 75% of the total, has been carried by sea. The 35% of seaborne trade consist of; liquid bulk cargoes, 28% of dry bulk cargos, 17% of containerized cargoes and 20% of other cargoes" (TC Denizcilik Şurası, 2013).

Comparison of annual growth rate of World Seaborne Trade and Merchandise trade in the years (2004-2013) is given in the Figure 2.2 below.

The transport volume of the World Seaborne Trade for the years (1990-2013) is given in the Figure 2.3 below.

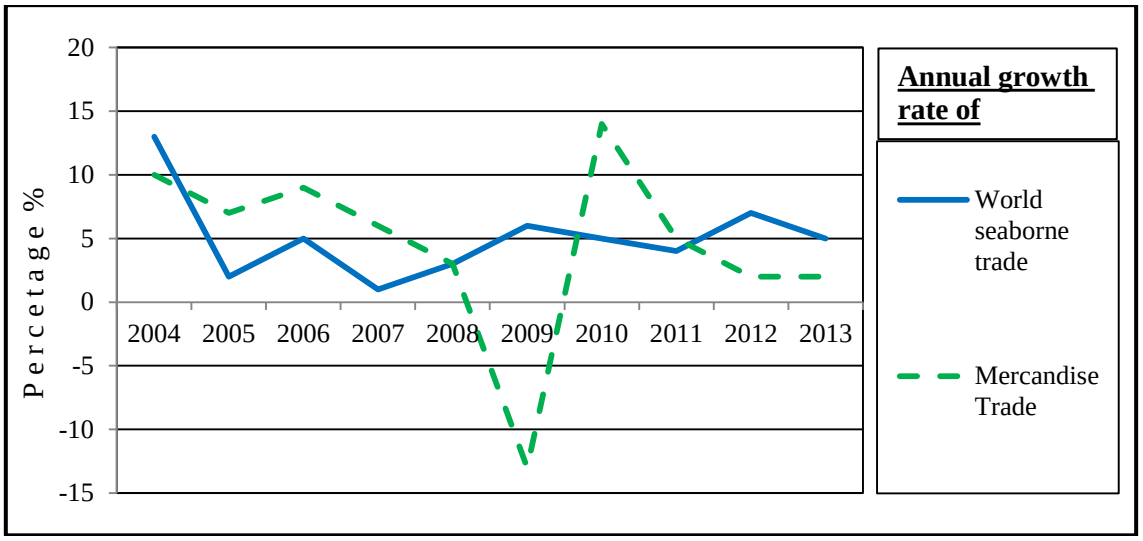

Figure 2.2: Annual growth rate of world seaborne trade and merchandise trade (2004-2013) (Authors' own compilation based on UNCTAD statistics (2004-2013))

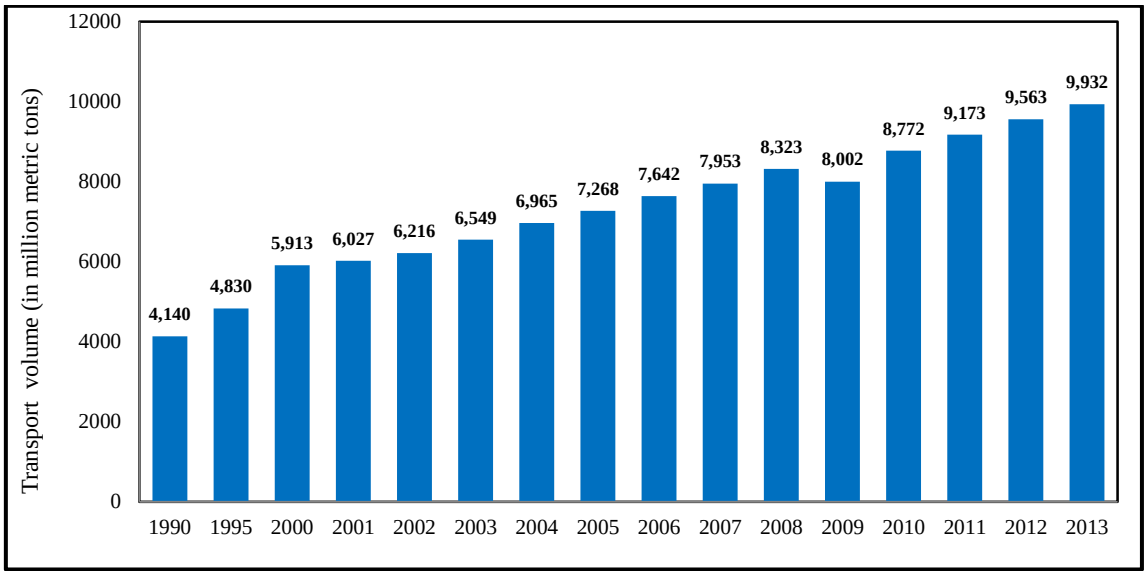

Figure 2.3: Transport volume of the world seaborne trade (1990-2013) (Authors' own compilation based on "The Statistics Portal")

2.4 World Maritime Fleet

The total of World Maritime Fleet is 1,607,317,000 DWT by the 1st of January 2014. World Maritime Fleet total capacities for principal vessel types are as shown in the Figure 2.4 below.

During the 12 months of 2014, the world fleet grew by 65.9 million DWT, an increase of 4.1% over 2013. (UNCTAD, 2014)

According to UNCTAD, World Maritime fleet by the 1st of January 2014;

- World Maritime Fleet Total: 1,691,628,000 DWT,
- Dry Bulk Cargo Carriers 726,319,000 DWT,
- Oil Tankers 482,017,000 DWT,
- Container Ships 216,345,000 DWT,
- General Cargo Ships 77,552,000 DWT,
- Other Ships 189,395,000 DWT.

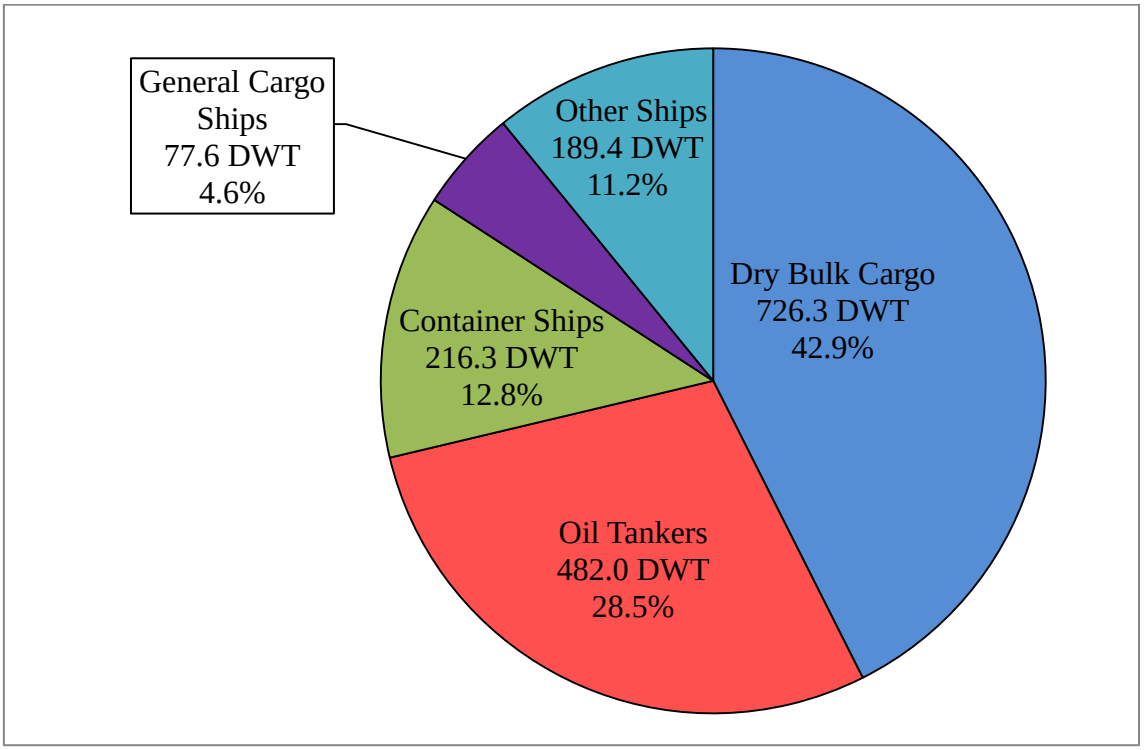

Figure 2.4: World maritime fleet total capacities (2014) (Million DWT)
(Authors' own compilation based on (UNCTAD, 2014))

CHAPTER 3

PRODUCTIVITY ANALYSIS OF SEABORNE TRANSPORTATION AT EASTERN MEDITERRANEAN

3.1 Definition of Productivity

"A measure of the efficiency of a person, machine, factory, system, etc., in converting inputs into useful outputs" (BD, 2014).

Productivity is an average measure of the efficiency of production. It can be expressed as the ratio of output to inputs used in the production process, i.e. output per unit of input.

3.2 Seaborne productivity

Shipping is the main indicator in the international trade. The value of shipping can be defined by measuring the cargo transported and the distance between two seaports that transported. Productivity of Seaborne trade will be depending on quantity of cargo and navigating distance.

3.3 Factors Affecting Productivity at Seaborne Transportation

In economics, factors of production, resources, or inputs are used in the production process in order to produce output.

1) **Physical structure of ships and ports:** The significant increases realized in world trade after the year 1950, enforced ships and ports to increase their productivity by enlarging their physical structures.
2) **Equipment of ships and ports:** Handling equipment of ships and ports has increased their productivity by enlarging their physical structures and capacities.
3) **Speed of ships and handling equipment:** Speed of ships and handling equipment has increased significantly.
4) **Unitize of cargos:** During this period; cargoes has changed their traditional systems and became unitized.
5) **Containerisation:** To improve transportation systems and create opportunity for cargoes to move from "door-to-door"; containerisation has been achieved, so that cargoes can easily be transferred among "Transport Modes".

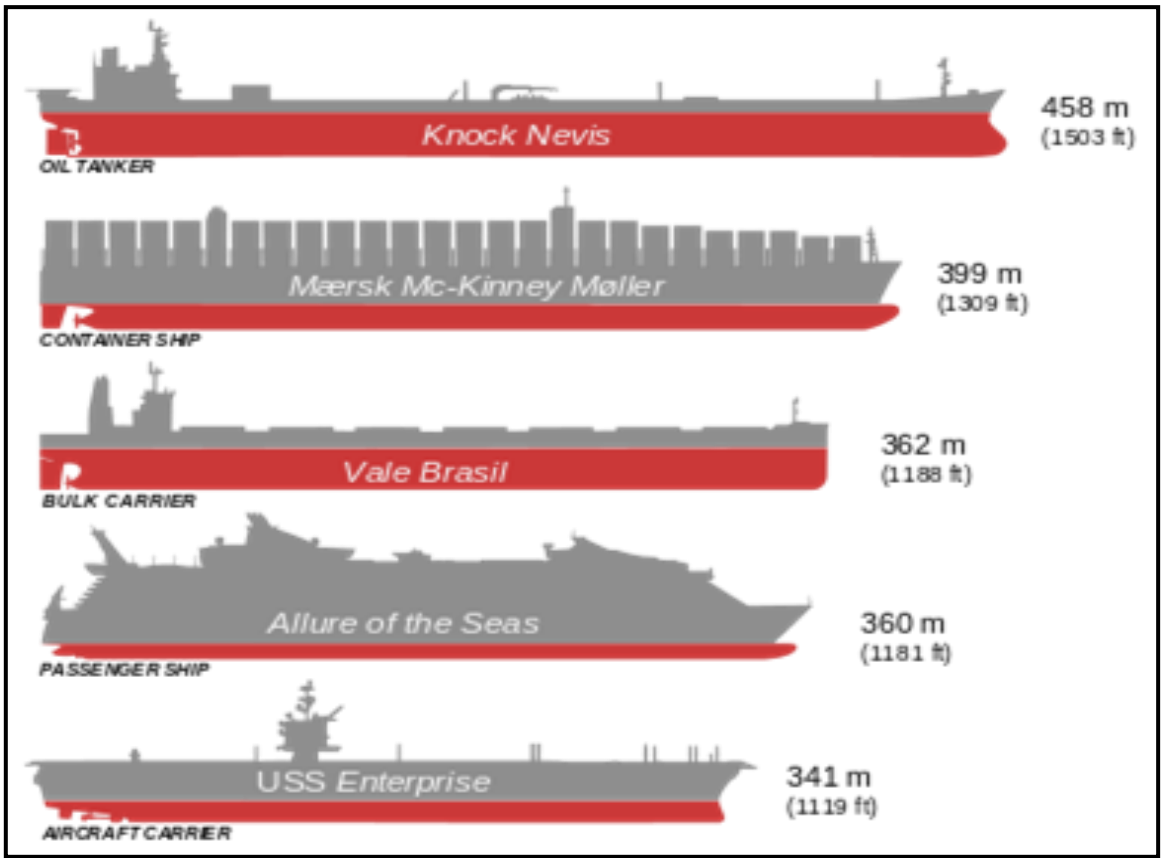

Figure 3.1: Development of ship dimensions (http://en.wikipedia.org/wiki) (Accessed date: 2015)

3.4 Factors Affecting Productivity at Ships

1) **Physical structure:** Dimensions of the ship, DWT, Draft,
2) **Equipment:** Ship's handling equipment, Ship's pumping capacity,
3) **Technology:** Computer-aided study,
4) **Employees:** Hiring competent ship's staff, working hours, employee training and an effective organizational structure,
5) **Economic Change:** Pressure is applied to ships to increase efficiency, while the world economy evolves,
6) **Economies of scale:** In accordance with the economies of scale; physical structure of ships (See Figure 3.1, Figure 3.2, Figure 3.3), handling equipment and pumping capacity develops,
7) **Time:** Speed affects productivity at the ships.

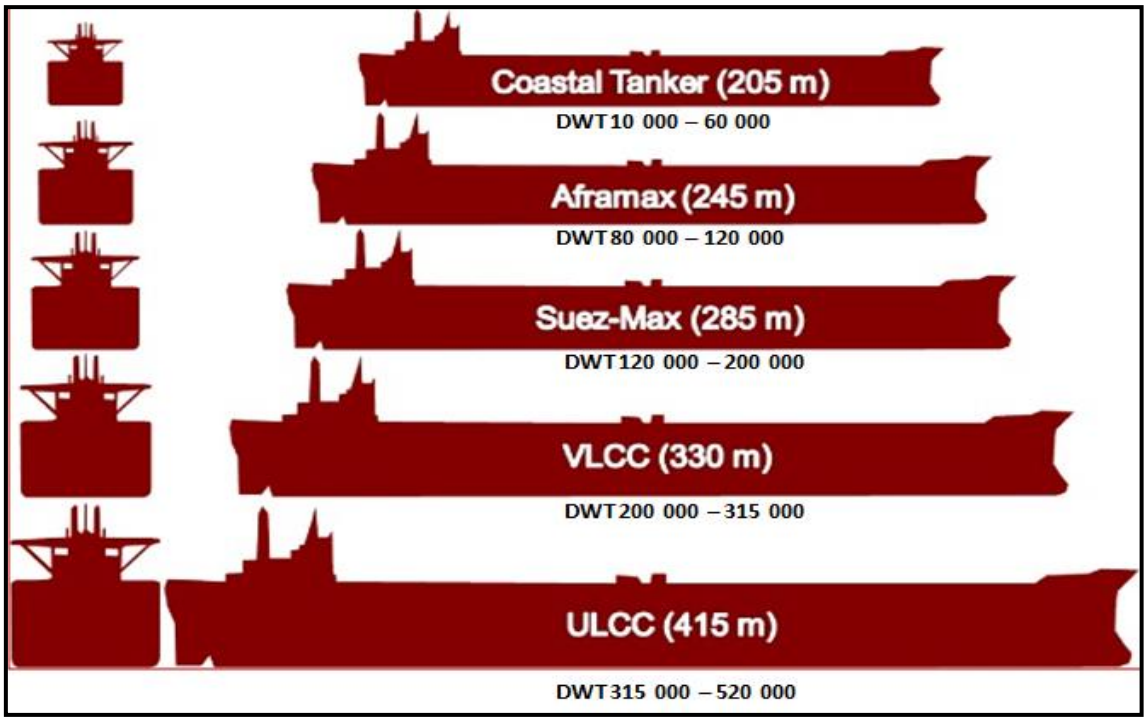

Figure 3.2: Development of tankers in sizes (http://www.nasmaritime.com/tankercilik_sizes.htm) (Accessed date: 2015)

Figure 3.3: Development of bulk carriers in sizes (http://www.stevesmaritime.com/bulk.html) (Accessed date: 2015)

3.5 Factors Affecting Productivity at Ports

1) **Physical Structure:** Quay length, storage space, number of doors and roads,
2) **Equipment:** Handling equipment, pumping capacity,
3) **Technology:** Computer-aided study**,**
4) **Employees:** Working hours and an effective organizational structure,
5) **Economic Changes:** Pressure is applied to ports to increase efficiency, while the world economy evolves,
6) **Economies of scale:** In accordance with the economies of scale; physical structure of ports, handling equipment and pumping capacity develops,
7) **Time:** Loading and Unloading time affects productivity.

3.6 Suez Canal and the Mediterranean Seaborne Transportation

Suez Canal is very important for the Mediterranean Seaborne Transportation. Construction of the Suez Canal began on the 25th of April, 1859 and completed on the 17th of November, 1869. The canal is 163 km long and 300 m wide.

The Suez Canal can accommodate ships with a 210,000DWT. Most of the Suez Canal is not wide enough for two ships to pass side by side. At Suez Canal there is one shipping lane and for facilitate the passage of big ships, there are several passing bays where ships can wait for others to pass. The Suez Canal has no locks because Mediterranean Sea and the Red Sea's Gulf of Suez have approximately the same water level. It takes around 11 to 16 hours to pass through the canal and ships must travel at a low speed to prevent erosion of the canal's banks by the ships' waves.

Reducing transit time for trade worldwide, the Suez Canal is one of the world's most significant waterways. Suez Canal is due to finish a project to widen and deepen the canal to accommodate the passage of larger and more ships at one time.

3.7 Mediterranean Seaborne Transportation

"Silk Trade Sea Routes", started with Vasco DA Gama in 1498, has been significantly shortened, after the opening of the Suez Canal in 1869 (See Figure 3.4 and Figure 3.5).

Before the opening of the Suez Canal; Eastern Mediterranean, being the cradle of civilization in history, was off the beaten track in terms of maritime transportation. With the Suez Canal, the far reaches of Asia became more accessible.

> "Modern maritime trade routes -sometimes in the form of artificial canals like the Suez Canal- had a visible impact on the economic and political standing of nations. The opening of the Suez Canal altered British interactions with the colonies of the British Empire as the dynamics of transportation, trade and communication had now changed drastically" (Carter, 2004)

Suez Canal like other countries, affected Cyprus economically and politically. British Sea Empire has decided to hire Cyprus, after the opening of the Suez Canal with the aim to protect the Canal.

Figure 3.4: Silk Trade Sea Routes at (1498)
(http://www.newworldencyclopedia.org/Silk_Road)
(Accessed date: 2015)

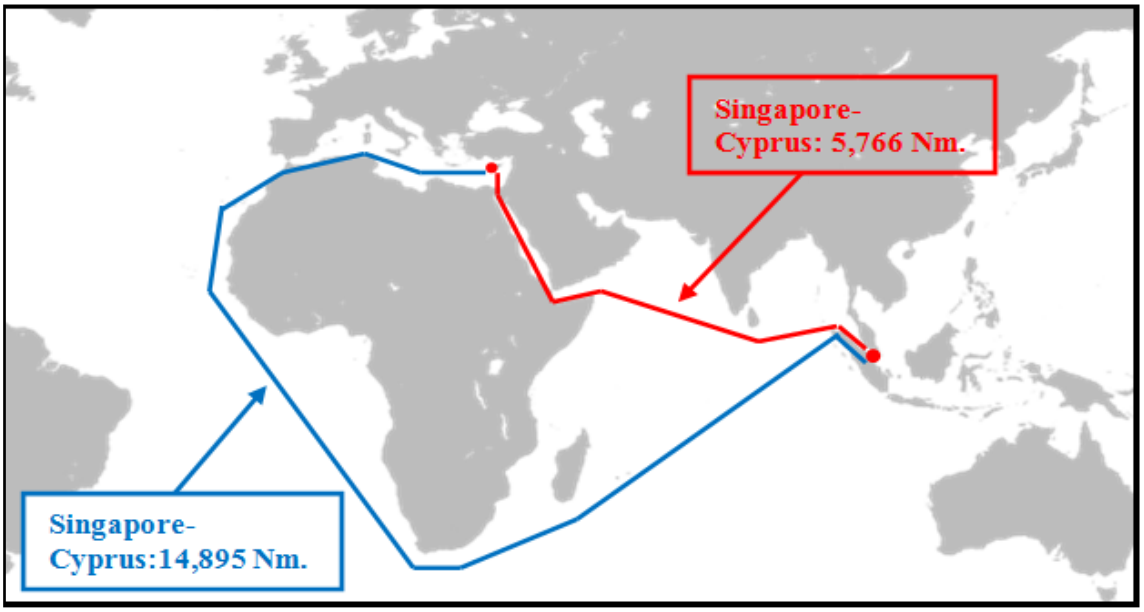

Figure 3.5: Comparison of Suez Canal and Cape of Hope Routes
(Author's own design)

3.9 Factors Affecting Productivity in Eastern Mediterranean Seaborne Transportation in Negative Way

Suez Canal plays an important role among the factors affecting the efficiency and productivity of maritime transportation in the Eastern Mediterranean. The Suez Canal has negative effects as well as positive effects on maritime transportation of the Eastern Mediterranean.

Oil Tankers bigger than Suez max type (120,000–200,000 DWT), such as "Very Large Crude Carriers", (VLCC) type (200,000–315,000 DWT) and "Ultra Large Crude Carriers" (ULCC) type (315,000–520,000 DWT), cannot pass through the Suez Canal.

Alike tankers, Ore Carriers bigger than 200,000 DWT, such as "Very Large Ore Carriers" (VLOC) (Cape Size Ore Carriers) type cannot pass through the Suez Canal.

Another factor that negatively affects the maritime transport in the eastern Mediterranean is the pipeline transportation.

All the above mentioned factors, has an important negative effect on freights for the Eastern Mediterranean maritime transportation.

3.9 Factors Affecting Productivity at Eastern Mediterranean Seaborne Transportation in a Positive Way

One of the most important systems affecting productivity in a positive way at Eastern Mediterranean Sea is the Global Maritime Container Transportation.

Despite the significant developments realized at the sizes of container ships in recent years, yet has not experienced a problem in crossing the Suez Canal.

3.10 The Mediterranean Sea and the Silk Road Trade

The Mediterranean Basin has been the cradle of world civilization in history. There had been an interactive relation between the Mediterranean Basin and the Silk Road Trade.

> "The Silk Road, or Silk Route, is a series of trade and cultural transmission routes that were central to cultural interaction through regions of the Asian continent connecting the West and East by linking traders, merchants, pilgrims, monks, soldiers, nomads, and urban dwellers from China and India to the Mediterranean Sea during various periods of time" (See Figure 3.4) (Elisseeff, 2001).

The Silk Road had been playing the role of a bridge linking the economies and cultures between the ancient East and West as well as connecting the friendship of China and Eurasia.

