The Impact of Mega Expansion Projects on Container Terminal Competitiveness in The East Mediterranean Region.

Sayed Elsayed ElKhouly

Professor of Management Planning Systems
Faculty of Business-Ain Shams University

Ahmed Ebrahim Kamel
Head of Strategic Planning & Marketing strategies at Damietta Container Handling Co.

Abstract:

The maritime industry faces a rapid and continuous changes i.e. the horizontal and vertical integration between shipping lines, ports and other plyers in the maritime industry, as well as the new technologies that significantly increase the competition between ports. The ability of a port or terminal to compete depends on many factors such as throughput, market share, geographical location, accessibility, infra/superstructure, turnaround time, cost, productivity, safety and others.

This paper investigates the competitiveness level of Damietta container terminal (DCHC) relative to the main container terminals in the east Mediterranean market. The study includes the eleven biggest container ports (in terms of cargo volume) in an inter-port level. Data Envelopment Analysis (DEA) technique used to benchmark the efficiency of such ports. In addition, the

researcher apply Herfndahl index technique to measure market concentration and the degree of competition among the container ports included in the defined market.

This study shows that, Piraeus, SCCT, Mersin ,Haifa, Ashdod and Alexandria (AICT) container terminals are the most efficient container terminals in the defined market with score equal to 1.0 in the DEA Scale. Beirut is relatively less efficient with score of and 0.81, Damietta score is 0.78 which is relatively in between. While Alexandria (ACCHCO.) and Port Said west are not efficient as their efficiency scores (0.66 and 0.46) below the average.

Damietta container terminal is able to compete and attract new traffic with its future facilities which will put in a new shape and higher rank. The investment projects, plans and strategies in Damietta container & Cargo Handling Company (DCHC) will create the appropriate conditions for a positive shift in competitiveness.

Keywords: Port competition, competitiveness, market share, port performance.

1. SCOPE OF THE STUDY

To increase their attractiveness most ports invest huge amounts in superstructure, equipment, and information technologies. Such investments are important not only for the customer satisfaction, but also for the enhancement of the port competitiveness. Therefore, terminal operators and port authorities invested in the

characteristics or of ports (e.g. water depth, container stacking yards, STS and other equipment) to maintain the current customers, attract new ones.

This research focuses on the competitiveness of the Damietta container terminal (DCHC) between the east Mediterranean ports, which include the eleven biggest container ports (in terms of cargo volume) in an inter-port competition level.

The main question of this study is: What is the competitiveness level of Damietta container terminal in the east Mediterranean market? Sub questions arising from the main research question are: Which is the leader port in the east Mediterranean market? Are the rest of the included ports more competitive than the Damietta container terminal? Could the current expansion projects and strategies of Damietta container terminal improve its competitiveness?

1.1Research methodology

In order to assess the efficiency and competitiveness level of the main container terminals / ports in the East Mediterranean region, the researcher used some of the most important elements affecting competition between ports. These factors are; terminals throughput, market share, market concentration, port location, port accessibility and port infra/superstructure. Such elements were selected according to the availability of

data gathered from different sources. The researcher uses Data Envelopment Analysis (DEA) technique to assess port performance and competitiveness. In addition, Herfindahl index (H) method was applied to examine the degree of market concentration.

1.1.1 Data collection

Gathering of the required data about the east Mediterranean container ports was not an easy task. The researcher collected necessary data from different sources, included: Web sites of all port authorities and terminal operators of the eleven ports included in the study, Web sites of various organizations (e.g. UNCTAD), Emails and telephone communication with some officials and experts in the field, Statistical and annual reports published by the terminal operations and port authorities. Reviews, articles and news from global magazines-newspapers (e.g. Containerization International).

1.2Limitations of the study

Due to lack of available statistical data, the researcher could not consider composition of volume i.e. transshipment or the getaway cargo.

The assessment will be limited to the efficiency and competitiveness level of the container terminals in the following eleven ports; Damietta, Suez Canal Container Terminal (SCCT),

Piraeus, Ashdod, Izmir, Haifa, Beirut , ACCHCO , AICT, Mersin and port Said west.

