

FEEDER SERVICE DEVELOPMENT IN MEDITERRANEAN PORTS TOWARD MORE EFFICIENT TRANSPORT TECHNOLOGIES

Nela Jadrijević, Ph.D. student
University of Rijeka
Faculty of Maritime Studies
Studentska ulica 2, Rijeka, Croatia
nelanet@gmail.com

Marko Tomašević, D.Sc.
University of Split
Faculty of Maritime Studies Split
Zrinsko - Frankopanska 38, Split, Croatia
mtomasev@pfst.hr

ABSTRACT

The subject of this paper is the development of feeder services in the Mediterranean maritime container traffic. Feeder service in container traffic directly affects the general prosperity of the regional container traffic in ports along the Mediterranean coast. The advantage of hub and spoke container system is in reducing cost for shipper companies and minimizing commodity stocks at all levels, which is the main factor for efficient producers. Feeder service development makes container service economically rational, efficient, cost-effective, less expensive and timely to end users. The quality of the hinterland infrastructure and the degree of integration of the port and traffic system taking into account road and railway connections along with inland waterways, are important factors in reinforcement of the connection between the mainland links of the port with its hinterland. Hub and spoke transport concept adopted by large shipping companies has led to important structural transformation in the Mediterranean what will be shown in addition of the paper.

Keywords: Mediterranean ports, hub and spoke transport concept, short sea shipping network, container traffic

1 INTRODUCTION

The Mediterranean Sea is located on geotrafic favourable position where passes one of the three most important trade roads between East and West. Therefore, it became an important place for container traffic between Europe and the Far-East. For a long time, Mediterranean ports could not compete with Northern European ports because of their not sufficiently developed gravitational hinterland. The signification of container feeder service has increased since the appearance of larger container ships in worldwide shipping industry. Dominant operators in the global container network give Mediterranean a new strategic importance. Thus, its port activities have been enlarged.

In this paper, the positive effect of the feeder service on entire container traffic are defined, with respect to its optimization, dynamism, better turnover, reduced container system costs etc. Aforementioned advantages become more visible as feeder service starts getting under way. The Mediterranean Sea as a landlocked sea is a suitable place for its further development.

In the comparative analysis of the container throughput in Europe highlighted are four multi-port gateway regions including Spanish Mediterranean range, Ligurian range, Seine Estuary range and North Adriatic as units of measurement. In addition, paper deals with

relevant container traffic parameters of the transshipment hub ports, serving smaller regional “feeder” ports, whose role significantly increased in Mediterranean container market.

It is important to emphasise that in Mediterranean shipping market have emerged hub and spoke transport concept along with short sea shipping network, in order to enable container traffic growth. Transshipment of goods from one vessel to another and its onward transport by feeder vessels to other regional ports is based upon hub-and-spoke container system. On the other hand, short sea shipping provides services by connecting two regional points. In contrast to feeder service, this shipping network offers door to door container services, instead port to port as with hub and spoke system.

When considering present and future flows of commodities, the question arises whether the short sea shipping network or hub and spoke container system likely to have a competitive advantage in terms of attracting more containers. In order to resolve the problem, the existing flow of goods are elaborated, with the aim of determining whether sufficient traffic justified a new feeder or regional short sea service in Mediterranean.

2 BASIC FEATURES AND CHARACTERISTICS OF FEEDER SERVICE

Feeder service is an English term that refers to the service of cargo distribution in the maritime container traffic. The smaller, so called, feeder ships distribute containers transported by the big ships “mother vessels” and are equipped with the necessary equipment so that they are independent of the one that ports, they call, own, and fast enough to follow the movement dynamics of “the mother vessels”. The term “mother vessel” 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 vessel”, the cargo amount for each spoke port, distance of the spoke port, distribution costs, time of the port availability, cargo handling costs.