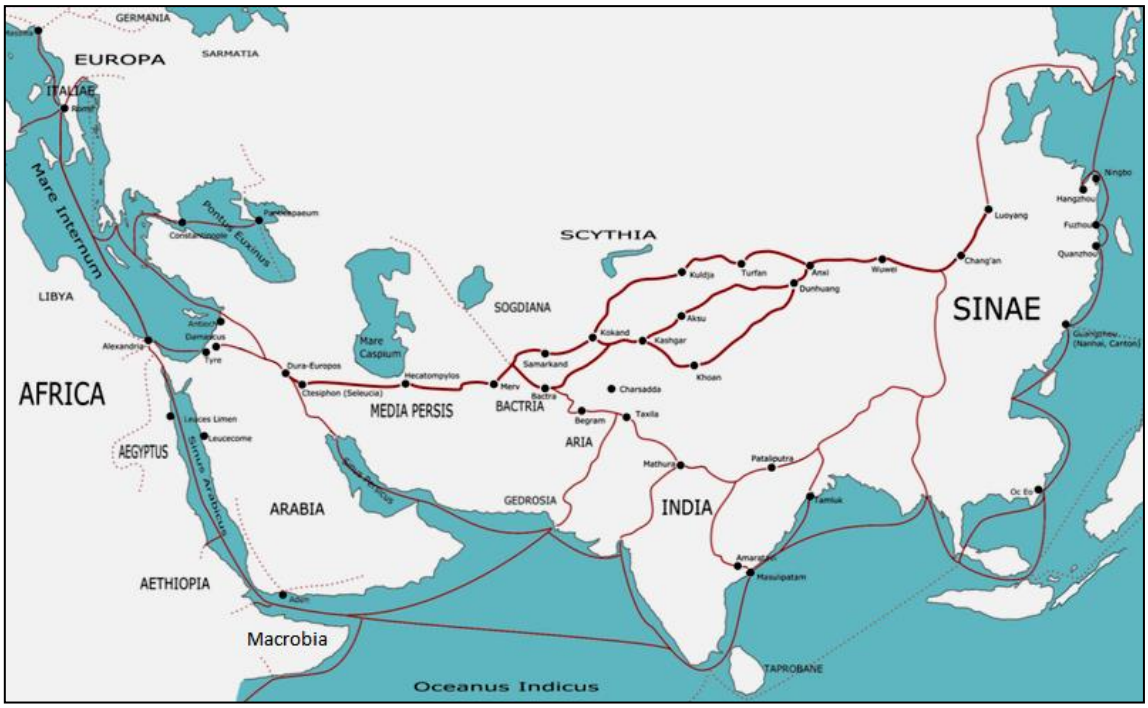

Figure 3.6: The Silk Road in the 1st century
(http://en.wikipedia.org/wiki/Silk_Road)
(Accessed date: 2015)

3.11 Silk Road Trade and Cyprus: The Historical Perspective

After Muslim powers took over the Lusignian Kingdom of Jerusalem, Lusignian powers moved to Cyprus in the year 1291. Lusignian Kingdom after moving to Cyprus, they brought the Silk Road trade with them and continue trading in Cyprus.

After the year 1291, Far-East goods reaching to Levant coast, were moved to Famagusta by Muslim traders and stored here. Thus, after this year Famagusta has become an antrepo (bonded warehouse) for Silk Road trading. Christian traders coming from the West were buying Far-East goods which were stored in Famagusta and carrying them to the West. During this period Cyprus and the city of Famagusta has become very rich and Port of Famagusta lived a golden age.

3.12 The Modern Silk Road Trade: Containerisation

Silk Road trading today is applied as containerisation. Far East-Europe trade reaches to the Eastern Mediterranean in containers via Suez Canal, as it was on the Silk Road trade in the old times. An important part of Far-East goods carried in containers, by large transoceanic ships; after reaching the Eastern Mediterranean Hub Ports are distributed by small feeder

ships to the destination ports. This maritime system, which is referred to as the containerisation actually is nothing than the “Modern Silk Road Trade”.

As it was on the Silk Road trade during the Lusignian Kingdom of Cyprus, Ports of Cyprus; should assume the function of distributing the containers. Ports of Cyprus are in the most appropriate location for the distribution of containers activity.

Located in the appropriate locations Ports of Northern Cyprus, should without delay do the necessary planning to grab a share from this activity.

CHAPTER 4
CONTAINERISATION

4.1 Definition of Containerisation

Containerisation is a system made a revolution by using containers made of steel. The containers have standardized dimensions. Containers can be transferred from one mode of transport to another without being opened. Due to this facility of containers, intermodal freight transport system developed. Containerisation has developed after the beginning of the 1960's, has reduced transport costs, and had a serious impact in the development of globalization. Intermodal Containers are loaded, unloaded, stacked, transported efficiently over long distances, and transhipped easily among ports. Ships carrying containers are bigger and faster so containers can be transferred more efficiently. With modern ships; shipping time significantly shortened. Handling of containers is done with cranes and special forklift trucks and other similar equipment, so that they can be transferred faster and cheaper. Containerisation has finished the heavy labouring and needs for warehousing.

4.2 History of Containerisation

In 1955, Malcolm P. McLean, realized it would be much simpler and quicker to have one container that could be lifted from a vehicle directly onto a ship without first having to unload its contents. His idea was that; a container, with the same cargo, can be transported through different transport modes during its journey. Containers can be transferred between ships, trucks and trains. Malcolm's idea leads to a revolution in international transportation that simply called Containerisation.

4.3 Containerisation Activities Worldwide

Although containerisation caused to a revolution in the world of shipping, its introduction did not have an easy acceptance. Shipping companies, ports, railways were concerned about the huge costs for adopting of their systems to containerisation. Trade unions were concerned about the job losses at ports. Containers were sure that will change the cargo handling operations at ports.

Containerisation changed the face of shipping, as well as the world trade. A container ship can be loaded and unloaded in a few hours. At the conventional system days were needed to unload cargo vessel with the same amount of cargo. Through reduction of handling time,

labour costs, and packing costs, container transportation allows considerable improvement in the efficiency of transportation.

World trade also affected due to Containerisation. With containers it takes a few weeks instead of months for a consignment to be delivered from Far-east to Europe. Again with containers there was less breakage due to less handling. Containers are sealed and only opened at the destination, due to this fact, pilferage and theft levels have been greatly reduced.

4.4 Effects of the Container Revolution on World Trade

There have been tremendous effects of the container revolution on world trade.

> "One of the most striking developments in the global economy since World War II has been the tremendous growth in international trade. As shown in the Figure 4.1, the increase in world trade accelerated dramatically during the early 1970s, with world trade growing in real terms from 0.45 trillion dollars in the early 1960s to 3.4 trillion dollars in 1990, by about a factor of "7". A central question is what accounts for this dramatic growth in world trade. Two broad explanations have been identified: (i) trade policy liberalization and (ii) technology-led declines in transportation costs" (Bernhofen and Zouheir, 2014).

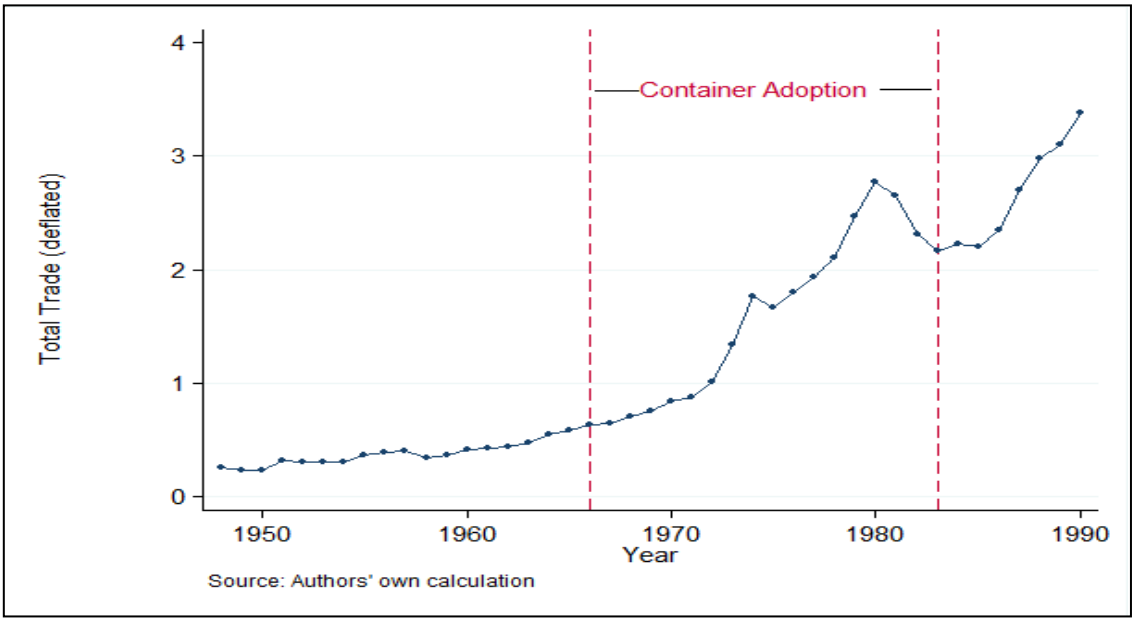

Figure 4.1: The growth of world trade (deflated) (1948-1990) (Bernhofen and Zouheir, 2014)

> "For many decades, containerized trade has been the fastest-growing market segment accounting for over 16% of global seaborne trade by volume in 2012 and more than half by value (in 2007). With containerisation being closely associated with globalization and fragmentation of global production, a recent study considering 157 countries over the 1962–1990 periods provided empirical evidence that containerisation is the driver of the twentieth century economic globalization." (Bernhofen and Zouheir, 2014)

There is a relationship between globalization and container transportation. Without the efficiencies and economies brought by containerisation; the development of the global manufacturing system and international trade expansion would be impossible. Containerisation has been a key element in the development of globalization.

4.5 Comparison of World GDP, Merchandise Trade and Container Trade

According to the UNCTAD data; the global container trade grew by 4.6% in 2013 and reached to a total of 160 million TEU's. The estimated data for this trade is 1.483 billion tons, of which is covering over 70% of the value of world international seaborne trade.

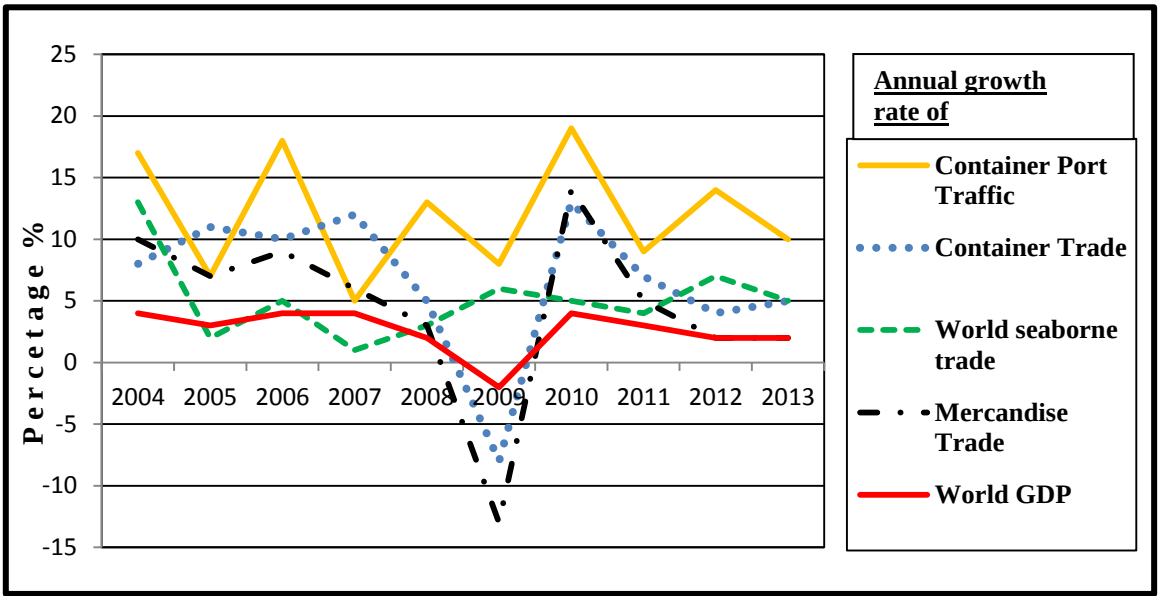

Figure 4.2: Annual growth rate of GDP, trade, container trade, and container port traffic (Authors' own compilation based on UNCTAD statistics (2004-2013))

The main cause of this increase seen at the Container transportation is the increase in global GDP, merchandise trade and container trade. Looking at the past decade, the average annual growth from 2004 to 2013 was about 3% of world GDP, 5% of merchandise trade and 7% of container trade. Except that in the year 2009, world GDP, merchandise trade and container trade faced a serious downturn (See Figure 4.2 above). During the same period, the average growth of merchandise and seaborne trade were 6% and 5%, respectively, approximately double the global GDP growth, and the average growth of container trade was over 10%, three times greater than global GDP growth.

Container trade is a part of seaborne trade and merchandise trade; the latter two outpace world output on average, and are also more than proportionally affected by fluctuations in world output, as shown in the Figure 4.2 above.

The 10-year trend shown in the Figure 4.2 covers one serious downturn in 2009, but the long-term trend of this growth is expected to continue. Before the global economic downturn, the global container port traffic had been growing at an average rate of 12% per year from 2004 to 2013.

4.6 Global Seaborne Trade, Container Trade and Container Trade Growth Rates

4.6.1 Global Seaborne Trade Carried By Container Ships (1980-2013)

Globally, seaborne containerized cargo amounted to around 1.5 billion tons loaded in 2013. A global seaborne trade carried by container ships between the years (1980-2013) is shown in the Figure 4.3 below.

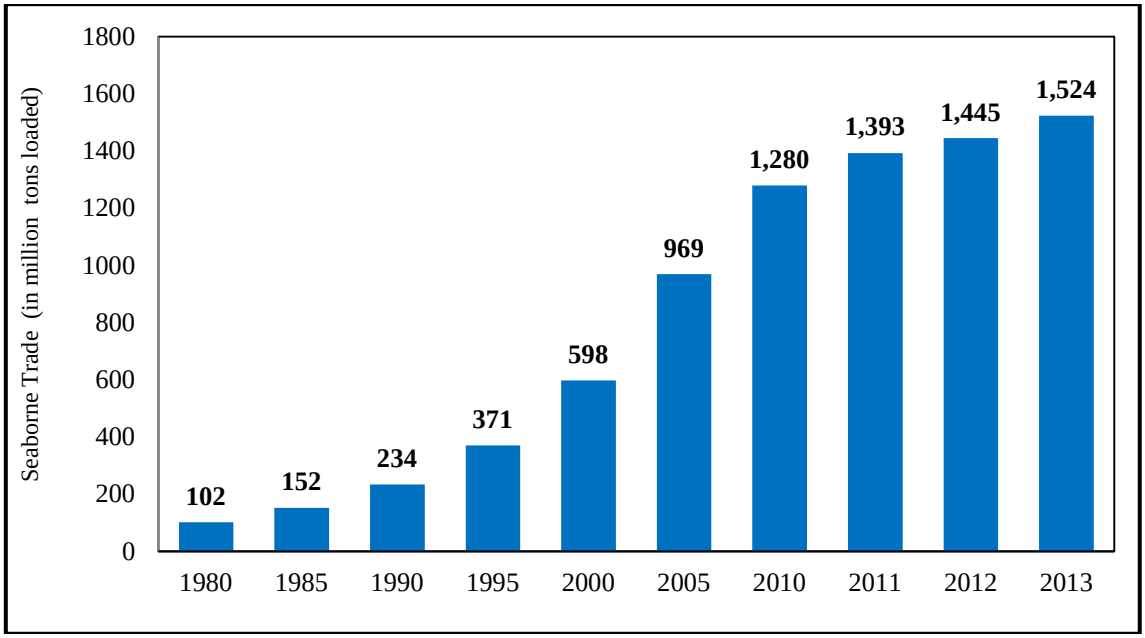

Figure 4.3: Global seaborne trade carried by container ships (1980-2013)
(Authors' own compilation based on "The Statistics Portal")

4.6.2 World Container Trade (1996-2014)

World container trade reached to 171 million TEU's in the year 2014. World container trade between the years 1996-2014 is given in the Figure 4.4 below.

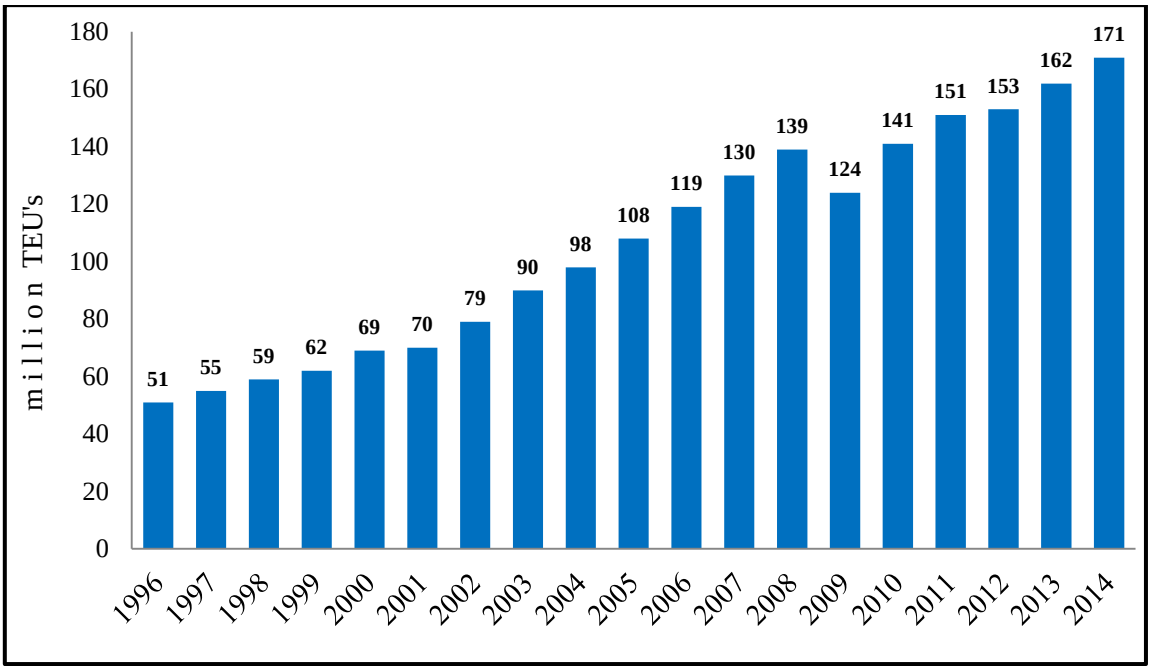

Figure 4.4: World container trade (1996-2014)
(Authors' own compilation based on (UNCTAD, 2014))

4.6.3 World Container Trade Growth Rate (1997-2014)

World container trade average growth rates between the years 1997-2014 gives an average of 10% except the year 2009 (See Figure 4.5).

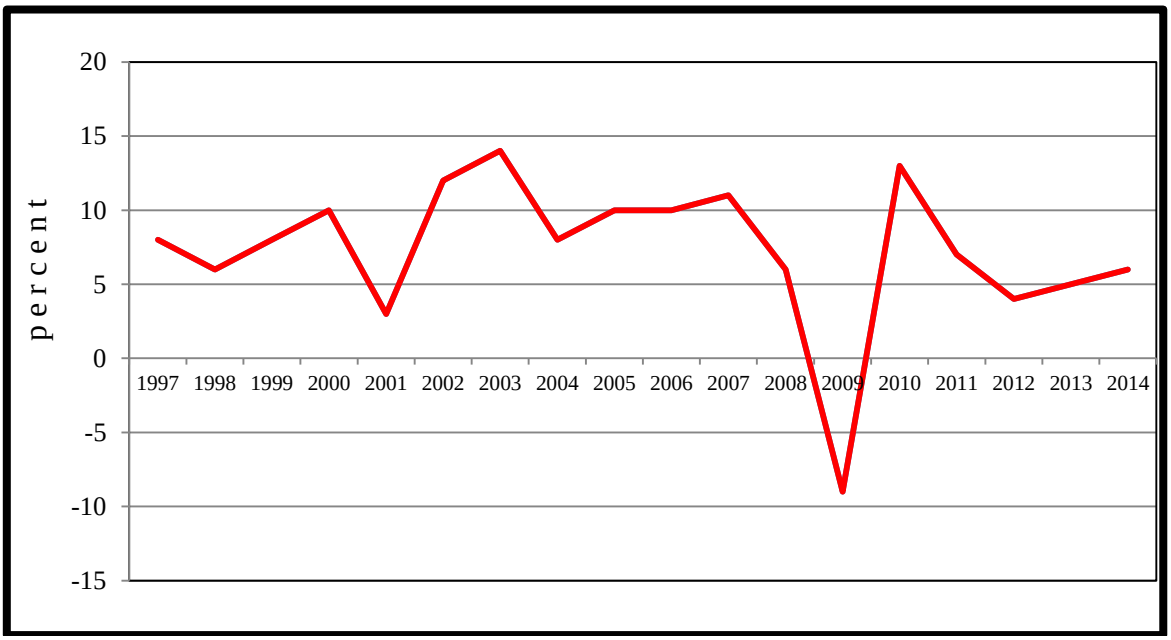

Figure 4.5: World container trade growth rate (1997-2014)
(Authors' own compilation based on (UNCTAD, 2014))

4.6.4 World Container Port Throughputs

World container port throughput reached to 651.1 million TEU's in the year 2013. World container port throughput between the years 2004-2013 is shown in the Figure 4.6 below.

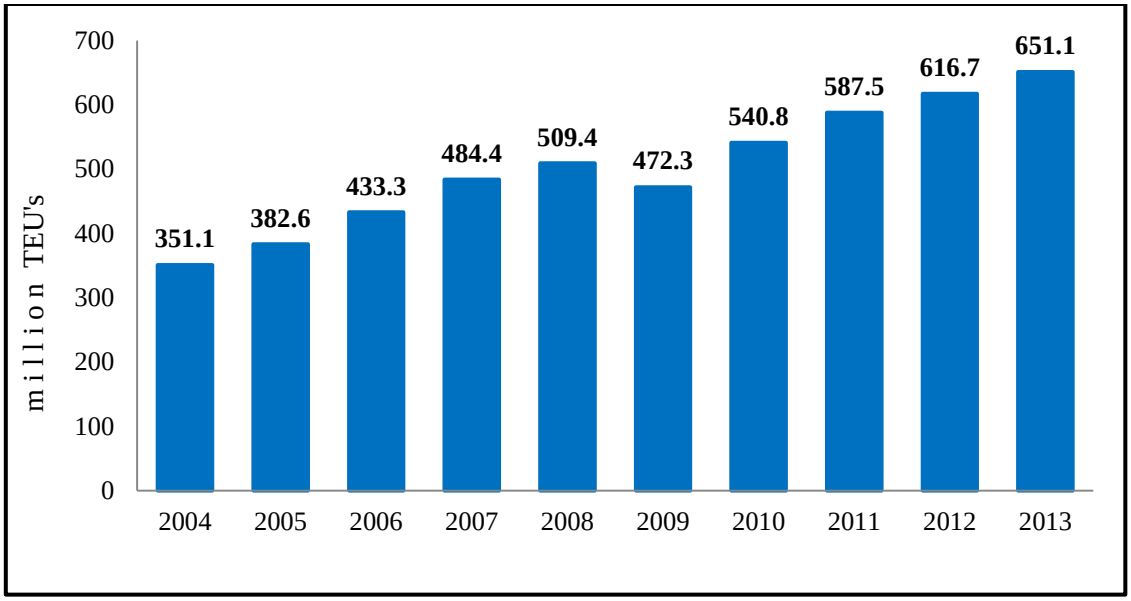

Figure 4.6: World container port throughput (2004-2013)
(Authors' own compilation based on (UNCTAD, 2014))

4.6.5 Comparison of World Container Trade and Port Throughput

"World Container Trade" is used to express the amount of goods carried in containers. It is used to give the capacity of countries trade realized by containers rather than the port capacities. On the other hand "World Container Port Throughput" is used to give the handling of container capacity of ports.