2. INTRODUCTION

Shipping lines and terminal operators face a rapid change and large amount of uncertainty. Technological developments, logistics integration and deregulation significantly changed the shape of maritime industry. Therefore, seaports that could not be able to be efficient players are at risk of termination. The increase of container traffic (even with lower rate than before), and the increase of container ship capacity have resulted in shipping lines minimize number of ports of call to achieve the maximum benefit from the economies of scale that bigger ships can provide at sea. Meanwhile, they are able to provide more flexible, reliable and faster transportation services and sailing schedule. On the other hand, the horizontal integration (strategic alliances, mergers and acquisitions) has led to more concentration of demand for port services that accordingly, not only decrease the number of shipping lines demanding services from ports or container terminals but also sharply increase competition between ports.

2.1Market characteristics

According to KPMG shipping insights: “when studying the current state of the shipping industry, it is impossible to miss the changes taking place in it. Major companies have decided to

acquire close competitors in order to drive growth and increase market share significantly. Major plyers such as Maersk, acquiring Hamburg Sud, Hapag Lloyd acquiring UASC and Cosco Shipping acquiring Orient Overseas Container Line, are just three examples of ongoing consolidation in the shipping market. This leads to a market situation that can be described as an oligopoly simply because now over 60% of global shipping market held by only seven liner companies."

Geographically, East Mediterranean is the main links between East and West markets and it is intersection points with Asia, Europe and Africa. This enables such region to become transhipment and logistics centers between markets. Moreover, these regions are now growing markets that can offer and absorb containers and commodities due to the economic growth in Egypt, East Med. and Black Sea countries.

2.1.1Market concentration

The Herfindahl index (H) measures the degree of competition among firms in the market. It is defined as the sum of the squared market shares of (n) individual company. As such, it can range from (1/n) to 1 moving from a large amount of small firms to a single monopolistic organization where H=1. A decrease in the Herfindahl index generally indicates a decrease in concentration.

Table (1) indicates that from 2015 to 2019 the Herfindahl index

were relatively small ranging from (0.1250) to (0.1722), which means that although Piraeus Greece and SCCT in Port Said East together account for about 50% market share in 2019, the market was competitive during the last six years. It might be due to the high degree of competition among the other terminals operators in ports included in the study. In the same time, it is clear that market go towards concentration this was clear in 2019. Although, the port's throughput and market share are influential factors that indicate the competitiveness level of a port, the port location also has a significant impact on its attractiveness and competitiveness.

Table (1) East Mediterranean container market concentration – Herfindahl index (H) in 2014-2019

Rank	Port	2014		2015		2016		2107		2018		2019	
		Market Share	HHI	Market Share	HHI	Market Share	HHI	Market Share	HII	Market Share	HHI	Market Share	HHI
1	Piraeus	22%	0.0480	22%	0.0489	24%	0.0563	24%	0.0568	27%	0.0703	31%	0.0961
2	Port said East SCCT	21%	0.0455	19%	0.0371	16%	0.0252	15%	0.0220	14%	0.0199	19%	0.0361
3	Mersin	9%	0.0087	10%	0.0095	9%	0.0085	9%	0.0087	9%	0.0087	12%	0.0144
4	Ashdod	8%	0.0061	9%	0.0075	9%	0.0084	9%	0.0080	8%	0.0064	9%	0.0081
5	Beirut	8%	0.0058	8%	0.0056	7%	0.0053	8%	0.0059	7%	0.0050	7%	0.0049
6	Damietta	5%	0.0024	5%	0.0027	6%	0.0031	7%	0.0052	7%	0.0044	7%	0.0049
7	Alexandria ACCHCO	6%	0.0040	7%	0.0047	6%	0.0039	5%	0.0027	5%	0.0024	6%	0.0036
8	Alexandria AICT	4%	0.0018	4%	0.0014	3%	0.0011	4%	0.0016	4%	0.0017	5%	0.0025
9	Port Said West	4%	0.0014	4%	0.0020	3%	0.0010	3%	0.0007	3%	0.0008	4%	0.0016
	Total	100%	0.1321	100%	0.1278	100%	0.1262	100%	0.1250	100%	0.1332	100%	0.1722

Source: Researcher derived from various sources

2.1.2 Development of market demand and supply

According to (review of maritime transport 2019): In the year 2018, the trade continues to grow on the major three East-West trade lanes, with volumes expanding by 4.8% (down from 5.7% in 2017). Asia-Europe trade increased by 3.6 % (down from 6.0% in 2017) reflecting weaker European import demand

and other developments affecting the route. Three regions recorded volume decline, the Middle East volumes falling by 10.1%, Africa (Mediterranean does not included) and Oceania volumes fell by 4.4% and 1.1% respectively. Among the gainers, both American and Chinese ports reported healthy cargo increases in the first quarter of 2019 and volume increased despite of the ongoing trade tensions between the two countries. The escalation of the trade war between China and US brings down container volume growth rates over on 2019.

