

Ports as Clusters of Economic Activity

Peter W. de Langen and Elvira Haezendonck

31.1 Introduction

The application of insights from cluster theories to ports started roughly a decade ago. The first two substantial works were Haezendonck (2001) and de Langen (2004). These were followed by, among others, Lambrou, Pallis and Nikitakos (2008), Musso and Ghiara (2008), Roh, Lalwani and Naim (2007) and Brett and Roe (2010). The port cluster concept has also been applied in practice: the port of Valencia has embraced the port cluster concept and positions itself as a leader in **port cluster governance** (Port of Valencia 2009); the Chinese government uses the port cluster concept in port planning (People's Daily Online 2008); the Korean Maritime Institute analyzes the potential of Korea's ports to develop further as logistics clusters, and United Nations publications promote the development of port and logistics clusters (UNESCAP 2007). So the port cluster concept seems, at least from an empirical perspective, to be useful and valuable.

In port studies, the perspective that regards ports as "transport nodes" is well established (for example Button 1993; Charlier and Ridolfi 1994; Cooper 1994; Goss 1990; Pallis, Vitsounis and de Langen 2010; Robinson 2002). The "cluster perspective" complements this "transport node perspective." Central in this cluster perspective is the recognition that interdependent firms cluster together in port regions, with various forms of coordination and resource sharing as a consequence.

Four arguments substantiate the value of analyzing seaports from the cluster perspective, as a complement to the more widely established "transport node perspective." First, the cluster perspective provides new insights for determinants of port competitiveness. For instance, research on clusters demonstrates the importance of intra-cluster competition (Porter 1998 and applied in Haezendonck 2001). This has led to attention to the value of intra-port competition for port competitiveness (see de Langen and Pallis 2006). Other relevant variables

based on cluster studies include an “education regime” (de Langen 2008) and cargo-controlling intermediaries and industrial clustering in ports (Haezendonck 2001).

Second, in the transport node perspective, the competitiveness of a port is typically measured by its throughput volume. A cluster perspective provides additional measures of performance, such as value added (Haezendonck 2001; Haezendonck, Coeck and Verbeke 2000; Robinson 2002) and investment level (Mathys 2009).

Third, a port consists of a large number of *independent*, but also *interdependent*, firms. The performance of a port depends to a large extent on coordination between firms. Collective action of firms in clusters may sometimes be problematic, because of opportunism or lack of trust, but it can also strongly contribute to the competitiveness of the cluster as a whole. For example, Jans and Haezendonck (2010) argue that cluster organizations have a positive impact on the proactive environmental strategies of firms in that cluster. The empirical application in this chapter concentrates on petrochemical firms in the port of Antwerp, and argues that this positive impact can lead to competitive advantages for these firms in the port cluster and for the cluster as a whole.

Collective action is discussed widely in the cluster literature (e.g. Baptista and Swann 1998; Krugman 1991; Maskell 2001; Nadvi 1999; Porter 1998, 2000; Steinle and Schiele 2002). Dominant firms may strongly influence the performance of a cluster (McKendrick, Donner and Haggard 2000). This may be particularly relevant in ports, since in many port clusters the port authority or a major port operator plays a crucial role and can therefore be key to the cluster’s success. The cluster perspective provides a

theoretical background for analyzing collective action and the role of dominant firms.

Fourth, the transport node perspective does not provide a solid theoretical framework for analyzing the role of the port authority. The widely accepted classification of landlord ports, tool ports and service ports describes only a part – directly related to transshipment on terminals – of all the activities port authorities engage in. A variety of other activities, such as port marketing, promotion, and acquisition of investors are not captured in this approach. Furthermore, the role of the port authority in attracting and facilitating industrial activity is not addressed. The cluster perspective offers an additional framework for analyzing the roles of port authorities in port clusters. This is discussed in more detail in Section 31.4. An overview of the key characteristics of both the transport node and cluster perspective for ports is provided in Table 31.1.

To conclude, the cluster perspective provides a theoretical framework that can usefully be applied to ports. This framework complements the common perspective in which a port is analyzed as a part of a transport (or supply) chain. The framework is especially useful in providing additional insights into determinants of port competitiveness, port performance indicators and governance in ports.

In this chapter we review some important results of the application of cluster theories to ports. First, we briefly discuss the activities included in a port cluster. Next, we focus on two main contributions made by applying cluster theories to sea-ports, the insights concerning port governance in Section 31.3 and the emerging issue of clusters of ports in proximity in Section 31.4. Section 31.5 concludes.

Table 31.1 Key characteristics of both port perspectives

	<i>Port as transport node</i>	<i>Port as economic cluster</i>
Definition	A gateway through which goods are transferred between ships and the shore	An economic complex consisting of all firms related to the arrival of ships and cargo <i>and</i> located in one region
Performance indicator	Throughput volume	Value added in the port (cluster)
Models for analyzing the role of government	The widely used but very stylized classification of ports in landlord ports, toolports and service ports	Port authority as central organization in cluster governance.
Frequently mentioned performance variables	Maritime accessibility Geographic location Hinterland connections	Intra-port competition Knowledge spill-overs A qualified labor pool
Research issues	Development of liner network structures Hinterland accessibility as determinant of port competitiveness Factors influencing terminal efficiency	The effect of institutional arrangements on port competitiveness Ports as logistics, trade and production centers Clusters of ports in proximity Green port and port's social responsibility
Geographical focus	Specific terminals	Geographical and institutional proximity of actors in ports.

Source: authors.

31.2 Defining a Port Cluster

Various scholars have provided cluster definitions; an often cited one is “a spatially concentrated group of firms competing in the same or related industries that are linked through vertical (buyer/supplier) and/or horizontal relationships (alliances, collaborations, resource sharing, etc.)” (Porter 1998). Haezendonck (2001) defined port clusters as inter-organizational networks among actors belonging to different sectors but situated at the crucial interface between the land and the water legs of industrial and

commercial activities. Such port clusters include shipping companies, pilotage and towing services, terminal operators, warehousing firms, value-added logistics companies, manufacturers, forwarders, shipping agents, distribution companies, haulers, railway companies, barge masters, maritime service companies (such as ship chandlers, insurances and experts in maritime law).