World Container Port Throughput figures are always higher than "World Container Trade" figures. This is due to the empty containers and the transhipment of containers. Most of the containers start from the origin port, using one or two hub ports until reaching to the destination port. At hub ports containers are double counted due to re-shipping operation. Comparison of "World Container Trade" and "World Container Port Throughput" statistics for the years 2004-2013 are shown in the Figure 4.7 below.

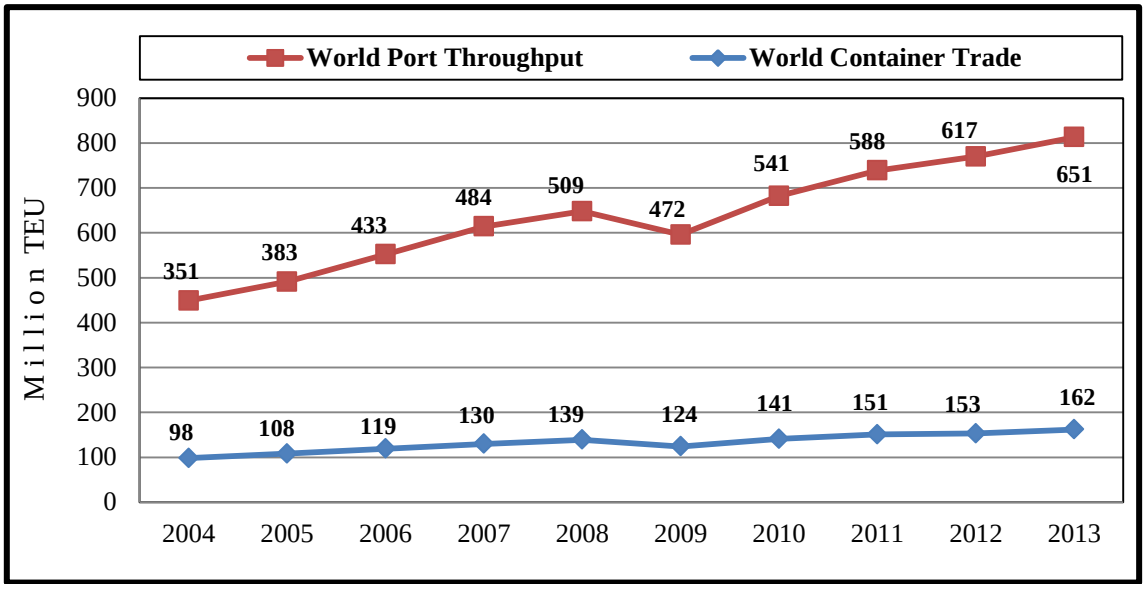

Figure 4.7: Comparison of world container trade and port throughput (2004-2013) (Authors' own compilation based on (UNCTAD, 2014))

4.7 Containers

Containers are big metal boxes mostly produced from steel. Containers are being used at shipping to transport goods from one destination to another in a safe way. A 20 ft standard container can be seen at Figure 4.8 below.

Figure 4.8: 20 foot standard container (TEU) (http://www.seagoline.com/services/containers/) (Accessed date: 2015)

4.7.1 Type of Containers and their Specifications

The dimensions of containers have been standardized. Specifications of dry and reefer containers are as shown in the Table 4.1 below.

Table 4.1: Specifications of containers
Authors' own compilation

	Type	Size	m^3	Ft^3
Dry containers	20' standard	20' x 8' x 8'6"	33	1,170
	40' standard	40' x 8' x 8'6"	67	2,390
	40' high	40' x 8' x 9'6"	76	2,714
	45' high	45' x 8' x 9'6"	85	3,040
Reefer containers	20' standard	20' x 8' x 8'6"	28	0,988
	40' high	40' x 8' x 9'6"	63	2,250

4.7.2 International Safety Requirements for Containers: "Convention for Safe Containers" (CSC)

The objective of Convention for Safe Containers (CSC) is to ensure a high level of safety of human life by formalizing common international safety requirements for the structural design and ongoing inspection and maintenance of cargo containers.

CSC is an international agreement resulting from the 1972 International Convention for Safe Containers. CSC is administered by the governments of the Contracting Parties or by organizations designated by governments such as the classification societies.

Approvals under the authority of a Contracting Party are accepted by other contracting parties. As a result, containers can operate worldwide under a single set of safety regulations.

1) **International Standards for CSC**
    a) Design type approval to ensure that new containers are designed and built to meet ISO (International Standardization Organization) dimensional and strength requirements.
    b) Safety inspections to ensure that containers are maintained in safe condition during their operating lives.

    Designs meeting all CSC and ISO requirements are assigned a *CSC number* which appears on the safety approval plate (CSC plate) of every container built to that design.

2) **Safety Examinations for CSC**
    a) Have the first safety examination no later than five years from the date of production.
    b) Have re-examinations at least every thirty months thereafter.

    The objective of the Examinations is to determine whether the container has damage that can place a person in danger.

3) **TIR Approval of Containers**

TIR Approval is a confirmation that the container meets the requirements for international transport under customs seal. The container is designed so that goods cannot be removed from or introduced into the container without breaking the customs seal or without leaving obvious traces of tampering.

4.8 Container Ships

Container ships are cargo ships that carry their entire load in truck-size intermodal containers, in a technique called containerisation. They are a common means of commercial intermodal freight transport and now carry most seagoing non-bulk cargo.

Container ship capacity is measured in twenty-foot equivalent units (TEU). Typical loads are a mix of 20-foot (1xTEU) and 40-foot (2xTEU) ISO-standard containers.

4.9 Type of Container Ships and Their Specifications

Containerisation starts in the midst of 1950's. The first container ships converted from conventional cargo vessels and tankers. The steady increase in container port traffic has pushed shipping companies towards operating larger ships. Also to reduce expenses for container ships increases in sizes, dictated by economies of scale. By the 1970's new modernized container ships started to be built and get bigger and bigger according to the market demands. But some waterways like the Suez Canal, Straits of Singapore and the Panama Canal, as well as port sizes are limiting the maximum dimensions of container ships.

The Suez Canal permits container ships called "Suezmax" with dimensions:

- Length: 400 meters
- Width: 50 meters
- Min Depth: 19 meters
- Draft: 17.4 meters
- Capacity: 12,000 TEU's

The type of container ships and their specifications are given in the Table 4.2 below.

Table 4.2: Type of container ships and their specifications
Source: http://en.wikipedia.org/wiki/Container_ship
(Accessed date: 2015)

Generation	Type of Vessel	Length (m)	Beam (m)	Draft (m)	No. Of TEU's
First (1956-1970)	Converted Vessels	135-200	-	<9	500-800
Second (1970-1980)	Cellular Container Ship	215	-	10	1,000-2,500
Third (1980-1988)	Panamax Class Container Vessels	250-290	32.31	11-12	3,000-4,000
Fourth (1988-2000)	Post Panamax Class Container Vessels	275-305	-	11-13	4,000-5,000
Fifth (2000-2005)	Post Panamax plus Class Container Vessels	355	46	13-14	5,000-8,000
Sixth (2006-)	New Panamax Class Container Vessels	366	49	15.20	11,000-14,500
Seventh (2010-)	Ultra Large Container Vessels	366-397	49 and wider	15.20 and deeper	15,000

The largest vessels that are currently in service can carry (18,000-plus) TEU's. The characteristics of "*M/V Mærsk Mc-Kinney Møller"* one of the largest container ships that have entered service in July 2013 is as follows:

- Type of Vessel: Suezmax
- Length: 400 m
- 400 m 59 m
- Depth: 14.5 m
- Capacity: 18,270 TEU
- Tonnage: GT: 194,849 Tons
  NT: 79,120 Tons
  DWT: 194,153 Tons

The generations of container ships growth can be seen in the Figure 4.9 below.

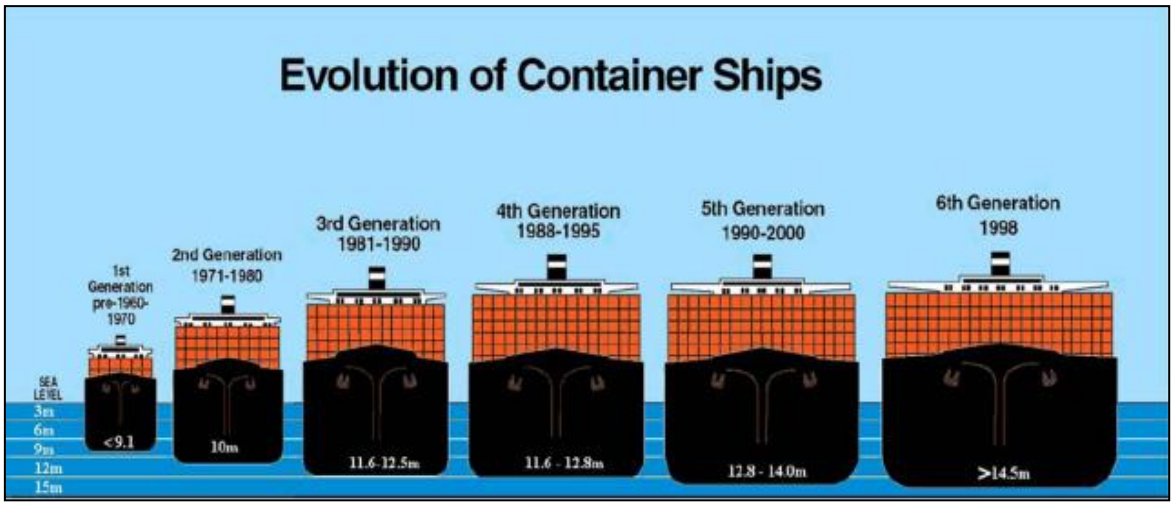

Figure 4.9: Growth of container ships
(https://www.google.com.tr/search)
(Accessed date: 2015)

The capacity growth rate of container ships for the years (1980-2015) is given in the Figure 4.10 below.

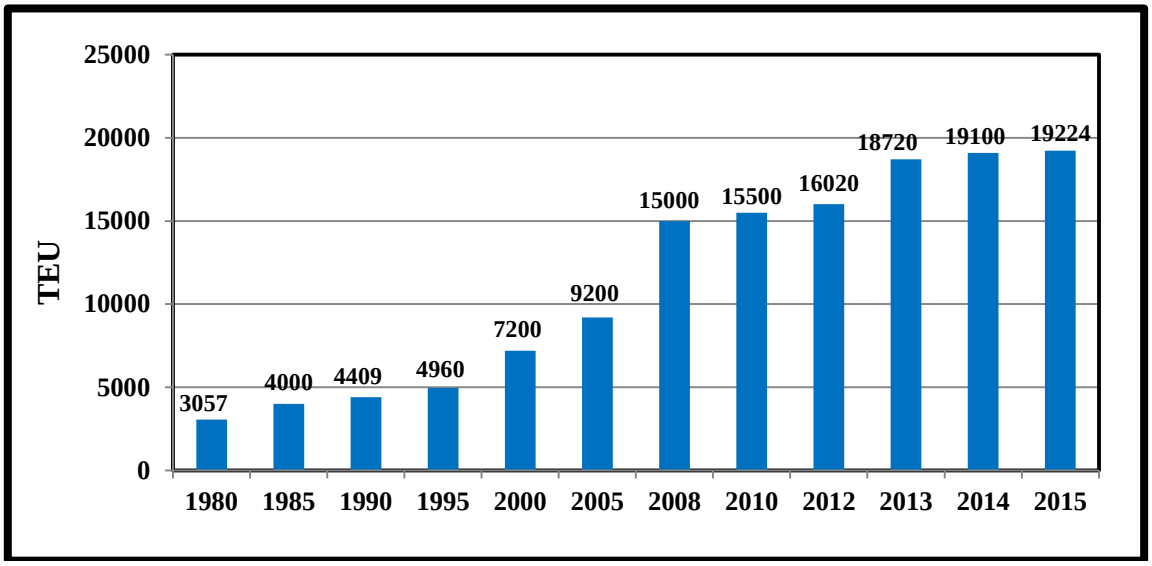

Figure 4.10: Capacity growth rate of container ships (1980-2015)
(Authors' own compilation based on (WSC, 2014))

4.10 Container Ports and Terminals

In parallel to the systematic increase in container port traffic and the high investments in the modernization of ships and port installations, brought up the container ports and terminals.

Ports and terminals invested for modernizing their installations, become **"**Hub Port" and **"**Regional Relay Hubs". These ports; have achieved significant transfer activity income, by transferring the container that discharged from "Container Mother Ships" to the smaller ports which they have not invested for modernized installations. Thus, ports, divided into two groups as; **"Central Ports"** that serving the mother container ships and **"Auxiliary Ports"** receiving service from central ports.

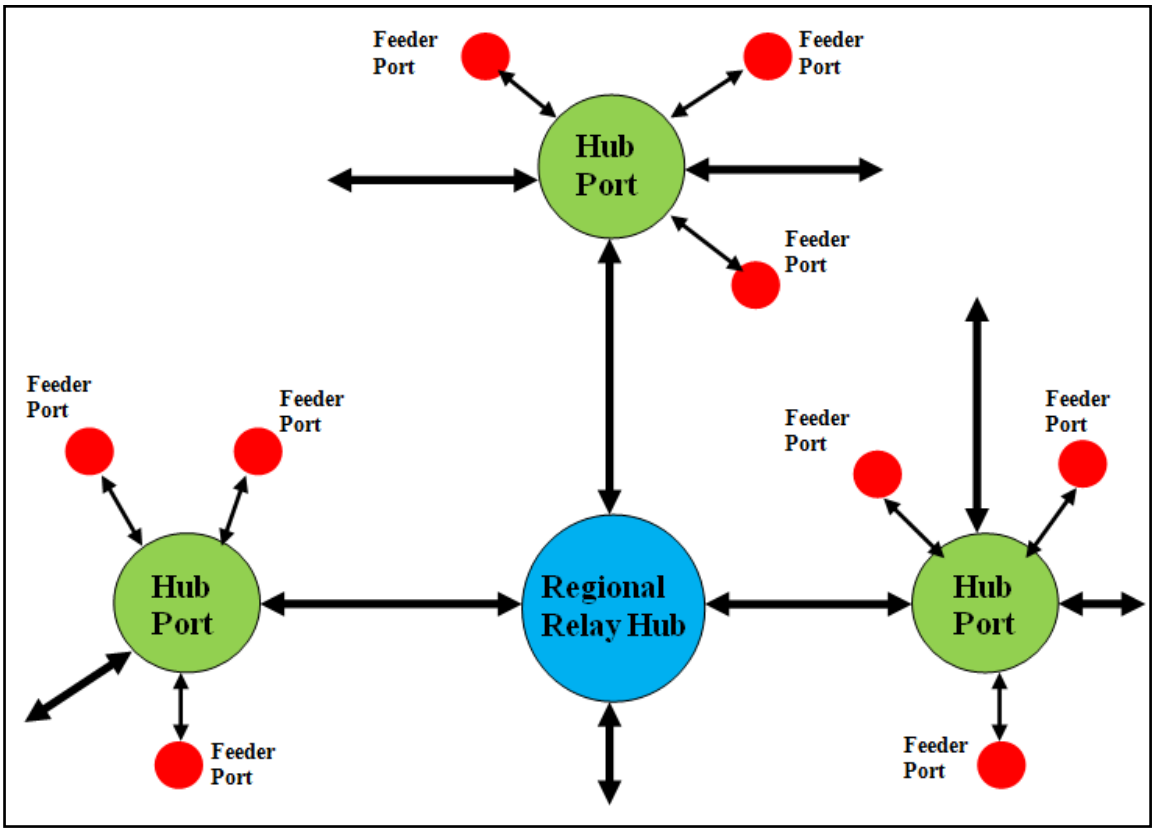

Figure 4.11: Structure of international container distribution system (Authors' own design)

4.10.1 Definition of Container Ports

Four kinds of container ports are defined as follows.

1) **Regional Relay Hub:** These ports are large central ports situated at economic regions of the world. Regional Relay Hubs; using the main container liner routes, they distribute containers among economic regions. The best example to these ports is the port of Singapore and Hong Kong.
2) **Hub Port (I):** These ports are generally interested in the international transit containers. They give very little interest in the local container services. These ports

are located just adjacent to the main shipping routes. The best example to these ports in the Mediterranean is the port of Gioia Tauro, Marsaxlokk and Port Said.

3) **Hub Port (II):** These ports are generally interested in the local/domestic containers. They give very little interest in international transit containers services. These ports do not have to be very close to the main container ship routes. The best example to these ports in the Mediterranean is the port of İzmir and Piraeus.
4) **Feeder Port:** Feeder Port is a port at which mother container ships do not call and all international containers are transferred from Hub Port I or Hub Port (II).

The transportation relation of these ports is shown in the Figure 4.11 above.

4.10.2 World Busiest Container Ports

World busiest top 20 container ports are given in the Figure 4.12 below. According to Review of Maritime Transport 2014, UNCTAD; 24% of World container port throughputs are from china ports.

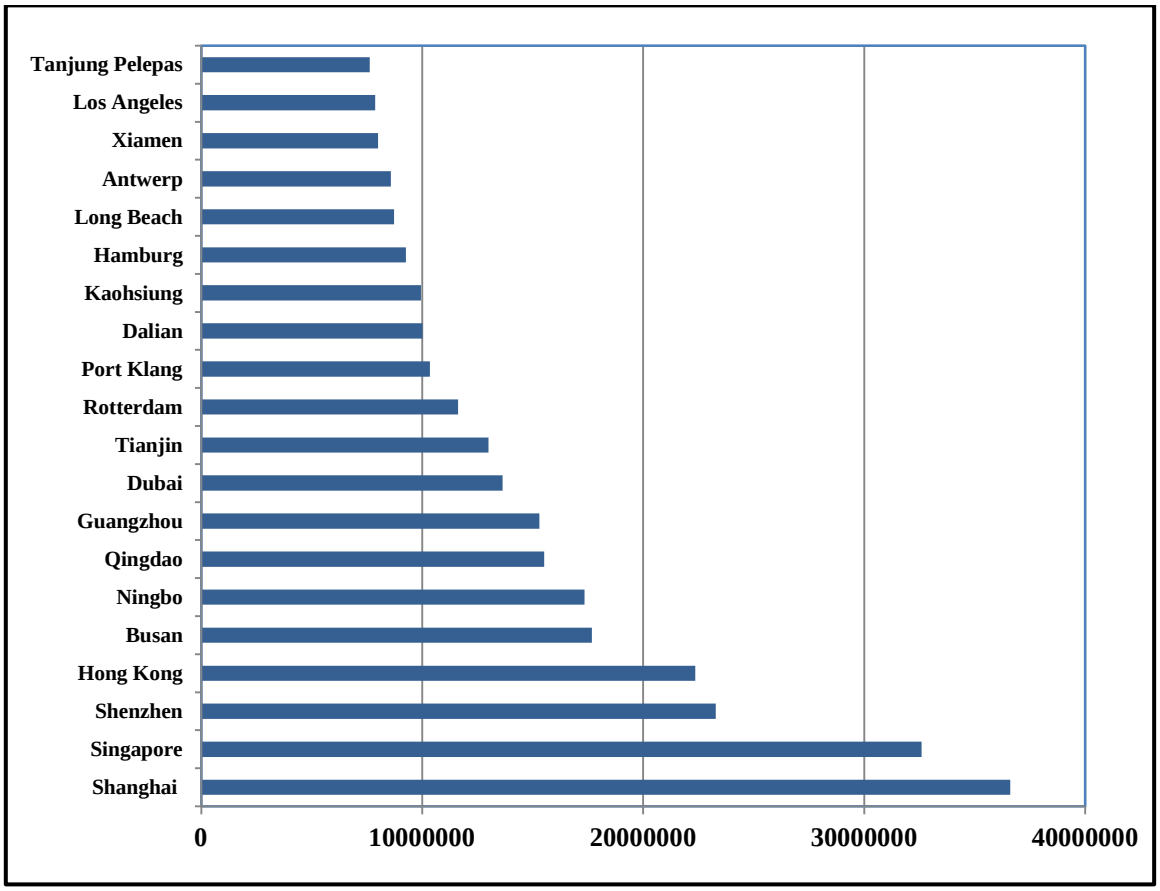

Figure 4.12: Graphic showing world busiest top 20 container ports
(Authors' own compilation based on (UNCTAD, 2014))

4.11 Cargo Market Types in Container Shipping

4.11.1 Destination Traffic (Hinterland)

Containers are transported for port hinterlands and for other inland points.

1) **Deep-sea Direct**

   Containers are transported by intercontinental services on deep-sea ships which call directly.

2) **Short/Near-Sea Intra-regional**

   Containers are transported intra-regional by smaller container ships.

3) **Short-Sea Feeder**

   Containers are transported by feeder services having been transhipped to other ports.

4.11.2 Transhipment Traffic

Transfer of containers from one ship to another. Containers are held in the terminal waiting reshipping on other ships.

1) **Hub and Spoke Transhipment**

   Containers originating in or destined for the region are transferred from hub ports to the spokes (feeder ports) by sea feeder services (See Figure 4.13).

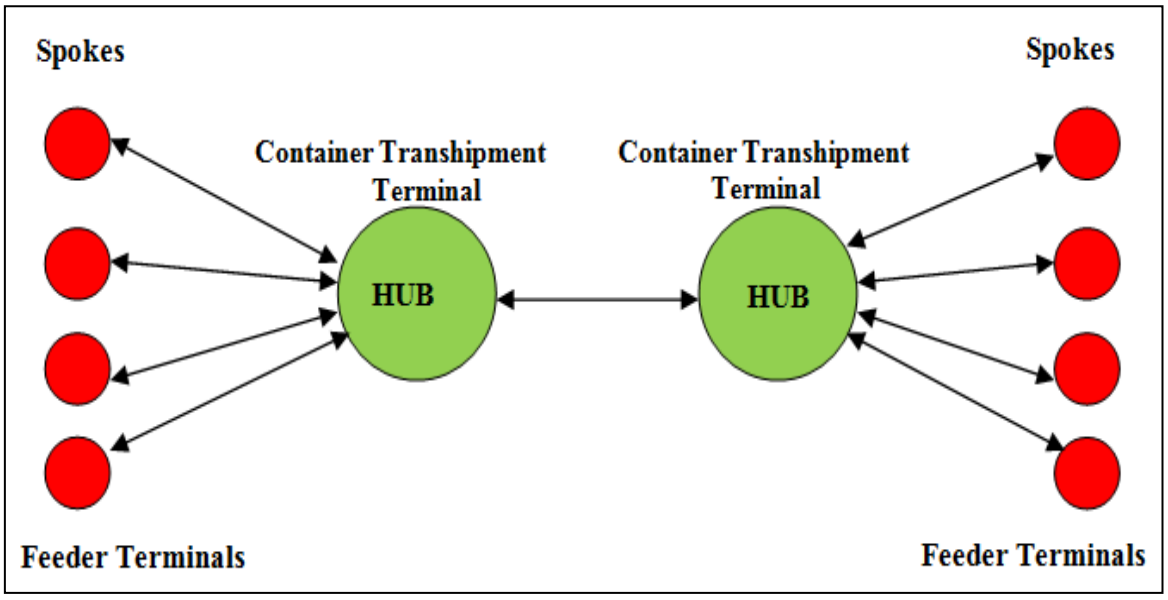

Figure 4.13: Hub and Spoke System
(Author's own design)

2) **Regional Transhipment**

International container relay traffic destined for areas beyond the regional markets. Regional transhipment of containers conducted by deep-sea vessels and has no involvement with the regional markets. Actually “Regional Relay Hubs” are transhipment hubs.