Despite of the large amount of uncertainties over the global trade environment, container volumes achieved growth in 2019-even at much lower rate than the previous two years when overall increased by 6.7 % in 2017 and 5.2% in 2018. (Alphaliner). According to UNCTAD and Lloyds list intelligence the international trade development growth rate forecast 2019-2025 are 4.5 % and 4.6% respectively.

In addition to the demand side, the new normal also entails some new trends on the supply side. Shipping lines have seemingly discarded the quest forever-bigger ships and are increasingly looking on growth prospects associated with the landside of operations. Ports and shipping companies appear to be focusing more attention on expanding activities to inland logistics. Major global container lines acquired regional carriers (e.g. Maersk's acquisition of Hamburg Süd or CMA CGM's purchase of the

American President Line or Hapag Lloyd acquiring UASC) could be indicative of industry behavior to adapt to changing conditions. Given the regionalization of trade flows and the trend towards restructuring supply chains, the new normal – despite the potential challenges – could generate opportunities, especially for developing countries striving to integrate more effectively into global trading networks.

3 ASSESMENT OF PORT COMPETITION

The degree of port competition within a region can be assessed using different indicators. This paper discusses various elements such as throughput, market share, market concentration, location, accessibility, port infra and super structure.

3.1 Ports Throughput

One of the most important factors that explain port competitiveness is the port throughput. Table (2) shows the development of throughput of the eleven ports/terminals included in this study form 2014 to 2019.

Port of Piraeus is the biggest port in the East Mediterranean region with 27% market share from the eleven ports included in the this study in 2018 . Its throughput was almost 3.49 million TEU in 2014 and reached 5.16 million TEU in 2019 with an average annual growth of 8%. Table (2) data shows that Piraeus Port has grown more than %51 during the study period and its

transhipment cargo volume is specified between 80-90 percent in various sources. Besides, the operator company COSCO Shipping plans to develop the port throughput up to 7,2 million TEU in the future. The critical factor contributing to the increase in traffic in Piraeus is the takeover by Cosco Shipping, combined with the expansion of Ocean Alliance, which has the most extensive east-west network and will positively assist the attraction of new service (Lloyds list / top ports 2018). The second important factor, Belt and Road incentive china consider Piraeus port the main gate to Europe and many of the other East Mediterranean countries.

Suez Canal container terminal (SCCT) achieved a throughput of 3.16 million TEU in 2019 compared with 2.61 in 2018 21% up, while its current capacity is 5.4 million TEU. SCCT ranked as the second container terminal after Piraeus. It achieved 21% growth rate in 2019 and start to regain traffic and compensate the decline from 3.4 million TEU in 2014. The main reason for such a drop is the competition from Piraeus when acquired by COSCO china, also from the close terminal DCHC in Damietta port. After new shape of the shipping lines alliances in 2017, SCCT was one of the losers as many of the terminated CYKEH alliance members joint both THE Alliance (Yang ming line and the Japanese three lines) and Ocean alliance (COSCO) and moved to Piraeus and Damietta. Today, the opening of Port Said tunnels, under the Suez Canal just south of Port Said allows faster access to SCCT and reduce the logistics costs. With the terminals strategic location

offering no deviation from the main routes on trade lanes between Asia and Europe, around 95% of SCCT's traffic has historically been made up of transshipment volume. "The new tunnel provides a fast connection to the highly populated districts in the Nile Delta and key industrial zones in Greater Cairo, also making SCCT a cost-effective option for import and export customers. Current operating hours for the tunnel are between 0800 hrs. to 1800 hrs.

