

## PORT SELECTION CRITERIA AND ITS IMPACT ON PORT COMPETITIVENESS

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### ABSTRACT

Container ports and terminals became essential components of the modern economy. Containerization plays an indispensable role in reducing transport cost of international trade. Hence, shipyards have started to produce new designs, which are technically better adapted to the new market conditions, more economical and above all extremely competitive compared to the existing ships. On the other hand, ports play important role in accommodating new designed ships with larger volumes of cargo. Ports competition takes different forms, including service quality and port elasticity. Quality of facilities can achieve faster ship turn-around time, less unit cost, and provide added value activities. This helps in enhancing port competitiveness. Ports have traditionally evaluated their performance by comparing their actual and optimum throughputs (measured in tonnage or number of containers handled). If a port's actual throughput approaches (departs from) its optimum throughput over time, the conclusion is that its performance has improved over time, and vice versa. Port competition can be viewed as inter-port competition (between ports) or intra-port competition (within a given port). Also, a number of measures and Key Performance Indicators (KPIs) have been developed for measuring ports performance and consequently for selecting a more competitive port. In this paper, the purpose is to investigate those elements that can be used by port clients in selecting a calling port. This paper is divided into five sections. In section two, a set of those elements that affects port selection from the available literature is discussed and grouped. In section three, a questionnaire is developed and the most important elements are identified. Competition between East Mediterranean ports is explained as a case study in the fourth section. Finally, a conclusion and further research is displayed in the fifth section.

**KEYWORDS:** Port Competition, Port Selection Elements, East Mediterranean Ports

### INTRODUCTION

Competition has different forms in port industry. The Inter-port competition is influenced by (1) port performance, (2) port accessibility and location, (3) port tradition, (4) government assistance, and (5) port user preferences (Fleming and Baird 1999). While, the intra-port competition fosters port specialization, innovation, and diversity. Competitors within the same port compete in the same environment (de Langen and Pallis 2005). A port's competitive position (or its competitiveness) may also be evaluated in terms of the growth, market share, and diversification of its traffic volume. An analytical tool that has been used to evaluate the competitiveness of a port (in a port range) that considers these factors is Strategic Position Analysis (SPA). SPA consists of three interrelated analytical components, including (1) Product Portfolio Analysis (PPA), (2) Shift-Share Analysis (SSA), and (3) Product Diversification Analysis (PDA) (Haezendonck et al. 2006).

PPA has been used to evaluate the competitive position of ports in a port range such as the overall market shares and total growth rates of the traffic volumes, which is presented in the external positioning analysis or portfolio of ports.

SSA decomposes the increase or decrease in a port's traffic volume into various components – a share effect, a commodity shift effect, and a competitiveness shift effect. PDA analyzes the diversification of a port's traffic volume for a specific period of time. A product diversification index that has been developed by de Lombaerde and Verbeke (1989) may be used to determine the relative importance of various traffic categories in a port's traffic volume. A high value for the index reflects low traffic diversification (e.g., dominated by one type of cargo), whereas a low value reflects greater diversification or greater balance in traffic categories.

Nevertheless, the market share is the most classical method to establish the port competition. The market share of each hub port is calculated as a percentage from the total throughput. Each port has a competition degree equal to the share of the affected market. The percentage of each port to the total market stands for the competition degree. The simplicity and immediacy of this method balanced of the deficiency of the port product quality (EL-Sayeh, 2007).

Ports should provide facilities and high quality services offered to the shipping lines in order to win their choices. These qualities should be measured through evaluating the economic cost. Moreover, ports should maintain their competitive advantage and level. They must ensure that the increase in operation cost for port users does not lead to a remarkable increase in the values of goods transported (Ng, 2006). The global shipping lines use four major criteria and 12 sub- criteria derived from the Delphi rounds conducted for the pilot survey. First, port physical and technical infrastructure: including as sub- criteria, basic infrastructure condition, technical infrastructure and inter-modal links. Second, port geographical location: including proximity to import and export areas, proximity to feeder ports and proximity to main navigation routes. Third, port management and administration: including management and administration efficiency, vessel turnaround time and port security and safety. Finally, carrier's terminal cost: including handling cost of containers, storage cost of containers and terminal ownership/exclusive contracts policy.

