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Configuration and Prospects of the Piraeus Shipping Cluster

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Abstract

It is well verified, in both theory and practice, that clustering provides significant added value to participating companies. Shipping clusters in particular have been at the core of maritime and transport business strategies, with the most well known ones being developed around major international ports (i.e., London, New York, Singapore). This study examines the case of the shipping cluster currently existing in the major Greek port, Piraeus. Despite the fact that Greeks stand as the principal merchant fleet owners, the presence and structures of which remain unexplored, with relevant research efforts to detail it and industry initiatives to represent it being few and recent. The empirical part of the study sheds light on the size and features of the Piraeus shipping cluster, by presenting a categorisation and analysis of the several companies that are part of the shipping cluster under examination. The study also explores the rationale for the lack of a more extensive cluster development and integration at a well-known shipping centre that, among others, is linked with a dynamic port of international importance. Going beyond a 'port cluster' approach, the paper also searches for similarities and differences of the Piraeus shipping cluster with other shipping clusters. Aiming to provide input for policy development, as well as the background for further research, the paper concludes with a SWOT Analysis highlighting the initiatives that could increase the attractiveness and the functionality of the Piraeus shipping cluster.

Keywords: cluster analysis, shipping strategies, Piraeus
JEL Classification: R12, L14, L91

1. Introduction

In economics and business studies, *cluster analysis* or *clustering* is a tool enabling to identify the presence of firms related with an economic process or activity that operate in a specific region, as well as the processes and interrelations taking place among them. The rationale of employing this approach is that the cluster, as a unit of analysis, allows the study of several aspects (i.e. the evolution of operational and strategic networks) that would not be detailed and/or evaluated using a firm-level approach. Moreover, the structure of a cluster provides a more concrete, comprehensive, and holistic approach regarding strategic choices, and their performance, as it takes into account the interactions within the various firms, operating in

the same market or region. This holistic approach provides the opportunity for developing policies and strategies with a wider scope and applicability.

Cluster definition varies among different nations and their industries (cf. Brett and Roe (2010), yet when analysing a cluster the analysis focuses on a specific economic activity, with the desired outcome being to outline the interrelations taking place between all the stakeholders of this economic activity. The core of cluster analysis is the activity commonality among various players in the market. Thus, a cluster is defined as "*a population of geographically concentrated and mutually related business units, associations and public and private organizations centered around a distinctive economic specialization*" (de Langen (2004a). This is a number of business units, in between a specific geographically defined area, with a common reference point regarding their business scope and operation. Porter (1990) was among the ones that raised the importance of geographical proximity.

As such, a shipping cluster consists of business units with their core activity being shipping – related. A shipping cluster is a geographically proximate - group of firms (shipping companies) and associated institutions linked by commonalities and complementarities. End-service companies are joined by suppliers of shipping related products and services, such as financing services and spare parts producers and traders; firms in related industries; specialised infrastructure providers; supported by government or local authorities, as well as by institutions providing specialised research, development and innovation (RDI) and technical support and training among others.

A maritime cluster can be further defined through three perspectives (see: Doloreux, 2017): (a) as an industrial complex; (b) as an agglomeration of interlinked industries; and (c) as a community-based network respectively.

Recognising a cluster in practice (i.e. via initiatives to enhance its competitiveness) can produce significant added value to an economy, as it allows for a better coordination of cluster companies activities, or even the launch of collective actions initiatives. Economies of agglomeration emerge as clusters can benefit the participating companies in their capability to innovate, attract strategic alliances and private equity partners (Folta et al., 2006). Moreover, clustering has a positive impact on firm performance through a better access to skilled workforce and specialized suppliers (Du et al, 2008).