***Port of Mersin*:** has a three competing terminals with total capacity of 2.65 million TEUs, it achieved 1.94 million TEU in 2019. , and quay length of 1,484 m, with 16.8 draft, 800,000 m2 of stacking yards. It is the biggest container port in Turkey with 9% market share from the eleven ports included in this study. After two years of declining throughput volumes, the port of Mersin rebounded in 2017 with a 6.8% increase in container traffic. The design of the East Med Hub 2 expansion project, which will increase capacity to 3.5m teu, has also started. It is projected to be operational as of 2021.

***Izmir port* is o**ne of the most growing competitors in the East Mediterranean transhipment market. Izmir port achieved highest average growth rate (25%) in the region, as the port recorded 1.6 million TEUs in 2018 almost the double of its throughput in 2014.

Table (2) Development of East Mediterranean ports container throughput, 2014:2019 (1000 TEU)

Rank	Port	2014	2015	2016	2017	2018	2019	Growth Rate 2019	Ave. Growth Rate
1	Piraeus	3,493	3,328	3,737	4,060	4,409	5,158	17%	8%
2	Port said East SCCT	3,400	2,900	2,500	2,528	2,610	3,161	21%	-1%
3	Mersin	1,484	1,466	1,453	1,592	1,722	1,939	13%	6%
4	Ashdod	1,250	1,308	1,443	1,525	1,480	1,525	3%	4%
5	Beirut	1,211	1,130	1,147	1,305	1,306	1,229	-6%	1%
6	Damietta	773	777	880	1,227	1,228	1,154	-6%	9%
7	Alexandria ACCHCO	1,006	1,028	978	887	912	947	4%	-1%
8	Alexandria AICT	684	591	562	745	845	890	5%	7%
9	Port Said West	669	522	503	461	617	701	14%	3%
	Total	13,970	13,050	13,203	14,330	15,129	16,704	7%	4%

Source: Author derived from different sources.

Beirut Container Terminal is a hub for Jordan, Syria, Iraq, and the Persian Gulf States. Two of the world's largest container shipping companies MSC, and CMA-CGM) have selected the Port of Beirut as their transshipment hub. CMA-CGM has constructed a regional headquarter building near the Port of Beirut. According

to the Port Authority of Beirut, The transshipment containers represent around 30% of total terminal throughput.

The Port of Beirut's container terminal has completed phase I of ongoing expansion efforts. This has extended quay 16 by 500 meters and create a new 18-hectare stacking area for containers. Phase I added capacity of 450,000 TEUs, bringing the terminal's annual container-handling capacity to 1.5 million TEUs. The phase II expansion will create a continuous 2,300 meter long quay and further increase container handling capacity by 600,000 TEUs per year. Once phase II is completed, the Port of Beirut's container terminal will have the capacity to handle 2.1 million TEUs per year.

Port of Haifa located in a natural, protected bay. The port opened the first phase in the "Carmel Port" expansion program in 2010. The new facilities expanded the port's annual container handling capacity by 500,000 TEU. 1.47 million TEUs was handled in Haifa in 2018, and the port achieve 5% average growth rate and maintain 8%over the study period. The privatization of Haifa is underway.

Port of Ashdod is one of the few deep-water ports in the region as it built on the open sea. The port handles 1.525 million TEU in 2019. It achieves 4% average gross rate and 8% market share in 2018.

Alexandria International Container Terminals (AICT) is a subsidiary of Hutchison Ports. AICT’s terminal has a draught

alongside of 12 m. The terminal maintain 5% market share in the defined market. The terminal is very efficient and achieves better use of its limited resources comparing with neighboring terminals. In 2019, AICT record 890,000 TEU with only 5 STS gantry crane which is quit high figure, the terminal operates much higher than its maximum capacity.

Alexandria Container Handling Co. ACHCO: operates two container terminals in Alexandria port. Major container lines call Alexandria include i.e. MSC, Evergreen, Arkas Line, Overseas Orient Container Line, Cosco, and APL among others. ACCH's. El-Dekheila terminal has one berth, which can accommodate three vessels at a time. The terminal has 6% market share in 2019. Although it achieved 14% increase in 2019, the average growth rate during the study period was -1%.

***Port Said Container Handling Co. PSCCHC*:** one of the three public container terminals in Egypt. In 2018, the terminal started to recover as it recorded 33% increase over 2017. Efforts has been made to strengthen its competitive position and attract new business. Today the terminal can accommodate and operate larger vessels with a draught of 15.5 m and length of up to 370 m. in 2019 the terminal has 4% market share and recorded 3% average growth rate 2015-2019.

