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**THE BLUE DENMARK VERSUS THE DUTCH MARITIME CLUSTER: A
FRAMEWORK FOR COMPARING (SIMILAR) CLUSTERS IN DIFFERENT
COUNTRIES**

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Abstract

The industry cluster approach has become the cornerstone in European maritime policy, with important work being carried out by the European Commission, national governments, maritime authorities, key maritime organizations and even individual firms. It has become the main maritime policy tool in many member states and an important part of maritime policies in other parts of the world. Recently, there have been enquiries to promote a “continent wide cluster” view on the European maritime industry and efforts at defining a “European Maritime Cluster”, which is seen as important for economic development (competitiveness, innovation and growth) as well as for encountering the potential social and environmental hazards related to the maritime industry. Through a comparative-historical case study of the maritime clusters in Denmark and the Netherlands the present paper argues that a focus on a “continent wide” or “European” maritime cluster is problematic, since with overly broad conceptualizations we miss out on a range of important subtleties and dynamics taking place at less aggregate spatial levels. As such, “the European maritime cluster” might be an analytically useful umbrella concept at best. At worst, it may prove a poor basis for maritime policy.

Introduction

Europe has substantial maritime industries with most member states engaged one way or the other in maritime activities. Over the past three decades, the European Commission has gradually built up a shared maritime policy for its member states. Until the late 1960s shipping was considered a member state issue only, but with the joining of the EEC by UK, Ireland and Denmark in 1973 there was a change in attitude towards including shipping in the EC legislative framework. It took more than a decade after that before the EC got involved in maritime affairs in any systematic and meaningful way. This happened with the Four Council Regulations of 1986, which later came to be known as “The First Package”. From that time onwards, EC involvement in this area has grown significantly and there are now strong efforts aimed at an integrated European policy for the multi-faceted maritime sector.

In recent years, the European Commission has focused increasingly on industry clusters as a tool for competitiveness in the maritime and other areas. An industry cluster refers to a geographic concentration of interconnected companies within a particular field and includes specialized suppliers, distribution channels and customer, producers of complementary products, companies related in terms of competence, technology or common inputs, and related associations and supporting institutions (Porter 1998). Central actors behind the integrated maritime policy of have suggested that the maritime sector in Europe would benefit from looking at itself as a continent wide cluster, thus echoing Porter’s (1998) claim that clusters can be found at almost any geographical level. Indeed, a central aspect of the integrated policy is to develop what is referred to as “the European maritime cluster”. As one observer puts it, “Maritime sectors are all part of a big maritime cluster. Such local, national and European networks of interrelated maritime companies and institutions are able to increase the competitiveness within the global economy” (Wijnolst 2006b, p. 120). This viewpoint is now a cornerstone in the new European maritime policy (“An Integrated Maritime Policy for the European Union”), which was published on October 10, 2007 (CEC 2007).

The new European maritime policy brings together the many interrelated maritime sectors and activities and treats them as a whole. It endorses a so-called holistic view and requires that maritime policy is inherently inter-sectoral, rather than simply a collection of vertical policies for each of the many different maritime industries. The impetus behind this new “integrated maritime policy” has been the recognition that, as a result of climate change, marine environment degradation, globalization, technological development and new scientific discoveries, Europe’s relationship with the oceans and seas is rapidly changing. Its key objective is to maintain a competitive and environmentally sustainable maritime industry, which is translated into the question of how to promote and reinforce the competitiveness of the European maritime cluster (Wijnolst 2006b). The action programme has been set by introducing seven *cluster process enablers* (or, indeed, a seven step recipe), which form the basic building blocks for the formulation of maritime policies at the national and European level (Wijnolst et al. 2003, Wijnolst 2006a): 1) define the cluster, establish its significance and promote visibility; 2) define an industrial/economic policy and vision of the future; 3) strengthen demand pull sectors within the cluster; 4) monitor and maintain a level playing field; 5) promote exports and internationalization; 6) strengthen

innovation, R&D and leader firms; and 7) strengthen maritime education and labor markets.

The first step would be to develop a common EU standard of maritime sector and cluster definitions (Wijnolst et al. 2003). Denmark, France, Germany, Italy, the Netherlands, Norway and The United Kingdom have already adopted cluster thinking in their national shipping strategies and maritime policies, but they have used somewhat different definitions of their maritime sectors and clusters. One study on the economic impact of European maritime industries, commissioned by the European Commission, identified the European maritime cluster as being composed of ten interdependent sectors and highlighted its importance for the European economy. In November 2005 a *European Network of Maritime Clusters* (ENMC) was founded in Paris by central maritime organizations in Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Poland, Sweden and The United Kingdom and later joined by Spain.¹ At its third roundtable, held at the UK Chamber of Shipping in London in September 2006, the network made its first joint effort at defining a European maritime cluster. In solving “the definition puzzle” analysts have now decided on a harmonization on the basis of normal industrial classification and in their proposal for a common standard for the European maritime cluster listed seventeen four digit NACE codes, covering a total of eleven maritime industries (Peeters and Webers 2006). It is acknowledged that this standard can result in the loss of detailed information on individual member states and the problem is noticed that the match between NACE classifications and actual maritime industries is imperfect. The standard is still preferred, however, as it will make statistics for the EU-25 become more comparable.