4.12 Transhipment Property of Container Transportation

In recent years, the circulation of the industrial goods between economic regions has been enormously increased due to the container.

Containers; easily can be transported among the ports in transit. This property of container transportation, emerge, ports to invest and increase their capacity in an intensely competitive environment, to become a “Regional Relay Hub Port” or a “Hub Port” and grab a share of this action. The following specifications, creates the transit property of container transportation:

1) **Container Mother Ships**

   Container Mother Ships are larger and faster vessels and they are very expensive compared to the conventional General-cargo ships. Due to these features, Container Mother Ships rather than many ports, they would prefer to call at a single port with suitable depth, high handling capacity and discharge or load their containers.

2) **The Use of Expensive Equipment at Container Terminals**

   Container handling vehicle and equipment due to their high specifications they are so expensive, that is not economical for every port to equip.

3) **The Easy Transfer of Containers by Feeder Ships**

   Containers discharged from Mother Ships, can be easily and cheaper distributed to their final destination port, by smaller ships called “Container Feeder Ships”, even if the final destination port is a conventional port and not a Container Terminal.

4) **Convenience Provided at Customs**

   In terms of customs practices worldwide; once sealed at the first Customs Office, containers can be transferred among the other ports with the same seal.

5) **Security of the Contents of the Container**

   The contents of a container can be waited at a Hub Port, more securely than the conventional transported break bulk general-cargo. Containers considerably reduced thefts, especially of valuable commodities. Theft was a serious issue at

ports before containerisation. Because of this feature of containers; can be transferred two or three Hub Ports before their final destination. For example; a container exported from Australia can be first sent to Singapore (Regional Relay Hub) than to Marsaxlokk (Hub Port) of Malta, and finally by feeder services to Port of Mersin and to Port of Famagusta.

Due to the above mentioned features; containers provide the opportunity for small production units, to submit their production to more distant markets.

4.13 Transhipment of Containers

At container terminals, containers are transhipped from one mode of transportation to another. Within terminals different types of material handling equipment are used to transhipp containers from ships to feeder ships, barges, trucks and trains.

> "According to Drewry, the incidence of transhipment at container terminals worldwide (as a percentage of global throughputs) increased from 17.6% in 1990 to 28.5% in 2010 and did not experience any annual decline during that period. As the latest generation of container ships on order have nominal capacities of approximately 13 thousand TEUs or more and are too wide and too deep to call at many ports in the world, shipping lines may instead seek to, or be required to, rationalise the number of port calls they make and hence increase transhipment between hub ports and final destinations" (GCM, 2015).

4.14 Asia - North Europe, Mediterranean, Middle East Trade Routes

According to data given by the World Shipping Council for the year 2014; most traffic of; Asia - North Europe, Asia-Mediterranean and Asia - Middle East trade routes are passing through the Mediterranean. The total of this trade routes traffic is 23,663,597 TEUs.

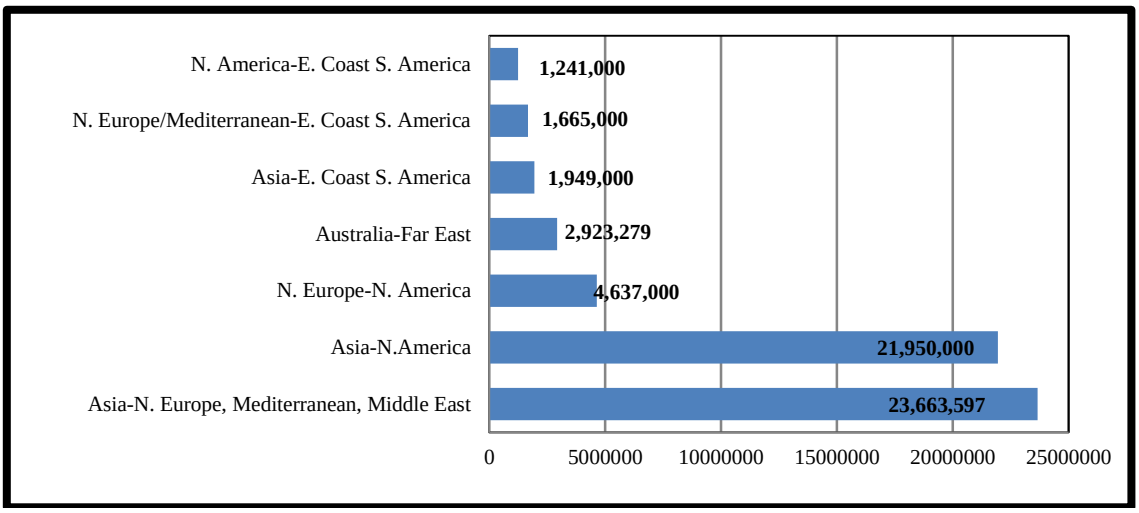

Figure 4.14: Cargo flows on major container trade routes in 2012
(Authors' own compilation based on (WSC, 2014))

23,663,597 TEUs moved at the Asia-North Europe, Asia-Mediterranean and Asia-Middle East Trade Routes constitutes the 40.78% of all containers moved by Container Liner Ships through Global Trade Routes (See Figure 4.14).

From this evaluation is understood that; most of the containers moved at the 'Asia-North Europe', 'Asia-Mediterranean' and 'Asia-Middle East' Trade Routes, passes through the Mediterranean using the Suez Canal (See Figure 4.14 and Figure 4.15).

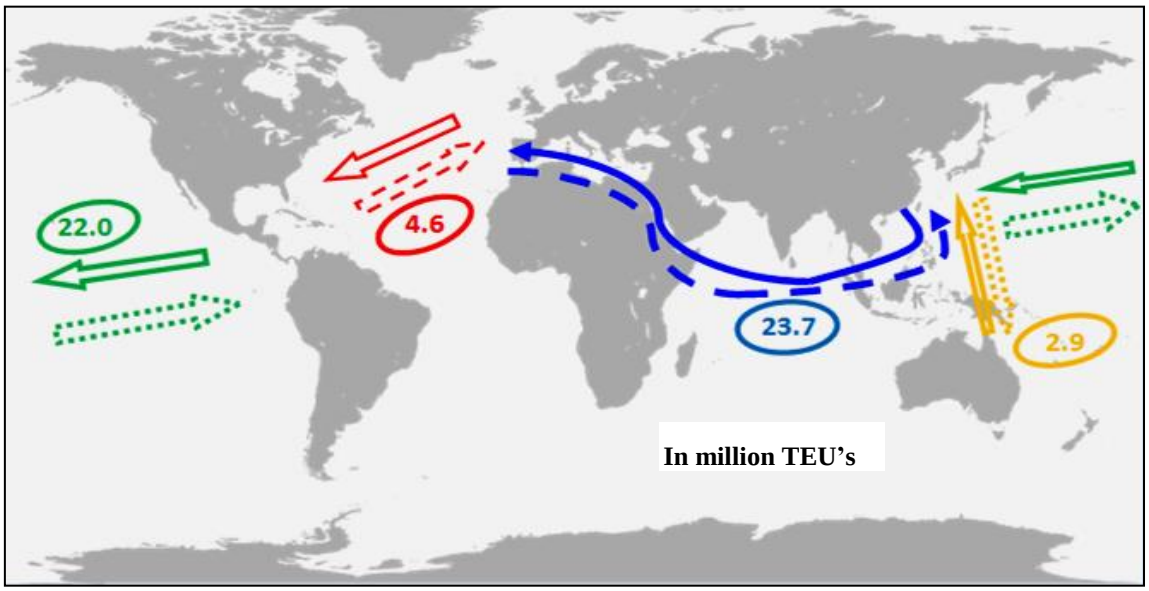

Figure 4.15: Cargo flows on major container trade routes in 2012
(An Author's own design based on (WSC, 2014))

4.16 Container Handling Equipment

The systematic increase in world container port traffic brought in the modernization of handling equipment at ports. The modernized container handling equipment is shown below.

4.15.1 Ship to Shore Gantry Cranes

Gantry cranes used to load and unload container ships. A Panamax Portainer can accommodate ships up to 13 containers in width, while a Post-Panamax Portainer reaches up to 18 containers alongside (See Figure 4.16).

Figure 4.16: Ship to Shore Gantry Crane (Accessed date: 2015)
http://upload.wikimedia.org/wikipedia(gantry_crane).jpg

4.15.2 Yard Gantry Cranes

1) **Rubber-Tired Gantry** (RTG)

The rubber-tired gantry (RTG) is used for loading and unloading railcars and trucks. It is also used stacking operations (See Figure 4.17).

Figure 4.17: Rubber-Tired Gantry

1) **Rail-Mounted Gantry** (RMG)

The rail-mounted gantry (RMG) is also used for loading and unloading railcars and trucks. It is also used stacking operations (See Figure 4.18).

Figure 4.18: Rail-Mounted Yard Gantry Crane

4.15.3 Straddle Carriers

The straddle carriers are used to loading and unloading rail cars and trucks as well as stacking containers (See Figure 4.19).

Figure 4.19: Straddle Carriers https://upload.wikimedia.org/wikipedia (Accessed date: 2015)

4.15.4 Stackers

1) **Reach Stacker**

   The reach stackers are used for stacking of containers (See Figure 4.20).

2) **Forklift**

   The forklifts are used to handling and stacking containers (See Figure 4.20).

Reach Stacker

Fork Lift

Figure 4.20: Stackers

4.15.5 Yard Chassis

Yard Chassis is a vehicle used in moving containers, from the ship to stacking area and from the stacking area of the ship (See Figure 4.21).

Figure 4.21: Yard Chassis

CHAPTER 5

MEDITERRANEAN AND CONTAINERISATION

5.1 Mediterranean and Containerisation

The Mediterranean Sea is located at a favourable geographic position where pass one of the three most important trade roads between East and West (See Figure 4.15 above). The Mediterranean Sea became an important region for container transhipment between the Europe and the Far-East trade. The Mediterranean ports were largely bypassed by the ships engaged in the Far-East Europe trade prior to the 1990's. After 1990's by the establishment of transhipment hubs, developments in container trade started to be seen in the Mediterranean Sea region. Hub and spoke system and feeder ship services helped a lot for the development of container port traffic in the Mediterranean.

> "The basin of the Mediterranean Sea has become an important focus of container port traffic. Two functions are represented by this activity: one, the transhipment of containers involved in global networks; and, second, and the intra-regional distribution of containers. This trade is revitalising port activity in many parts of the basin. Most striking has been the emergence of new hub ports, many of which now eclipse old-established port cities. The revitalisation offers prospects for a third function: the possibility of becoming the southern gateway of Europe" (Ridolfi, 2015).

Table 5.1: Mediterranean container terminal capacity and port throughputs activity forecast (2014-2021) (Million TEU's), Source: Authors' own compilation based on the "MEDA 12th Ports Summit, 2014"

	2014	2015	2016	2017	2018	2019	2020	2021
Mediterranean Ports Capacity	87.0	92.5	96.9	98.6	101.7	102.4	107.1	113.4
Port Throughputs	55.0	58.3	61.9	65.8	67.5	71.8	76.5	81.6

5.2 Mediterranean Container Activities

According to various sources, there are 42 ports dealing with containers within the Mediterranean. The existing container terminals; offer 72 kilometres quay length, equipped with 440 ship-to-shore container gantries plus some 120 mobile harbour cranes to load and discharge the ships. The total Intra-Mediterranean full container trade (regional trade and feeder boxes) has reached around 15.3 million TEU's, up from 14.9 million TEU in 2013. The container terminals of these ports have a capacity of 87 million TEU's and handled around 52.1 million TEU's in the year 2013. It is foreseen that Mediterranean container

terminal capacity will increase up to 113.4 million TEU's and port throughputs will be realized an increase up to 81.6 million TEU's in 2021, as shown in the Table 5.1 below.

5.3 The Main Ports of Mediterranean

The main Ports of Mediterranean, which they are handling over one million TEU's annually is given in the Table 5.2 below.

Table 5.2: Mediterranean Ports, (2009-2013) (1000 TEU), Source: Authors' own compilation based on IAPH World Ports

Port	2009	2010	2011	2012	2013	Growth Rate % (2013-2009)	Country	Region
Algeciras	3,043	2,810	3,602	4,114	4,501	148	Spain	West Med.
Valencia	3,654	4,207	4,327	4,469	4,328	118	Spain	West Med.
Barcelona	1,800	1,946	2,034	1,756	1,720	96	Spain	West Med.
Gioia Tauro	2,857	2,851	2,305	2,721	3,087	108	Italy	Central Med.
Marsaxlokk	2,260	2,371	2,360	2,540	2,750	122	Malta	Central Med.
Genoa	1,534	1,759	1,847	2,064	1,988	130	Italy	Central Med.
La Spezia	1,046	1,285	1,307	1,247	1,298	124	Italy	Central Med.
Port Said	3,301	3,475	4,306	3,631	4,100	124	Egypt	East Med.
Ambarlı (İst.)	1,836	2,540	2,686	3,097	3,378	184	Turkey	East Med.
Piraeus	665	513	1,680	2,734	3,164	476	Greece	East Med.
Alexandria	799	808	1,490	1,463	1,508	189	Egypt	East Med.
Mersin	844	1,024	1,126	1,263	1,378	163	Turkey	East Med.
Haifa	1,140	1,264	1,235	1,372	1,357	119	Israel	East Med.

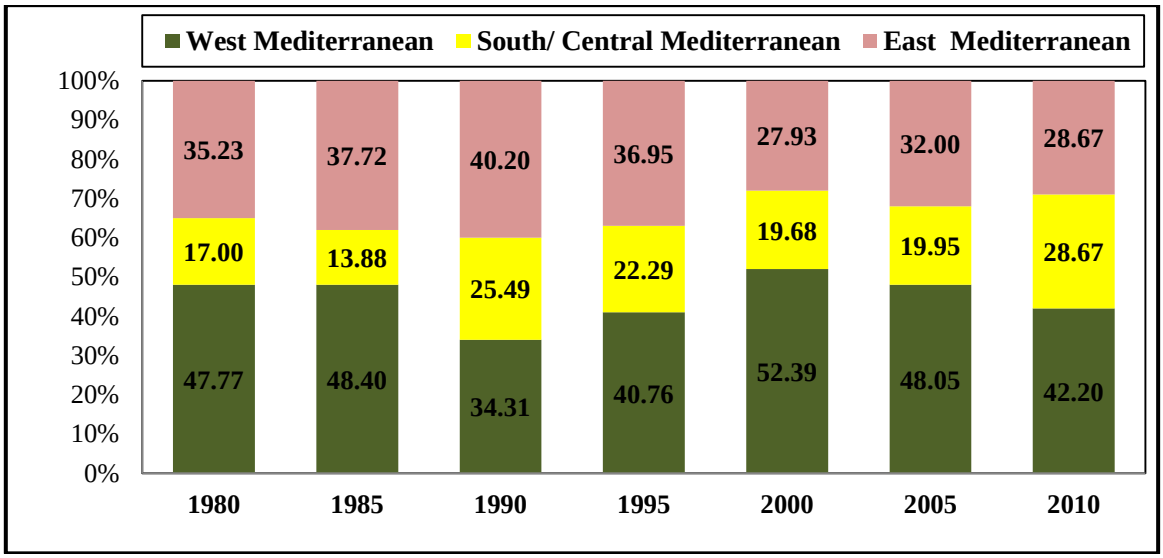

Figure 5.1: Container traffic percentages by port range of Mediterranean (Authors' own compilation based on (DR, 2014), Figure 2)

5.4 Regional Container Ports of Mediterranean

The Mediterranean is divided in three regional container ports. Percentage shares of each port region of the Mediterranean for the years (1980-2010), are given in the Figure 5.1 above.

> "The Mediterranean is divided in three distinct ranges that better reflect the regional characteristics of its ports. The **"Western Mediterranean Range"** extends from Gibraltar to the southern tip of Italy, which covers the major economic regions of Mediterranean Europe. The **"Eastern Mediterranean / Black Sea Range"** covers more marginal, but rapidly growing economies of Eastern Europe and Turkey. The **"Southern Mediterranean range"** (Giaou Tauro, Marsallok of Malta) attracts transhipment traffic bound to European ports, implying that a growing volume of the cargo handled relates to European derived demand" (Gouvernal, Rodrigue and Slack, 2012).

5.5 Developments of Transhipment Traffic in the Mediterranean Region

In line with global trends, transhipment operations (hub and spoke, and relay) in the Mediterranean region, has been increasing over the years. Transhipment from oceanic vessels to direct feeder ships facilitate the hub and spoke system while transhipment between oceanic vessels facilitates the system of relay.

> "In the Mediterranean region, there has been considerable growth in transhipment, as compared to direct services. Over the period 1990-1998, transhipment volumes in the region have been growing at a compound annual average rate of 20%. This strong growth in transhipment has boosted growth in the direct feeder sector servicing the hub and spoke system, which experienced a 17% annual average growth rate over the same period" (EMTP, 2005).

5.6 Mediterranean Container Transhipment Activity Forecast

Container transhipment is the main activity in the Mediterranean Sea region. According to Euro Mediterranean Transport Project, transhipment is expected to level at about 52% in the European Mediterranean, 24% in the MEDA region, and 43% for the entire Mediterranean.

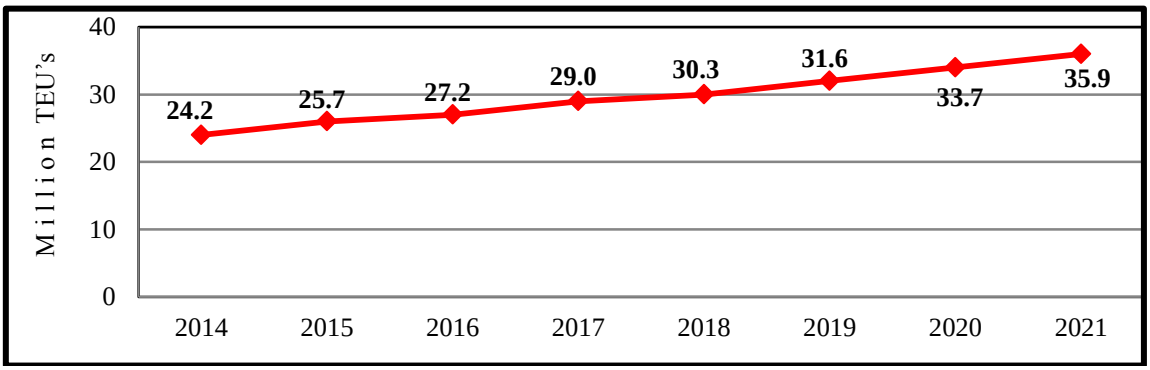

Figure 5.2: Mediterranean container transhipment activity forecast (2014-2021)
(Authors' own compilation based on the "MEDA 12th Ports Summit")

According to the "MEDA 12th Ports Summit", the Mediterranean container port traffic was around 52.1 million TEU's in the year 2013. The 43% of the Mediterranean container port traffic, which is around 22.4 million TEU's in the year 2013 are transhipment units in the hub and spoke system. The Mediterranean Container Transhipment Activity Forecast for the years (2014-2021) is given in the Figure 5.2 above.

5.7 New Era in the Mediterranean Transhipment Operations

Stuart Rankin a correspondence in "Port strategy"; wrote the article about Mediterranean Container Transhipment Operations. At his article dated 10 Feb 2015 named "Mediterranean Battleground", Rankin is giving interesting ideas. Rankin's article is given at follows.

> "With container ship sizes heading over the 20,000 TEU's is underway, Mediterranean transhipment operations are heading into a new era.
> The hallmarks of this will be progressively bigger, strategically located transhipment hubs building healthy volume growth and a reduction of interest in transhipment activity in smaller hubs, especially at those located a significant way off the main arterial trade routes.
> Between the existing main transhipment hubs there are no significant differences in available capacity and particularly so when it comes to serving the highest capacity vessels. Malta Freeport is a case in point: not all its quays can serve the largest vessels and it is true to say that the potential is limited as to the number of new berthing windows it can offer for such vessels. Expansion plans are in the melting pot, but these are by no means imminent. For some ports there is also the issue of the draft: 17 metres are the new standard and not all meet these criteria. When you look at the combination of factors - which include the optimal routing of the new high capacity ships, available berthing windows, new operational requirements flowing out of mega consortia arrangements and new draft requirements - then there appears to be scope for the entrance of at least one or two major new hubs" (Rankin, 2015).

5.8 Port Finance International Conferences about Mediterranean

At the Conferences held in İstanbul by Port Finance International in the years 2009 and 2012 also emphasized the importance of Mediterranean container ports for transhipment.

5.8.1 Port Finance International 12-13 May 2009 İstanbul Conference

A conference organised by the Port Finance International under the title "Maritime Transport in the Eastern Mediterranean" held in İstanbul on 12-13 May 2009. At his presentation Marten van den Bossche, Chairman of ECORYS from Nederland gave the world containerisation growth rates, for each region. At this presentation; the regional container growth for the years 2004-2020 has also been given. The growth rate for Turkey has been given by 5% to 6% and for Balkan and Black sea countries by 7% to 8% (See Figure 5.3) (Bossche, 2009).

5.8.2 Regional Container Port Traffic and Container Transhipment

At his presentation Marten van den Bossche added that; a number of port terminals would grow considerably up to 300 terminals worldwide during an 8 year period.

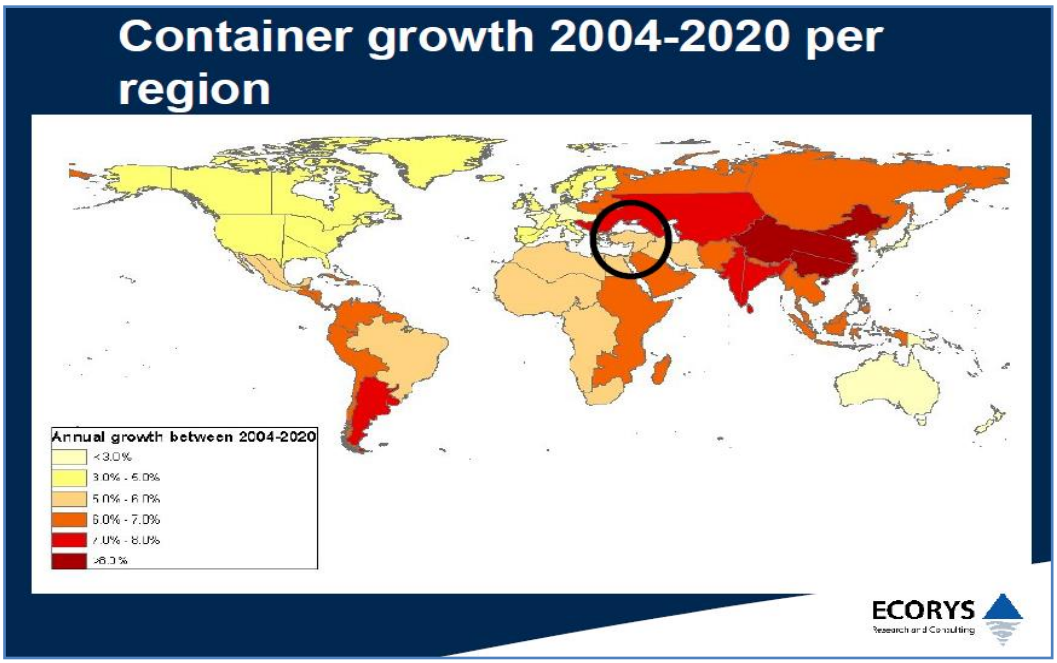

Figure 5.3: Container growth rates of regions (2004-2020) (PFI, 2009)

He also added that; at Eastern Mediterranean well positioned, many new terminals could be expected. Marten van den Bossche, zooming into the regional container port traffic between the years 1995-2004, he gave average annual growth for the Mediterranean and Southern Europe 11.4 per cent of Container Trade and 16.9 per cent for Container Transhipment. The traffic for the Eastern Mediterranean and Black Sea has been given 10.4 per cent by Marten van den Bossche, while an average annual growth has been realized 10.5 per cent worldwide (See Table 5.4, Table 5.5 and Table 5.6) (Bossche, 2009).