Even though the “borders” of a cluster are somewhat vague in practice, it is important – at least conceptually – to delimit and define a cluster as precisely as possible. This can be done in the following steps.

31.2.1 *Selecting the core activity of a cluster*

Delimiting a cluster starts with selecting a core cluster activity in a specific region (e.g., financial services in London, life sciences in the Øresund). Generally, the analysis of geographical concentration, with such indicators as an above-average location quotient, a clear “export surplus” of products to other regions (Porter 1998) and the presence of regional industry associations, provides the basis for the selection of core activities (see for example the European cluster observatory, www.clusterobservatory.eu). In the case of port clusters, core activities encompass all those related to cargo and ships.

31.2.2 *Analysis of linkages*

The second step consists of defining “cluster industries.” An automotive cluster, for example, encompasses the industries forging and stamping and vehicle assembly. Cluster industries are generally identified according to an analysis of economic linkages (Porter 2010). The existence of linkages is shown by input/output relations, inclusion in the same value chain, information exchange, specialization of firms and the existence of joint ventures and other partnerships.¹

This analysis leads to a list of the industries included in a cluster (see the cluster descriptions of Harvard Business School’s cluster project, led by Michael Porter, for practical examples). Table 31.2 shows industries generally included in the port cluster (de Langen 2004).

31.2.3 *The relevant cluster region*

The geographical scope of a cluster is in many cases not well defined. Often,

Table 31.2 Activities included in a port cluster

<i>Cluster component</i>	<i>Activities</i>
Cargo handling	Loading, unloading and transshipment activities Pilotage Port engineering
Transport	Shipping services Inland shipping services Salvage services Shipbrokers Rail transport Pipeline transport Trucking services
Logistics	Transport intermediaries (forwarders and ship agents) Warehousing and storage Logistics consultancy services
Manufacturing	Oil refining Flour milling Cokes manufacturing Basic chemical manufacturing Other chemical manufacturing Production of iron and steel Shipbuilding and repair Specialized suppliers to port industries
Trade	Trade intermediaries in oil, fuel and chemical products Trade intermediaries in metals, ores and food Fuel, grain, metals and mineral oil wholesalers

Source: de Langen (2004).

administrative regions are used. When detailed data are available, a relevant cluster region can be defined as all adjacent areas where cluster industries are overrepresented. This issue is relevant in ports, as ports in proximity can in some cases be regarded as one port cluster, even when the ports are located in different regions or even in different countries; see Section 31.4.

This approach to defining ports has been applied to the ports industry (see de Langen 2004 and Musso and Ghiara 2008, as well as Mathys 2009, which calculates the economic impact of ports in line with this method). The application of the cluster concept to ports not only has an effect on such impact studies (another example of an empirical application is the EU co-funded IMPACTE project in 2006; see IMPACTE 2006 and Haezendonck, Dooms and Verbeke 2010), but also has important implications for theories on port governance. These are addressed next.

31.3 The Cluster Perspective and Port Governance

In cluster studies, the importance of collective action for the performance of a cluster is widely accepted (see for instance Nadvi 1999 and Giuliani 2005). Even when the collective benefits of collective action exceed (collective) costs, cooperation does not (always) develop spontaneously. This tendency towards insufficient shared investments is relevant for various types of investments in clusters, including education, innovation and marketing (see de Langen and Visser 2005; Fuller, Bennett and Ramsden 2004).²

31.3.1 *The role of port authorities*

From a welfare point of view, collective goods (or local public goods) should be provided by local institutions, and the costs recovered directly, for example through local taxation. This does *not* involve subsidies by national governments. Port authorities are often well positioned to play this role of providing local public goods and to recover the costs through revenue streams, such as land rents and port dues. However, for a port authority (PA in the remainder of this chapter) to play this role effectively, it first needs to have **incentives** to invest in the cluster. This is the case when the revenue streams of the PA are related to the performance of the cluster. Second, the PA needs to be self-sustaining, but not profit-maximizing.

The port authority owns and exploits the port area and benefits when the port cluster is an attractive location, because it can potentially lease more land and charge higher prices. Furthermore, port authorities collect “port dues.” Thus, the more ships call at a port, the higher the port dues. For these two reasons, port authorities have a clear incentive to invest in the performance of the port cluster³ (the first condition). Furthermore, many port authorities are self-sustaining but not profit-maximizing (the second condition). Such port authorities can act as cluster managers⁴ in the sense that they invest in collective goods, such as port marketing, training, education and a **port community system**. With such investments, port authorities improve the competitive position of the entire port complex. And the investments are in the end financed by the port users, through port dues and land rents.

Given this background, Figure 31.1 shows a “decision tree” for port authorities. The