By adopting a comparative case study approach the present paper challenges the feasibility of such European maritime sector and cluster definitions. The real question is not how big the maritime industry in Europe is, or how it compares across individual member states. Rather, it is about how we can understand its dynamics, which build significantly on differences across the states and the complex division of labor between them. In this light, the paper aims at developing a framework for comparing similar clusters in different countries, which is sensitive to their subtle but essential differences in structural composition and evolutionary dynamics. In particular, it focuses more on the micro-foundations of clusters than on cluster composition per se. An important aim should be to characterize the different sources of cluster-based dynamics and competitive advantages across different geographical or sectoral clusters and over time. Such a framework would function as an alternative to a descriptive common standard based on traditional industry classification. For one thing, the framework questions the notion of a continent wide maritime cluster. With overly broad conceptualizations we miss out on a range of important subtleties and dynamics taking place at less aggregate levels. The strategy implications are straightforward: to the extent European maritime clusters differ the way to endorse their development is likely to differ as well. The framework also challenges the one-dimensional focus on the economic significance of clusters, which is consistent with a cluster conception based on industry classifications.

¹ The purpose of the network is to promote and strengthen the maritime clusters of individual member states as well as of Europe as a whole. The participants cooperate on a voluntary basis for issues related to their national agendas, and in a more structured way for actions at the European level.

Maritime Clustering in Denmark and the Netherlands

The present article compares the Danish and the Dutch maritime clusters. Denmark and the Netherlands are both small open economies, but they are also highly competitive maritime nations with a long history in trade and the exploitation of the sea for commercial purposes. Both were among the first European countries to endorse cluster thinking in relation to their shipping policies.² In Denmark the Danish maritime cluster, nicknamed “the Blue Denmark”, entered the political agenda in the late-1980s, whereas the Dutch maritime cluster became the emphasis in Dutch shipping policy in the mid-1990s. In 1994, a study on the future of the Dutch shipping industry commissioned by the Ministry of Transport, Public Works and Water Management was published (Peeters et al. 1994). This study for the first time approached the shipping industry from a broader angle, highlighting the economic importance of onshore maritime activities and thus bringing to the fore in Dutch maritime policy strong points in a number of maritime industries in the Netherlands. One result was the establishment in 1997 of “The Dutch Maritime Network” – a formal organization set up with the explicit aim “to promote and reinforce the Dutch Maritime Cluster” (Janssens 2006).

The Blue Denmark

The Blue Denmark is built essentially around the shipping and maritime services industries, which exhibit strong preferential direct and indirect trade linkages with each other. Around these two industries there is a direct and close network of supplying and using industries. The Blue Denmark is a national cluster in the sense that there is important interfirm coordination and sharing of knowledge and information across maritime companies throughout Denmark (Sornn-Friese 2003) and in the sense that the Danish government has adopted a national maritime cluster policy (Ketels 2004). The Blue Denmark is one of twelve “national competence clusters”, which are internationally highly competitive and provide for a substantial part of value added to the Danish economy.³ Nevertheless, there is regional clustering of maritime activities in Denmark (see Figure 1). There is a concentration of shipowners in and around Copenhagen, some of which are fierce competitors while at the same time collaborating closely on certain issues such as attracting young people to the industry, communicating with the maritime authorities (which are also located in Copenhagen), defining the standards for social and environmental industry regulation and promoting Copenhagen as a leading centre for world shipping. A host of various types of maritime companies have been founded in the greater Copenhagen area to serve and to benefit from geographical proximity to the shipowners. Some of these go as far back in history as

In the region surrounding the seaport of Esbjerg in the south of the peninsula of Jutland there is a similar concentration of maritime companies catering to the needs and requirements of the North Sea offshore oil and gas extraction industry. This regional cluster encompasses between 50 to 75 companies and has hitherto been dominated by

² More generally, both countries have a strong tradition of employing clusters in their national economic policy (Ketels 2004).