2.1 The role of feeder services in container traffic

Considering the fact that in the liner maritime traffic there is a trend toward rationalizing the number of port calling due to reducing the costs, the Mediterranean ports that are near the main navigation route between the Suez Canal and Gibraltar, have taken over the function of major container transshipment ports. The distribution of the containers from these ports to distant ports in the Mediterranean basin is carried out by regular feeder lines. [8] The advantage of this system is in the adaptation to the exporters and the importers, because a selection of the point of departure and destination is not required. Today, the world standard is that the departures are accustomed to a certain production dynamics; the feeder departs precisely on a particular day for one port and arrives in the main port, regardless of destination. Such system of world container transport has contributed to a significant reduction of cost for the shippers (so the freight from the departure point to destination is significantly lower than a decade ago), and minimizing the stock at all levels, which is the main factor of efficient producers. Owing to the feeder service the entire container service has become economically rational, efficient and cost-effective, therefore cheaper and timely for the end users.

2.2 The positive effects of feeder services on container transport

The essential positive features of the feeder service which help toward optimization of either container or total seaborne transport can be defined as follows:

- feeder service makes the entire container service rational, well balanced, symmetrical and dynamic;
- feeder service helps toward achieving a better turnover of large container ships being of utmost importance for the large and expensive container ships;
- container delivery time to the final destinations is much shorter and, owing to the frequency of ship calls and timely delivery of goods, the service in general is upgraded;
- the number of ships, in the existing global container service of particular shipping companies along a given sea- route, has decreased;
- smaller container terminals in the ports and land based cargo-distribution centres are improving their operation and becoming recognizable;
- feeder service helps toward achieving better turnover of containers so that the total costs of the container system are also reduced;
- the experiences gained in one feeder service may be very useful for the successful operation of the container transport on any other route.

As resulting from the above said, feeder service is of utmost importance for the overall operation and optimization of any container transport and seaborne traffic. [7]

Owing to their specific qualities, not all of the advantages extended by the feeder service could be adequately identified right in the beginning. However, as the feeder service starts getting under way, the container service gains in dynamism and quality, thus making substantial contribution to the optimization of the maritime traffic. In the international worldwide shipping industry, the container feeder service became particularly important when large container ships ranging between 4000 and 6000 TEU appeared on the market. [7]

The container ships of such capacity require the feeder service implementation, since the number of large container terminals able to accommodate those ships has been constantly decreasing. The greatest number of the feeder service takes place in the zone of landlocked seas or large sea gulfs.

Mediterranean ports can become hub ports for the mega-carriers as per following conditions:

- existing container cargo routes keep on undertaking cargoes and maintain their signification in the world trade;
- container carrier`s decision to use a Mediterranean port as their consolidation centre;
- container terminals should have all necessary infrastructure and superstructure in order to enable smooth acceptance of large container vessels;
- the port service should be of high quality at competitive price.

3 CONTAINER THROUGHPUT DYNAMICS IN THE EUROPEAN PORT SYSTEM

Growth in Europe has been particularly strong in the last few years with an average annual growth rate of 10.5% in the period 2005-2008, compared to 6.8% in the period 1985-1995, 8.9% in 1995-2000 and 7.7% in 2000-2005. [9] The economic crisis which started to have its full effect in late 2008 has brought an end to the steep growth curve. Figures for 2008 based on 78 European container ports show that total container throughput increased from 82.5 million TEU in 2007 to 83.2 million TEU in 2008 or a growth of only 0.8%. Container ports in the Hamburg-Le Havre range handle about half of the total European container throughput. The market share of the Mediterranean ports grew significantly between the late 1980s and the late 1990s at the expense of the ports in the Hamburg-Le Havre range. [9] The

significant improvement of the market share of the Med was mainly the result of the insertion of transshipment hubs in the region since the mid 1990s. In the new millennium, the position of the northern range has gradually improved while Mediterranean ports and the UK port system lost market share. The Baltic and the Black Sea have strengthened their traffic position.

3.1 The development of multi-port gateway regions in Europe

Container throughput dynamics in Europe can be analyzed by using ‘multi-port gateway regions’ as units of analysis. The relevance of using a multi-port gateway level is supported by the calling patterns in the liner service networks of shipping lines and associated complementarity and competitive relationships among the ports concerned and communality in hinterland connectivity issues among ports of the same multi-port gateway region. [9] Figure 1. provides an overview of the multi-port gateway regions in Europe including Spanish Mediterranean range, Ligurian range, Seine Estuary and North Adriatic ports. Stand-alone gateways are somewhat isolated in the broader port system, as they have less strong functional interactions with adjacent ports than ports of the same multi-port gateway regions.