Focusing on shipping, a cluster can provide significant benefits, ranging from the presence of specialised labour to targeted training, from increased market awareness to interactions with R&D institutes, and from strategic co-operations to inter-related maritime activities (Wijnolst and Wergeland, 2009). This can be achieved by producing externalities or synergies that can be grouped in: (a) business-to-business and research cooperation; (b) competency development and knowledge sharing; (c) marketing and visibility; (d) smart infrastructure and planning; and (e) trans-boundary cooperation (DG MARE, 2014). Clustering can also facilitate the extraction and documentation of strategic decisions (Gu, 2008), while in the maritime industry has been used as a policy tool (Stavroulakis and Papadimitriou, 2016).

The development of shipping and shipping-related economic activities in "clusters" has emerged to a mainstream model of advancing the competitiveness and the consequent value input of shipping in a country's' economy, although some have questioned whether this is a sustainable development tool (Zagkas and Lyridis, 2010). This concentration of related activities improves the quality of the microeconomic environment, whereas it acts as employment generator. All corporate entities that are part of a shipping cluster are benefitting by the easiness of collaboration and smooth network development. The latter facilitates

innovation and the sophistication of operations and strategy, thus increasing the performance of the shipping industry.

Regarding the cluster management, either formal or informal, it is a common ground, that those business units being part of it are rarely aware of its existence. Nonetheless, when formalised cluster management, can coordinate business units and set up common goals through a defined and wide accepted strategy. In the shipping worlds, a formal cluster management leading by example is the Dutch "Nederland Maritiem Land".

Despite the fact that shipping is a significant economic activity for the Greek economy, both in terms of GDP and employment, a competitive shipping cluster has yet to be materialized resulting in a loss of significant added value to the local and national economy. The vast number of the Greek-owned shipping companies, including vessel operators and ship management companies, is located in the greater Piraeus area, creating a critical mass for the development of a shipping cluster. The majority of them are small and medium sized companies (cf. Theotokas, 2007).

Aiming at exploring the structures of the Piraeus shipping cluster we commence with a review of the governance issues linked with shipping and seaports clusters (Section 2), before outlining the methodological framework (Section 3). We then present the empirical findings and analysis regarding the structure of the shipping cluster under examination (Section 4). The study concludes with a SWOT analysis (Section 5) providing input for relevant policy measures, as well as for further researcj.

2. Governance of Shipping Clusters

The agglomeration of firms, business activities and services has led to the identification of a group of advantages either in a business level or at a regional one. Drivers of collective actions, innovation, joint learning processes, institutions of reciprocity are some of the benefits that have been attributed to clusters (Elsner, 2010). In the case of maritime clusters, their importance and the benefits of the interconnection of sea-related activities has been widely akwnoledged (see: Salvador et al., 2016).

The Dutch maritime cluster is a good example of how the clustering of shipping and maritime businesses might develop and contribute to the economy of a country/region. "Nederland Maritiem Land" is one of the largest and most advanced maritime clusters in the world, comprising mostly by shipbuilding and shipping firms. The concentration of side activities that are strongly related with them, such as port services, maritime services and ship suppliers, are also playing a key role in the cluster.

The main scope behind the identification of a cluster is to apply governance tools in order to turn a cluster into an organization. Cluster governance is a tool that can be applied in order to describe how the business units inside the cluster interact influencing the structure of the cluster and vice versa (De Langen, 2004b). Such governance tools, which can be applied either in a formal or in an informal way, might vary considerably, for examble, they might range from tools oriented to the cluster as an organisation, to tools that focus on the cluster participants and how their interaction can be facilitated. Hence, in their analysis of maritime clusters Wijlnost et al. (2003) suggest the potential of a variety of "cluster enablers".

Another positive example on how to govern a maritime cluster is that of the city of London, the location of the Maritime London Cluster (MLC). Founded in 2000, with the support and assistance of the Corporation of the City of London, this is a formal structure of cluster governance aiming at maintaining and enhancing London's maritime position, promoting the

country's maritime services' sector, and attracting new maritime-related business to London and the UK.