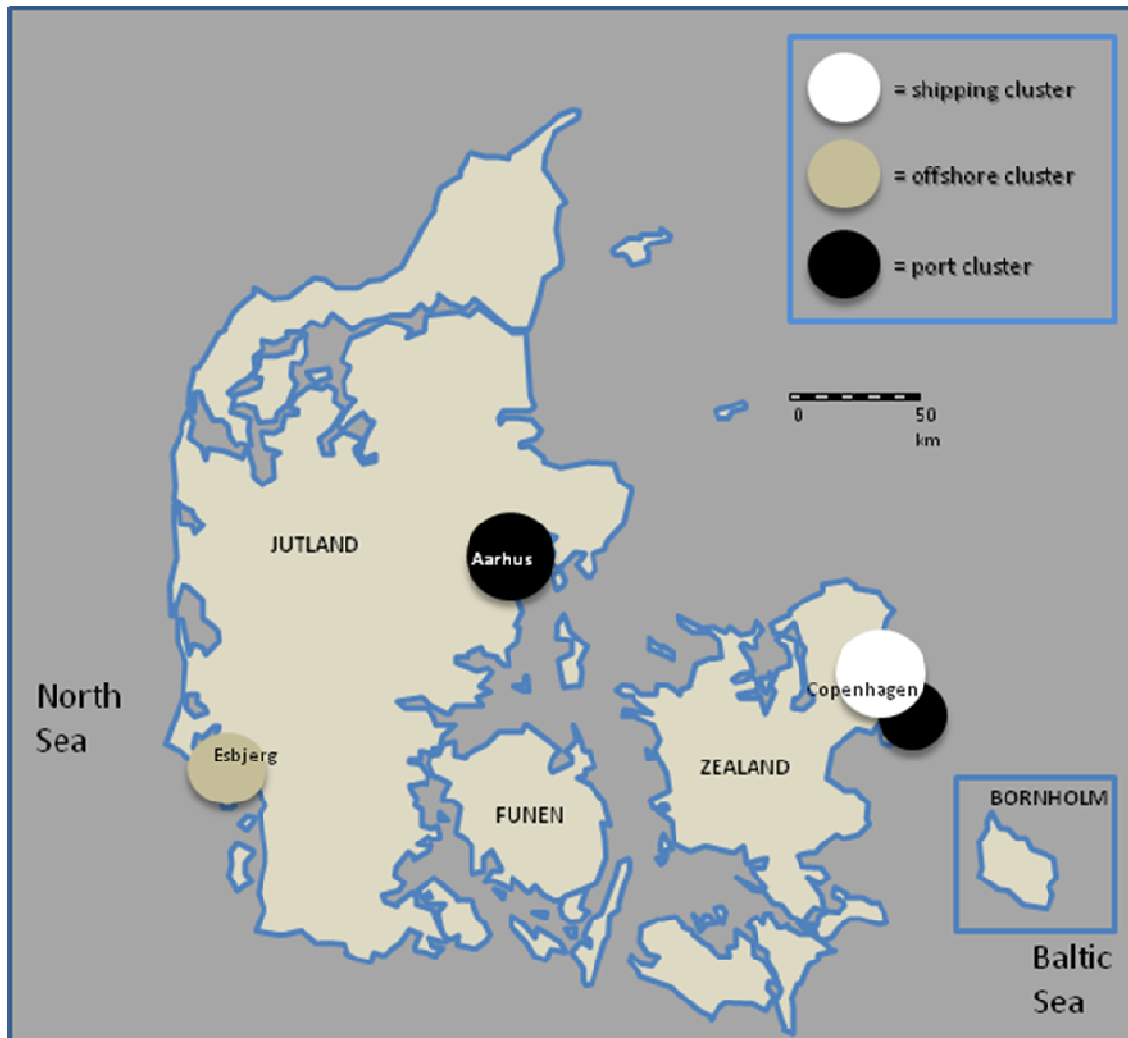
³ The other national competence clusters are those for the windmill industry, the hearing aids industry, the handicap industry, the power electronics industry, the seeds growing industry, the fur industry, the water industry, the cooling and heating technology industry, the pork industry, and the dairy products industry (pls. visit the Ministry of Science, Technology and Innovation at <http://videnskabsministeriet.dk>).

the A. P. Moeller-Maersk subsidiary, Maersk Oil and Gas, which operates fifteen of the total of nineteen fields in the Danish part of the North Sea.

With about 130 traffic ports and a number of fishing ports, Denmark has a rapidly growing port sector (in the Danish maritime cluster policy this sector is still included in the broader maritime services sector). After the inauguration on June 1 2000 of the Öresund Bridge, which physically connects Denmark and Sweden, Copenhagen has greatly expanded its port activities in collaboration with the Swedes, thus turning the combined Copenhagen-Malmö port into a central hub for the increasing traffic between Central Europe and Scandinavia. Furthermore, the combined port has obtained leadership in the northern European cruise market. Significant expansion has also taken place at Aarhus Port, on the east coast of the peninsula of Jutland, which is the leading container port in Denmark. Both the Copenhagen-Malmö port and the port at Aarhus have significant clustering of companies in various maritime industries.

It should also be mentioned that the NorCOM wireless communications cluster in the north of Jutland emerged in the mid-1960s with a number of world leading producers of maritime communications and navigation equipment (Dalum 1995, Dalum et al. 2005). It has since then developed into a more general radio and telecommunications cluster, consisting of about fifty firms, a science park, and Aalborg University and with maritime communication occupying only a minor part.

Figure 1. Regional Maritime Clusters in Denmark



The cluster comprises ten maritime sectors. Shipping, maritime services, ports, shipbuilding, marine equipment and offshore oil and gas extraction constitute the core of the cluster, whereas offshore wind energy, commercial fishing, maritime recreation and the Royal Danish Navy (RDN) are considered secondary sectors.⁴ The cluster was first popularized in 1987 by the President of the Danish Shipowners' Association, Mr. Knud Pontoppidan, who argued that a passive Danish maritime policy would have consequences not only for the shipping industry but also for the entire maritime cluster, including the shipyards, the specialized sub-suppliers and maritime research units.⁵ He even nicknamed the cluster "the Blue Denmark".