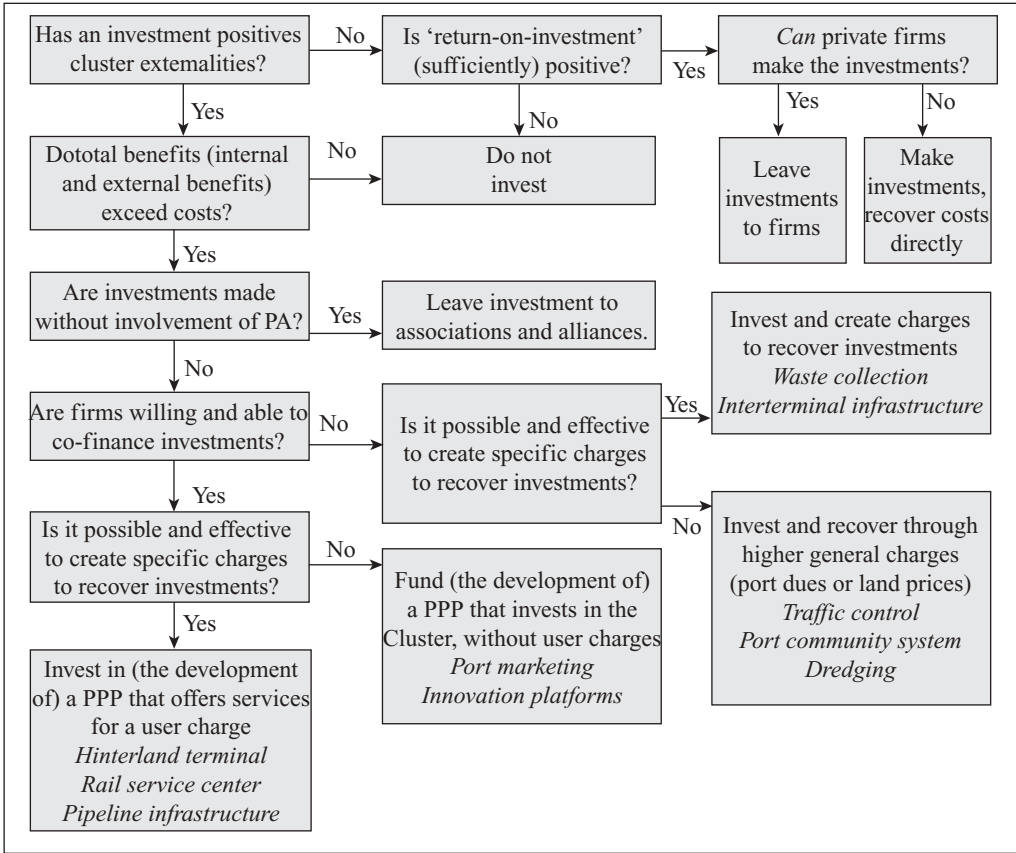


Figure 31.1 A “decision tree” for a cluster manager
 Source: authors.

tree shows four arrangements that port authorities can create to make and facilitate investments, with cluster effects and examples of such investments.

31.3.2 Port authority investments with collective benefits

Port authorities have convincing arguments for making investments such as port marketing and a port community system when three conditions are met. First, the investment has positive *external* effects for the

cluster (in other words, it contributes to the competitiveness of various firms in the port cluster); second, overall benefits (the benefits for the PA itself and benefits for the firms in the port cluster) exceed overall costs; and third, without PA involvement these investments are not made.

The PA can finance and recover investments in four different ways. When private firms are not willing to contribute to investments, the PA needs to invest alone. These investments can in some cases be recovered through direct charges (e.g. a charge for

shore power); in other cases this is not possible, and the PA revenues from port dues and land rents can be used to make these investments (for example dredging).

When private firms are willing to contribute to investments, a partnership of various firms that contribute financially is generally more appropriate. In some cases,

this partnership can charge firms for the services it provides (for instance a hinterland terminal); in other cases investments are made without direct cost recovery (such as port marketing).

Table 31.3 shows that in practice port authorities do make investments with collective benefits. Investment costs are recov-

Table 31.3 Cluster investments of PAs

<i>Four forms of cluster management</i>	<i>Cluster investments</i>	<i>Arrangements of private co-financing</i>	<i>Cases</i>
Direct investments of the port authority, recovered through general charges	Traffic control, port community system, dredging	No direct private co-financing, financed through port dues	Rotterdam, LMPC, Durban
Direct investments of the port authority, recovered through specific charges	Logistics zones Dedicated freight transport systems	Land lease charges Infrastructure charges. In principle, once the investments are made, exploitation could be tendered to private operators.	Rotterdam Rotterdam (pipeline)
Investment through a public private partnership that invests without direct cost recovery	Port marketing and promotion	Subsidy to a port marketing association that is also funded by contributions of firms.	Rotterdam
	Innovation platforms and research	Member firms of the platform pay a fee.	Rotterdam, LMPC
Through a public private partnership that charges users for its services	Rail and barge service centers	Port authority invests in infrastructure and equipment and leases this on a cost recovery basis to firms.	Rotterdam, LMPC ¹
	Venture capital provision	Port authorities take a share in venture capitalist. The investments of this firm should generate a healthy return, while reducing start-up barriers.	Rotterdam
	Training and education infrastructure	Schools develop training courses; costs are partially recovered through fees. Port authority contributes to developing courses.	Rotterdam, Durban

Source: de Langen 2004.

ered indirectly, through port dues and land prices. The cluster perspective provides the theoretical explanation for this role of PAs. This theoretical background suggests that this role of a port authority can contribute to the competitiveness of the port as a whole.

The theoretical background discussed above suggests that a port authority can create “real benefits.” These benefits are (at least partially) passed on to importers/exporters (and finally consumers). This is beneficial for the economy as a whole.

31.3.3 *Port governance structure for the cluster manager*

This argument has important implications for port governance. Port governance structures that enable the PA to play this role as cluster manager effectively are – other things being equal – more beneficial for a country than structures where this is not possible (see Helsley and Strange 1998).⁵

In line with the arguments provided above, an ideal type port governance structure consists of PAs that are *self-sustaining*, can decide the level of port dues and land rents required to finance investments in the port, have the freedom to *recover investment costs as specifically as possible*, and to invest when “cluster benefits” exceed costs but private firms are not willing to invest.⁶ This requires a not-for-profit port authority that administers one port cluster. These two implications are further discussed below.

The line of reasoning discussed above provides a convincing argument against fully private port authorities: private port authorities are less inclined to make investments with positive cluster externalities precisely because these benefits cannot be PA-internalized. Furthermore, private PAs

will have higher transaction costs for creating joint investments, since the threat of opportunistic behavior from a private PA is higher than that of a commercially operating but not profit-driven PA.⁷

The cluster perspective is also relevant for analyzing the appropriate geographical scope of PAs. The appropriate geographical scope is *one port authority for one port cluster*. In this case, over-investment in similar facilities is prevented, while the PA faces competition and thus needs to be efficient. Furthermore, the firms in the port cluster have clear incentives to improve the performance of the PA.⁸

A national PA (for instance one PA in India that sets tariffs, collects revenues and decides about investments for all Indian ports) is not effective for two reasons. First, a branch in charge of one specific port has limited incentives to operate efficiently, since all revenues are collected centrally. This leads to a principal-agent problem, and consequently high monitoring costs.