On the other hand, there are shipping or maritime clusters with limited or no formal governance structures in place. The case of Cyprus is one of them. Despite the fact that the country has a flourishing shipping and maritime industry and an international port (Limassol) belonging to the core Trans European Transport Network (TEN-T), it has not -at least yet- managed to impose a formal or even an informal cluster governance model. As such, the maritime cluster in Cyprus remains fragmented with limited initiatives of collective actions.

In the case of Piraeus there is also a lack of a clustering governance scheme (formal or informal) whether with refers to the port case *per se* (i.e. what might be termed as 'seaport cluster'), or to the shipping community operating in the wider region (the 'shipping cluster'). Piraeus corresponds to a typical cluster case where activities within it are strongly associated to shipping as well as port functions (Pardali et al, 2016), which in their turn are regionally interdependent (for further analysis on the classification of maritime clusters, see: Zhang and Lam, 2013).

In terms of maritime policy development, Othman et al. (2011) examine the factors that affect most the performance of the cluster. The scholars suggest that a maritime cluster consists of three main, and substantially distinctive in their evolution, sectors, namely shipping, shipbuilding, ports and terminals respectively. In this vein, in order to examine the case of Piraeus the current study endorses the term "shipping cluster", as it best reflects the composition of the cluster and the focus of our analysis. With shipping and shipping related companies being the majority of the firms within the cluster (for details: Section 4), the shipping element is dominant, and 'shipping cluster' stands is a most appropriate term. This said, in other cases – an example being the Dutch maritime cluster – the 'maritime cluster' terminology and, not least, a more general approach conceptualisation seems to be more appropriate, given that these clusters are composed by companies related with several aspects not directly related with shipping industry, for example fisheries, watersports and offshore activities etc.

3. Methodological Framework

The research has applied a four-step methodological approach towards the identification and the analysis of the configuration of the Piraeus shipping cluster in terms of both structures and geographical allocation of the firms included.

The first step has ben the selection of the economic sector for which the analysis is performed: The economic sector selected is "shipping", a most vital industry for the Greek economy, given that shipping and shipping - related activities contributing a significant part of the country's GDP, maintaining tens of thousands of jobs (see: FEIR, 2013).

The second step has ben the identification of the economic activities taking place within the economic sector under examination. Towards this end, the related listing of the important and traditional maritime sectors in Europe as provided by the European Commission (2009) provided the categorisation of the relevant maritime sectors that has been applied in order to detail the Piraeus shipping cluster.

A third step has been the definition of the region(s) to be examined. The region selected for analysis is the Attica region, a geographical area that in the was past standing as a single governance entity, the "Attica prefecture', and is commonly measured (i.e. in the case of national statistics) as a single unit for measuring economic and social activities. Piraeus city

is part of it, stands as the locational centre (the core of the cluster) for shipping and other maritime related activities. With the majority of shipping and shipping-related activities and companies traditionally located in Piraeus, which also hosts the biggest Greek port in terms of containerised cargo and passenger throughput, and one of the biggest ones in Europe, it is assumed to be the core of the cluster, and basis for searching the operation of shipping firms in proximate locations. As in the last decade, or so, a relocation of shipping and shipping related companies in other areas of Attica region is reported to take place, therefore the analysis had to carried out on a regional (Attica) rather than local (Piraeus) perspective.

The fourth step of the research has been the identification of the firms within the cluster population, and then the functional and spatial breakdown, in activities and in number of firms. The study used, along with other available data sources (including national statistics), the most comprehensive database regarding shipping and shipping related companies located in Greece - provided by Greek Shipping Publications (2016).