### **Research Problem**

In terms of global competition, this research seeks to investigate the following research problem: What are the elements that can be used by port clients in selecting a calling port?

### **Research Methodology**

This paper aims to identify those elements used by shipping lines, as port clients, in selecting a calling port. A number of port selection criteria were identified from the available literature. Then, a questionnaire was developed and distributed to a number of shipping lines in the East Mediterranean basin. Primary data were collected and analyzed in order to identify those elements that are considered in port selection by shipping lines.

### **East Mediterranean Ports**

East Mediterranean ports are important from the point of view of the global carriers. It is necessary to set up hub and spokes systems that can collect goods from a great variety of ports taking into consideration that there is also a number of fairly small specialized operators in the East Mediterranean region in addition to the large companies. These smaller operators can offer feeder services to the large companies, but they may also operate independently with direct calls. In a complex and rich area such as the East Mediterranean they have little difficulty in finding scope for their operations. East Mediterranean region includes Egypt, Cyprus, Turkey, Syria, Lebanon, Israel and Greece. A total number of 22 commercial ports is competing in the region, 15 of them are including at least one containers terminal.

**Table 1: Shows the Nominated Ports for the Analysis**

Country	Port	Ports Which Contain Container Terminals
Egypt	Alexandria	Alexandria
	El-Dekheila	El-Dekheila
	Port Said	Port Said
	East Port Said	East Port Said
	Damietta	Damietta
	Arish	
Cyprus	Old limassol port	New limassol port
	New limassol port	Larnaka
	Larnaka	
	Pafos	
	Latsi	
	Vassiliko	
Turkey	Mersin	Mersin
	Antalya (akdeniz)	Antalya (akdeniz)
	Iskenderun	
Syria	Lattakia	Lattakia
	Tartous	Tartous
Lebanon	Beirut	Beirut
	Tripoli	
Israel	Haifa	Haifa
	Ashdod	Ashdod
Greece	Piraeus	Piraeus
	Thessaloniki	Thessaloniki

The shipping lines criteria for selecting a hub port in the Mediterranean transshipment container market create competitive markets that attract the global carriers. Such criteria depend on different factors such as the geographical location, the availability of infrastructure, the level of port performance and other. The level of competition among container ports to maintain and/or enhance their market share is also readily visible today. While the world's leading container ports have the resources to invest in state-of-the-art technology and terminal facilities that would help maintain their gateway port status, many smaller ports find themselves relegated to a lower status in the global hierarchy of ports. Especially with the effect of new Suez Canal, the east-Mediterranean plays major role in traffic and trade movement, the 190-kilometer Suez Canal has its critical role in international trade since it was opened. According to the Suez Canal Authority, 7.5% of world trade passes through the Canal annually.

Mediterranean ports can be classified according to the following categories; Transshipment ports, which can work as the hub center in a hub and spokes system (for example, Damietta, Alexandria, Port Said) or as relay, linking two orthogonal routes (like most of the activity at Algeciras). Gateway ports, namely ports with a hinterland supporting them that is rich in production and consumption. For example Piraeus, Odessa, Haifa, Izmir, in the east of the Mediterranean.

**Regional Ports:** which can be situated in the vicinity of industrial centers or densely populated areas, but positioned in remote locations with respect to the actual urban area (like most eastern Mediterranean ports). The traffic in these ports consists of smaller feeder ships, or infra-regional connected directly with gateway ports or to other minor ports. Linear Shipping Connectivity Index (LSCT) for the competing countries in East-Mediterranean, Table 2 shows the ranking of selected countries from the 2009 application of the Liner Shipping Connectivity Index (LSCI).

**Table 2: Liner Shipping Connectivity Index for East-Med Countries**

Country	LSCT Value	Rank
Egypt	53	17
Turkey	32	30
Lebanon	30	34
Israel	19	57
Cyprus	13.3	71
Syria	12.3	76

Source: UNCTAD, newsletter, 2009

### Port Competition in East Mediterranean Basin

The concept of port competition is very complex and difficult to explain in all its variables and dimensions. The concept of port competition is measured the indicator to determine port competitiveness which is based on the technical efficiency in handling ships, cargo and costs. These factors can be quantified to better or lesser degree. The predictable increase of container traffic, and the constant drive for specialization and capacity increase of maritime vessels have resulted in shipping companies directed as much as possible on a limited number of East-Mediterranean ports of call. All the time, the connection services are left to feeders. In this method, shipping companies are able to increase benefit from the economies of scale that their larger vessels offer, while they are also able to provide more flexible and faster transport services and sailing schedules.