Most importantly, the cluster revolves around the shipping industry, which is one of the largest export industries in Denmark. Danish shipowners control about seven percent of the world's merchant fleet and they carry almost ten percent of world seaborne trade (Danish Maritime Authority 2007). Together they operate a merchant

⁴ The Navy is important to the cluster in the sense that it purchases ships and maintenance and repair services, engages in various supplier and vendor relationships within the cluster, and operates a broad range of educational curricula with relevance to the cluster (e.g., by raising quality and setting standards).

⁵ *Morgenavisen Jyllands-Posten*, September 30, 1987 ("Nyt dansk skibsregister vil stoppe tonnageflugten"). Mr. Pontoppidan claimed that the Blue Denmark counted 45,000 employees endangered by fierce competition and the high level of costs in Denmark.

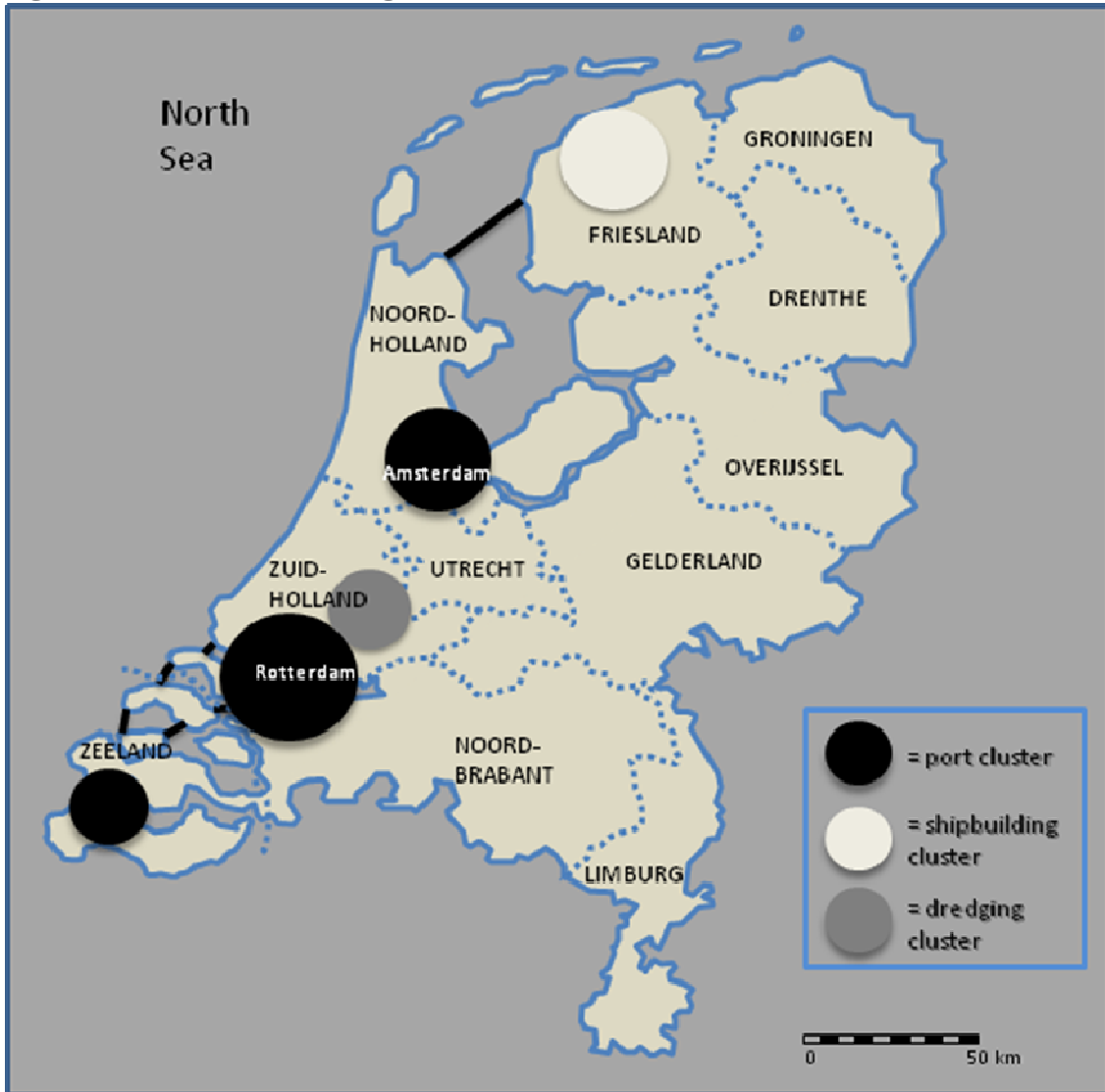
fleet of about fifty million dwt. According to figures from Lloyd's Register Fairplay this makes Denmark the seventh largest shipping nation in the world following closely after South Korea, The United States, Great Britain and Singapore and greatly behind China and Greece. When measured in terms of commercially operated fleet, the Netherlands enters as the twentieth largest shipping nation in the world. Danish shipowners operate a fleet of container, tanker and bulk vessels whose operations encompass a wide aspect of maritime activities: shipbuilding, warehousing, storage, logistics, container port operations, specialized product carrier services, some cable-laying, salvage and offshore supply services, traditional bulk, tanker trade, general cargo, heavy lift, reefer activities, offshore drilling and production, and roll-on/roll-off and some passenger traffic. In recent years the trading of ships has also become a characteristic activity of several Danish shipping companies. The Danish shipping industry has maintained its competitive edge by drastically expanding its fleet, investing in technologically advanced vessels, employing highly skilled people and building upon the highly specialized and proficient maritime know-how that has developed in concord with longstanding Danish maritime traditions. The industry has about two hundred companies, but is dominated by a few large and internationally competitive shipping companies, all of which were founded at the time of the birth of the modern Danish shipping industry from around 1870.