The selection of Piraeus for exploiting the presence and the potentials of the shipping clusters is based on the fact that Piraeus is the home-city of the Greek shipping industry. With the Greek-owned merchant fleet being the biggest in the world (15,8% in terms of DWT) counting 4.199 vessels (over 1.000 GT) with a total capacity of 308.836.933DWT (UNCTAD, 2018), the presence of shipping companies in Piraeus has been traditionally strong. Moreover, the city of Piraeus hosts one of the biggest cargo and passenger ports in Europe. Piraeus port is ranked in the sixth place for 2017 as regards cruise and ferry passenger traffic in the Mediterranean (MedCruise, 2018); in the sixth place as regards container traffic in Europe, and second major in the Meditteranean (Notteboom, 2019); and is also a major hub for Ro-Ro traffic in East Mediterranean (Vaggelas and Pallis, 2018). Due to its importance in the facilitation of the country's trade, as well as due to the value of the port as a transhipment hub in the Mediterranean Sea, the port is a factor of attractiveness for opting to operate nearby, and a significant enabler for the development of a cluster. Yet, it is worth to explore whether in the era of advanced technology, and digitalisation of the maritime world, this clustering happens in reality.

To conclude, our study carries out a SWOT Analysis aiming at assessing the characteristics of the Piraeus shipping cluster. Due to the scarcity of practical expertise in shipping clustering, the research adopted a snowball sampling method (see Biernacki and Waldorf, 1981) aiming at collecting relevant data and information on the strengths, weaknesses, opportunities and threats of Piraeus shipping cluster. The data gathered through brainstorming sessions with five shipping experts in Greece, out of eight experts invited to participate in the research. Then with the use of snowball sampling method the initial five experts introduced other experts that also participated in the research. In the second round, 14 additional experts have been invited to participate in brainstorming sessions with six of them being positive to participate. As such in total 11 experts (out of 22 reached) gave input for the development of a SWOT analysis of the Piraeus shipping cluster.

3.1. The Database: Gradual Formation and Refinement

Based on the review of online databases, a research method well established in the international literature (Zikmund, 2000; Bryman και Bell, 2003), the research used the data provided in the Greek Shipping Publications (2016) online database. In total 4.300 shipping related companies located in Greece have been identified and used as an input for the configuration of the Piraeus shipping cluster.

Following the identification of the total sample, a series of filtering processes have been applied. The first filtering work led to the exclusion of companies that were out of the scope of the analysis. The two criteria for the refinement of the database were the company's location and its relevance with the shipping industry. As regards the location, only companies located in the Attica region were selected for inclusion in the database of the firms composing the Piraeus shipping cluster. Focusing on the relevance of the industry, and as clusters are formed by companies that evolve in relation to the core service/industry, all companies dealing with products and services that are directed for use by the shipping industry have been included in the constructed database.

3.2 Categorisation: type-of-business grouping

A further fine-tuning enabled the accurate definition of the current structures of the Piraeus shipping cluster. With the use of 28 main categories of shipping related business-activity, each company belonging to the cluster has been attributed to a specific category. Whenever applicable, these categories have been further decomposed into sub-categories depending on their business scope. Table 1 presents the applied categorisation.

Table 1: Categories of shipping related business

Business Category	***Sub-category***	***Business Category***	***Sub-category***
(1) Agents		(15) Other Marine Services	
(2) Bunker Services	– *Bunker Suppliers* – *Bunker Surveyors*	(16) P & I Club Representatives	
(3) Chambers		(17) Press & Publications	– *Publishers* – *Newspapers*
(4) Crew Manning		(18) Ship Registration & Classification	– *Classification Societies & Ships Registration*
(5) Environment, Safety, Security	– *Maritime Security* – *Environment Protection Systems* – *Waste Management*	(19) Shipbrokers, Charterers	
(6) Finance, Banking, Accounting	– *Accountants* – *Banks* – *Finance/Investments*	(20) Shipbuilding & Breaking	– *Ship Breakers* – *Shipbuilders, Repairers*
(7) Forwarding & Marine Logistics	– *Forwarding/Transport Agents/Marine Logistics*	(21) Ship managers & Operators	