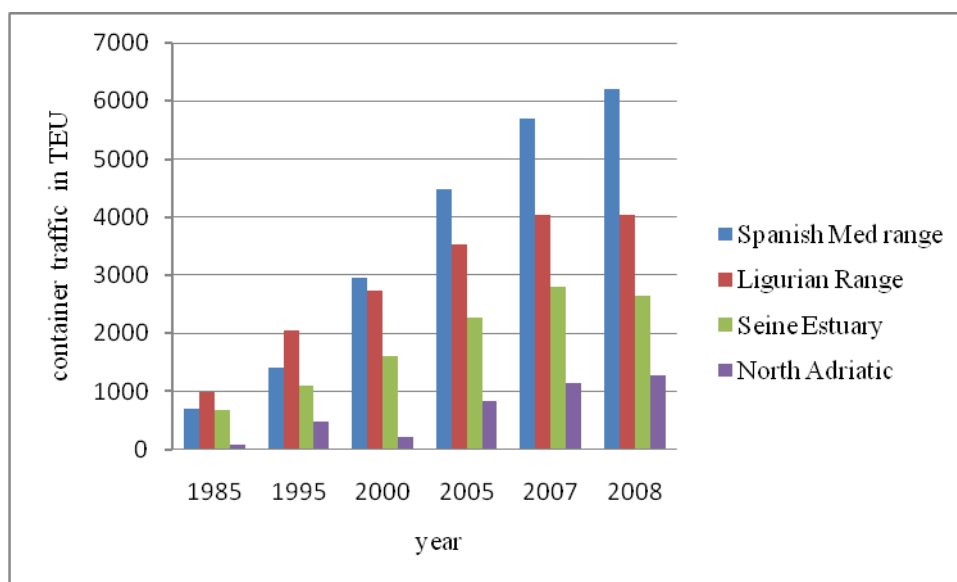


Figure 1: Container throughput figures in Main multi-port gateway regions in Europe in 1000 TEU [9]

The following conclusions can be drawn on the basis of figure 1. Among the major winners are found the Spanish Med ports (from 4% in 1993 to 7.5% in 2008). These ports have particularly benefited from the extension of the economic hinterland in Europe. [9]

The Ligurian ports in Italy have difficulties in keeping up with other regions in Europe. The ports jointly represent some 4.9% of the total European port volume, a decline compared to 6-7% throughout the 1980s and 1990s. The Ligurian ports rely heavily on the economic centres in northern Italy and also aim at attracting business from the Alpine region, the southeast of France and southern Germany. Just like the Ligurian ports, the North-Adriatic ports have been facing lower than average growth rates. [9]

Growth slowdown of Mediterranean container traffic is partly due to the Italian economy, which indirectly confirms that container traffic in Italian ports originates from the domestic production system. International operators keep on preferring German and Dutch ports, which offer more efficient logistic systems and, most importantly, feature very good railway, river and road links to the markets of origin and destination of the goods. Italian port's main weakness consists in the lack of adequate links to the hinterland, and railway links

in particular, and lack of logistics organisation. Ports keep on serving essentially the domestic market, while many Italian and especially Northern Italian companies are increasingly shipping their goods through Northern European ports and airports. [17]

It is foreseen an increase of Mediterranean containerised traffic up to 90 million TEUs in 2015. The fastest growing areas would be, among others, the West Mediterranean and Black Sea. Adriatic ports showed better average performances than Tyrrhenian ports. The increase in transport demand, mainly originating from Eastern Countries improves the competitive position of the Adriatic coast, which often features very good links with Eastern Mediterranean and East, with good relating transit time.