Second, and directly derived from the “cluster management” line of thought, national tariffs prevent PAs from setting the appropriate investment level and resulting level of port charges.⁹ This will lead to under- or over-investment,¹⁰ both with adverse welfare-economic effects.

Too much decentralization is also not effective, for two reasons: PAs with a small jurisdiction will not be able to invest in new port facilities outside this jurisdiction, even if locations outside this jurisdiction are superior. This argument is relevant because the ongoing spatial transformation of port regions (see Bird 1971; Hayuth 1988) requires investments in new port facilities at new locations. Second, a PA with a small jurisdiction will increase the risks of duplication of facilities such as container

terminals, vessel-tracking systems, hinterland infrastructure, and a port community ICT system.

These implications for port governance are important in the ongoing debate on this issue (see Brooks and Pallis 2008), and form a contribution from the cluster perspective to the understanding of port governance.

31.4 Ports in Proximity: One Port Cluster?

One of the key questions concerning port clusters is: In which cases can ports in proximity be regarded as one port cluster? As argued in Section 31.3, this question has important implications for port governance. There is no clearly established method of addressing this question. For instance, de Langen defined the “Lower Mississippi Port Cluster” as one integrated cluster, stretching more than 200 km along the banks of the river, but did not consider Rotterdam and Antwerp, no more than 100 km apart, as one cluster (de Langen 2004). Initiatives to develop port policies for groups of ports or gateways can be observed in many parts of the world: Chinese policy makers regard the Pearl River delta ports as one port cluster, the ports in the Adriatic sea position themselves as one cluster, and Canada has developed gateway policies, where gateways consist of a number of ports. Furthermore, in some cases port governance is unified on a broader geographical scope. For instance, the port authorities in the Vancouver area cooperate strongly and the ports of Copenhagen and Malmö are fully merged. This shows the practical relevance of analyzing clusters of ports in proximity.

In the next subsection, we first relate the discussion of the relevant geographical scope to recent theoretical and practical developments concerning port regionalization, and second discuss the case of Copenhagen Malmö Ports – the only cross-border merger of publicly owned port authorities – to illustrate the preceding theoretical analysis.

31.4.1 *A regional cluster of different ports in proximity?*

Port regionalization (Notteboom and Rodrigue 2005) and the extended gateway concept (VIL 2006) show that ports increasingly develop into port networks. As suggested and discussed in Notteboom and Rodrigue (2005), logistics integration, new patterns of freight distribution and the changing role of ports lead to an increasing network orientation. Changes in logistics and the pursuit of efficiency improvements in logistics (such as decreasing the total cost of logistics, for example in container transportation), and more generally the changing market environment, have induced the development of global supply chains and have forced ports to focus more on hinterland locations to sustain or increase their competitiveness. Notteboom and Rodrigue (2005) argue that port competition is focusing increasingly on the development of hinterland connections because the inland logistics costs are crucial. The concept of port regionalization, based upon market strategies and policies, extends the hinterland reach of a port, with a closer link to inland freight distribution centers and to other ports, including inland ports.

This logic of network formation also applies to ports in proximity. Port networks consist of vertical networks, with inland

nodes, as well as horizontal networks, with other seaports. Ports in proximity may benefit from collaboration in terms of, for example, hinterland infrastructure, terminal capacity and a shared labor market (see Notteboom, Ducruet and de Langen 2009). Port competition and an increasing number of customer demands can trigger ports to share resources, and complementary ports may even jointly develop a “regional port network.” The growing importance of the network of ports with inland logistical hubs and other ports became clear in an all-encompassing calculation of the socioeconomic impact of the port of Antwerp: the development of the port network would lead to more employment creation in the wider region than in the port itself (Verbeke and Dooms 2007). In line with this concept of port regionalization and with the results obtained by various studies on the future importance of inland logistical hubs in the context of port competition, Vlaams Instituut voor de Logistiek (VIL) developed its “Extended Gateway” concept for Flanders (VIL 2006). Both concepts are building on the facts that land for port-related activities is increasingly scarce and that multimodality, value-added complementarities and logistics optimization are increasingly important for a port’s and a region’s strategy.¹¹

Cooperation of ports can contribute to resource sharing and a lower, or at least less concentrated, environmental impact. As a result, different government levels encourage the formation of port networks or even mergers. An example is the concept of the “Flanders Port Area,” which encompasses the four main ports in Flanders situated less than 100 km from each other, Antwerp, Zeebrugge, Ghent and Ostend. The aim is to stimulate port cooperation

and to provide a platform for combining, sharing and developing assets. Many firms operate in two or more of these ports and consider these ports as complements for their clients. Interestingly, many industry experts argue that this is just a first step in collaboration – initially focusing on marketing – and that the aim should be joint governance, such as a port holding structure (see for example Vlaamsehavenvereniging.be, Alfaportantwerpen.be and the Flemish Ministry of Mobility and Transport). Similar policies to enhance cooperation between ports in proximity are in place in the Netherlands and Canada.

In this context, Haezendonck and Dooms (2007) and Haezendonck, Dooms and Coeck (2006) argue that cooperation between ports in proximity may have an impact on their environmental performance, as scale may promote environmentally friendly modes of inland transport (rail and barge).

The abovementioned recent developments suggest that it increasingly becomes necessary to analyze clustering in the port industry at a wider geographical level, and to pay more attention to clusters of ports in proximity, as more unified forms of governance may have potential for the increased performance or growth of these ports. This issue is explored next.

31.4.2 *The case of Copenhagen Malmö Port*

In this section, we briefly describe the case of Copenhagen Malmö Port, to illustrate the relevance of cooperation between ports in proximity. This case alone is not enough to provide scientifically valid empirical support for the preceding arguments, but may serve as an exploration of a topical

issue and provide a basis for “analytical generalization” (Yin [1984] argues that in analytic generalization, previously developed theory is used as a template against which to compare the empirical results of the case study).