Maritime services is a diverse industry that consists of consultancy; naval architects; insurance and finance; ship chandlers; ship broking, dispatch and chartering; piloting; classification; training and education; rescue and towing; legal counseling; maritime agencies; stevedore and cargo handling, port administration; warehousing and terminal operations. Denmark has a long and important history of *shipbuilding*, going back at least a thousand years. Throughout its history the industry, while not strictly a vehicle in Danish industrialization, has been vital for the Danish economy and historically, there has been a shipyard in most Danish seaports. Very few ships are being built in Denmark today. The Danish shipbuilding industry has experienced a dramatic decline in orders for new ships over the past three decades, with the result that many formerly strong Danish shipyards have had to close down. Today only a single major new-building shipyard exists in Denmark; namely the A. P. Moller Maersk subsidiary Odense Steel Shipyard (a.k.a. the Lindø Yard). A number of small and medium-sized Danish shipyards focus on small niche markets, mainly within conversion and repair and with some new-building activities on a small scale. *Marine equipment* is a growing sector in Denmark and includes multiple and typically highly specialized industries. It includes companies that produce equipment for ships, drills, port and other maritime activity (such as, engines; compressors; control, measuring and navigation equipment; life-saving equipment; maritime communication equipment; boilers, fittings, cables and screws; containers; a number of textile and plastic products; inks and paints; and chemicals). *Oil and gas* production in Denmark started in 1972 and is now well established with activities offshore and onshore. The industry purchases a number of commodities and services from maritime and related sectors, including shipping services, bridges, accommodation equipment, alarm systems, buoyancy units and float elements, pumps, engineering, supervision, containers, control systems, cranes, engines, fabricators and platforms, filters, towers, hydraulic cylinders, maintenance and repair, pipe handling equipment, propeller systems, propulsion packages, purifiers and rigs and ships.

The Dutch Maritime Cluster

The Dutch Maritime Cluster is described as “probably the most complete maritime cluster”. A formal organization, The Dutch Maritime Network, has existed since 1997 with the explicit purpose of promoting and reinforcing the cluster (Janssens 2006). Like the Blue Denmark it is promoted as a national cluster, but also in the Netherlands there are clear regional concentrations of maritime activities (see Figure 2), several of which constitute sub-clusters, or, “cliques” (Langen 2002).

Figure 2. Maritime clustering in the Netherlands



Source: Inspired by Langen (2002)

The Netherlands is famous for its main seaports of Rotterdam and Amsterdam, each of which constitutes a regional maritime sub-cluster. There is also an important Zeeland Seaports cluster around the ports of Vlissingen-Oost and Terneuzen between the western Scheldt River and the North Sea in the southwestern Netherlands. In the northern region of Frisia there is a clear concentration of maritime companies such as shipyards, ship owners, marine equipment suppliers, the Central Industry Group (which

offers specialized industrial and engineering services to shipyards), ship financing companies and other maritime service companies. These firms interact with a number of local maritime organizations and supporting institutions such as education and maritime knowledge centers. Together, these firms and organizations constitute a maritime sub-cluster centered on shipbuilding (see Klink and Langen 2001). Finally, several of the world's leading dredging companies are located in the area around Rotterdam and Delft. Together with a number of associations and supporting institutions – including the Central Dredging Association (CEDA), the International Association of Dredging Companies (IADC), Delft Technical University, the Delft Geotechnical Lab, the Delft Hydraulics Lab, the Public Works Department, the Rijkwaterstaat agency under the Dutch Ministry of Transportation and Water Management, and the Harbor Division of the Municipality of Rotterdam – they make up a local maritime sub-cluster.

According to a number of studies carried out by the Dutch Maritime Network, the Dutch maritime cluster comprises 11 broad maritime sectors, including inland shipping, shipping, ports, maritime services, shipbuilding, marine equipment, yachting, fishing, dredging, offshore oil and gas extraction, and the Royal Navy (Peeters et al. 1994, 1999a, 1999b, Wijnolst et al. 2003, Wijnolst 2006). In terms of value added it builds significantly around the ports and the offshore sectors. Central in the cluster, however, are the shipbuilding, marine equipment and maritime services sectors, as these have pecuniary linkages to all the other sectors in the cluster. In general, some of the sectors are closely interwoven, whereas others (the navy and the fishing industry) are more stand-alone (Langen 2002).