With nearly 1.3 million TEU in 2008 the Adriatic ports now handle a fraction of the volumes of the two leading multi-port gateway regions of the Hamburg- Le Havre range. Extensive hub-feeder container systems and short sea shipping networks emerged in the Mediterranean since the mid 1990s to cope with the increasing volumes and to connect to other European port regions. The transshipment hubs in the Mediterranean have substantially increased their role in the container market. After a steep increase of the market share from 4.9% in 1993 to 14.3% in 2004, the last few years have brought a small decline to 12.2%. This decline came as volume growth in mainland Mediterranean ports allowed shipping lines to shift to more direct calls. [9]

3.2 Container traffic movement in transshipment hub ports

Marsaxlokk on Malta, Gioia Tauro, Cagliari and Taranto in Italy and Algeciras in Spain act as turntables in a growing sea-sea transshipment business in the region. Terminals at transshipment hubs are typically owned, in whole or in part, by carriers which are efficiently using these facilities. The sites were selected to serve continents, not regions, for transshipping at the crossing points of trade lanes, and for potential productivity and cost control. They are typically located far away from the immediate hinterland that historically guided port selection.

The container traffic in transshipment hub ports in West and Central Mediterranean reached the highest volume in 2007 but since then started to decline as volume growth in mainland ports allowed shipping lines to shift to direct calls. While some shipping lines still rely on the hub-and-spoke configuration in the Med, others decided to add new line-bundling services calling at mainland ports directly. In reaction, mainly Italian transshipment hubs are reorienting their focus, now serving Central and East Med regions. Algeciras relies a lot on east-west and north-south interlining and is facing competition from newcomer Tanger Med in Morocco. The net result of the above developments has been a slight decline in the market share of the West Mediterranean hubs in recent years. This has led some transshipment hubs such as Gioia Tauro and Algeciras to develop inland rail services to capture and serve the economic centres in the distant hinterlands directly, while at the same time trying to attract logistic sites to the ports. [9]

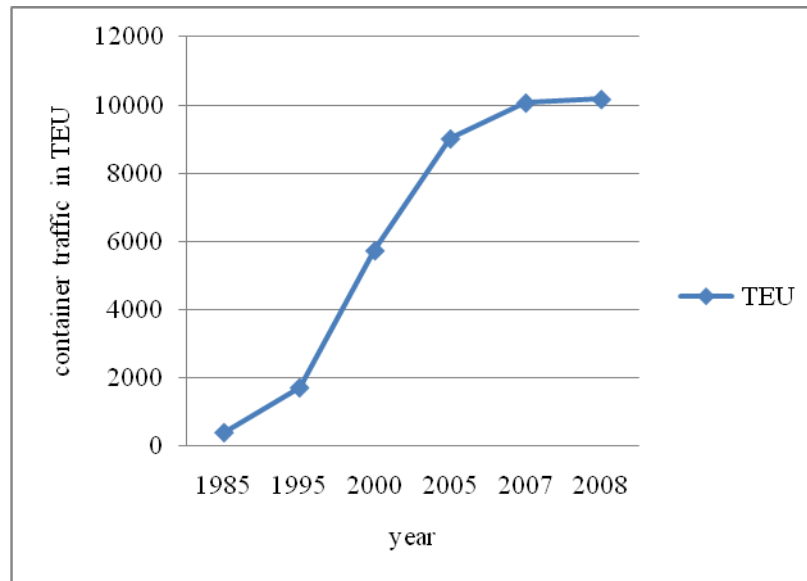


Figure 2: Container throughput figures in Mediterranean hub ports (1985-2008, in 1000 TEU) [9]

In Europe, hubs with a transshipment incidence of 85% to 95% can only be found in the Mediterranean. Northern Europe does not count any pure transshipment hub. Hamburg, the North European leader in terms of sea-sea flows, has a transshipment incidence of about 45%, far below the elevated transshipment shares in the main south European transshipment hubs. Barcelona and Valencia are among the large Mediterranean ports combining an important gateway function with significant transshipment flows, i.e. a transshipment incidence of respectively 38.8% and 43.9% in 2008. The dynamics in the transshipment business have implications on freight distribution patterns in Europe. [9] A hub-and-spoke based network means less cargo concentration in mainland destination ports and as such a more dispersed or fragmented inland transport system. Alternatively, traffic growth can lead to an undermining of the position of transshipment hubs in favour of a limited number of large-scale mainland ports, each connected to intermodal corridors. Europe's long coastline and its specific geographical characteristics are clear invitations to further develop short sea and feeder networks based on mutual dependence among ports in the same and different regions.