Damietta Container Handling Co. DCHC recorded a throughput of 1.15 million TEU in 2019. It maintain a market

share of 7% in 2019. The incensement of market share started in 2015 when Damietta Port Authority (DPA) announced the increase of allowed ships draft from 13.25 m. to 14.5 in 2015 and to 15m. in 2018. The terminal has sufficient land for storing container exceed 70 hectares, also it is connected with the main cities and economic area of Egypt with efficient network (road, rail and barges). The accessibility of Damietta port and the geographic location of the terminal in the heart of Nile Delta strongly increases the demand from fruit and vegetables Egyptian exporters.

3.2 Market share:

The market share of each ports is calculated as a percentage from the total throughput of the eleven mentioned ports and is presented in Table (3). Piraeus is the Market leader in the East Mediterranean with a consistent growth of market share ranging from 22% in the year of 2014 to 26% in 2018. However, strong competition still exists between ports in the East Mediterranean. In 2018, SCCT in Port Said East recorded a market share of 14% and DCHC in Damietta port 7% and currently conducts major infra structure projects that increase its ability to gain higher market share in the coming years. Alexandria terminals recorded 5% and 4%, while Port Said west has only 3% of the market share. Mersin and Izmir benefits from the recent trend of shipping line to increase directs calls to many ports rather than

transhipment Hub and Spoke system, Beirut, Ashdod and Haifa are the same. Ashdod and Haifa maintain a steady market share of 8%. Also the same for AICT Alexandria, which achieves 5%. While Alexandria and Port Said container terminals have 5% and 4% market respectively.

Mersin and Izmir benefits from the recent trend of shipping line to increase directs calls to many ports rather than transhipment Hub and Spoke system, Beirut, Ashdod and Haifa are the same. Ashdod Haifa maintains a steady market share of 8%. Also the same for AICT Alexandria, it achieved 4%. While Alexandria and Port Said container terminals achieved 5% and 3% market share with 1% decrease of their market share.

Table (3) - Development of Market share of the container ports in East Mediterranean Container markets. 2014 – 2019 (%).

Rank	*Port*	*2014*	*2015*	*2016*	*2017*	*2018*
1	Piraeus	22%	22%	24%	24%	26%
2	Port said East SCCT	21%	19%	16%	15%	14%
3	Mersin	9%	10%	9%	9%	9%
4	Izmir	5%	4%	8%	8%	9%
5	Ashdod	8%	9%	9%	9%	8%
6	Haifa	7%	8%	8%	8%	8%
7	Beirut	8%	8%	7%	8%	7%
8	Damietta	5%	5%	6%	7%	7%
9	Alexandria ACCHCO	6%	7%	6%	5%	5%
10	Alexandria AICT	4%	4%	4%	4%	4%
11	Port Said West	4%	3%	3%	3%	3%
	Total	100%	100%	100%	100%	100%

Source: Author, derived from various sources.

3.3 Port Location

The geographic location of a container port from the main trade route(s) is also an important factor to assess the competitiveness of a port (Lu & Marlow, 1999). The carrier's main objectives are to provide the most comprehensive door-to-door coverage with minimum transit time and cost. Therefore, the closer the port is to

the main route, the higher is its competitive advantage in the market (Guy & Urli, 2006). For example, all the Egyptian container ports in the Mediterranean coast have very advantageous positions as these ports located in the mouth of Suez Canal with deviation distance ranging from 0 nm to 60 nm. In the same context, Beirut, Izmir, Mersin, Ashdod, and Haifa are less competitive than other ports six ports included in this study. However, from the shipping lines perspective the port competitiveness level not only depends on the port location but also on the port accessibility.

3.4 Port accessibility

The introduction of larger ships has led to demand for container terminals close to the open sea in order to minimize transit time and to reduce costs. On the hinterland side, direct connections to highways, rail and inland navigation system is also strengthening the hub port competitive position (Fleming & Baird, 1999). Accordingly, in the East Mediterranean region, transhipment ports such as SCCT, Beirut and Piraeus have maintained their terminals to accommodate 16.5 m ships draft while Haifa, Ashdod, Izmir, Mersin and lately Damietta are 15 and 15.5 m ships draft respectively.