The seaport of Rotterdam is situated at the delta of the rivers Rhine and Meuse, which are the most important inland waterways in Europe, and it serves a large hinterland, including parts of Austria, Germany and Switzerland. Covering more than 100 square kilometers, it is the largest seaport in Europe. Until recently it was the busiest port in the world, rivaled only by the ports of Singapore and Shanghai.

Denmark	The Netherlands
Shipping	Shipping
Shipbuilding	Shipbuilding
Marine equipment	Marine equipment
Maritime Services	Maritime services
Offshore	Offshore
Fishing	Fishing
Maritime recreation	Yachting and water sports
Royal Danish Navy	Royal Navy
	Inland shipping
	Dredging
	Ports

Table 1 summarizes the composition of the two maritime clusters. They are clearly very similar in terms of composition, but there are also important differences. Proponents of a continent-wide European maritime cluster endorse the similarities between the maritime clusters of different member states and highlight these for the biased purpose of getting the political attention that is perceived necessary to sustaining the competitiveness and development of European maritime industries, while the historically evolved differences are in fact the more important if we are to fully understand the dynamics of the industries. To flesh out the important dynamics the

following sections present detailed case studies of the two clusters, paying close attention to their peculiar historical paths.

The Development of the Dutch Maritime Cluster

Pinpointing the events of history that have led to the maritime clusters of Denmark and the Netherlands is not easy. Even in the case of Silicon Valley, which is probably the most intensely studied of all clusters, there is disagreement as to its beginning (Wolfe and Gertler 2003).⁶ While the genesis of the present Dutch maritime cluster in important ways traces to the years immediately after the Second World War and the Blue Denmark dates back at least to the 1910s, both build on structures and capabilities that go back much further. The Danes were famous seafarers even before the Viking Age and the Dutch had navigated the inland waterways of Northern Europe for many centuries, but essentially both countries expanded greatly as maritime nations by the seventeenth century. In its “golden age”, which lasted throughout the seventeenth century, the Netherlands was the largest shipping nation in the world. In this period, the Dutch promoted trade with West Africa and the East Indies, breaking into what had previously been especially Portuguese terrain. Owing particularly to the strength of the United East India Company (VOC), the Dutch soon dominated the East Indies trade and became the prevailing colonial power in East Asia. Inspired by the achievements of the Dutch, and copying the organizational innovations introduced by the VOC, the Danes started to compete in the East India trade and so became the sixth European nation to sail to East Asia and establish colonies. Danish colonies were significantly smaller than the Dutch, among other things because the Danes did not wish to engage in costly wars to conquer more land, but they were nevertheless economically and strategically important to Denmark.

Both the Dutch and the Danes were to eventually lose out to other European maritime nations, but the early maritime history of the two countries has formed a basis for maritime competence that extends to the present day.

Early Maritime History

The Dutch had prospered greatly from cross-trade between the Baltic Sea and the Iberian Peninsula (Spain and Portugal). The dominant factor in the development of the Baltic Sea trade had been the appearance and abundance of King Herring around the Danish ruled Swedish peninsula of Scania. The Hanseatic League – a powerful network of towns that stretched across the Netherlands, Germany, Belgium, the Baltic States, Norway and Poland – had taken the leading place in the Baltic Sea trade and attained predominance. Rival merchants could only get direct access to the Baltic Sea by permission granted by the league, and only within restricted limits. However, the northern Dutch towns, and foremost among these Amsterdam, managed to join in on the profitable trade by sailing the long way around the Danish peninsula of Jutland and east

⁶ Most attribute the emergence of Silicon Valley to William Shockley moving to California and establishing his semiconductor company in 1956 and the subsequent spin-off into the Fairchild Semiconductor Company. Others argue that the roots of the cluster should be dated back to the foundation of the Federal Telegraph Company in 1909.

down through the Sound. The invention of the flute ship (*Hollandse Fluyt*) in 1595 in the harbor town Hoorn just north of Amsterdam allowed them to do so cost effectively.⁷

Two major events in the later sixteenth century would lead to the rise of Amsterdam to a leading position: firstly, when the Hanseatic League collapsed the Baltic Sea trade continued to flourish through the towns that had stayed outside the league, and secondly, with the sacking of Antwerp by Spanish troops in 1585 a leading revival to the Dutch was fated. With Amsterdam and Rotterdam as natural entrepôts for the produce of Central Europe, the Dutch attained monopoly of the supply of salt fish, which provided a bulky export in huge demand. During the seventeenth and eighteenth century, this monopoly gave outward cargoes for a great number of Dutch ships, allowed for the finance of homebound cargoes of goods both for domestic consumption and for re-export, and secured cargoes for Dutch vessels in the cross-trades (Fayle 1933). Amsterdam became the key trade centre in Northern Europe, with a growing and prosperous mercantile community. To service this community and sustain its international trade, new trades such as banking, stock exchange, insurance, printing and cartography developed, making Amsterdam the centre of what has been termed Holland's Golden Cluster (Nootboom and Constandse 1995). Shipping, shipbuilding and other maritime industries developed at an astounding rate. Along the river Zaan an important shipbuilding industry grew up, producing sea-going vessels mainly for the Amsterdam merchants. In 1600 no ships were built in that area, but around 1700 annual production was regularly as high as 200 ships (Unger 1975). Dredging companies emerged to drain the lakes of the Northern Netherlands and construct canals. Financial services developed too, making it possible to finance a growing number of pioneering but risky deep sea expeditions to the Far East at the end of the sixteenth century.