Table 5.3: World and Europe container port traffic (1995-2004)
Source: (PFI, 2009)

	World Wide	Europe	Northern Europe	Mediterranean and Southern Europe
Average annual growth	10.5%	9.5%	8.1%	11.4%
Total volume 1995 (Million TEU)		34.1	20.6	13.5
Total volume 2004 (Million TEU)		77.2	41.6	35.7

Table 5.4: World and Europe container transhipment (1995-2004)
Source: (PFI, 2009)

	World Wide	Europe	Northern Europe	Mediterranean and Southern Europe
Average annual growth	10.5%	13.8%	10.5%	16.9%
Total volume 1995 (Million TEU)		7.0	3.9	3.2
Total volume 2004 (Million TEU)		22.5	9.5	13.0

Table 5.5: Southern Europe and Mediterranean container port traffic (1995-2004)
Source: (PFI, 2009)

	Atlantic Europe	Western Med.	Central Med.	Eastern Med and Black Sea
Average annual growth	9.6%	11.4%	13.1%	10.4%
Total volume 1995 (Million TEU)	1.6	3.6	3.8	4.5
Total volume 2004 (Million TEU)	3.7	9.6	11.5	11.0

At the same conference held in İstanbul, Marten van den Bossche comparing the worldwide growth figures added that;

- Total volume growth in the Mediterranean was above worldwide standards and European total growth,
- Mediterranean transhipment volume was growing even faster,
- Eastern Mediterranean is growing slower than Western and Central Mediterranean, at world average, but faster than Europe,
- Turkey's container growth has been given high above all averages.

5.8.3 Other Developments in the Mediterranean Container Market

In his presentation Marten van den Bossche, also gives information about other developments in the Mediterranean container market; Far East-North Europe containers, instead of passing through the Mediterranean for their final destination, prefer to use Far East-Mediterranean container services. This means potential for one or two more hub ports in the Mediterranean region (Bossche, 2009).

5.9 Port Finance International 18 April 2012 İstanbul Conference

In the conference organised by the Port Finance International under the title "Emerging Market Structures in Ports: The End of the World as We Know It?" held in İstanbul, on the, 18th of April 2012 has emphasized the importance of the Mediterranean in transhipment operations, the expanding capacity of Black Sea containers and the huge amount of containers coming from the Far East to Europe.

At the conference it has also emphasized the importance of the Far East Trade Area and especially the significant steps that have been taken by China and India via container trade (Simpson, Beard and Jin, 2012).

5.9.1 China Trade Area (in the Year 2007)

- Total exports from China: 1,202 billion US Dollars (9.8% of world total vs. 8.9%,
- Total imports to China: 1,006 billion US Dollars (8.0% of world total vs. 5.6%,
- Total exports from China to Europe: 243 billion US Dollars,
- Total imports to China from Europe: 138 billion US Dollars,
- Total exports from China to Middle-East: 61 billion US Dollars,
- Total imports to China from Middle-East: 58 billion US Dollars.

5.9.2 India Trade Area (in the years 2011-2012)

- Total exports from India: 190 billion US Dollars,
- Total imports to India: 236 billion US Dollars,
- Total exports from India to Europe: 70 billion US Dollars,
- Total imports to India from Europe: 42 billion US Dollars,
- Total exports from China to W. Asia, N. Africa: 49 billion US Dollars,
- Total imports to China from W. Asia, N. Africa: 35 billion US Dollars.

CHAPTER 6
EASTERN MEDITERRANEAN AND CONTAINERISATION

6.1 Eastern Mediterranean Container Port Traffic

Mediterranean container port traffic was realized as 55 million TEU's in the year 2014. Eastern Mediterranean container port traffic is around 30% of the total Mediterranean container port traffic. According to this percentage; Eastern Mediterranean container port traffic share will be around 16,500,000 TEU's in 2014.

It is strongly believed that the Eastern Mediterranean container port traffic will increase more than this amount in the coming years. This increase will be due to the regions of the Black sea and Balkan countries which are in the target of Eastern Mediterranean Hub Ports.

The Eastern Mediterranean-Black Sea range covers more marginal, but rapidly growing economies of Eastern Europe, Russia and Turkey (Gouvernal, Rodrigue and Slack, 2012).

The Eastern Mediterranean Container Port Traffic shares in the years (1980-2010), are given in the Figure 6.1 below.

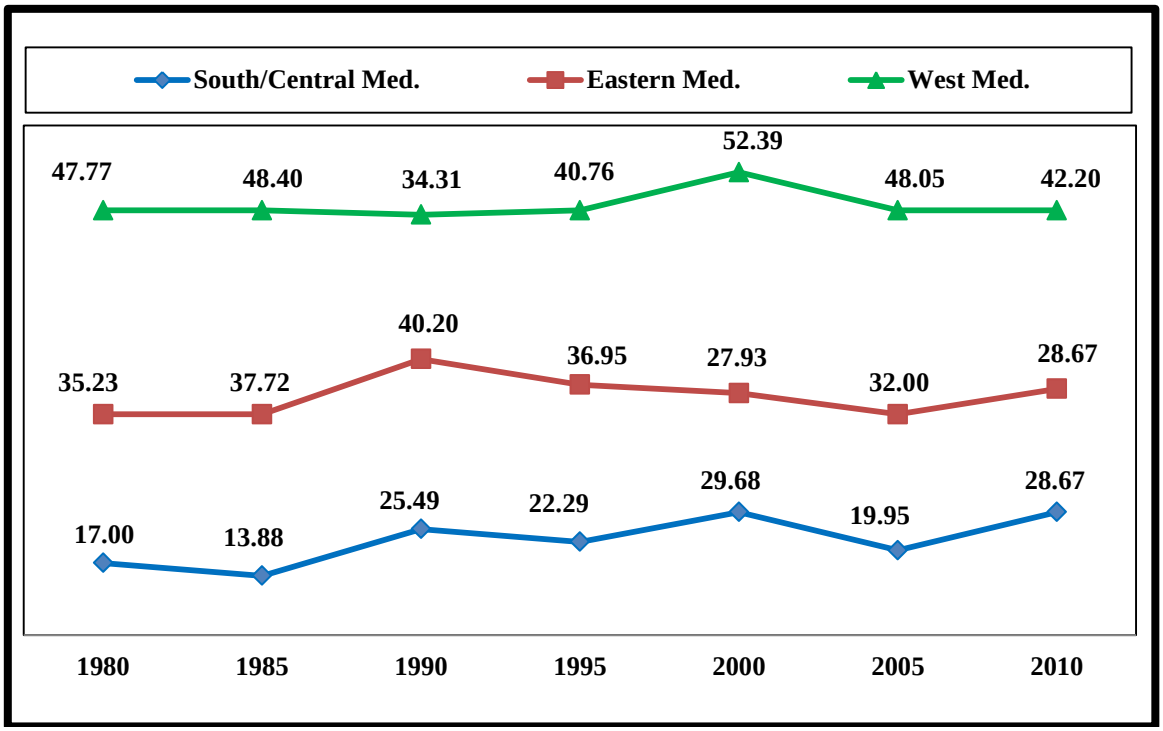

Figure 6.1: Container port traffic percentages by port range Mediterranean (1980-2010) (Authors' own compilation based on (DR, 2014), Figure 2))

6.2 Trade Areas in the Target of the Eastern Mediterranean Hub Ports

Mediterranean region, being on the main routes between Far East and Europe trade areas, became one of the most important competing regions of the world. Major Hub Ports in Eastern and Central Mediterranean is competing to take more shares from the container distribution in the Eastern Mediterranean, Black Sea, Adriatic Sea and Balkan countries. Container distribution system and trade areas in the target of Eastern Mediterranean can be seen in the Figure 6.2 below.

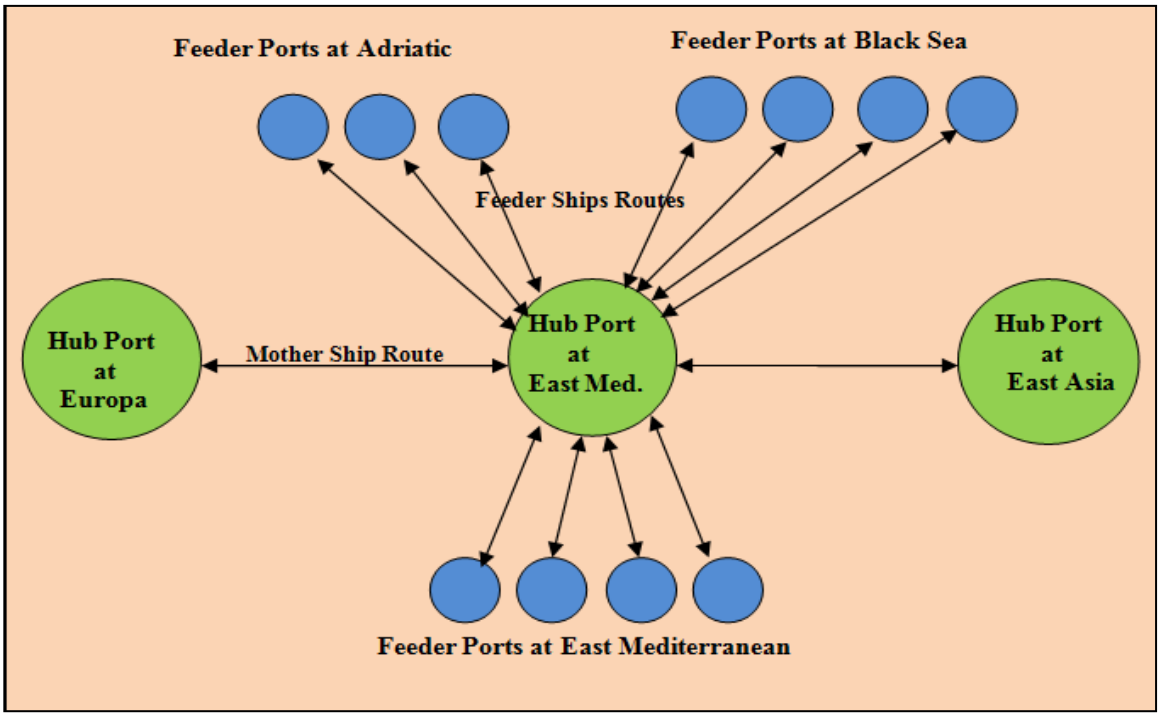

Figure 6.2: Container distribution system in the Eastern Mediterranean (An Author's own design)

6.3 Evaluation of Trade Areas in the Target of the Eastern Mediterranean Hub Ports

The relationship between Global Trade growth and Gross Domestic Product (GDP) growth also reflects the GDP growth and the Global Container Throughput growth.

Research made about Population, GDP, GDP Avarage Growth Percentage and Container Port Traffic, for the trade areas which are in the target of Eastern Mediterranean Hub Ports is giving interesting results.

Research showed that; the population of the countries in the target is 404,823,114, GDP 4,593.8 billion US Dollars and container throughputs are 21,176,600 TEU's in total at the year 2014 (See Table 6.1).

Working out with the projection of this figure up to the year 2023, found out that; 4 593.8 billion US Dollars of GDP in 2014, raises to 5 898.4 billion US Dollars in 2023 (See Table 6.2). Evaluation of the container throughputs projection of the trade areas in the target, found out that; 21 176 600 TEU's in 2014, raises to 47 911 600 TEU's in 2023 (See Table 6.3).

Table 6.1: Population, GDP, GDP avarage growth percentage and container port traffic at the countries in the target of the Eastern Mediterranean hub ports
Source: Authors' own compilation based on various statistics

Countries	Population* (2014)	GDP (2014) Billion USD**	GDP Average Growth %	Container Port Traffic (2013) *(TEU's)****
East Mediterranean & Middle East Countries				
Turkey	77,695,904	813.3	4	7,284,207
Lebanon	4,104,000	47.5	4	1,117,000
N. Cyprus	294,906	3.0	3	28,000
S. Cyprus	858,000	21.3	2	307,060
Syria	23,088,882	60.0	4	795,707
Libya	6,317,000	49.3	10	434,608
Total	**112,358,692**	**973.1**	-	-
Black Sea Countries				
Russia	146,270,033	2,057.3	2	3,968,186
Ukraine	42,928,900	134.9	4	808,051
Bulgaria	7,245,677	55.1	3	156,769
Romania	19,942,642	202.5	3	684,059
Moldavia	3,557,600	7.7	4	-
Georgia	4,490,500	16.1	5	277,226
Azerbaijan	9,593,000	77.9	4	-
Total	**234,028,352**	**2,551.5**	-	-
Adriatic and Balkan Countries				
Albania	2,893,005	13.6	4	106,512
Serbia	7,146,759	42.6	3	357,000
Croatia	4,267,558	58.3	2	168,026
Slovenia	2,065,868	49.9	2	570,744
Hungary	9,849,000	129.7	2	244,300
Austria	8,579,747	436.1	2	385,255
Slovak Rep.	5,421,034	100.1	3	73,800
Kosovo	1,827,231	7.5	4	-
Bosnia	3,791,622	20.5	4	-
Czech Rep.	10,528,477	200.0	2	-
Macedonia	2,065,769	10.9	6	-
Total	**58,436,070**	**1,069.2**	-	-
Grand Total	**404,823,114**	**4,593.8**	-	-

* **Population**: http://en.wikipedia.org/wiki/List_of_countries_by_population (Accessed date 2014)
** **GDP:** http://knoema.com/tbocwag#Turkey (Accessed date 2014)
*** **Container:** http://data.worldbank.org/indicator/IS.SHP.GOOD.TU (Accessed date 2014)

Table 6.2: GDP Projection of the countries in the target of the Eastern Mediterranean hub ports
Source: Authors' own compilation

Country	GDP (billion USD)									
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Eastern Mediterranean Countries										
Turkey	813.3	845.8	879.7	914.9	951.4	989.5	1,029.1	1,070.2	1,113.1	1,157.6
Lebanon	47.5	49.4	51.4	53.4	55.6	57.8	60.1	62.5	65.0	67.6
N. Cyprus	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
S. Cyprus	21.3	21.7	22.2	22.6	23.1	23.5	24.0	24.5	25.0	25.5
Syria	60.0	62.4	64.9	67.5	70.2	73.0	75.9	79.0	82.1	85.4
Libya	49.3	54.2	59.7	65.6	72.2	79.4	87.3	96.0	105.6	116.2
Total	**9,73.1**	**1,036.6**	**1,081.1**	**1,127.3**	**1,175.9**	**1,226.7**	**1,280.0**	**1,335.9**	**1,394.6**	**1,456.2**
Black Sea Countries										
Russia	2,057.3	2,098.4	2,140.4	2,183.2	2,226.9	2,271.4	2,316.9	2,363.2	2,410.5	2,458.7
Ukraine	134.9	140.3	145.9	151.7	157.8	164.1	170.7	177.5	184.6	192.0
Bulgaria	55.1	56.8	58.5	60.2	62.0	63.9	65.8	67.8	69.8	72.0
Romania	202.5	208.6	214.8	221.3	227.9	234.8	241.8	249.0	256.5	264.2
Moldavia	7.7	8.0	8.3	8.7	9.0	9.4	9.7	10.1	10.5	10.9
Georgia	16.1	16.9	17.8	18.6	19.6	20.5	21.6	22.7	23.8	25.0
Azerbaijan	77.9	81.0	84.3	87.6	91.1	94.8	98.6	102.5	106.6	110.9
Total	**2,551.5**	**2,610.0**	**2,670.0**	**2,731.3**	**2,794.3**	**2,858.9**	**2,925.1**	**2,992.8**	**3,062.3**	**3,133.7**
Adriatic and Balkan Countries										
Albania	13.6	14.1	14.7	15.3	15.9	16.5	17.2	17.9	18.6	19.4
Serbia-Mont.	42.6	43.9	45.2	46.6	47.9	49.4	50.9	52.4	54.0	55.6
Croatia	58.3	59.5	60.7	61.9	63.1	64.4	65.7	67.0	68.3	69.8
Slovenia	49.9	50.9	51.9	53.0	54.0	55.1	56.2	57.3	58.5	59.6
Hungary	129.7	132.3	134.9	137.6	140.4	143.2	146.1	149.0	152.0	155.0
Austria	436.1	444.8	453.7	462.8	472.0	481.5	491.1	501.0	511.0	521.2
Slovak Rep.	100.1	103.1	106.2	109.4	112.7	116.0	119.5	123.1	126.8	130.6
Kosovo	7.5	7.8	8.1	8.4	8.8	9.1	9.5	9.9	10.3	10.7
Bosnia	20.5	21.3	22.2	23.1	24.0	25.0	26.0	27.0	28.1	29.2
Czech Rep.	200.0	204.0	208.1	212.2	216.5	220.8	225.2	229.7	234.3	239.0
Macedonia	10.9	11.6	12.2	13.0	13.8	14.6	15.5	16.4	17.4	18.4
Total	**1,069.2**	**1,093.3**	**1,117.9**	**1,143.3**	**1,169.1**	**1,195.6**	**1,222.9**	**1,250.7**	**1,279.3**	**1,308.5**
Grand Total	**4,593.8**	**4,739.9**	**4,869.0**	**5,001.9**	**5,139.3**	**5,281.2**	**5,428.0**	**5,579.4**	**5,736.2**	**5,898.4**

Method: Countries GDP. Multiply by Average GDP Growth percentage.

Table 6.3: Container throughputs projection of the countries in the target of the Eastern Mediterranean hub ports
Source: Authors' own compilation based on various sources

Country	Container Port Traffic (TEU's) (000)										
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Eastern Mediterranean Countries											
Turkey	7,284.2	8,012.6	8,813.9	9,695.3	10,664.8	11,731.3	12,904.4	14,194.8	15,614.3	17,175.8	18,893.3
Lebanon	1,117.0	1,228.7	1,351.6	1,486.7	1,635.4	1,798.9	1,978.8	2,176.7	2,394.4	2,633.8	2,897.2
N. Cyprus	28.0	30.5	33.2	36.2	39.4	43.0	46.9	51.1	55.7	60.7	66.2
S. Cyprus	307.1	331.7	358.2	386.9	417.8	451.2	487.3	526.3	568.4	613.9	663.0
Syria	795.7	875.3	962.8	1,059.1	1,165.0	1,281.5	1,409.6	1,550.6	1,705.7	1,876.2	2,063.8
Libya	434.6	504.1	584.8	678.4	786.9	912.8	1,058.9	1,228.3	1,424.8	1,652.8	1,917.2
Total	**9,966.6**	**10,982.9**	**12,104.5**	**13,342.6**	**14,709.3**	**16,218.7**	**17,885.9**	**19,727.8**	**21,763.3**	**24,013.2**	**26,500.7**
Black Sea Countries											
Russia	3,968.2	4,285.7	4,628.5	4,998.8	5,398.7	5,830.6	6,297.0	6,800.8	7,344.9	7,932.4	8,567.0
Ukraine	808.0	888.8	977.7	1,075.4	1,183.0	1,301.3	1,431.4	1,574.6	1,732.0	1,905.2	2,095.7
Bulgaria	156.8	170.9	186.3	203.1	221.3	241.3	263.0	286.6	312.4	340.6	371.2
Romania	684.1	745.7	812.8	885.9	965.7	1,052.6	1,147.3	1,250.6	1,363.1	1,485.8	1,619.5
Moldavia	-	41.1	45.2	49.7	54.7	60.2	66.2	72.8	80.1	88.1	96.9
Georgia	277.2	307.7	341.5	379.1	420.8	467.1	518.5	575.5	638.8	709.1	787.1
Azerbaijan	-	415.3	456.8	502.5	552.7	608.0	668.8	735.7	809.3	890.2	979.3
Total	**5,210.2**	**6,855.2**	**7,448.8**	**8,094.5**	**8,796.9**	**9,561.1**	**10,392.2**	**11,296.6**	**12,280.6**	**13,351.4**	**14,516.7**
Adriatic and Balkan Countries											
Albania	106.5	117.2	128.9	141.8	155.9	171.5	188.7	207.5	228.3	251.1	276.2
Serbia-Mont.	357.0	389.1	424.2	462.3	503.9	549.3	598.7	652.6	711.3	775.3	845.1
Croatia	168.0	181.4	196.0	211.6	228.6	246.8	266.6	287.9	311.0	335.8	362.7
Slovenia	570.7	616.4	665.7	718.9	776.4	838.5	905.6	978.1	1,056.3	1,140.8	1,232.1
Hungary	244.3	263.8	285.0	307.7	332.4	359.0	387.7	418.7	452.2	488.4	527.4
Austria	385.3	416.1	449.4	485.4	524.2	566.1	611.4	660.3	713.2	770.2	831.8
Slovak Rep.	73.8	80.4	87.7	95.6	104.2	113.6	123.8	134.9	147.1	160.3	174.7
Kosovo*	-	39.9	43.89	48.3	53.1	58.4	64.3	70.7	77.8	85.5	94.1
Bosnia*	-	109.3	120.2	132.3	145.5	160.0	176.0	193.6	213.0	234.3	257.7
Czech Rep.*	-	1,066.2	1,151.5	1,243.6	1,343.1	1,450.6	1,566.6	1,691.9	1,827.3	1,973.5	2,131.3
Macedonia*	-	58.1	65.1	72.9	81.6	91.4	102.4	114.7	128.4	143.9	161.1
Total		**3,337.9**	**3,617.6**	**3,920.4**	**4,248.9**	**4,605.2**	**4,991.8**	**5,410.9**	**5,865.9**	**6,359.1**	**6,894.2**
Grand Total		**21,176.6**	**23,170.9**	**25,357.5**	**27,755.1**	**30,385.0**	**33,269.9**	**36,435.3**	**39,909.8**	**43,723.7**	**47,911.6**

Method: Country Average GDP growth percentage plus % 6 world container growths annually
* See Important Note

* **IMPORTANT NOTE**

GDP and Container Throughput Relation:

Container throughput figures for Albania, Serbia-Mont, Croatia, Slovenia, Hungary, Azerbaijan and Moldavia could not find. Container throughput figures for these countries calculated as follows:

- Total GDP of (Albania, Serbia-Mont, Croatia, Slovenia, Hungary) in the year of 2014 = 294,100,000,000 USD
- Total Container Throughputs of Albania, Serbia-Mont, Croatia, Slovenia, Hungary in the year of 2014 = 1,567,900 TEU's
- 294,100,000,000 USD ÷ 1,567,900 TEU = 187,575 USD
- **187 575 USD** can be accepted as a factor figure in this area.