3.5Terminal infra/superstructure

The growth of container traffic and the introduction of ever-larger container vessels have put further pressures on terminal operators to introduce measures to improve the ship turnaround time and to reduce the container's dwell times. Meanwhile, at the time of increasing port competition, terminal operators have to reduce their operating costs and to invest in new facilities such as quay length, quay cranes, yard equipment and yard stacking area (Drewry shipping consultant, 2000).

Table (4) shows that terminal operators in the East Mediterranean highly competitive in terms of terminal infra/super structure. Piraeus is the largest port in the East Mediterranean with three container terminals with total area of 130 hectares, quay length of 3600 m, and 36 quay gantry cranes. SCCT is also competing, as its terminal length is about 2400 m and 21 quay gantry cranes. Mersin and Izmir in Turkey also have a competitive advantage in terms of terminal length quay gantry cranes. Meanwhile Damietta has a relatively shorter terminal of 1050 m in length equipped with 10-quay gantry + three mobile cranes. However, the terminal area of 60 hectares and the storage capacity of 40,000 TEU encouraged the port to invest in new facilities. The port has ordered three STS Quay cranes with the highest specifications, ten tractors and six RTGs in addition to 400 of quay and 10 hectares to enhance the terminal capacity and productivity.

4 BENCHMARKING THE EFFICIENCY AND COMPETITIVENCES LEVEL OF THE MAIN TERMINALS IN THE EAST IN THE EAST MEDITERRANEAN CONTAINER MARKET.

The dynamic characteristics of the East Mediterranean container market have a significant impact on determining the competitiveness level of container terminals. There are many factors to be considered when assessing the port competitiveness such as throughput and market share, port location, accessibility and terminal infra/superstructure. However, when evaluating the competition between ports, such elements should uses collectively rather than individually. For instance, from the above analysis it can noticed that although Piraeus is the market leader in the East Mediterranean in terms of throughput and market share as well as terminal infra/super structure, it has less competitive advantage than Damietta and SCCT in terms of port location and accessibility.

In this paper, the efficiency of the main container terminals and port in the east Mediterranean container market assessed using the Data Envelopment Analysis technique. The data included in this paper used as benchmarking criteria. Terminal area, quay length & depth and number of gantry cranes are used as inputs (Table 4), while terminal throughput in 2019 are used as output criteria. The Constant Return-to-Scale (CRS) model is used as a DEA model for benchmarking.

The DEA technique uses a 0 to 1 scale in order to benchmarking the efficiency of different firms (DMUs) in the market concerned. Table (4) shows that, Piraeus, SCCT, Haifa, Ashdod, Mersin and Alexandria (AICT) container terminals are the most efficient container terminals in the defined market with score equal to 1.0 in the DEA Scale. Beirut is relatively efficient with scores of 0.81. Damietta score is 0.78 which almost between. While Alexandria (ACCHCO.) and Port Said west are not efficient as their efficiency scores (0.63 and 0.51) below the average.

Table (4) Benchmarking the efficiency of the main container terminals in the east Mediterranean container market using DEA technique.

no.	*DMU*	*Quay Length*	*max. Draft*	*Vessel operation (Gantry)*	*Vessel operation (Mobile)*	*Yard Operation (RTG)*	*Yard operation (RS)*	*Total Area*	*Throughput 2019*	*Eff. score*
1	Piraeus	3630	19.5	35	1	60	0	1000	5.158	1
2	SCCT	2400	16.5	21	0	67	7	1200	3.161	1
3	Mersin	2370	15.8	12	5	38	12	1120	1.939	1
4	Ashdod	1100	15.5	10	3	16	0	625	1.525	1
5	Haifa	950	15.5	12	0	16	0	625	1.470	1
6	Beirut	1100	17.5	16	0	51	18	600	1.229	0.808
7	Damietta	1050	15	10	3	30	18	795	1.154	0.778
8	Acchco	1570	14	15	0	29	30	570	0.947	0.628
9	Aict	970	12	5	0	21	10	300	0.890	1
10	PSCCHC	950	15.5	10	1	28	25	572	0.700	0.505

Source: Reaseacher calculation using Zhu, J. (2003) Quantitative Models for Performance Evaluation and Benchmarking: Data Envelopment Analysis with Spreadsheets. Kluwer Academic Publishers, Boston.