On January 1, 2001, the ports of Copenhagen and Malmö merged, to become Copenhagen Malmö Port (CMP). The shareholders of CMP are “Port of Copenhagen” and “Port of Malmö.” CMP engages in port activities. Port of Copenhagen is still active in urban redevelopment of old port areas. Port of Malmö also still administers some investments that have been left outside the merger. Figure 31.2 shows the ownership structure of CMP.

When CMP was formed, it was explicitly decided not to distinguish a “Swedish” and a “Danish” business unit. Such business units would lead to questions regarding where profits were made and where investments would take place. Instead, there are five business units, for the five most important market segments. This structure ensures that CMP does not control which

part of turnover, profits or investments is made in Copenhagen and which part in Malmö. For the customers of both ports, little has changed since the merger, since the account managers have remained the same for most companies.

CMP is a “service port,” engaged in operational activities in the port. CMP provides cargo-handling services. The port land is still owned by the municipality and/or state. The throughput figures of both ports declined after the opening of the Øresund Bridge, because of the loss of ferry traffic (and some container traffic). Since the merger in 2001, throughput has grown consistently

Some key figures of CMP are given in Table 31.4. These figures show that the turnover, productivity, profits and solvency all have increased following the merger.

As an illustration of the analysis of cluster governance changes on cluster performance, we analyze the evolution of the market share of Copenhagen Malmö Port after the merger. Figure 31.3 indicates how the market share of CPM, relative to all

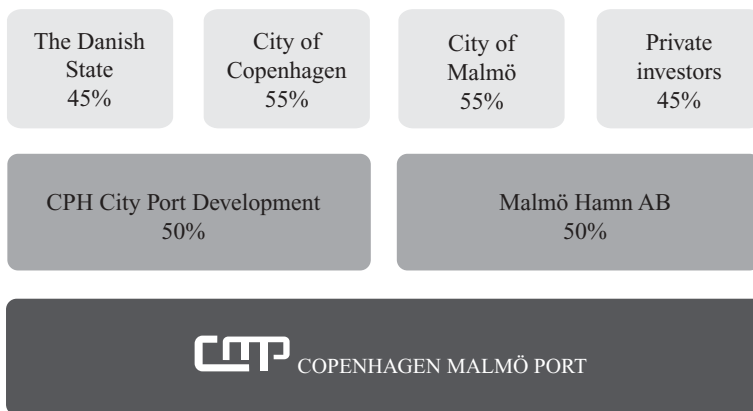


Figure 31.2 The ownership structure of CMP
Source: Copenhagen Malmö Port (2010a).

Table 31.4 Key total traffic figures of CMP (2001–2009)

	2009	2008	2007	2006	2005	2004	2003	2002	2001
Throughput Malmö and Copenhagen ('000 tonnes)	15,000	18,000	18,051	16,600	15,200	14,800	14,800	13,400	13,259
Net sales (SEK millions)	733	784	733	649	602.9	544.6	509.7	473.4	464.0
Operating profits (SEK millions)	128	181	146	93	79.7	35.2	31.0	13.2	8.8
Net margin (%)	17	23	20	14	13.2	6.5	6.1	2.8	1.9
Solvency (%)	75	72	68	61	50.3	56.2	60.6	58.4	56.6
Net sales per employee (SEK 1,000)	1779	1647	1497	1378	1302	1184	1151	1081	1052

Source: Copenhagen Malmö Port (2010a).

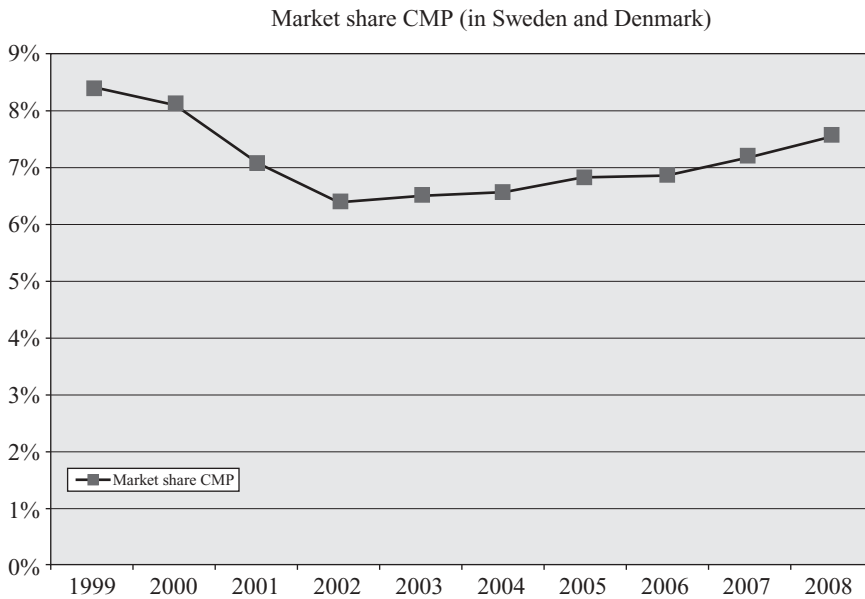


Figure 31.3 Evolution of CMP market share in Sweden and Denmark (1998–2008)

Source: authors' calculations based on port statistics.