Business Category	***Sub-category***	***Business Category***	***Sub-category***
(8) ICT & Telecommunications	— *Maritime Training. Systems* — *Marine/Maritime Information Services* — *Marine Telecommunications*	(22) Spare Parts & Marine Equipment	— *Fire-fighting Equipment* — *Marine Engines* — *Marine Spare Parts* — *Marine Equipment Manufacturers* — *Marine Chemicals* — *Marine Oils / Lubricants* — *Marine Paints / Coatings* — *Ship Suppliers / Spare Parts* — *Turbochargers* — *Marine Electronics / Navigational Aids* — *Refrigeration*
(9) Legal Services		(23) Technical Services	— *Electrical Works* — *Insulations* — *Fumigations* — *Pipe fitters* — *Sand Blasting* — *Ship Cleaning* — *Underwater Works / Diving* — *Marine Surveyors* — *Technical Services* — *Marine Inspections*
(10) Marine Engineering & Naval Architects	— *Naval Architects* — *Marine Engineering*	(24) Towing - Salvage	
(11) Marine Insurance	— *Average Adjusters* — *Marine Insurance - Underwriters*	(25) Trade Related Services	— *Trading Companies* — *Importers / Exporters*
(12) Marine - Maritime Consultants		(26) Travel Agents	
(13) Maritime Education	— *Maritime Education, Institutes, Universities*	(27) Unions, Associations, Clubs	
(14) Maritime Organisations, Institutions, Ministries, Representations		(28) Yachts	

Source: Authors

3.3 Locational analysis

The realisation that Piraeus shipping cluster has spatially expanded across the wider geographical area of the Attica region, led to a further breakdown that reflects the spatial dimension of the cluster.

In particular, the region of Attica has been divided into seven (7) sub-regions, with the companies that are part of the cluster been allocated to one of these sub-regions, namely East Attica, Central Attica, North Attica, Piraeus, Salamis island, South Attica, and West Attica Region.

4. Configuration of the Piraeus Shipping Cluster

The research identified a population of 3.273 companies being part of the Piraeus shipping cluster, as they operate across the Attica region. Ship-owning and ship management companied stand as the core of the shipping cluster, both in terms of location and economic activities. At the same time, as one would expect, the port of Piraeus is playing a vital role in the formation of the shipping cluster: by hosting a significant number of shipping and shipping related activities Piraeus attracts also companies and institutions that supports the shipping industry, such as governmental authorities, educational institutes, research and development organizations, financing services companies, insurance and vessel classification companies, among others.

As a result, the cluster's operational configuration is characterised by the diversity insofar as the participating entities are concerned. That said, the relative concentration of the largest shipping cluster of the country in certain business is also present, with shipping management (29,8% of total companies) and shipping operating companies (18,7%) being quite dominant.

4.1 Analysis per market segment

Table 2 presents the number of participating companies per market segment, allowing conclusions on the strength of the cluster per industry.

The dominant cluster group, belong to the *Ship-managers and Operators* category, with the number of participating companies standing at 974, Most of the Greek-owned shipping companies are located in Attica and most of them hold their premises around the port of Piraeus. Notably, some of these companies are well–known at a global level for their influential presence and leverage. These two characteristics contribute to the strength of the cluster, as does the high number of participants.

Another group worth to be mentioned, given both its size and economic magnitude, are the approximately 600 companies involved in the provision of "*spare parts & marine equipment*". This group of companies includes 11 sub-categories (see: Table 1) and is mostly oriented in works and services dealing with the technical management of vessels.