4 SHORT SEA SHIPPING AS A CRUCIAL FACTOR IN EUROPEAN MARITIME TRANSPORT

As per definition of the European Commission, Short sea shipping means the movement of cargo and passengers by sea between ports situated in geographical Europe or between those ports and ports situated in non-European countries having a coastline on the enclosed seas bordering Europe.

Short sea shipping includes domestic and international maritime transport, including feeder services, along the coast to and from the islands, rivers and lakes. The Short sea shipping centre should strengthen the activities of the national centres in promoting short sea with shippers, forwarders, etc. along with following main points:

- the exchange of ideas between centres to stimulate individual national work (best practice);
- support and guidance to newly established centres beginning their work;
- identification of common problems needs and bottlenecks arising from the contacts with the (potential) users.

The European Commission has an active policy to promote Short Sea Shipping. Furthermore, this form of transport mode is highly efficient in terms of environmental performance and energy efficiency. It has the potential to solve road congestion problems affecting many parts of the European continent.

In addition, the establishment of a "European maritime transport space without barriers" should help to boost Short Sea services in all maritime regions. This concept would ensure a reduction of the administrative formalities, in particular customs formalities that apply today to the intra-EU seaborne trades and that do not apply to similar road transport services.

The subvention programme Marco Polo I became operational in 2003 and Marco Polo II in 2007. In the first selection rounds, approximately half of the accepted projects involved starting up new lines of Short Sea Shipping. The new programme identifies Motorways of the Sea as a specific new action. This action should decrease road traffic over time on a given corridor by shifting goods from road to Short Sea Shipping operating on Motorways of the Sea. Motorways of the Sea are an important instrument for promoting Short Sea Shipping. Implementing Motorways of the Sea requires partnership and co-operation. This is vital to accomplish the concentration of freight flows that is imperative for Motorways of the Sea to become viable. Motorways of the Sea should include short-sea links with quality of services (frequency, punctuality, liability), as well as quality infrastructure and superstructure in ports and hinterlands connections, and efficient administrative procedures.

Most vulnerable point in short sea shipping is a port. Port efficiency and quality of the service determines the quality and the cost of the entire service from the supplier and receiver. Establishment of the qualitative centres of short sea shipping can reduce delay and assure better reliability of the service. [14]

In 2008, Short Sea Shipping between EU-27 ports and ports located in the Mediterranean was 592 million tonnes. This accounts for about 28% of total Short Sea Shipping declared by EU-27 ports. The North Sea followed close behind, with 566 million tonnes or 27% of EU-27 Short Sea Shipping. For most countries, the highest share of their SSS was with partner ports located on a sea region where they had a coastline. One exception was Romania where more than half of its SSS came from or was destined for ports located in the Mediterranean. For Latvia and Poland, the North Sea region took the largest share. EU-27 SSS of goods fell by 0.2% in 2008, following years of continuous growth. This downturn reflects the impact of the general economic crisis on maritime transport. For SSS of goods in containers, Antwerp was the largest port, recording a 22% growth rate in 2008 after rises of 28% in 2007 and 17% in 2006. The SSS container market is very concentrated in terms of handling ports (in 2008 the top 5 ports accounted for a little under 42% of total container handling). Container transport was the only SSS segment to record a positive annual growth rate in 2008 of 0.7% at EU-27 level. Short Sea Shipping of containers recorded a positive growth rate of 1.7% in 2008 also in volume (TEUs) terms. [16]

5 CONCLUSION

Mediterranean ports have more favourable geographic position when taking into consideration Northern European ports, particularly with respect to Euro-Asian maritime transport route. The prosperity of the maritime container traffic in the Mediterranean Sea can be accelerated by higher degree of integration of the ports and their hinterlands. In this way, the positive effect on cargo volume in Northern European ports is influenced by highly developed transport links with hinterland. In order to provide more efficient port operations in Mediterranean range, the European Union and individual countries should work to develop stronger linkage with the inland transport network. Drawing on the aforementioned, the

efficiency of industry is adversely affected by inadequate connections to rail and inland waterways.