There were even greater profits to be earned on the ocean routes, and supremacy in the European trades supplied the Dutch the shipping, seamen, and capital necessary for the exploitation of these routes (Fayle 1933). By the end of the 1500s Dutch merchants explored the profitable oriental trade, importing silks, tin, spices and more from such remote places as India, the East Indies (now Indonesia), Malaysia, China and Japan. These goods were then re-exported at great profits in Europe. To share the financial risks and reduce the dangers of these voyages the merchants cooperated in small syndicates known as *Compagnie's*. In 1602 the States-General of the Netherlands proposed the merging of all the mercantile interests of the Northern Netherlands and by the granting of a 21-year monopoly to carry out colonial activities in Asia thus lead to the creation of the United East India Company (VOC). It was essentially a joint venture of six harbor towns led by Amsterdam (the other towns were Delft, Enkhuizen, Hoorn, Middelburg and Rotterdam) and governed by a body called the Seventeen Lords.⁸ It was granted a state charter, which included the ability to form an army, wage war, negotiate treaties, coin money and establish colonies (Ames 2007). The VOC established a local branch in Batavia (the present day Djakarta), marking the beginning of a strong Dutch colonial regime that would control the profitable trade with "round voyages" between

⁷ The first Dutch flute ship was an adaptation to the specifics of the Baltic Sea trade: since the Sound Toll collected by the Danish king was calculated in relation to the size of the deck, the flute was built with a relatively small deck and a bulky trunk. The growing competitiveness of the Dutch merchant marine resulted to a large extent from innovation in shipbuilding (Vries and Woude 1997). In fact, the fluyt was so effective for bulk carriage that it soon became the most preferred common cargo carrier in Europe.

⁸ At that time, the public administration of The Netherlands was decentralized by town and with merchants dominating town councils.

Europe and the Far East. The Dutch were able to obtain monopoly status in a number of East Asian Islands and nations, the most prominent of which were Japan.

The Netherlands experienced evident maritime industrial decline in the 18th century when it was overshadowed by the expanding maritime power of Great Britain, who remained the world's leading shipping nation well into the 20th century. Already in the seventeenth century, British merchants became serious competitors with the Dutch in seaborne trade. The riches of British merchants grew and seaborne trade became a vital national interest. Through a series of protectionist shipping laws (the Navigation Acts) the British Parliament sought to exclude the Dutch from many of its formerly controlled trades. The passing of the laws coincided with the starting decline in Dutch maritime supremacy and was, according to Johnsen (1949), the direct cause for the progress of British shipping from the second half of the seventeenth century.⁹ It has been noticed, however, that the reason for the decline in Dutch maritime supremacy owed more to the long series of exhausting wars in which the Netherlands engaged than it did to the passing of the British navigation laws (Fayle 1933).

While Great Britain gradually took over as the leading European maritime nation, the merchant fleet of the kingdom of Denmark-Norway also did well. During the seventeenth century Denmark had established a number of small, but nevertheless economically and strategically significant colonies in the West Indies (the present US Virgin Islands), India, and along the Guinea coast in West Africa. Danish merchant shipping developed into two major systems (not counting the North Atlantic interests): the East-India trade, going from Denmark around Africa to East Asia, and the Guinea-West Indies trade. The latter became known as the Triangle trade: Danish merchants would charter a ship and load it with goods to be sold in the Danish Guinea for slaves, who were then taken to the Danish West Indies to be sold as workers in the manufacture of especially rum and sugar, which was then shipped back to Denmark. After 1730 the Cantons in China became Danish colony and soon became more profitable than the Indian possessions. From China, the Danes imported tea, silk and porcelain.

Denmark expanded its maritime stronghold during the second half of the eighteenth century and the capital city Copenhagen became a thriving trade centre, especially for the sugar and coffee trade in Europe. Besides from the small overseas colonies, the kingdom included three major provinces (Denmark proper, Norway and the two duchies Schleswig and Holstein in the Danish-German border region south of Jutland) and the North Atlantic territories in Iceland, Greenland, and the Faroe Islands. Danish international trade had a special structure (Johansen 1992): most of the exports came out of Norway (bulky articles such as fish, timber and iron), while Copenhagen and the duchies were the main importers. Copenhagen also had a mushrooming re-export to the various Baltic ports of luxury goods, wine and fruits imported from mainland Europe. Danish trade at the time involved short sea as well as deep sea shipping. While Danish short sea shipping was operated by an expanding provincial merchant fleet, the Copenhagen-based merchant fleet was focused on distant ports in Western Europe, the Mediterranean, the North Atlantic, and overseas ports in the West Indies and East Asia. Besides from shipping, Copenhagen had a significant maritime activity (Poulsen 2008). Various maritime services, the manufacture of marine equipment such as sails, flags and compasses, and the building and repair of ships

⁹ According to Israel (1989), Dutch supremacy in world trade peaked around 1670. From around the 1720s overall Dutch leverage in world trade was considerably weakened.

flourished in Copenhagen, which was also home to the Royal Danish Navy and several naval shipyards.