Table 2: Piraeus shipping cluster: Configuration per market segment

Industry	**No of companies per market segment**	**% Per market segment**
1. Agents	**245**	**7,49%**
2. Bunker Services	**64**	**1,96%**
3. Chambers	**2**	**0,06%**
4. Crew Manning	**24**	**0,73%**
5. Environment/Safety/Security	**30**	**0,92%**
6. Finance/Banking/Accounting	**26**	**0,79%**
7. Forwarding & Marine Logistics	**58**	**1,77%**
8. ICT & Telecommunications	**33**	**1,01%**
9. Legal Services	**115**	**3,51%**
10. Marine Engineering & Naval Architects	**39**	**1,19%**
11. Marine Insurance	**94**	**2,87%**
12. Marine/Maritime Consultants	**95**	**2,90%**
13. Maritime Education	**25**	**0,76%**
14. Maritime Organisations/Institutions/Ministries/Representations	**47**	**1,44%**
15. Other Marine Services	**26**	**0,79%**
16. P & I Club Representatives	**21**	**0,64%**
17. Press & Publications	**16**	**0,49%**
18. Ship Registration & Classification	**36**	**1,10%**
19, Shipbrokers/Charterers	**217**	**6,63%**
20. Shipbuilding and Breaking	**193**	**5,90%**
21. Ship-managers & Operators	**974**	**29,76%**
22. Spare Parts & Marine Equipment	**612**	**18,70%**
23. Technical Services	**123**	**3,76%**
24. Towing - Salvage	**18**	**0,55%**
25. Trade Related Services	**38**	**1,16%**
26. Travel Agents	**31**	**0,95%**
27. Unions/Associations/Clubs	**54**	**1,65%**
28. Yachts	**17**	**0,52%**
Grand Total	**3.273**	**100%**

Source: Authors

4.2 Analysis per geographical location

The configuration of the Piraeus shipping cluster also reveals some interesting spatial characteristics. The spatial distribution of the cluster companies is shown in **Table 3** and is visualized in Figure 2. The vast majority, i.e. 60,3% of the total number of the cluster companies, are located within the wider Piraeus area. South Attica (16,2% of the companies), as well as North Attica (10,1%) and Central Attica (9,6%) host a large number of companies with few companies located in the rest of the Attica region.

Table 3: Geographical distribution of Piraeus shipping cluster

Location	Total No of companies	% of total
Piraeus	1.975	60,3%
South Attica Region	532	16,2%
North Attica Region	330	10,1%
Central Attica Region	313	9,6%
East Attica Region	61	1,9%
West Attica Region	44	1,3%
Salamis Island	19	0,6%

Source: Authors

Figure 2: Locational Analysis: Piraeus shipping cluster

Source: Authors

5. Assessment of the Piraeus shipping cluster potentials

Despite its size and importance for the local and national economy, the Piraeus shipping cluster is not subject to any official or unofficial governance scheme. With this reality standing as a starting point, it is interesting to proceed in an evaluation of the Piraeus

shipping cluster through a SWOT analysis. Utilising the input of experts, this analysis aims at highlighting the strengths, weaknesses, threats, and opportunities of the Piraeus shipping cluster with an eye on establishing an efficient and organized cluster with a global reputation, being able to attract more shipping and shipping-related businesses.

5.1 Strengths of the Piraeus shipping cluster

The major strength of the Piraeus shipping cluster is the strong, almost dominant, presence of companies dealing with the core of shipping (i.e. ship-owning and ship-management). Evidently, this is a shipping cluster rather than anything else. The presence of companies dealing with various aspects of shipping related businesses gives a high diversity level, which in turn provides a balance to the cluster and its dynamics; this adds to the strength of the cluster as the shipping industry is extremely volatile, and, beyond this, adaptability to fast advancing technology demands the presence of various types of businesses for a cluster to remain competitive.

The long-standing tradition of Piraeus as a shipping centre, the presence of numerous shipping and shipping related companies and the active involvement and operation of educational institutes helped towards the development of high skilled personnel in shipping which is also an important strength of Piraeus shipping cluster.

The shipping cluster is further reinforced by the presence of an important cargo and passenger port, that of Piraeus, which is among the top ports in Europe. Piraeus port adds value to the cluster and advances its growth potential, through the attractiveness of additional companies. Apart from the port, the city of Piraeus is a well-known shipping centre with international reputation that facilitates any future initiative towards the formation of a cluster governance scheme.