It is important to highlight that inefficiency seen as a ratio between inputs employed and the output achieved in 2018. It means that the container terminals in Piraeus, SCCT, Haifa, Ashdod and Alexandria (AICT) container terminals are very efficient in terms of infra and superstructure as they reach the maximum level of utilization of their facilities. At the same time, it could also interpreted as the fact that they need to invest in new facilities i.e. AICT container terminal operates with more than 160% of its planned maximum capacity and urgently in need to increase the quay length and stacking yards as both represent a bottle necks, which could play against their attractiveness. Furthermore, the different level of throughput of ports reflect the use of different technologies. In addition, the composition of port throughput is also an important factor to explain efficiency and it was not considered in the estimation. These limitations have led us not to rely only on the results from DEA to evaluate port performance and to understand the main factors that affect the efficiency and the competitiveness level of Damietta container terminal.

5 DAMIETTA PORT COMPETITIVENESS LEVEL

The current mega projects and investments will increase the terminal capabilities to meet the increasing demand. However, Damietta port has a major development of port infrastructure, especially in quay length with 38% up (from 1050 to 1450) and

water depth to reach 17m. alongside container berths. In order to minimize ships' turn-around time and to provide a reliable and efficient service for its customers the DCHC uses the state-of-the-art technology (Navis N4) in addition to Electronic Data Interchange (EDI), SMS messaging to inform customers of the status of their cargoes and prompt messaging of cargo arrival and inspection times.

5.1 The current investments in Damietta Container Terminal (DCHC)

DCHC started to invest large amounts in infrastructure, superstructure and cargo handling equipment. In this way, the terminal will create the suitable conditions for the provision of a variety of services to the customers. According to DCHC announcement, the investment plan of the Damietta Container Terminal is the following:

- In October 2019, DCHC increased the quay length with 38% from 1050m. to 1400 m.
- The depth of the new berths will be 17 m. With this depth, the container terminal can provide services even to the biggest mother ships.
- There will be an increase of the reefer capacity from 1850 TEU‟s into 2500,000 TEU‟s.
- Improvement of IT system. The TOS (terminal operating system) upgraded with Navis N4.
- DCHC will invest in 10 RTG‟s until the middle of 2022. By the

use of those cranes, the terminal will achieve high density of stacking.

More over DCHC will be able to accommodate and operate the biggest container ships worldwide as the allowed ships draft will reach 15.5m and the STS outreach able to handle 25 containers across deck. DCHC benefits from good transport links (Rail/ Road/Barges) to the Egyptian hinterland.

6 CONCLUSION

- The face of maritime transport is changing rapidly, reflecting a shift to a new normal. This is characterized by a moderation in global economic and trade growth, the expanding regionalization of supply chains and trade patterns, a larger role of technology and services in value chains and logistics i.e. block chains IoT, and accelerated environmental sustainability agenda. Such developments need for adequate response and flexible and forward-looking transport policies that anticipate change.
- The objective of this paper is to assess the competitiveness level of Damietta Container Terminal and the east Mediterranean terminals in the light of its current mega projects.
- The study concluded that the port of Piraeus ranked first, Port Said and SCCT ranked second, with the rest of the ports following. These conclusions are based on the cargo volume

data for the years 2015 to 2019.

- The main competitors of DCHC do not have draught problems and they are ready for berthing larger vessels. So that, DCHC project to dredge the approach channel and port basin down to -18 m depth will make a big difference. Same for quay length and other areas of devilment i.e. upgrading the TOS new STS and other equipment. It is highly important to finish these major projects on time.
- DEA analysis emphasized only on technical factors rather than other influential elements that should be considered when assessing the efficiency of ports such as the labor, the port management and operation systems, the usage of IT and the future plans of the ports. There is a need for a detailed analysis of Damietta Port to show that a number of factors could provide a competitive advantage to this port.

7 RECOMMENDATIONS

- DCHC managers should go ahead and pay more efforts to finish the current mega expansion projects i.e. increase the allowed draft, quay length, new quay and yard equipment in due time. The current upgrading of TOS is a major step to maintain customers.
- In order to survive and grow in such a highly competition market, port managers and terminal operators should

continuously assess their internal (strengths and weaknesses) and external environments (opportunities and threats).