Scientific methods implemented in resolving the posed problem are based on an in-depth analysis of statistical data of container throughput in four multi-port gateway regions in Europe as well as in transshipment hub ports. The container cargo movement in Mediterranean container system is observed in the period from 1985. to 2008. Dysfunction of the world market caused the reduction of the maritime traffic, because of the diminution of economic activities caused by the economic crisis of global proportions, and spread to all its components.

In the elaborated container throughput of the four multiport-gateway regions, analysis indicates that the fastest growing area would be among the West Mediterranean ports. Tyrrhenian ports indicated lower average performances than Adriatic ports. After excessive boost of the market share, transshipment hub ports have entered the phase of decline growth rate. Additionally, the decrease came due to container traffic enlargement in mainland Mediterranean ports which enabled shipping lines to switch to more direct calls.

The role of transshipment hub ports can be diminished by throughput expansion in mainland in favour of a limited number of large-scale mainland ports, each linked to intermodal corridors. Accordingly, these circumstances could ensure subsequent development of Short Sea Shipping among Mediterranean ports.

REFERENCES

1. J. Bukša, S. Kos, „Analysis of the structure of transported containers in the Adriatic feeder service with a retrospect on the proportion and effect of empty containers on the service“, *Pomorstvo*, 19, 2005, pp.89-99.
2. K. Cullinane, M. Khanna, „Economies of scale in large containerhips: optimal size and geographical implications“, *Journal of Transport Geography* 8, 2000, pp.181 – 195.
3. D. Čišić, A. Perić, „Primjena modela javno privatnog partnerstva na razvoj luka“, *Pomorstvo*, 19,2005, pp.101-103.
4. D. Čišić, D. Rudić, „Morske luke i morsko brodarstvo Primorsko- Goranske županije- postojeće stanje i razvojne koncepcije“ *Naše more*, 140, 52(3-4) 2005, pp.133-143.
5. D. Čišić, B. Hlača, P. Komadina, „Network analysis of the mediterranean port supply chain structures“, *Pomorstvo*, 21,1, 2007, pp. 211-220.
6. D. Čišić, B. Hlača, P. Komadina, „Globalizacija u industriji pomorskog prijevoza“, *Naše more*, 2006, 53(5-6)
7. B. Hlača, D. Rudić, „Feeder - servis koji promiče revitalizaciju kontejnerskog prijevoza u jadranskim lukama“, *Naše more*, 52(1-2), 2005,pp.37 – 44.
8. H. Karlić Mujo, „Kontejnerski promet na sredozemlju s posebnim osvrtom na Sjevernojadranske luke“, *Naše more*, 2009, 56(1-2)
9. T. Notteboom, „Concentration and the Formation of Multi-Port Gateway Regions in the European Container Port System“, *Journal of Transport Geography*, 18, no. 4, pp. 567-583.
10. A. Otto, H. Grossmann, S. Stiller, J. Wedemeier, „Growth Potential for Maritime Trade and Ports in Europe“, *Intereconomics*, 42(2), 2007, pp.226 - 231.

11. T. Poletan, „Relevantni indikatori prometnog rasta i dinamike robnih tokova na Paneuropskom koridoru Vb“, *Pomorstvo*, 19, 2005, pp137 - 157.
12. G. Rindolfi, (1999.), „Containerisation in the Mediterranean: between global ocean routeways and feeder services“, *Geojournal*, 48, pp.29 - 34.
13. <http://www.tc.gc.ca/eng/policy/report-acf-tp14876-menu-1012.htm>
14. http://www.shortsea.lt/index.php/pagrindinis_meniu/short_sea_shipping/840
15. http://ec.europa.eu/transport/maritime/short_sea_shipping/short_sea_shipping_en.htm
16. http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-QA-10-026/EN/KS-QA-10-026-EN.PDF
17. <http://portus.regione.fvg.it/portus/opencms/portus/en/>
18. http://www.martrans.org/documents/2003/ports/OSpaper_megacarriers.pdf