The Piraeus shipping cluster is also enriched with activities that provide added value and expertise to the participating companies. The fact that of governmental institutions (i.e. the Ministry of Shipping and Insular Policy) along with important shipping and maritime related organizations, public service authorities, and educational organisations (i.e. the University of Piraeus, marine academies, maritime training centres, etc.) are located at the city of Piraeus, or nearby locations, increases the added value that can be produced by the shipping cluster.

Last, but not least, Greece provides to Piraeus shipping cluster, a contemporary regulatory environment that encompasses EU and international initiatives, regulations and laws (i.e. those related to safety and security - see Pallis and Vaggelas, 2007), safeguarding that the members of the cluster operate in a competitive and regulated business environment which corresponds to the needs of the shipping industry.

5.2 Weaknesses of the Piraeus shipping cluster

The lack of coordination among the cluster participating companies appears to be the most important weakness of the Piraeus shipping cluster. Unlike competing cluster (i.e. the Dutch or the London one). The Piraeus cluster lacks a formal, or even an informal, governance scheme that would allow the cluster to initially realise its existence and, at a later stage, to advance those necessary measures for developing the cluster; thus providing added value to the participants and, not least, allow to proceed with collective actions, voluntarily investments and other initiatives aiming at overcoming common problems and existing operational barriers.

The present situation leads several of the cluster participants, even those belonging in the same segments of the shipping industry, to proceed with independent actions aiming at increasing the sectoral added value or resolving sectoral problems. In turn, this endangers a

potential conflict of interests and jeopardizes a level playing field that could create more benefits. The absence of a formal or informal governance scheme can be attributed to the lack of cluster mentality by the state and in many cases by the Greek business sector. From the national admistration's point of view this barrier can be lifted with the development of initiatives focusing on the enhancement of the cluster's operational potential, i.e. by creating conditions for co-operation and clustering that would increase, among others, the added value for the local and the national economy.

An additional drawback for the shipping cluster in Piraeus is the lack of appropriate infrastructures that can foster the potentials of the cluster. Piraeus is lacking of a business centre which along with the congestion in the major road networks and the lack of sufficient parking spaces are conditions standing as major or minor limitations for the development prospects of the Piraeus shipping cluster.

5.3 Opportunities for the Piraeus shipping cluster

The active presence of Associations, organisations, universities and research institutes that evolve inside the cluster, can fuel the cluster with new knowledge, advanced know – how increasing the cluster's functionality.

The role of the port of Piraeus as already analysed is important for further strengthening the shipping cluster. An opportunity arises following the acquisition of Piraeus Port Authority (PPA) SA by a private port operator (China COSCO Shipping Corporation). The Chinese operator bought the 51% of the PPA shares; with the right to buy a further 16% once a set of guaranteed investment will be completed (for more details: Pallis and Vaggelas, 2017). Once completed foreseen guaranteed investments (see: Pallis and Vaggelas, 2019) are expected to increase the port's potential in terms of throughput served, which in turn will increase the attractiveness of Piraeus for shipping, shipping related and port related business. This provides the opportunity to further enrich and strengthen the Piraeus shipping cluster. Among the guaranteed investments of the new owner is the upgrade of the ship repair zone located close to Piraeus (Perama area), creating the potential for the revival of the ship repair industry and the increase of the related companies.

Furthermore, given that the new owner of PPA, belongs to one of the major group of companies dealing with shipping and ports worldwide (COSCO Pacific), it has the ability to apply for port cooperation and coordination strategies aiming at increasing the competitiveness of the port (Pallis and Vaggelas, 2010). Assuming structural changes in the existing logistics and supply chains as a consequence of the growth of the port, the transformation of PPA to a 'smart' port authority (Chlomoudis and Pallis, 2004), acting as a port development company (De Langen and van der Lugt, 2017) would further advance the prospects of the shipping cluster. Responding to the complex environment, the advancement of networking changes can lead to an increase in the system's efficiency. Such arrangements are expected to go beyond internal networking in port operations, and involve (a) the operation of strategic networks, referring to long-term arrangements among distinct but related firms in order to gain or sustain a competitive advantage vis-à-vis their competitors (Jarillo, 1988) and/or (b) regional networks made up of small and medium-sized firms embedded in the port area. Networks can also evolve out of personal ties or market relationships among various parties (cf. Powell, 1990).