Accordingly Total Container Throughputs for;

- Kosovo: 7,500,000,000 USD ÷ 187,575 USD = 39,984 TEU's
- Bosnia: 20,500,000,000 USD ÷ 187,575 USD = 109,290 TEU's
- Czech Rep.: 200 000,000,000 USD ÷ 187,575 USD = 1,066,240 TEU's
- Macedonia: 10,900,000,000 USD ÷ 187,575 USD = 58,110 TEU's
- Azerbaijan: 77,900,000,000 USD ÷ 187,575 USD = 415,300 TEU's
- Moldavia: 7,700,000,000 USD ÷ 187,575 USD = 41,050 TEU's

6.4 Evaluation of the Projection Figures

Evaluation of the projected figures given above; shows that a tremendous increase is expected at the trade areas in target in terms of Gross Domestic Product (GDP) and in container port traffic in ten years as follows;

- GDP: 4,593.8 billion USD - 5,898.4 billion USD = **1,304.6 billion USD**
- Container Port Traffic: 47,911,600 - 21,176,600 = 26,735,000 TEU's,
- Russia's Black Sea share in 2023 is calculated to be: 1,884,740 TEU's,
- Russia's other region shares total is: 8,567,000-1,884,740 = 6,682,260 TEU's (See Table 6.4),

  The actual container port traffic of the Eastern Mediterranean, Black Sea, Adriatic Sea and Balkan country region in 2023 is:

  26,735,000 - 6,682,260 = **20,052,740 TEU's.**

Throughput projection figures showed that container port traffic in the Eastern Mediterranean region will increase by 20 million TEU's in ten years. This amount of increase in container port traffic, shows the need of many new container terminals and a few numbers of container hub ports.

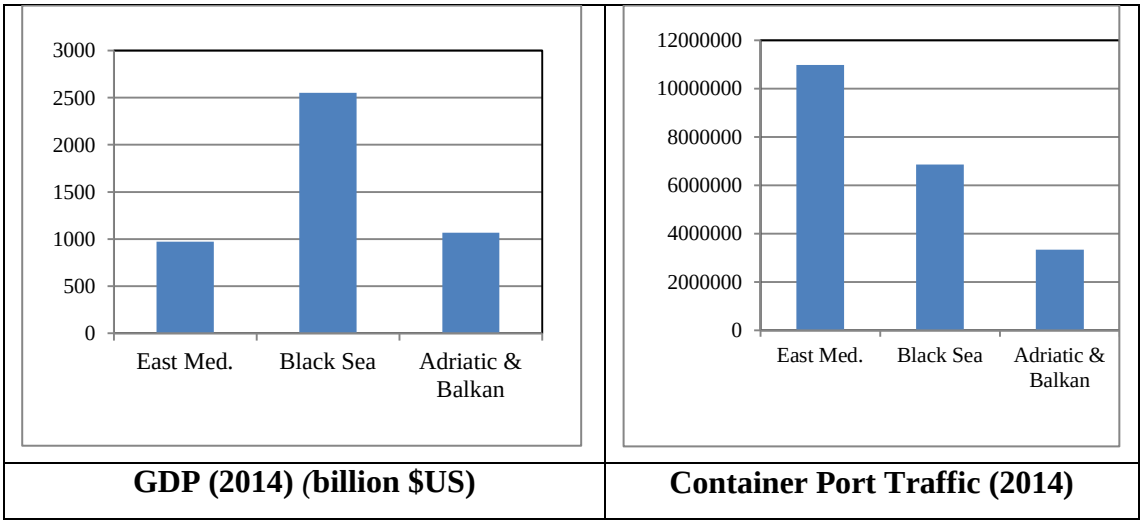

Figure 6.3: Comparison of GDP and container port traffic of countries in the target of the Eastern Mediterranean hub ports (Authors' own compilation)

At the Conference held in İstanbul by Port Finance International at the 12-13 May 2009, Marten van den Bossche gave similar ideas for the development of container ports and terminals. Bossche suggested that; until the year of 2020, number of port terminals will

grow considerably up to 300 terminals worldwide in 8 years. Continuing with his presentation he also expressed that; well positioned, many new terminals can be expected at Eastern Mediterranean (Bossche, 2009).

6.5 Evaluation of the Advantage of Black Sea Countries

Evaluation of the (Figure 6.3, Figure 6.4 and Figure 6.5) shows that; Black Sea countries have the highest values in terms of population (234 028 352) and GDP, than the other trade areas, but is the lowest at container port traffic.

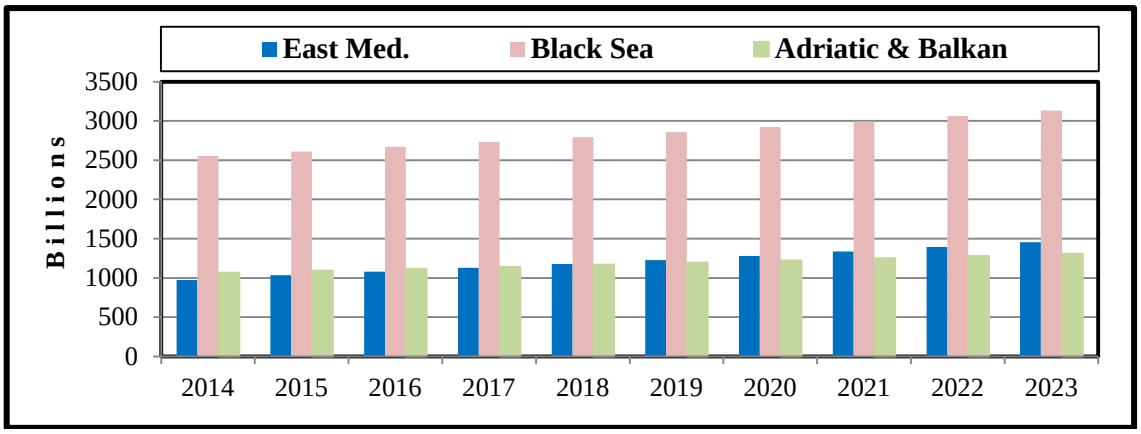

Figure 6.4: Comparison of GDP (USD) projection of targeted trade areas in the years (2014-2023) (Authors' own compilation)

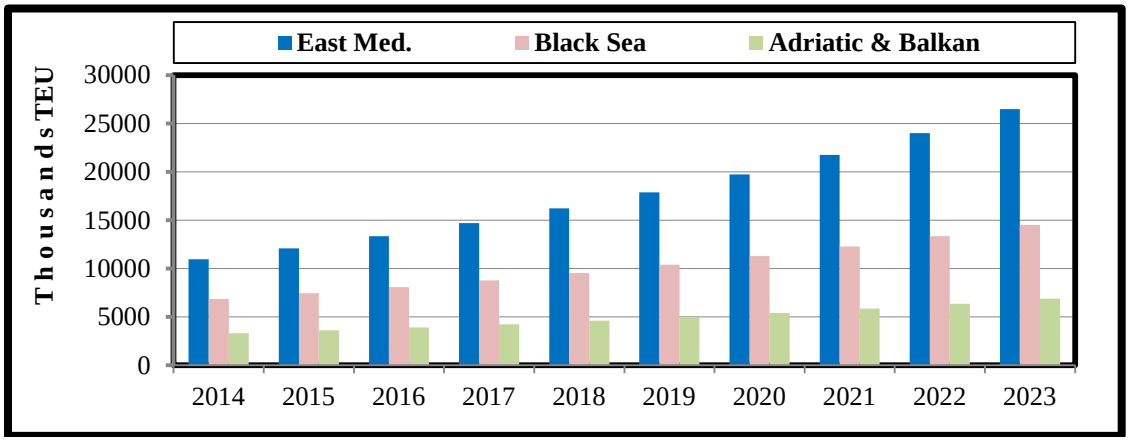

Figure 6.5: Comparison of container port traffic (TEU) projection of targeted trade areas in the years (2014-2023) (Authors' own compilation)

Also comparison between Turkey and Russia shows that; Russia has higher GDP values, but less container port traffic than Turkey (See Figure 6.6 and Figure 6.7). It seems that

Black Sea and particularly Russia can make the leap at container port throughputs in the coming years.

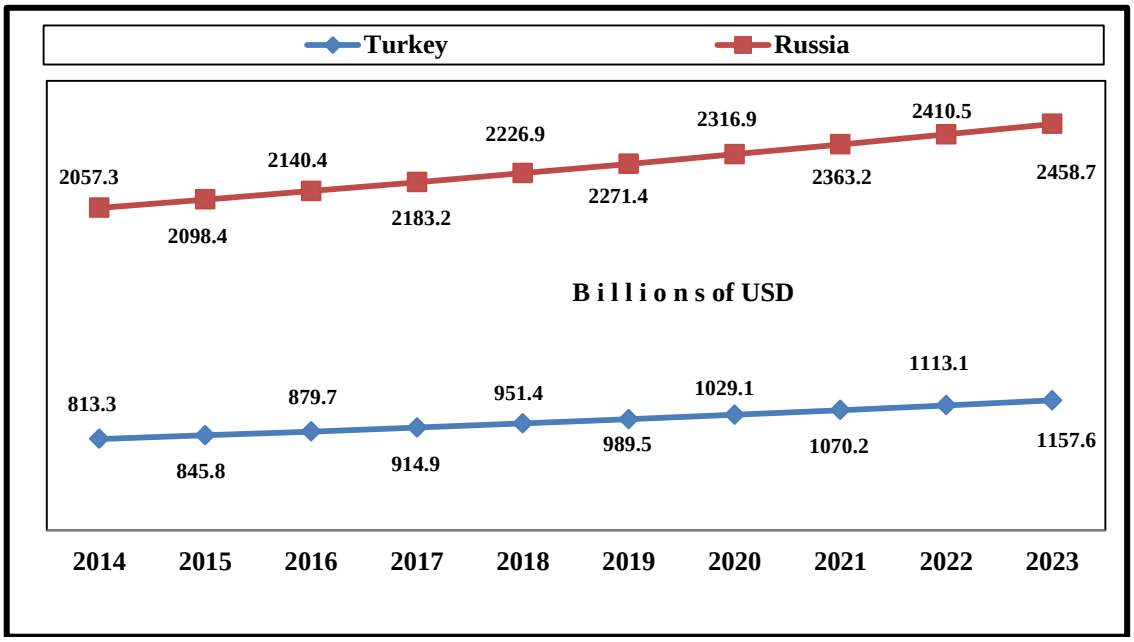

Figure 6.6: Comparison of GDP projection of Turkey and Russia in the years (2014-2023) (Authors' own compilation)

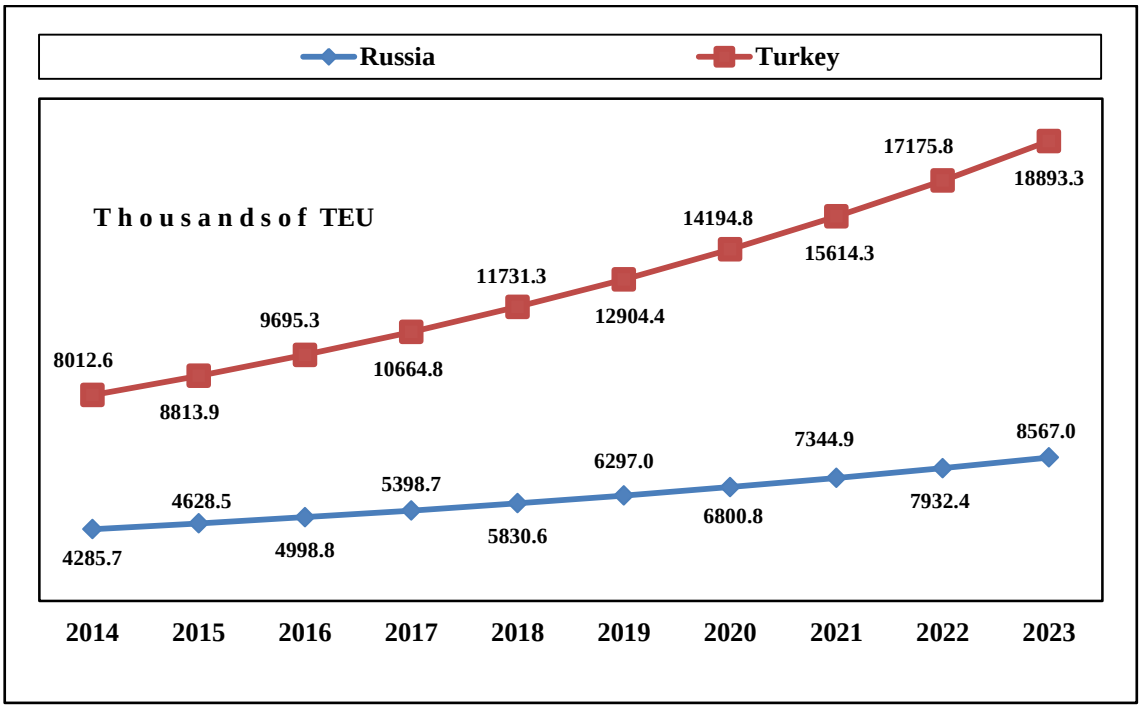

Figure 6.7: Comparison of container port traffic projection of Turkey and Russia in the years (2014-2023) (Authors' own compilation)

"Actually, only 13% of Russian containers is getting service through Black Sea ports. But Russian containers coming through Black Sea ports has the biggest improvement percentage (43%)" (See Table 6.4) (GCMIO, 2015).

6.6 Russian Container Port Traffic

"The total Russian container volumes, including container transit through Finland and the Baltic countries grew from approximately 748 thousand TEUs in 2000 to 4,126 thousand TEUs in 2010 demonstrating a "Compound Average Growth Rate" (CAGR) of 18.6%" (GCMIO, 2015).

The Russian container market was one of the fastest growing markets over the last ten years. The following (Table 6.4) shows annual average container volume growth over the last ten years.

Table 6.4: Russian container port traffic (2000-2010) (TEU's in thousands)
Source: (GCMIO, 2015)

Port	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**CAGR (10 year)**
Baltic Sea Basin ports	306	1,604	1,879	2,209	1,436	2,160	22%
Black Sea Basin ports	13	253	380	493	335	453	43%
Far East Basin ports	142	532	702	877	542	774	18%
North Russia's ports	—	47	49	99	107	109	N/A
Total Russia's ports	**461**	**2,436**	**3,011**	**3,679**	**2,420**	**3,496**	**22%**
Year-on-year growth percentage		23%	24%	22%	34%	44%	

6.7 Population-Container Ratios and Eastern Mediterranean

Population-Container Ratios is an indicatore shoving container number per thousand of country population.

> "According to Drewry, container port traffic in the United States and European Union in the year 2010 amounted 132 TEU's and 168 TEU's per thousand people, respectively" (GCMIO, 2015).

Population-Container Ratios for Eastern Mediterranean, Black Sea, Adriatic and Balkan Countries has been calculated according the figures obtained from Table 6.1 and Table 6.3 above.

Population-Container Ratios for Eastern Mediterranean, Black Sea, Adriatic and Balkan Countries are shown in the Table 6.5 below.

The low containerisation level in Eastern Mediterranean, Black Sea, Adriatic and Balkan Countries at present, shows the high upside potential for container port traffic development. there is also a potential for further containerisation of general cargo.

Table 6.5: Population-container ratios for the Eastern Mediterranean, Black Sea, Adriatic and Balkan Countries
Source: Authors' own compilation based on the Table 6.3 statistics

Countries	**Population (2014)***	**Container Port Traffic (2014)** *(TEU's)***	**Population Container Ratio**
East Mediterranean & Middle East Countries			
Turkey	77 695 904	8 012 600	103
Lebanon***	4 104 000	1 228 700	299
N. Cyprus	294 906	30 500	104
S. Cyprus***	858 000	331 700	386
Syria	23 088 882	875 300	38
Libya	6 317 000	504 100	80
Black Sea Countries			
Russia	146 270 033	4 285 700	29
Ukraine	42 928 900	888 800	21
Bulgaria	7 245 677	170 900	23
Romania	19 942 642	745 700	37
Moldavia	3 557 600	41 100	12
Georgia	4 490 500	307 700	68
Azerbaijan	9 593 000	415 300	43
Adriatic and Balkan Countries			
Albania	2 893 005	117 200	40
Serbia	7 146 759	389 100	54
Croatia	4 267 558	181 400	42
Slovenia***	2 065 868	616 400	298
Hungary	9 849 000	263 800	27
Austria	8 579 747	416 100	48
Slovak Rep.	5 421 034	80 400	15
Kosovo	1 827 231	39 900	22
Bosnia	3 791 622	109 300	29
Czech Rep.	10 528 477	1 066 200	101
Macedonia	2 065 769	58 100	28

* Table 6.1
**Table 6.3
***Countries serving container transhipment

6.8 Eastern Mediterranean Main Ports, Container Port Traffic

Eastern Mediterranean main transhipment hub ports, container port traffic and growh rates for the years (2009-2013) are given in the Table 6.6 and in the Figure 6.8 below.

Table 6.6 Eastern Mediterranean main ports, container port traffic (2009-2013) (1000 TEU), Source:Authors' own compilation based on "IAPH World Ports, 2015"

Port	2009	2010	2011	2012	2013	Growth Rate % (2013-2009)	Country
Port Said	3,301	3,475	4,306	3,631	4,100	124	Egypt
Ambarlı (İst.)	1,836	2,540	2,686	3,097	3,378	184	Turkey
Piraeus	665	513	1,680	2,734	3,164	476	Greece
Alexandria	799	808	1,490	1,463	1,508	189	Egypt
Mersin	844	1,024	1,126	1,263	1,378	163	Turkey
Haifa	1,140	1,264	1,235	1,372	1,357	119	Israel

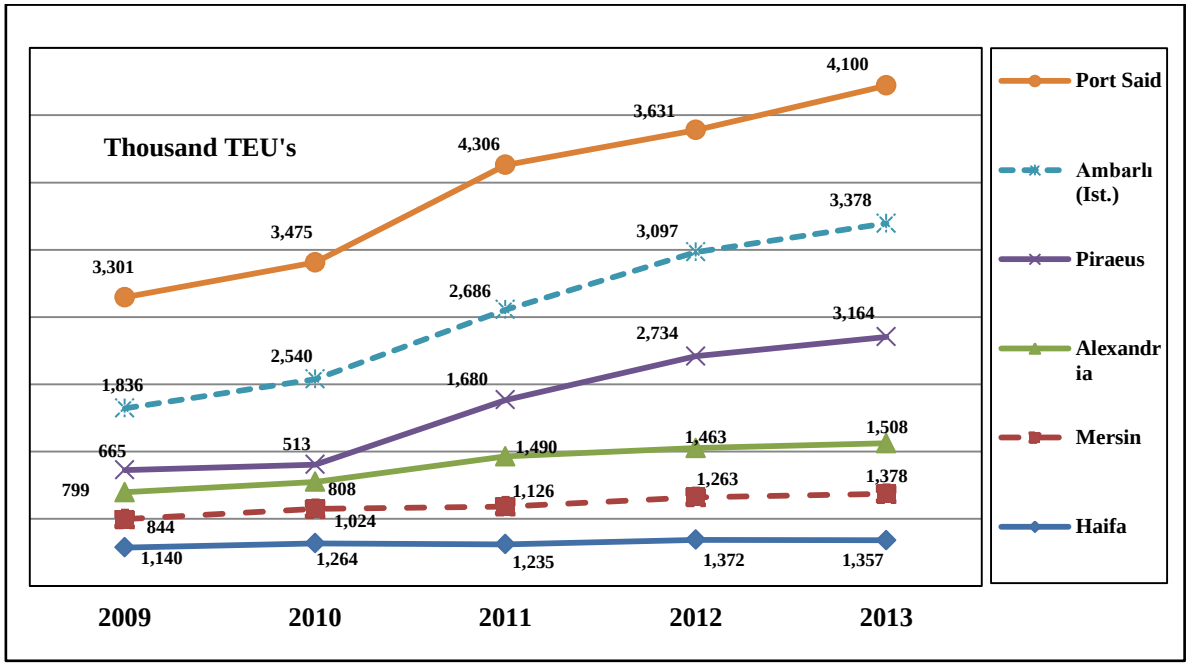

Figure 6.8: Eastern Mediterranean main ports, container port traffic (2009-2013) (Authors' own compilation based on "IAPH World Ports, 2015")

6.9 Deviation Distances of Major Hub Ports of the Eastern and Central Mediterranean

The increase realized between Far East and Europe trade areas has improved especially container transportation.

Beside the hinterland capacity of a major port, the other important criteria to upgrade ports as a hub ports are; first the mother ship's deviation distance and secondly the feeder service distances. Eastern Mediterranean and some Central Mediterranean ports are specified according to these two criteria.

Container mother ships crossing Mediterranean are following the most suitable route between the Suez Canal and Gibraltar passage.

6.10 Eastern Mediterranean and Container Transhipment

Increases realized in Far-East Europe trade, increased container ships traffic passing through Mediterranean. Changes realized in the operational strategies of the main container shipping operators are boosting transhipment and feeder demand in the Mediterranean region. Main container shipping operators are operating an increasing number of deep-sea relay services through the Mediterranean to meet the Far-East Europe trade.

Container mother ships, are calling at a few hub ports in the Mediterranean. Container mother ships passing through the Mediterranean are increasing in size and there is an increasing trend to use these ships to service the region through feeder service systems. The latest generation of container ships reached to capacities of approximately 18 thousand TEUs or more. These ships are too wide and too deep to call at many ports in the Mediterranean. Container shipping lines have to restrict the number of port calls they make and increase transhipment between hub ports and feeder ports.

Last years the highest container transhipment operations are realized in the Eastern Mediterranean region. This is due to the low Population-Container Ratios of the Eastern Mediterranean, Black Sea and Adriatic and Balkan Countries.

> "Most experts predict that this trend for increasing transhipment will see bigger feeder vessels operating in the Mediterranean region. It is also anticipated that the growth in the feeder market will be increasingly controlled by the largest shipping lines. Experts suggest that increased volumes in transhipment will bring about economies of scale in the regional feeder market, which larger shipping lines will take advantage of by establishing their own dedicated direct feeder networks" (EMTP, 2005).

It should be borne in mind that figures regarding transhipment do not directly apply to all ports in the Mediterranean, as some ports have been able to become transhipment ports while others did not.

"According to Drewry, the incidence of transhipment at container terminals worldwide (as a percentage of global throughputs) increased from 17.6% in 1990 to 28.5% in 2010 and did not experience any annual decline during that period" (GCMIO, 2015).

> "Transhipment is expected to level at about 52% in the European Mediterranean, 24% in the MEDA region, and 43% for the entire Mediterranean. Another observation that can be made from this figure is that the MEDA's share of transhipment is expected to remain stable at about 20% of total Mediterranean transhipment." (EMTP, 2005).

Central and Eastern Mediterranean Hub Ports and their transhipment ratios are given in the Table 6.7 below.

Table 6.7: Central and Eastern Mediterranean hub ports and their transhipment ratios
Source: Authors' own compilation based on various sources

Port	Total Throughputs (TEU) 2013	Transhipment Ratio, %	Total Transhipment Throughputs (TEU) 2013
Gioia Tauro	3,087,000	93.6	2,889,432
Marsaxlokk	2,750,000	95.5	2,626,250
Piraeus	2,750,000	80.0	2,200,000
Port Said	4,100,000	95.0	3,895,000
Alexandria	1,508,000	70.0	1,055,600
Damietta	1,300,000	87.0	1,131,000
Mersin	1,378,000	25.0	344,500
Haifa	1,357,000	30.0	407,100
Limassol	307,060	65.0	199,589
Total	**18,459,060**	**79.9**	**14,748,471**

6.11 History of Transhipment Hub Ports in the East and Central Mediterranean Region

Eastern and Central Mediterranean Regions Transhipment Hub Ports; are serving in the same trade areas which are the Eastern Mediterranean, the Black Sea Adriatic Sea and Balkan countries.