### Elements of Port Competitiveness

There are many elements that should be taken into consideration when assessing the competition between ports such as the development and new investment in port facilities, the replenishment of equipment, the classification of the present and potential development of different routes and the improvement of port efficiency and effectiveness. The most important criteria for the assessment of port competition can be classified into five groups. The first group is the cargo volume which implies the ability of ports to handle more cargoes including import, export and transshipment. The second group is the port facilities which comprise both port infra and superstructure in the sense that the greater the capacity, the higher the competitiveness level of a port. The third group embraces port location which explains the importance of the geographical location and accessibility of a port in port competition. The fourth is the service level as the higher the quality of services provided to the port users, the higher the competitiveness level of the port. The fifth group is the port expenses which include port dues, tariff, terminal handling charges in the sense that the cheaper the port expenses, the higher the competitiveness level of a port. Table 3 displays these elements were considered in the questionnaire and distributed to the shipping lines.

**Table 3: List of the Elements of Port Competitiveness**

Elements of port competitiveness	
Application of EDI system	Ability of port personnel
Average hours of port congestion	Port accessibility
Berth/terminal availability	Port congestion
Building port MIS	Port facilities
Capacity of transportation connectivity	Port marketing
Capacity/status of facilities available	Port operation
Cargo volume of handling transshipment	Port operation by government
Changes in social environment	Port operation by local autonomous entity
Changes in transport and cargo function	Port operation by private sectors
Complete preparation of multimodal transport	Port operation time
Concentration of volume by export/import	Port ownership
Customs clearance system	Port productivity
Dredging: yes or no (?)	Port service
Easy access to port	Port size
Economic scale of hinterland	Port tariff
Effectiveness of terminal operations	Possibility of mutual reference of electronic computation network
Existence of cargo tracing system	Price competitiveness
Existence of port hinterland road	Response of port authorities concerned
Existence of terminal operating system	Road network to be fully equipped
Existing pattern of navigation routes	Sea transportation distance
Extent of port EID	Securing deep draft
Financial factors of port	Securing exclusive use of equipment
Free time of container freight station	Securing fairway
Frequency of ships calling	Securing navigation facilities/equipment
Handling charge per TEU	Securing railroad connection
Handling volume of export/import cargo	Status of national economy
Inland transportation cost	Sufficiency of berth
Inter-linked transportation network	Sufficiency of securing information equipment
Internal policies	Technical factors of port
Loading time	Terminal facilities
Location factors of the port concerned	Trade market
Market position within the area	Trade/commerce policy
Mutual agreement of port users	Transportation distance
Navigation distance	Types of port operation/management
Nearness to hinterland	World business
Nearness to main trunk	
Number of liners calling at ports	

Source: Song, D.W., & Yeo, K.T. (2004). A competitive analysis of Chinese container ports using the analytic hierarchy process. *Maritime Economics & Logistics*, 6, 31