Despite the absence of a 'cluster mentality' there are some initiatives that emerged over recent years towards the formation of cooperating schemes between companies. The most important of these initiatives is a joint effort by the Union of Greek Shipowners, the Hellenic Chamber of Shipping and the Piraeus Chamber of Commerce and Industry. In 2016 these

organizations, formed the so called “Maritime Hellas”, aiming at systematically promoting and coordinating the Greek maritime cluster. Through an online application the initiative has called companies, entities, and even physical persons to declare their participation in the cluster, so as to both create a registry but also enable further collaboration. Even though this initiative aims to address the maritime cluster concept on a country level, until the time of concluding this study (January 2019) only 182 registrations have been registered. Another initiative (on a sectoral level) has been the establishment of the Hellenic Marine Equipment Manufacturers and Exporters Association (HEMEXPO) Association. Such initiatives offer opportunities and incentives towards a more coherent governance scheme for the Piraeus shipping cluster.

The implementation of the non-domicile initiative by the UK, as well as the intentions of the UK to exit the EU stand as opportunities for the further growth of the Piraeus shipping cluster. These developments are expected to reduce the attractiveness of the respective UK locations (London in particular), for Greek-owned shipping and shipping related companies, thus provide the background to consider relocation from London to Piraeus.

5.4 Threats for the Piraeus shipping cluster

The major challenge for the Piraeus shipping cluster is the competition it faces from other maritime centres and shipping clusters around the globe. Singapore, London and Dubai are among the major competitors of Piraeus as places for the location of shipping companies (Ernst and Young Greece, 2017). Recently, Cyprus endorsed a new regulatory framework and launched several initiatives aiming at increasing the country’s attractiveness for shipping companies. If Cyprus continues to adopt policies aiming at reinforcing the country’s shipping cluster, this might result in an additional challenge for Piraeus.

The economic environment in Greece stands also a threat for the Piraeus shipping cluster. With the Greek economy in a recession for almost a decade and the fiscal measures (including taxation) regularly under review, the uncertainty for companies increases, while shipping stands as the most globalised business with several options as regards their establishment. Deteriorating the tax regulatory framework generate a non-competitive environment for economic activities, posing a threat for the prospects of the Piraeus shipping cluster.

6. Conclusions

The mapping of the Piraeus shipping cluster revealed that clustering goes beyond the port-centric approach. While the port stands as the crucial factor for attracting port and port-related activities, a question is the extend that the cluster attracts shipping and shipping related activities. The paper deliberately excluded port and port related activities from the analysis, aiming to unveil the fact that a shipping cluster could be developed without been port-centric. True, if the port and port related activities had been included, then the number of companies in the cluster would have been significantly larger. In that case however, there will be two core activities in the cluster, port and shipping related. Although these activities can be seen as complimentary, this co-existence would imply several issues regarding the cluster’s scope, governance and management.

Currently, the discussion regarding how cities can achieve their potential and transformed to shipping centres has been fuelled by relevant research. The results of the analysis demonstrate that Piraeus has potentials and could further strength its presence in the global shipping networks. Moreover, the study demonstrates that thinking beyond the port cluster approach would allow a better understanding of the trends in maritime and shipping clusters,

and the formation of distinctive, yet interlinked, clusters. It can thus be argued – and is supported by the empirical findings – that the existence of a port can be a supportive but not an essential element in the development of a shipping cluster. This is contrary to previous conceptualizations (cf. de Langen, 2004b) supporting that shipping and shipping related activities are located in seaports due to the fact that ports are core transport nodes. In the case of Piraeus, the port has been developed significantly the last decade, following the concession of its container terminal to a private operator in 2009. Shipping companies have been located in Piraeus well before the emergence of Piraeus as one of the major European ports.

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