6.11.1 Ports of the Southern Cyprus

Southern part of Cyprus was one of the first countries to start with transhipment of containers. Cyprus Port Authority starts planning, container terminals in the year 1973 and realized planning by the year 1978. Cyprus Ports Limassol and Larnaca handled 34,463 TEU's in the year 1978. Ports Limassol and Larnaca continuously increased their container port traffic and by the year 1988 handled 287,349 TEU's. After investments of new equipments Cyprus ports reached to a capacity over 550,000 TEU's by the year 1995 of which 84% were transshipped to the countries at Levant and Turkey. Cyprus Ports Limassol and Larnaca, due to the high labour charges started losing capacity by the same year. Ports Limassol and Larnaca were charging 160 US Dollars per TEU in transhipment,

where global charges were around 60 US Dollars per TEU's in transhipment. Due to these high charges; Scan-Dutch were the first global container operator to stop calling Cyprus ports. Scan-Dutch by the year 1995 started calling to the newly established Port of Damietta, Egypt. At the year 1996 global container operator Cosco and some others also left Cyprus ports to the Port of Gioia Tauro, Italy which was established in the year 1995. In the year 1997 Turkey implemented a retaliatory embargo in Southern part of Cyprus. Due to these realizations, Cyprus could not increase its capacity again. Capacity of Southern part of Cyprus was 307,060 TEU's by the year 2013.

6.11.2 The Port of Marsaxlokk, Malta

Port of Marsaxlokk started container operations in the year 1988. Port of Marsaxlokk is a major maritime transhipment hub port in the Central Mediterranean presently ranking with the key players in the region. Port of Marsaxlokk realized a capacity of 2,750,000 TEU's in the year 2013. Port of Marsaxlokk transhipped 95.5% of its capacity to Adriatic, Balkan and Eastern Mediterranean countries.

6.11.3 The Port of Gioia Tauro, Italy

Port of Gioia Tauro container terminal starts container operations by the year 1995. Gioia Tauro is one of the most important transhipment hub ports serving in Central and Eastern Mediterranean. Gioia Tauro realized a capacity of 3,087,000 TEU's in the year 2013 and transhipped 93.6% of its capacity to Central and Eastern Mediterranean countries.

6.11.4 The Port of Port Said, Egypt

Port Said container terminal starts container operations in the midst of 1990. But the boost in container throughput of Port Said starts with the establishment of Suez Canal Container Terminal (SCCT) in the year 2000. The terminal has been operational since October 2004. Suez Canal Container Terminal expanded by the year 2012. SCCT is capable of handling the largest container ships of the global container fleet. The new expansion will increase annual capacity of SCCT to 5.4 million TEU's, making it the largest container terminal in the Mediterranean Sea.

Port Said, located at the mouth of the Suez Canal, is a major transhipment hub for the Eastern Mediterranean and Black Sea regions. Port Said realized a capacity of 4,100,000 TEU's in the year 2013 and transhipped 95% of its capacity.

6.11.5 The Port of Alexandria, Egypt

Port of Alexandria is one of the oldest ports of Egypt. Container operations at the Port of Alexandria start by the midst of 1990. Port of Alexandria realized a capacity of 1,508,000 TEU's in the year 2013 and transhipped 70% of its capacity to Eastern Mediterranean and North Africa countries.

6.11.6 The Port of Damietta, Egypt

Port of Damietta starts container operations in the midst of 1990. Port of Damietta is the first modern container port of Egypt. Port of Damietta realized a capacity of 1,500,000 TEU's in the year 2013 and transhipped 87% of its capacity to Eastern Mediterranean and Black Sea countries.

6.11.7 The Port of Piraeus, Greece

The port of Piraeus first Container Terminal operations had begun in 1978 and expanded in 1986. The Port of Piraeus until 2010 had an average capacity around 500,000 to 600,000 TEU's. After 2011 Port of Piraeus had an agreement with the Chinese Shipping Companies, which boosted its capacity by 476% to reach 3,164,000 in the year 2013. The port of Piraeus transhipped 80% of its capacity to Adriatic, Balkan and Black Sea countries.

Chinese Shipping Companies actually had an agreement in the year 2005 to build a container hub port; for up to 2 million containers a year, on the shore of South Crete (Timbaki). But due to same unknown reasons the agreement between Greece and Chinese Shipping Companies suspended. Bearing in mind that South Crete (Timbaki) is an excellent location for a transhipment hub, it is believed that in the future Chinese or other oceanic container operators will insist for it. Information about South Crete (Timbaki) hub port project is at (Attachment-1).

6.11.8 Evaluation of Transhipment Hub Ports of Central and Eastern Mediterranean

Turkish Port of İstanbul is having some transhipment to the neighbouring countries, but figures could not be determined. Mersin is serving containers in transit in Northern Cyprus and North of Iraq. Beirut in Lebanon is also having some containers in transit to Syria and Northern part of Jordan, but figures are unknown.

As can be seen in the Table 6.7 above; transhipment hub ports are handling 18,459,060 TEU's, of which 79.9% equal to 14,748,471TEU's are transhipment containers. Transhipment hub ports of central and Eastern Mediterranean are serving in the Eastern Mediterranean, Black Sea, Adriatic Sea and Balkan countries.

Evaluation of transhipment hub ports of Central and Eastern Mediterranean in total; showed that in about 25 years, five to six hub port terminals were established.

Projection made in the countries in the target of Eastern Mediterranean hub ports, together with the evaluation made above shows that every eight to ten years two to three transhipment hub ports will be needed at Eastern Mediterranean

6.12 Container Trade in Turkey

Turkey has realized important increases during recent years, particularly after the economic growth of 2001. Turkey, at the year 2005 was listing 26th at the world ranking with 3,174,077 TEU's of port throughput, while in 1985 Turkey was listing 40th with 184,667 TEU's. Turkey has promoted its capacity and with 7,284,207 TEU's of port throughput, was ranked 13th in the year 2013. Compared to previous years, Turkey has realized an increase of 12.46% in the year 2012 and 8.13% in the year 2013. Turkey, with this growth rate is the fastest growing country in Eastern Mediterranean and growth rate is likely to continue.

According to the report of "The Nationwide, Port Development Master Plan in the Republic of Turkey" prepared by Japanese experts in the year 2000, port throughput of Turkey has projected that, Turkey will reach the number of 3 million TEUs by the year 2010 and 6 million TEUs by the year 2020. Container port throughput numbers of the year 2013 show that Turkey is well ahead than the numbers projected by Japanese experts.

According the projection figures given in the Table 6.3 above, Turkey will reach to a capacity of 18,893,300 TEU's in the year 2023.

The Master Plan also expressed that, three container terminals each over the capacity of one million, at the Mediterranean, Aegean and Marmara coasts of Turkey will be necessary to be built. Turkey is well ahead of the container port throughput figures, however, is far behind of the container terminal capacities that was projected in the Master Plan mentioned above.

At present, Turkey is outsourcing its service needs through the hub ports of Gioia Tauro of Italy, Port Said and Damietta of Egypt, Marsaxlokk of Malta and some other hubs in the region.

For the development of "Transhipment Hub Port" three important features are;

1) The hinterland container port traffic,
2) The deviation distance from the deep-sea container ships main routes,
3) Feeder service distances from the transhipment hub to the destination port.

Turkish ports (İstanbul, İzmir and Mersin) in terms of hinterland container port traffic are in the best position of the Eastern Mediterranean. But when mother ship's main route deviation distances and feeder service distances are in question, Turkish ports (İstanbul, İzmir and Mersin) are not in a good situation. This reality is highlighted at the report of "The Nationwide, Port Development Master Plan in the Republic of Turkey" prepared by Japanese experts in the year 2000.

When deviation distance and feeder service distances are in question, Northern Cyprus ports are in much better positions. Especially at feeder service distances for distribution of containers, Northern Cyprus ports are in the best location in the Eastern Mediterranean region. This reality is also highlighted at the report of "The Nationwide, Port Development Master Plan in the Republic of Turkey" prepared by Japanese experts in the year 2000.

Another important development realized in Turkey about the containerisation; has been the increase in exports, especially after 2001. Due to the above mentioned features; containers provide the opportunity for small production units, to submit their production to more distant markets. Goods produced by KOBİ's (Small and medium-sized enterprises-SME's) in Anatolia, received the opportunity to reach the world markets due to the containers.

6.13 Turkey and Northern Cyprus Ports

The economy of Turkey is the most powerful economy of the Middle East and Eastern Mediterranean and is a continuously developing and growing economy.

After a solution that will satisfy both communities is reached in Cyprus in coming years, ports in Northern Cyprus will gain more importance.

If Turkey with Northern Cyprus is evaluated in the same economic system, the ports of Northern Cyprus will gain more importance, in the same logistics system with Turkey in the future.

In this context; importance should be given to Northern Cyprus ports and strategies should be developed for boosting their capacities. Container transhipment offers significant opportunities in Northern Cyprus. For this reason, importance should be given to planning and opportunity should be provided with an adequate level of a container transhipment hub port. Therefore macro level development planning of ports should be made.

In this concept; as a motherland for Northern Cyprus community, Turkey can be accepted as the hinterland for Northern Cyprus ports. Due to close relations between Turkey and Northern Cyprus and being at a very close distance to the Turkish ports the proposed container hub port in the Port of Gemikonağı is likely to have precedence among the other ports of the Eastern Mediterranean.

One should note that there are factors over and above deviation distance and hinterland responsible for the choice of a transhipment port, such as the port's inherent centrality and its operational efficiency, cost, conveniences, the availability of a shipping environment.

CHAPTER 7
NORTHERN CYPRUS AND CONTAINERISATION

7.1 Strategic Importance of the Island of Cyprus

Being in the middle of the Eastern Mediterranean; ports of Cyprus, had a great strategic importance through history. The economy of Cyprus has always enhanced by the opportunities that are derivative of its strategic function.

Cyprus is on the sea lane of the great maritime highway connecting the Mediterranean Sea to the oceans through two sea gates. Cyprus is a natural transhipment centre for Europe-Far East trade. The trade areas of the Eastern Mediterranean, Adriatic Sea and Balkan countries and Black sea countries can be easily accessed from Cyprus. Cyprus has a minimum diversion distance from the main routes between Far East and Europe. Cyprus is also giving opportunities for a hub to the other deep-sea trades traversing the Mediterranean and as well as inter-regional seaborne traffic.

Cyprus fulfils the role of a hub for a number of key trading areas of world significance. Cyprus is a natural transhipment centre for Europe-Far East trade. The various shipping markets situated along the coasts of the Levant, North Adriatic and Black Sea can easily be accessed from Cyprus and with minimum diversion from the main arterial route. Equally, Cyprus is a logical hub for other mainline deep sea trades traversing the Mediterranean and for inter-regional maritime traffic.

7.2 Existing and Proposed Container Terminals at Northern Cyprus

Port of Famagusta is the only port in operation with containers in Northern Cyprus. A new Container Terminal is proposed at the Port of Gemikonağı (Karavostasi) by a İstanbul originated Turkish Company. Locations of Famagusta and Gemikonağı ports can be seen in the Figure 7.1 below.

7.3 Container Terminal at the Port of Famagusta

Container operations have started at the Port of Famagusta since 1990 and reached to a capacity of 28,000 TEU’s annually. Port of Famagusta is receiving containers, mostly through the port of Mersin in transhipment.

The Arkas Shipping Company of Turkey has started calling at Port of Famagusta regularly since 2011 and transporting containers directly from İstanbul and İzmir as well as from Europe.

Figure 7.1: Northern Cyprus existing and proposed container terminals (Author's own design)

The Arkas Shipping Company has built a modern container stacking area at the Port of Famagusta in 2012 and positioned a mobile container crane and two stackers for the handling of containers.

According to information obtained from Arkas Shipping Company officials; Port of Famagusta has been chosen as a transhipment centre for the Europe-Eastern Mediterranean container transportation of the company.

The Arkas Shipping Company has developed a throughput projection study for reaching to a capacity of 270 000 TEU's by the year 2020. Although a limited capacity, but it is very important to the Port of Famagusta.

Port of Famagusta does not have many chances for receiving containers directly from Far East- Europe container transportation due to the deviation distance. But Port of Famagusta has many chances for receiving containers from Europe and intra-regional container transportation.

Port of Famagusta has developed a National Master Plan for the future in case of increases realized in capacity of container transportation and/or Cruises. A development plan and phases for the Port of Famagusta is shown in the Figure 7.2 below.

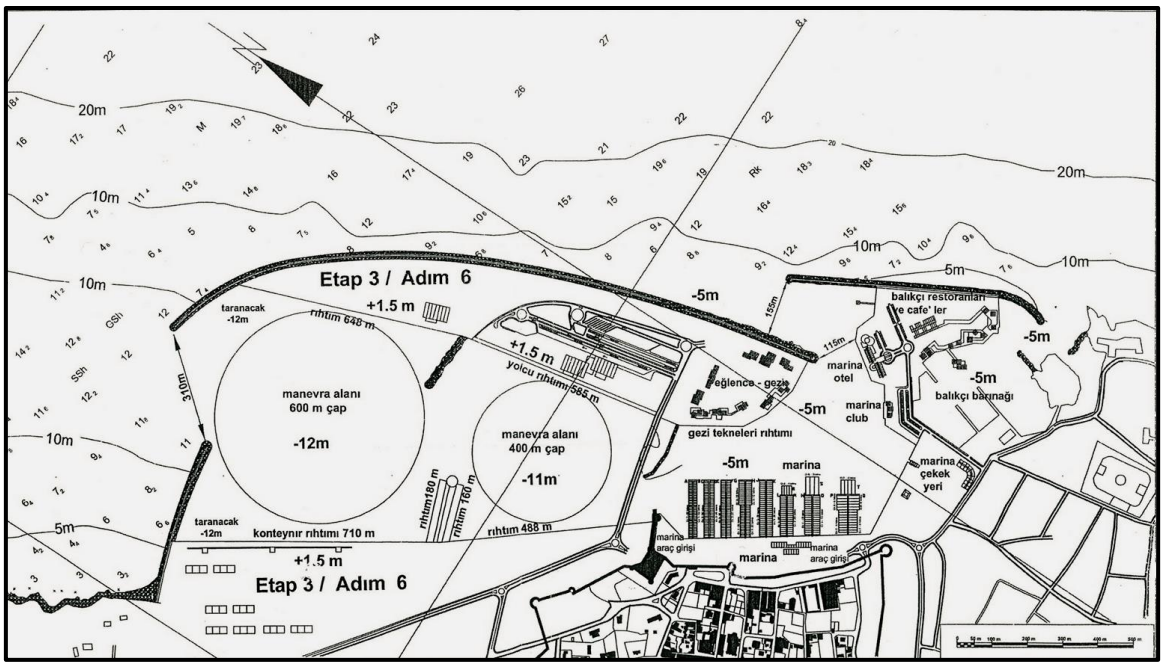

Figure 7.2: The Port of Famagusta development plans
(National Master Plan for Northern Cyprus ports)

7.4 The Port of Gemikonağı (Karavostasi)

Competition between ports in order to take share from container transhipment has increased and due to its location, Mediterranean Sea has become one of the most important competing regions of the world. The Port of Gemikonağı is located in an excellent position in the Eastern Mediterranean for this purpose.

Being at a strategic geographical location; the Port of Gemikonağı is offering ideal conditions for transhipment activities in the Eastern Mediterranean, the Black Sea, the Adriatic Sea and Balkan countries.

7.4.1 The Proposed Container Terminal at the Port of Gemikonağı

The proposed container terminal at the Port of Gemikonağı, with the 2,700 meters of quay length and 17.50 meters of depth will be able to serve the fourth, fifth and sixth generation Container ships as a Hub Port. Having enough depth, the Port of Gemikonağı will also be able to serve Ultra Large Container Vessels as well. The Port of Gemikonağı with the

large land area of 200.00 hectares plus 50 hectares on the quays will have a enough stacking yard for large amount of containers. The Port of Gemikonağı is proposed to serve as transhipment Hub Port. The proposed container terminal at the Port of Gemikonağı can be seen in the Figure 7.3, Figure 7.4 and Figure 7.5 below.

As a container hub port, the Port of Gemikonağı has three trade areas in the target. These are the Eastern Mediterranean, the Black Sea, the Adriatic Sea and Balkan Countries.

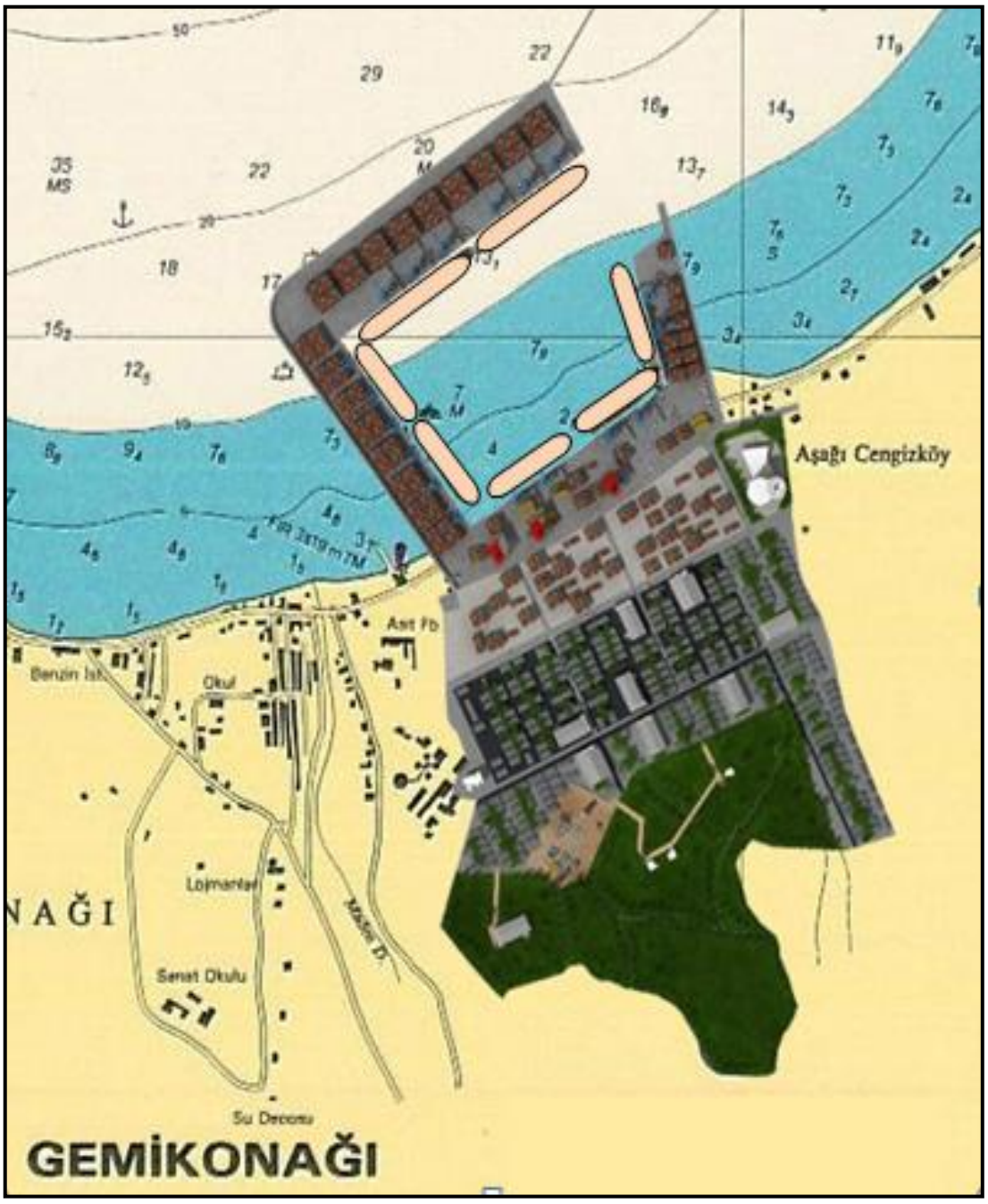

Figure 7.3: The proposed Port of Gemikonağı
(Port İSBİ's, Proposed Port of Gemikonağı)

Figure 7.4: Architectural image of the proposed container terminal at the Port of Gemikonağı
(Port İSBİ's, proposed container terminal at the Port of Gemikonağı)

Evaluation of the projected figures for the trade areas in the target for the Port of Gemikonağı can be seen in the chapter 6, paragraph 6.4. above. The projected figures show that a tremendous increase is expected.

Projected figures showed that container port traffic in the Eastern Mediterranean region will increase by 20,052,740 TEU's in ten years. This much increase of container port traffic, shows the need of many new container terminals and a few numbers of container hub ports.

At the Conference held in İstanbul by Port Finance International at the 12-13 May 2009, among other things Marten van den Bossche also suggested that; until the year of 2020,

number of container terminals will grow considerably up to 300 terminals worldwide in 8 years. Continuing with his presentation he also expressed that; well positioned, many new terminals and at least one or two new hub ports can be expected at Eastern Mediterranean.

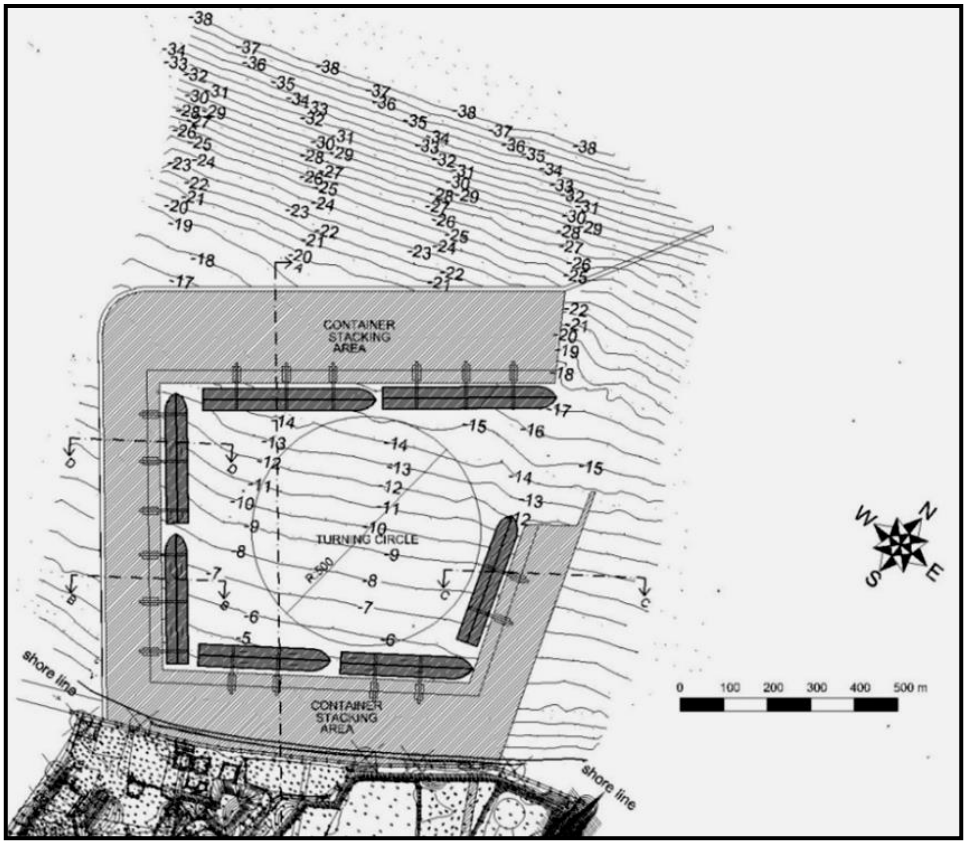

Figure 7.5: Soundings plan of the proposed container terminal at the Port of Gemikonağı
(Port İSBİ's, proposed container terminal at the Port of Gemikonağı)

Marten van den Bossche continuing his evaluation about the Mediterranean region added that; container mainline services like port locations; with low deviation costs and locations with the hinterland.