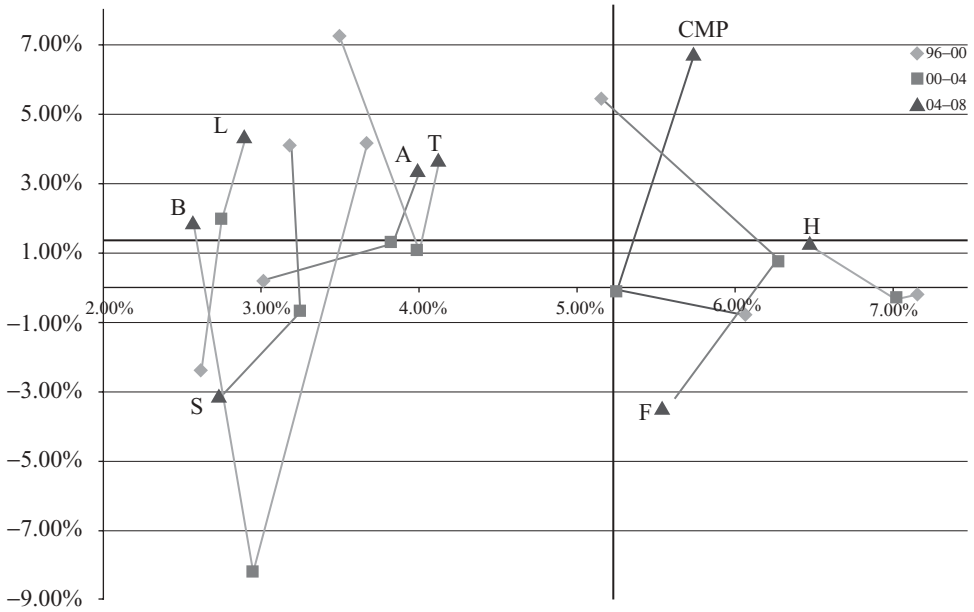


Figure 31.4 Dynamic port portfolio analysis of CMP and eight relevant competing ports. The considered competing ports in the portfolio are: Brofjorden Preemraff (B), Fredencia Havn (F), Trelleborg (T), Luleå (L), Århus Havn (A), Statoil-havnen (S), Helsingborg (H) and Copenhagen Malmö Port (CMP). Source: authors’ calculations based on throughput data of the respective port authorities (port statistics). (For the portfolio analysis included, the authors would like to thank Dr. Steven De Schepper for his valuable contribution.)

Danish and Swedish ports, has steadily grown since the port merger in 2001. Building upon the port portfolio analysis developed by Haezendonck (2001), Figure 31.4 provides a more detailed look into the changed competitive position of CMP considered in terms of three relevant time periods (1996–2000, 2000–4 and 2004–8) and seven competitors, namely Brofjorden Preemraff, Trelleborg, Luleå, Fredericia Havn, Århus Havn, Statoil-havnen and Helsingborg. (Göteborg is excluded as an outlier, because of its very high volume and market share; note that Göteborg did not grow as rapidly as CMP in the three periods

considered.) The selected ports in Denmark and Sweden, with more than 7.5 million tonnes of throughput per year, together account for more than 50 percent of Sweden’s and Denmark’s port throughput; they were identified as the relevant “port range” for this *dynamic* port portfolio analysis.

CMP is the only port of the eight competitors that succeeds, within the considered time frame and focusing on the last period considered, in combining a very favorable annual growth rate and a higher than average market share, and is the only “star performer” in the range.¹² Although

most of the eight competing ports considered increased their growth rates in the third period (2004–8), CMP performed noticeably better in terms of average annual growth, and combined this with a greater than average market share in the range.

This analysis provides some evidence for arguing that the merger of these two ports in proximity did lead to a better performance of the port management company, as well as to a better performance of the entire port complex. Of course, these data do not prove that the merger directly caused these effects. A more in-depth analysis could include other ports in the Baltic region in competition with CMP and should also further investigate the relationship between the degree of integration and increased performance. However, the data do suggest that adjusting the governance structure of ports in proximity may have positive performance effects.

31.5 Summary

This chapter first discussed the relevance of applying the cluster concept to ports and provided, in general terms, an approach for defining a port cluster. Next, the cluster concept was used to address an increasingly important issue: cooperation and changing governance structures of ports located in geographical proximity. The cluster perspective is relevant for the ongoing discussion on port governance structures: in a model with self-sustaining, regionally operating and commercial but not profit-maximizing port authorities, the port authority is well positioned and has the incentives to make investments with collective benefits. This role is beneficial for the

port as a whole as well as for the wider economy.

The case of Copenhagen Malmö Port suggests that unified governance of ports that can be regarded as one port cluster may strongly contribute to the performance of this cluster. Thus, the model of a full-fledged merger may be an effective way to promote the joint competitive position of ports in proximity. Future empirical research to complement case study analysis should be encouraged. It should be based on alternative methodological frameworks, such as statistical analysis of the causal relationship of “key port performance indicators” to levels of intra- and inter-port cooperation using data of different regions, ports and sub-clusters in ports, and over various periods in time.

Notes

- 1 Linkages with strategic relevance (shown by frequent information exchange and partnerships) are more relevant than “arm’s-length” ones. For example, machinery supply is included in a shipbuilding cluster, while “general administrative services” are not. Input/output data provide a basis and are often complemented by a “value chain analysis” based on an analysis of interactions, partnerships, ownership structures and specialization (Porter 1998). The presence of a cluster association also gives information on the nature and strength of linkages. A regional association that brings together firms from different industries – in the case of a port a port association – shows such linkages. Therefore, an analysis of the association structure of a region is a practical first step in a cluster analysis.
- 2 Because firms in clusters cannot – or at least not perfectly – be excluded from