- The three public container terminals i.e. Damietta, Port Said and Alexandria should efficiently utilize their existing facilities, and to plan for future investment in the right time to achieve better efficiency level.
- DCHC managers have to pay more attention to the marketing of their facilities and services.
- Smart port technologies are the future of container terminals.

References:

1. Zhu, J. "Quantitative Models for Performance Evaluation and Benchmarking: Data Envelopment Analysis with Spreadsheets". Kluwer Academic Publishers, Boston, 2003.
2. Fleming, Douglas K., and Alfred J. Baird. "Comment some reflections on port competition in the United States and Western Europe." *Maritime Policy & Management* 26.4 (1999).
3. United Nations Conference on Trade and Development (UNCTAD), Review of maritime transport 2019.
4. United Nations Conference on Trade and Development.(UNCTAD), Review of maritime transport 2018.
5. Clarkson Research. (2019). Shipping Intelligence Network. Time series. Retrieved from

   https://sin.clarksons.net/Timeseries.
6. https://www.dchc-egdam.com, accessed Nov. 2019.
7. https://www.petlim.com.tr/kurumsal/socar-terminal, accessed Nov. 2019.
8. https://www.ashdodport.co.il/english/pages/homepage.aspx, accessed Dec. 2019.
9. https://www.haifaport.co.il/en/terminals/ accessed Jan. 2020.
10. https://alexcont.com , accessed Jan. 2020.
11. https://www.pscchc.com , accessed Jan. 2020.

Appendixes:

Appendix (1): Deviation from the Main Shipping Route of Mediterranean Container Ports

Rank	Port	Dev. Distance (nm)
1	Piraeus	107
2	Port said East SCCT	0
3	Mersin	339
4	Izmir	345
5	Ashdod	
6	Haifa	241
7	Beirut	418
8	Damietta	30
9	Alexandria ACCHCO	40
10	Alexandria AICT	40
11	Port Said West	0

Appendix (2) - East Mediterranean and Middle East hub ports infra/superstructure comparison

	Port		Quay Lingth	Max Draft	Vessel Operation	Yard Operation	Throughput Capacity	Total Area	Reefer Plugs
1	Piraeus	Terminal 1	1150 m	12m : 19m	7 STS + 1 mobile crane	8 RMGs	1 M TEUs		138
		Terminal 2	1480 m	14.5m : 16.5m	18 STS	16 RTGs	3.2 M TEUs	1,200,000 m2	760
		Terminal 3	1000 m	18.5m : 19.5m	10 STS	18 RTGs	2,3 M TEUs		360
2	Port said East SCCT		2400 m	16.50 m	21 STS	67 RTG + 7 R/S	5.4 M TEUs	1,200,000 m2	3636
3	Mersin		3370 m	15,8 m	12 STS + 5 mobile crane	38 RTGs + 12 R/S	2,6 M TEUs	1,120,000 m2	1250
4	Izmir		2245 m	16.8 m	7 STS +7 mobile crane	21 RTG + 15 R/S	1.5 M TEUs	2,650,000	
5	Ashdod		1100 m	15.5 m	10 STS + 3 mobile crane	16 RTG	1,17 M TEUs	625.000 m2	650
6	Haifa		950 m	15.5 m	6 Gantry Cranes	16 RTG	1,2 M TEUs	625.000 m2	650
7	Beirut		2300 m	17.5 m	22 STS + 2 mobile cranes	51 RTG + 18 R/S	2.1 M TEUs	1,000,000 m2	
8	Damietta		1050 m	15 m	10 STS + 5 mobile Cranes	30 RTG + 18 R/S	1.5 M TEUs	795.000 m2	1850
9	ACCHCO	Alexandria	531 m	12 m	4 STS	11 RTG + 18 R/S	500.000 TEU	163000 m2	1050
		EL-Dkhila	1040 m	12-16 m	11 STS	18 RTG + 17 R/S	1 million TEU	406000 m2	1500
10	AICT	Alexandria	380 m	12 m	2 STS	6 RTG + 4 R/S	200.000 TEU	110.000 m2	1000
		EL-Dkhila	586 m	12 m	3 STS	9 RTG + 6 R/S	300.000 TEU	190.000 m2	1900
11	Port Said West		950 m	15.5 m	10 STS + 1 mobile Cranes	28 RTG +27 R/S	1.5 M TEUs	572000 m2	1000