Author's opinion is that; in connection with the above evaluations, the proposed container terminal at the Port of Gemikonağı will be one of the well positioned container hub ports with low deviation distance and best feeder service distances.

Another important feature of transhipment hub port is hinterland container port traffic. Turkey is the motherland for Northern Cyprus community, so hinterland container port traffic of Turkey, may count on behalf of the proposed Port of Gemikonağı.

7.4.2 Specifications of the Proposed Port of Gemikonağı

Features and specifications of the Port:

- Position: Lat.: 35^0 08,7'
  Long.: 32^0 50,7'
- Depth in port: 17.50 Meters
- Total quay length: 2,700.00 Meters
- Total land area: 200.00 Hectares (2,000,000 M^2)
- Quay Area Added: 50.00 Hectares (500,000 M^2)
- Container Stacking Area: 60.00 Hectares (600,000 M^2)
- Free Zone Area: 50.00 Hectares (500,000 M^2)

7.4.3 Port Capacities of the Port of Gemikonağı

According the technical data and the performance criteria, the proposed Port of Gemikonağı container terminal, calculated to be capable of handling 3,500,000 TEU's annually. However, due to expenditure and marketing performance considerations, a three stage development plan found to be appropriate for the project, before reaching to the maximum capacity. Developmental stages are as follows:

1) **First Stage Capacity of the Port of Gemikonağı**

   At the first stage capacity is projected to be 1,500,000 TEU's per year. Three of fourth generation container mother ships will be accommodated (See Figure 7.6).

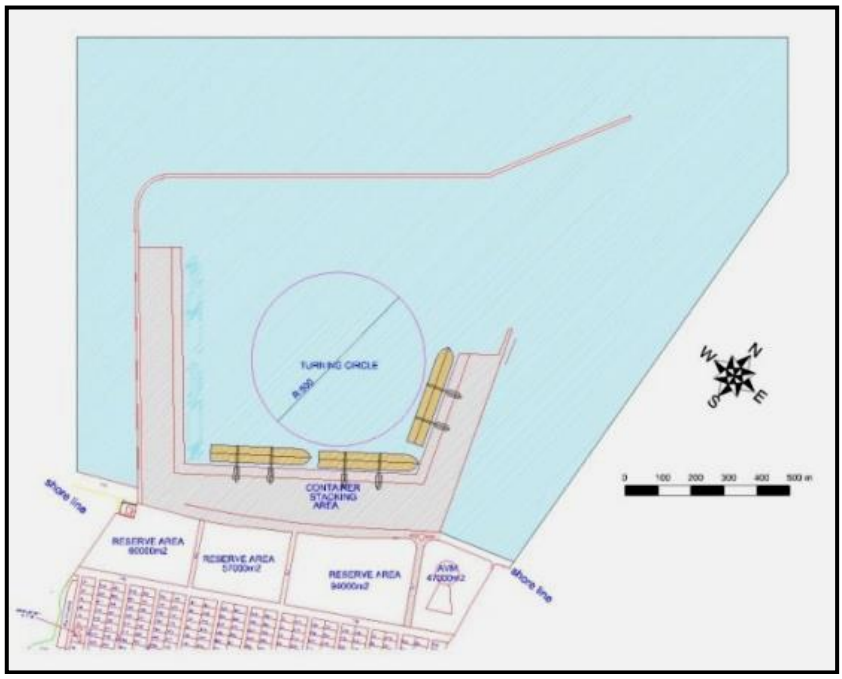

Figure 7.6: First stage capacity plans of the Port of Gemikonağı (Port İSBİ's, proposed port of Gemikonağı)

2) Second Stage Port Capacity of the Port of Gemikonağı

At the second stage capacity is projected to be 2,500,000 TEU's per year. Five of fourth generation container mother ships will be accommodated (See Figure 7.7).

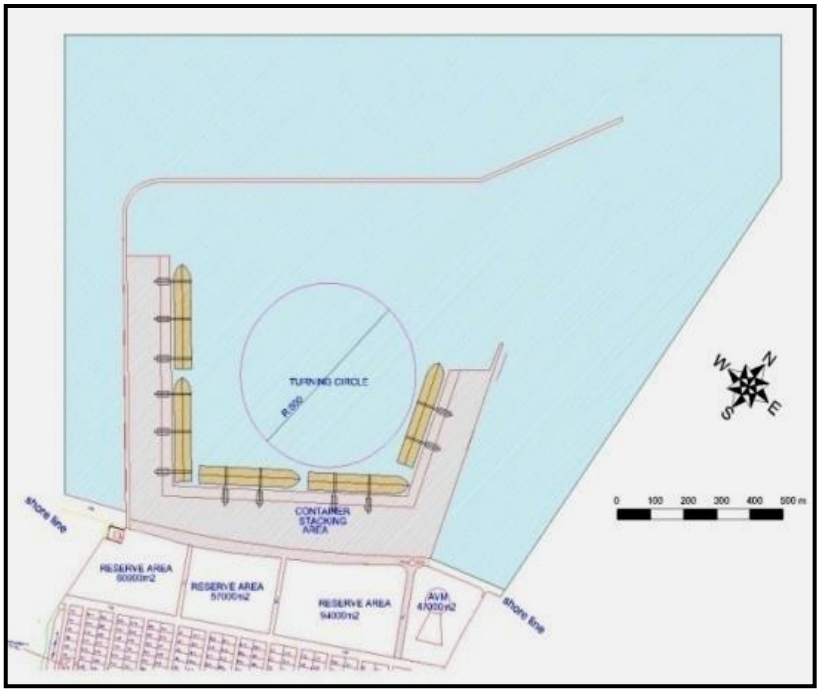

Figure 7.7: Second stage capacity plan of the Port of Gemikonağı (Port İSBİ's, proposed port of Gemikonağı)

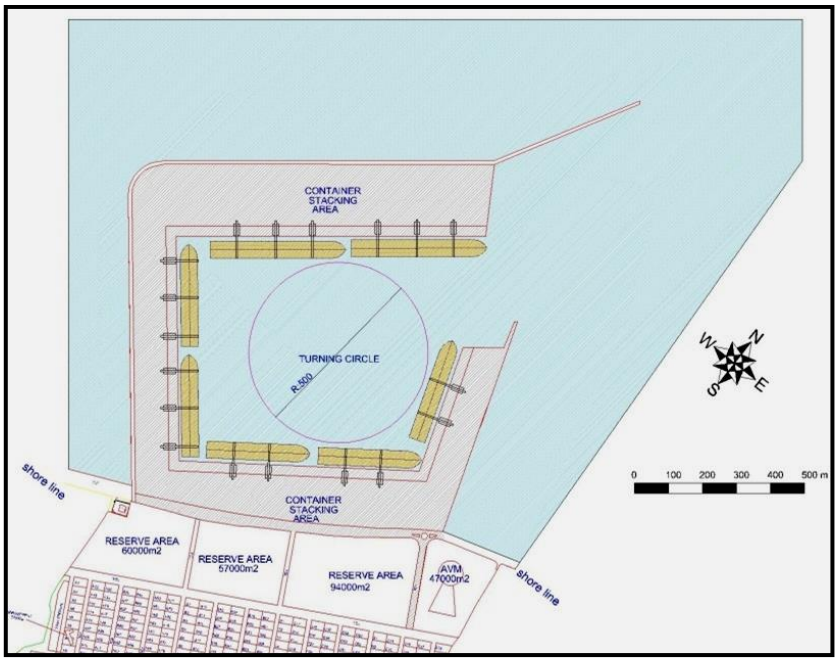

Figure 7.8: Third stage capacity plan of the Port of Gemikonağı (Port İSBİ's proposed port of Gemikonağı)

3) **Third Stage Port Capacity of the Port of Gemikonağı**

At the second stage capacity is projected to be 3,500,000 TEU's per year. Five of fourth generation and two seventh generation container mother ships will be accommodated (See Figure 7.8).

7.4.4 Approximate Initial Cost of the Proposed Container Terminal at the Port of Gemikonağı

The cost of the project of the Proposed Container Terminal at the Port of Gemikonağı is estimated 400 million US Dollars.

7.5 Deviation and Feeder Service Distances for the Port of Gemikonağı

The main two criteria to designate a port as a hub port, are; the mother ship deviation distance and the feeder service distances.

"Feeder service is an English term that refers to the service of cargo distribution in the maritime container port traffic. The small, so called, feeder ships distribute containers transported by the big mother ships and are equipped with the necessary equipment and fast enough to follow the movement dynamics of the mother ship. The term "mother ship" refers to large container vessels that sail on the main world navigation routes, across the Atlantic and the pacific or around the world, and call in a small number of large, but efficient ports. Due to their size, they cannot call a large number of ports, primarily because of high fixed costs of the ship, and inadequately equipped ports. A number of ports that some shippers call depend on several factors: the size of the mother ship, the cargo amount for each spoke port, distance of the spoke port, distribution costs, time of the port availability, cargo handling costs" (Jadrijević and Tomašević, 2014).

7.5.1 Deviation Distance for the Port of Gemikonağı

Container mother ships crossing Mediterranean are following the most suitable route between the Suez Canal and Gibraltar passages. The Port of Gemikonağı, with the 244 nautical miles of deviation distance is in a good position for becoming a transhipment hub port.

Deviation distances of Major Hub Ports of Eastern and Central Mediterranean are given in the Table 7.1 below.

Table 7.1: Deviation distances of major hub ports of the Eastern and Central Mediterranean**,** Source: Authors' own compilation

	Port	**Deviation Distance (NM)**
1	Gioia Tauro	66
2	Marsaxlokk	6
3	Haifa	241
4	Damietta	70
5	Port Said	0
6	Beirut	418
7	İstanbul	691
8	Izmir	345
9	Mersin	339
10	Piraeus	177
11	Limassol	254

Comparing hub port deviation distances of the Eastern Mediterranean; easily can be seen that the Port of Gemikonağı will have less mother ship's main route deviation distance than most of the other hub ports. The (Figure 7.9) shows the main route for a mother ship in the Mediterranean passage and the deviation route of the Port of Gemikonağı.

Deviation distance from the main route of the container mother ships is very important for transhipment hubs. This is due to the high expenses of the mother ships. Running cost expenses for a mother ship may reach to 120,000 US Dollars/ a day, for a fourth generation container mother ship, and much more higher for bigger ones.

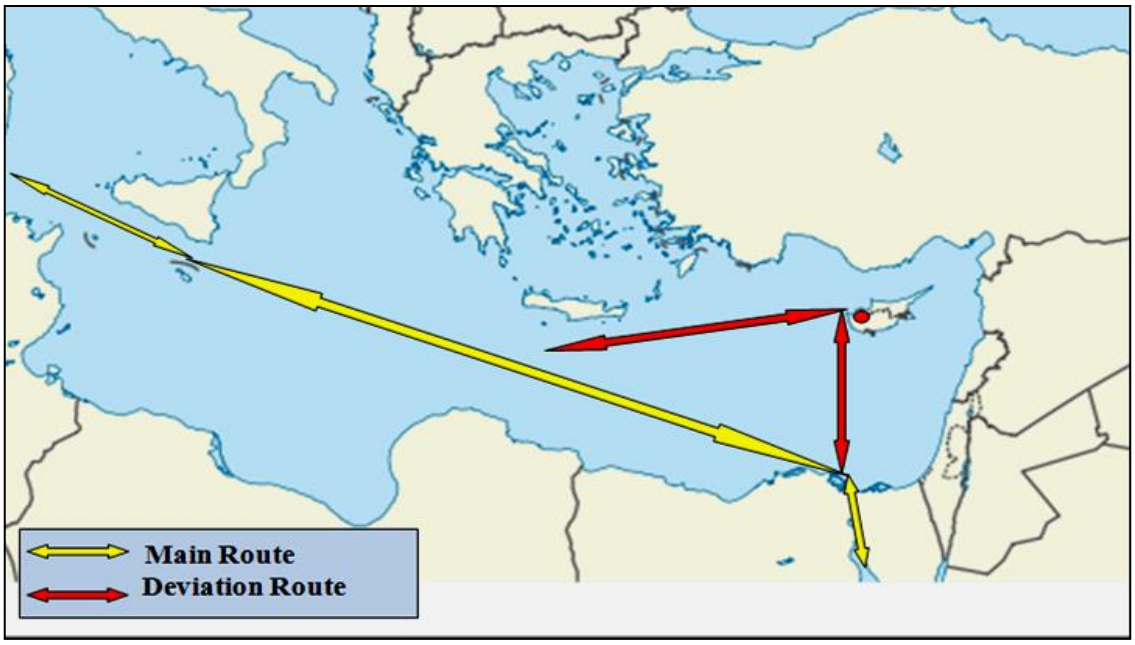

Figure 7.9: Mother ships main route in the Mediterranean and deviation to the Port of Gemikonağı (Author's own design)

7.5.2 Feeder Service Distances of the Proposed Container Hub Port of Gemikonağı

At the container transhipment system; containers brought to a hub port by container mother ships are distributed by smaller container vessels which are called Feeder Service Ships. Transhipment is a scheme of transport, consisting of disembarking cargo of a large ship (called mother ship) in an intermediate destination port and then embarking it onto smaller ships (feeder vessels) for onward transport to its final destination. The transhipment hub receives mother ships from transoceanic routes and distributes their load to small feeders going to regional ports.

Feeder service distances are very important for a transhipment hub. According to the report of "The Nationwide, Port Development Master Plan in the Republic of Turkey" prepared by the Japanese experts; the location of Cyprus in the Eastern Mediterranean gives the best chance to the ports of Cyprus in terms of feeder service distances (OCDI, 2000).

Feeder Ship's routes to the Eastern Mediterranean, Black Sea and Adriatic Sea are shown in the Figure 7.10 below.

Figure 7.10: Feeder ships routes from the Port of Gemikonağı (Author's own design)

Feeder service distances to the targeted trade area ports from the Port of Gemikonağı, are shown in the Table 7.2 below.

Table-7.2: Feeder service distances and container throughputs of ports in target of the Eastern Mediterranean hub ports
Source: Authors' own compilation based on various source

Port	Feeder Distance (NM)	Container Throughputs 2013 *(TEU's)*
Eastern Mediterranean Ports		
İzmir	498	821,591
Mersin	135	1,378,000
Antalya	149	126,404
Beirut	221	949,155
Lattakia	162	649,005
Benghazi, Libya	712	161,820
Black Sea Ports		
Ambarlı, İstanbul	695	3,378,000
Varna	842	142,611
Constanta	891	556,694
Illichivsk	1,015	406,848
Novorossiysk	1,131	419,611
Poti	1,277	226,115
Adriatic Ports		
Durres	838	86,875
Bar	928	283,435
Rijeka	1,202	137,048
Koper	1,234	476,731

CHAPTER 8
CONCLUSION & RECOMMENDATIONS

8.1 Conclusion

Considering that;

1) The global containerized trade reached to160 million TEU's in 2013 and the average growth of container trade was 10%, three times greater than global GDP growth;
2) The containerized trade has been accounting over 16% of global seaborne trade by volume and over 70% by value, of which the world seaborne trade was around 10.98 trillion US Dollars in 2012;
3) The global container port traffic reached to 651.1 million TEU's in the year 2013 and the average growth of container port traffic had been at an average rate of 12% per year;
4) The containers; easily can be transported among the ports as transhipment. This property of container transportation, emerge, ports to invest and increase their capacity in an intensive competitive environment, to become a "Regional Relay Hub Port" and/or a "Hub Port" and grab a share of this action;
5) Over the past decades, ships have strongly increased in size, up to 18,000 TEU. In order to use these big ships efficiently, the docking time at the port must be as small as possible. This means that large amounts of containers have to be loaded, unloaded and transhipped in a short time span, with a minimum use of expensive equipment;
6) The incidence of transhipment at container terminals worldwide -as a percentage of global throughputs- increased from 17.6% in 1990 to 28.5% in 2010 and did not experience any annual decline during that period;
7) The Mediterranean Sea is located in a favourable geographic position which passes one of the three most important trade roads between East and West;
8) The container terminals of Mediterranean ports have a capacity of 87 million TEU's and handled around 52.1 million TEU's in the year 2013. It is foreseen that Mediterranean container terminal capacity will increase up to 113.4 million TEU's and port throughputs will be realized an increase up to 81.6 million TEU's in 2021;

9) In the Mediterranean region, there has been considerable growth in the transhipment, as compared to direct services. Over the period (1990-1998), transhipment volumes in the region have been growing at a compound annual average rate of 20%. This strong growth in transhipment has boosted growth in the direct feeder sector servicing the hub and spoke system, which experienced a 17% annual average growth rate over the same period;
10) The Mediterranean container port traffic was around 52.1 million TEU's in the year 2013 and 43% of the container port traffic, which is around 22.9 million TEU's were transhipped in the hub and spoke system;
11) The hub ports of Central and Eastern Mediterranean; are serving in the Eastern Mediterranean, Black Sea, Adriatic Sea and Balkan countries. Hub ports of Central and Eastern Mediterranean container port traffic were 18,459,060 TEU's of which 79.9%, totalling 14,748,471 TEU's were in transhipment in 2013;
12) According to the forecast prepared for the Eastern Mediterranean, Black Sea, Adriatic Sea and Balkan countries; container port traffic will increase by 20,052,740 TEU's by the year 2023; shows the increase of container transportation and trashipment in the Mediterranean area.

Furthermore, taking into account that; as the latest generation of container ships on order has nominal capacities of approximately 18 thousand TEUs or more and are too wide and too deep to call at many ports in the world; shipping lines will have to seek new options of port calls they make and hence increase transhipment between hub ports and final destinations.

Container Liner Shipping Operators are seeking solutions to increasingly competitive conditions. The best solution for this competition, lies in the reduction of transporting cost per unit (TEU).

The world's leading Container Liner Shipping Operators; believes that, the reduction of transporting cost per unit (TEU), lies in changing the port-to-port transportation to door-to-door transportation system.

If the Container Liner Shipping Operators, get involved with the feeder service operations; today's container transhipment factors and property will change.

Most experts predict that this trend for increasing transhipment will see bigger feeder vessels operating in the Mediterranean region. It is also anticipated that the growth in the feeder market will be increasingly controlled by the largest shipping lines. Experts suggest

that increased volumes in transhipment will bring about economies of scale in the regional feeder market, which larger shipping lines will take advantage by establishing their own dedicated direct feeder networks

8.2 Recommendations

Port of Gemikonağı is offering ideal conditions for transhipment activities in the Eastern Mediterranean. After a solution that will satisfy both communities is reached in Cyprus; ports in Northern Cyprus will gain more importance at containerisation.

The economy of Turkey is the most powerful economy of the Middle East and Eastern Mediterranean and is a continuously developing and growing economy. If Turkey with Northern Cyprus is evaluated in the same economic system, the ports of Northern Cyprus will gain more importance, in the same logistics system with Turkey in the future.

In this context; importance should be given to Northern Cyprus ports and strategies should be developed for boosting their capacities. Container transhipment offers significant opportunities in Northern Cyprus. For this reason, importance should be given to planning and opportunity should be provided with an adequate level of a container transhipment hub port. Therefore macro level development planning of ports should be made.

In this concept; as a motherland Turkey can be accepted as the hinterland for Northern Cyprus ports. Due to close relations between Turkey and Northern Cyprus and being at a very close distance to the Turkish ports, the proposed container terminal at the Port of Gemikonağı is likely to have precedence among the other ports of the Eastern Mediterranean.

It is believed that; in connection with the above evaluations, the proposed container terminal at the Port of Gemikonağı will be one of the well positioned container hub ports with 17 meters of draft, and with low deviation distance and best feeder service distances. The Port of Gemikonağı container terminal will play the role of a container base for motherland Turkey.

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APPENDIX

CONTAINER HUB PORT IN CRETE, GREECE

Container Transhipment Hub In Timbaki

The former Greek Minister of Mercantile Marine, Manolis Kefalogiannis, plans to make Greece a centre of container transshipment. Therefore he asked all the "big players" of world economy to invest in Greece. Among other projects, it is planned to build a container port for up to 2 million containers a year on the shore of South Crete (Timbaki).

The present web site is an initiative from citizens worried about this project which, we think, threatens the area at all the levels of its life: economical, environmental and cultural. Our first aim is to collect and dispatch as much objective information as possible about the project. The information given on this site have been collected by us from all available sources, especially newspapers. Since official information is very scarce, the validity of it only relies on our sources and on our own attention. If you have more precise info or if you notice any mistake, please feel free to contact us. We will be happy to improve the accuracy of our information (See Figure A1 below).

Location and geographical elements

The town of Timbaki is located on the south coast of Crete island, in South East Mediterranean Sea (See Figure A2 below).

The island is thus situated on the roads of the container ships bringing, to all the Mediterranean zone and Europe, goods produced in China. Currently, these ships, after passing the Suez canal, continue their trip towards Western and Eastern Europe. They already ship south of Crete, and they can be seen on the horizon.

Since the beginning of the project, the ideal localisation of Crete for building a transshipment hub has been pointed out by Mr Li Kelin, Chairman of China Shipping Group and president of CSCL ([click here to see source]): a transshipment hub in Crete would allow the company to develop its activity, especially towards the Eastern Mediterranean, the Black Sea and the Adriatic Sea, in relation with "the rapid growth of China Shipping's container volume on its Far East-Mediterranean services".

Source: http://ns.no-container-port-in-timbaki.net/facts_en.php Acsessed date: (2010)

Figure A1: The proposed container transhipment hub in Timbaki
Source: http://ns.no-container-port-in-timbaki.net/facts_en.php
Acsessed date: (2010)

Figure A2: The island of Crete and position of Timbaki
Source: http://ns.no-container-port-in-timbaki.net/facts_en.php
Acsessed date: (2010)

November 7, 2005

Mr. Manolis Kefelogiannis,
Minister of Mercantile Marine,

The Hellenic Republic of Greece

Dear Mr, Kefalogiannis,

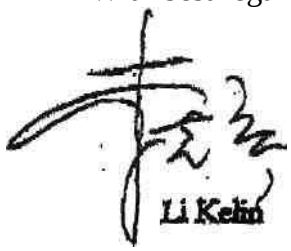
Port Development in Crete

My delegation and I left Crete on November 3 and returned to Shanghai yesterday after a short stay in the Netherlands. This week-long trip included stops at a number of Mediterranean and European cities however, Crete was the highlight. The warm reception and hospitality accorded us in Crete, as well as the information we learned about Crete, exceeded our expectation by far. In particular, you flew all the way from Athens to Crete personally. This has convinced us of the high level of attention and support from the Greek government towards developing a container transshipment center in Crete. Taking this opportunity I would like to extend our sincere gratitude to your Ministry and to you personally.

With the rapid growth of China Shipping's container volume on its Far East-Mediterranean services, establishing our own transshipment hub in the Mediterranean region is put on the agenda of my company. The geographical location of Crete makes it an ideal choice to develop a transshipment center for East Mediterranean, the Black Sea and Adriatic Sea areas. We also share your belief that Timbaki with all its features *is* a good site for transshipment terminals. We are positively evaluating this project, and will keep in touch with you and your colleagues. If necessary, we will invite a delegation from your Ministry to come to Shanghai for further discussions.

It is our hope and belief that we will receive the continued support from your Ministry and yourself in the days to come, either on this project or on other matters of mutual interest. Personally I look forward to meeting you again in the near future.

With best regards,



President,
China Shipping Group

Source: Mr Li Kelin's letter to Mr Kefalogiannis, 10th November 2005).