**Shipping Lines’ Perspectives**

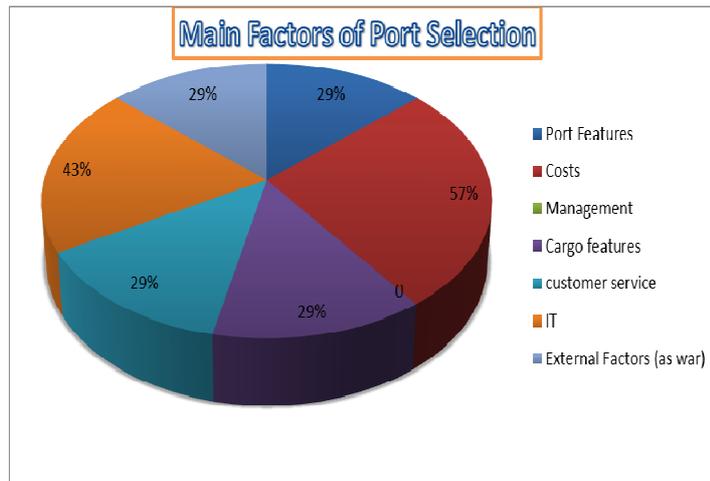
Shipping companies’ decisions on selecting ports is mainly focused on their structure and networks and on their tendency to increase their ship capacity to cope with the development of the hub and spoke networks and thus achieve economies of scale in both sea legs and ports. Carriers have their own criteria which can be divided into four main categories. The main criteria are: The cost of port transit which is considered the most important criterion as carriers look for ports with relatively low transit cost, port services, including turn-around time is the second most important criterion as shipping lines are seeking a comparative advantage with shorter transit time; third , the port physical description including water depth, infra and super structure, the quay length, number and capacity of cranes and ability to deal with a variety of vessels and these criteria are favorite to some carriers because of their vital contribution to reducing ships’ turn-around time in port.

The questionnaire was developed using those elements that are currently used by shipping lines in selecting a calling port. The questionnaire is divided into seven parts and including 45 constructs. Port features, port charges, port operations management, cargo handling, customer service levels, information technology and external factors are the main parts of the questionnaire. A questionnaire has been sent to 35 shipping lines as they constitute one of the most important port clients. In addition, a list with different factors has been identified for selecting ports, taking into consideration how cooperative port authority is to the demands and needs of the shipping lines and consequently the reflection on port competitiveness. The main target of this questionnaire is to identify the carriers' criteria in port selection and especially in container terminal selection in the East Mediterranean region. This area has a considerably big number of container terminals competing. Consequently, this can act as a challenge that affect the shipping lines' criteria in the selection of a specific port or container terminal especially with the presence of a high competition between ports and container terminals, even in the same port. Thus, in this case each shipping line has a different point of view in identifying the selection criteria.

**Data Analysis and Discussion**

The analysis of the data provided from the questionnaire shows that the category of "Port Charges" constitute the

most important factor with a percentage of 57% from the total sum of the percentages obtained by the rest of the categories (See Figure 1). In addition, the second most important factor is the Information Technology, with a percentage of 43%. Other categories such as Port features, Cargo handling, Customer service level and External factors obtained a similar percentage of 29% from the total of most important factors for the shipping lines in their selection. However, the thing that isn't expected is that the category of Operation Management hasn't obtained a percentage from the concern of the shipping lines. This confirms that the shipping lines are interested more in the outcome of the management decisions and not the nature of the management itself and the extent of the management response to the needs and requirements of various shipping lines.



Source: The Researcher

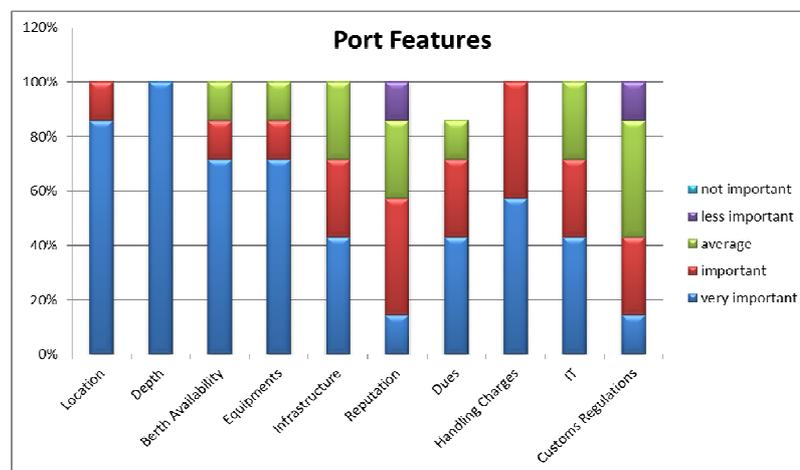
Figure 1: Shipping Lines' Selection Criteria

Analyzing port features as a sample in this paper, it is divided into 10 sub-categories varied in their level of importance for the shipping lines in a great way. The sub-category of "Port Depth" exceeds all the expectations and achieves the utmost importance to all the shipping lines with the percentage of 100%. This is due to the fact that many elements depend on this factor as the depth of the vessel which the port can receive. As for the second sub-category in the level of importance for the shipping lines comes the "Geographical Location" with the present of 86%. This factor was expected to come as the most important factors in the Port Features category because it is directly connected to the different maritime distances and the amount of deviation from the international navigation tracks, which represent for many companies a great material burden in addition to the amount of time spent and the consumption of fuel and supplies. All these factors force companies to shift the selection process towards the ports on their navigation track to avoid deviation.