- benefits of investments, such investments can be considered “local public goods” (Zodrow and Mieszkowski 1986) or “collective goods” (Antonelli 2000).
- 3 The “Hanseatic port model” (Kreukels and Wever 1998), in which the local or regional administration controls the port authority, is fairly widespread, especially in Continental Europe. In this model the port authority has an additional motive, on top of the economic incentives mentioned above, to invest in the port cluster: it generates employment and value added in the port region. For regional policy makers, such effects are important.
 - 4 Port clusters are special because of the prominent role of port authorities. In many other clusters, such as the Dutch maritime cluster (de Langen 2002), the shipbuilding cluster in the Northern Netherlands (Van Klink and de Langen 2001) and Silicon Valley (Hall and Markusen 1985), a central actor, with a similar set of incentives and resources and a similar institutional position, is lacking. Therefore, cluster management is likely to be more advanced in ports than in other clusters.
 - 5 An interesting comparison that is beyond the scope of this paper is with so called “business improvement districts” (BIDs). In such districts, firms have to contribute financially to investments to improve the district as a whole. This requires specific legislation to enable the BID to function effectively. The five criteria discussed in this paper also apply to these BIDs: they have to be self-sustaining, have incentives to invest in the performance of the BID, be able to make investment decisions, recover costs as specifically as possible, and not “replace” investments that would have been made by (alliances of) private firms in the first place (see Helsley and Strange 1998).
 - 6 This can be the case because a substantial part of the benefits are “external” to the (coalition of) firm(s), the uncertainty is too high, the payback period is too long, or regulation prevents private investments.
 - 7 In this respect, it is important to note that, even though there is a clear trend towards privatizing terminal operations (Baird 2002), PAs themselves are in the vast majority of ports public (see Baird 2002; Cullinane and Song 2002). This argument for public PAs is not relevant in all cases: when there is no or hardly any need to make investments with cluster externalities, as in single-user ports or ports with a small number of users, ports can be fully private and there is no need for a public PA that acts as cluster manager. In the case of large and diverse port clusters, public ownership is better, since the PA creates real economic benefits that are passed on to port users.
 - 8 The issue of the market power of a PA that administers one port cluster must be assessed case by case. In some cases, competition from other ports will be sufficiently strong (thus, the PA has no market power), while in other cases regulation to prevent abuse of market power is necessary.
 - 9 If specific branches do have such autonomy, the central port authority has no decision-making power and is not a “port authority” in the sense used in this chapter.
 - 10 It is virtually impossible for a national PA to identify the appropriate investment level for each individual port, since the local branch of a national PA will lobby for all investments and there is a considerable difference in information between the local branch (that has more knowledge of the local market) and the national PA, leading to difficult “principal agent problems.”
 - 11 Various recent studies on the economic and social impacts of ports (e.g. National Bank studies in Belgium NBB annual studies on the value-added of Belgian seaports, and the EU-funded IMPACTE study carried out in 2006) show that the geographical distribution of the various impacts of port activ-

ities has become very important for port management, policy and, especially, attracting public investment funds.

- 12 See Haezendonck (2001) for the terms given to the quadrant in port portfolio analysis.

References

- Antonelli, C. (2000) Collective knowledge communication and innovation: the evidence of technological districts. *Regional Studies* 34(6): 535–48.
- Baird, A. (2002) Privatisation trends at the world's top-100 container ports. *Journal of Maritime Policy and Management* 29(3): 271–84.
- Baptista, R. and P. Swann (1998) Do firms in clusters innovate more? *Research Policy* 27(5): 525–40.
- Bird, J. (1971) *Ports and Port Terminals*. London: Hutchinson University Library.
- Brett, V. and M. Roe (2010) The potential for the clustering of the maritime transport sector. *Maritime Policy and Management* 37(1): 1–16.
- Brooks, M. R. and A. A. Pallis (2008) Assessing port governance models: process and performance components. *Maritime Policy and Management* 35(4): 411–32.
- Button, K. J. (1993) *Transport Economics*. Cheltenham: Edward Elgar.
- Charlier, J. J. and G. Ridolfi (1994) Intermodal transportation in Europe: on modes, corridors and nodes. *Maritime Policy and Management* 21(3) 237–250.
- Cooper, J. (1994) The global logistics challenge. In J. Cooper (ed.), *Logistics and Distribution Planning*, pp. 98–121. London: Kogan Page.
- Copenhagen Malmö Port (2010a) Annual reports 2009 and 2006. www.cmport.com/Corporate/Finance/Annual%20Reports.aspx (accessed February 2010).
- Copenhagen Malmö Port (2010b) Company description. www.cmport.com/Corporate/Organisation%2052/Ownership.aspx (accessed February 2010).
- Cullinane, K. and D.-W. Song (2002) Port privatisation policy and practice. *Transport Reviews* 22(1): 55–75.
- Fuller, C., R. J. Bennett and M. Ramsden (2004) Local government and the changing institutional landscape of economic development in England and Wales. *Environment and Planning C: Government and Policy* 22(3): 317–47.
- Giuliani, E. (2005) Cluster absorptive capacity: Why do some clusters forge ahead and others lag behind? *European Urban and Regional Studies* 12(3): 269–88.
- Goss, R. O. (1990) Economic policies and seaports. *Maritime Policy and Management* 17: 207–87.
- Goss, R. O. (1999) On the distribution of economic rent in seaports. *International Journal of Maritime Economics* 1(1): 1–9.
- Haezendonck, E. (2001) *Essays on Strategy Analysis for Seaports*. Leuven: Garant.
- Haezendonck, E., C. Coeck and A. Verbeke (2000) The competitive position of seaports: introduction of the value added concept. *International Journal of Maritime Economics* 2(2) Special Issue on Ports: 107–18.
- Haezendonck E. and M. Doods (2007) Environmental strategy for ports: towards a green network approach. *Proceedings of Annual Conference of the International Association of Maritime Economists (IAME)*, Athens, July 4–6, 2007.
- Haezendonck, E., M. Doods and C. Coeck (2006) Environmental strategy for ports. In T. Notteboom (ed.), *Ports are More than Piers*, pp. 147–73. Antwerp: De Lloyd.
- Haezendonck, E., M. Doods and A. Verbeke (2010) Socio-economic impact of ports: development of a European port economic impact toolkit. *Proceedings of Annual Conference of the International Association of Maritime Economists (IAME)*, Lisbon, July 7–9.
- Hall, P. and A. R. Markusen (1985) *Silicon Landscapes*. Winchester, MA: Allen & Unwin.