Concerning the two sub-categories "Berth Length" and "Handling Equipment Availability" both come in the third level of importance with a percentage of 71% for the shipping lines. They represent important factors for the port facilities because if there is any shortage in any of them, this will result in the occurrence of overcrowded ports. This might lead to the delay for the container ships which have very strict sailing schedules and result in paying more demurrage for both the shipping lines and for the owners of the goods as a consequence of overcrowding, lack of movement facility inside the port, delay of the ships and delivery.

For handling charges as a sub-category, only got the fourth place with a rate of 57% in terms of the order of the degree of importance for shipping companies, and this component is associated with the cost of the freight as freight includes all inside the expenses of traded goods, which are also associated with many of the technical points which vary from one port to another. The fifth sub-category in the order of importance for shipping companies is "Information Technology" with the percentage of 43%, which represents a system of communication and exchange of information, both related to ships and to the goods, which helps to reduce the during time of the ship in the port.

The last two sub-categories for the lowest proportion of importance for shipping companies are Customs Regulations and Reputation with a rate of only 14% of the interest of shipping companies in ports, due to their connection with the shippers in terms of their goods and the speed of their final exit of the port. Figure 2 shows the relative importance of the sub categories of port features.



Source: The Researchers

Figure 2: Relative Importance of Port Features Elements

## CONCLUSIONS

A result of the tough competition in the maritime market, especially the rivalry between shipping companies operating lines of regular container transport, and as a result of the cost of the enormous borne by those companies, which are divided into the cost of access to assets (container ships) Capital Costs, which began featuring in recent decades Baveadh evident in the size of those ships to achieve the greatest economic benefit (to achieve economies of scale).

Thus the parties must basic client in the navigation market for the transfer of containers shipping companies, as well as ports administrations, taking into account how coordination between them to satisfy the desire of shipper who prefer to transport their goods by container, but before that you must achieve the desires or needs of shipping companies in their choice of container terminals in the study area.

When taking into consideration that different standards, which are placed from the standpoint of shipping companies in the selection of container terminals different in the trade area selected or on the line of route navigation of the company, we will find that the selection process is different and the order of those stations differ in the priority of those companies, which should be mindful of him container terminals of different departments as one of the key elements to reduce the fierce competition between those terminal and especially converged geographically and in volume.

**REFERENCES**

1. Lin, Q. (2010) (Efficiency Analysis of container ports & Terminals), college London, U.K.
2. Talley, W. K. (2006b). Port Performance: An Economics Perspective. Issue on Devolution, Port Governance and Port Performance: Research in Transportation Economics, Editors, M. Brooks and K. Cullinane, Amsterdam: Elsevier, Ltd.
3. Fleming, D. K. and Baird, A. J. (1999), Some Reflections on Port Competition in the United States and Western Europe: Comment, Maritime Policy and Management, Vol. 26, No. 4,
4. Song, D. and Yeo, K. (2004) A competitive analysis of Chinese container ports using the Analytic Hierarchy Process, Maritime Economics & Logistics, 6, 34-52.
5. Centre d'Etudes des Transports pour la Méditerranée Occidentale ([http://www.cetmo.org/e\\_index.htm](http://www.cetmo.org/e_index.htm)).
6. A summary is given in Analysis of the benefits of intra-port competition, P. Langen and A. Pallis, Industrial Organization 0510003, EconWPA, 2005.
7. UNCTAD, newsletter, 2009, (Liner Shipping Connectivity Index for East-Med countries), United Nations, Geneva.
8. Talley, W. K., 1994. Port pricing: a cost-axiomatic approach. Maritime Policy & Management 21, 61–76.