- Hayuth, Y. (1988) Rationalization and deconcentration of the US container port system. *Professional Geographer* 40: 279–88.
- Helsley, R. W. and W. C. Strange (1998) Private government. *Journal of Public Economics* 69: 281–304.
- IMPACTE (2006) Intermodal Port Access and Commodities Transport in Europe. The economic role of ports, delivery package 2B, Development of a socio-economic impact tool kit, EU-supported study for SEEDA. www.seeda.org.uk/enabling_infrastructure_&_development/transport_projects/impact/.
- Jacobs, W. (2007) Port competition between Los Angeles and Long Beach: an institutional analysis. *Tijdschrift voor de Economische en Sociale Geografie* 98: 360–72.
- Jans, T. and E. Haezendonck (2010) The impact of the meso-level on proactive environmental strategies of firms. Paper presented at the Academy of Management (AOM) annual conference, Montreal, August 6–10 2010.
- Klink, H. A. van and P. W. de Langen (2001) Cycles in industrial clusters: the case of the shipbuilding industry in the northern Netherlands. *Journal of Social and Economic Geography* 92(4): 449–63.
- Kreukels, T. and E. Wever (1998) *North Sea Ports in Transition*. Utrecht: Van Gorcum.
- Krugman, P. (1991) Increasing returns and economic geography. *Journal of Economy* 99(3): 483–99.
- Lambrou, M. A., A. A. Pallis and N. V. Nikitakos (2008) Exploring the applicability of electronic markets to port governance. *International Journal of Ocean Systems Management* 1(1): 20–39.
- Langen, P. W. de (2002) Clustering and performance; the case of maritime clustering in the Netherlands. *Maritime Policy and Management* 29(3): 209–21.
- Langen, P. W. de (2004) The performance of port clusters; a framework to analyze cluster performance and an application to the port clusters of Durban, Rotterdam and the Lower Mississippi. PhD thesis, Erasmus University Rotterdam. ERIM and TRAIL thesis series.
- Langen, P. W. de (2008) Analysing training and education in ports. *WMU Journal of Maritime Affairs* 7(1): 5–16.
- Langen, P. W. de and A. A. Pallis (2006) Analysis of the benefits of intra-port competition. *International Journal of Transport Economics* 33(1): 69–86.
- Langen, P. W. de and E. J. Visser (2005) Collective action regimes in port clusters: the case of the Lower Mississippi port cluster. *Journal of Transport Geography* 13: 173–86.
- Maskell, P. (2001) Toward a knowledge-based theory of the geographical cluster. *Industrial and Corporate Change* 10(4): 921–43.
- Mathys, C. (2009) Economisch belang van de Belgische havens: Vlaamse zeehavens, Luiks havencomplex en haven van Brussel – Verslag 2007. Working Paper 172, Nationale Bank van België (National Bank of Belgium), Brussels.
- McKendrick, D. G., G. F. Donner and S. Haggard (2000) *From Silicon Valley to Singapore: Location and Competitive Advantage in the Hard Disk Drive Industry*. Stanford, CA: Stanford University Press.
- Musso, E. and H. Ghiara (2008) *Ports and Regional Economies*. Milan: McGraw-Hill.
- Nadvi, K. (1999) Collective efficiency and collective failure: the response of the Sialkot surgical instrument cluster to global quality pressures. *World Development* 27(9): 1605–26.
- Notteboom, T., Ducruet, C. and de Langen, P. (2009) *Ports in Proximity: Competition and Coordination among Adjacent Seaports*. Aldershot: Ashgate.
- Notteboom, T. and J. P. Rodrigue (2005) Port regionalization: towards a new phase in port development. *Maritime Policy and Management* 32(3): 297–313.
- Pallis, A. A., T. K. Vitsounis and P. W. de Langen (2010) Port economics, policy and management: review of an emerging research field. *Transport Reviews* 30(1): 115–61.

- People's Daily Online (2008) Hebei to build world largest coal export port cluster. February 29. <http://english.peopledaily.com.cn/90001/90776/90884/6363571.html>.
- Porter, M. (1998) *The Competitive Advantage of Nations*. 2nd rev. edn. London: Macmillan.
- Porter, M. (2000) Location, competition, and economic development: local clusters in a global economy. *Economic Development Quarterly* 14(1): 15–34.
- Porter, M. (project leader) (2010) Cluster Profiles website of the Institute for Strategy and Competitiveness at Harvard Business School. <http://data.isc.hbs.edu/cp/index.jsp>.
- Port of Valencia (2009) El cluster portuario de Valencia port liderado por la Autoridad Portuaria, elegido "Best in class" por el Global Institute of Logistics. Press release, 16 June. www.valenciaport.com/SiteCollectionDocuments/cultures/es-ES/Documentos/News/APV%20nombrada%20Best%20In%20Class.pdf.
- Robinson, R. (2002) Ports as elements in value-driven chain systems: the new paradigm. *Maritime Policy and Management* 29(3): 241–55.
- Roh, H. S., C. Lalwani and M. M. Naim (2007) Modelling a port logistics process using the structured analysis and design technique. *International Journal of Logistics* 10(3): 283–302.
- Steinle, C. and H. Schiele (2002) When do industries cluster? A proposal on how to assess an industry's propensity to concentrate at a single region or nation. *Research Policy* 31: 849–58.
- UNESCAP Transport Division (2007) *Logistics Sector Developments: Planning Models for Enterprises and Logistics Clusters*. New York: United Nations. www.unescap.org/publications/detail.asp?id=1257.
- Verbeke, A. and M. Doooms (2007) Long-term strategic port planning: integrating the extended gateway concept: an application to the port of Antwerp. Presented at Calgary Asia-Pacific Gateway and Corridor Round Table; Prairie Canada/Western Canada in the Emerging Asia-Pacific Gateway. Calgary, March 28–9, 2007.
- VIL (2006) Jaarverslag 2005 [Annual report]. Vlaams Instituut voor de Logistiek (Flemish Institute for Logistics), Antwerp.
- Yin, R. (1984) *Case Study Research: Design and Methods*. 1st edn. Beverly Hills, CA: Sage.
- Zodrow, G. R. and P. Mieszkowski (1986) Pigou, Tiebout, property taxation, and the under-provision of local public goods *Journal of Urban Economics* 19(3): 356–70.

Further Reading

- Langen, P. W. de and M. H. Nijdam (2009) A best practice in cross-border cooperation: Copenhagen Port. In T. Notteboom, C. (eds.), *Ports in Proximity: Competition and Coordination among Adjacent Ports*, pp. 163–74. Aldershot: Ashgate.