The wars between Denmark and England (1801-1807, 1814), an offshoot of the Napoleonic wars, put an end to the primarily Copenhagen-based maritime strength and furthermore separated Norway from the kingdom. It was not until late in the nineteenth century that a more liberal system in international shipping enabled the Danes to regain the same relative importance in European shipping (Johansen 1992).

The Emergence of Modern Maritime Industry

The modern shipping industry was born with the invention of the steel steamship in the period from the mid-1860s until around the turn of the 20th century. At that time, London had replaced Amsterdam as the main centre of world shipping. The competition among maritime nations was carried on by peaceful means and in an open field and was based on economic efficiency and rate-cutting (Fayle 1933). The mid-nineteenth century was a period of commencing Danish industrialization and – in comparison to other European countries – exceptional economic growth and it also marked the birth of the modern Danish shipping industry. Short sea shipping was the primary activity of Danish shipowners, especially in the Baltic and the North Sea. The fierce competition in these trades led to the establishment of the Baltic and White Sea Conference, through which the shipowners agreed on minimum freight rate levels and the contractual terms of trade in the Baltic Region. It later changed its name to the Baltic and International Maritime Conference (BIMCO).¹⁰

Chief pioneers in the modern Danish shipping industry were companies such as the United Steamship Company (DFDS) founded in 1866, the Steamship Company Norden founded in 1871, J. Lauritzen founded in 1895, the Steamship Company Torm founded in 1889, the East-Asiatic Company (EAC) founded in 1897 and, of course, the two companies founded by Mr. A. P. Møller, which later became the shipping company Maersk Line (a part of the conglomerate A. P. Moeller-Maersk Group): the Steamship Company Svendborg founded in 1904 and the Steamship Company of 1912 founded in 1912. Except from the EAC, which liquidated all its shipping activities in the early 1990s, these companies have dominated Danish shipping until the present day.

This was also the period when the first Danish shipowners entered into liner shipping. Before the advent of the steel steamship the global shipping market had been a unified one, but from around 1870 the shipping industry started developing along two lines in which tramp shipping would be distinguished from liner shipping (Harlaftis and Theotokas 2002). Liner ships carried general cargoes (finished and semi-finished manufactured goods) in regular traffic along fixed routes and tramp shipping carried bulk cargoes (such as coal, grain, ore, oil and fertilizers), trading on the spot market with no fixed schedule or published ports-of-call. The activity of the Danish owned steamship *Helge* in 1870, according to Møller (1998), illustrates Danish tramp shipping around that time very well. In the beginning of the year, the *S/S Helge* lay in the port of Rotterdam where it had discharged a load of grain from Danzig. During the rest of 1870, its navigation was as follows (outward bound loads in parenthesis):

¹⁰ Today, BIMCO is an international organization, headquartered in Copenhagen but open to ship owners from around the world.

Rotterdam (empty) – Newcastle (coal) – Danzig (grain) – Hull (empty) – Newcastle (coal) – Elsinore (empty) – Helsingborg (oats) – London (empty) – Newcastle (coal) – Copenhagen (empty) – Königsberg (grain) – Rotterdam (empty) – Newcastle (coal) – Copenhagen (empty) – Königsberg (grain, flax) – Dunkirk (empty) – Archangel (linseed) – Hull (empty) – Newcastle (coal) – Copenhagen (empty) – Königsberg (oats) – Le Havre (empty) – Newcastle (coal) – Copenhagen (empty) – Kronstadt (wheat) – Leith (empty) – Granton (iron, coal) – Kronstadt (wheat) – Leith (empty) – Granton (coal) – Königsberg (wheat) – Antwerp (empty) – Newcastle (coal) – Stetting (empty) – Danzig (grain) – Rotterdam (empty) – Ystad (barley).

From around the 1870s to the 1940s liner and tramp shipping were not always clearly defined as they could substitute for each other, but their organization was markedly different with liner shipping being characterized by oligopoly and protectionism and tramp shipping by close to perfect competition. Thingvalla Line commenced overseas liner services as early as 1880. In 1898 this company was absorbed by DFDS, but its ships continued their services under the name Scandinavian-American Line. DFDS established regular short sea liner services between Copenhagen and Vejle and between Esbjerg and Harwich in Great Britain; the East-Asiatic Company established its first regular line between Bangkok and Copenhagen in 1898 and soon expanded with lines from Europe to Australia and New Zealand; and almost thirty years later Maersk Line established services between Europe and the United States, between Europe and the Far East as well as inter-Asian lines. Mr. A. P. Møller had earlier established a line between Germany and the Middle East, but this had turned out a bad investment and was shut down. Nowadays, Danish liner shipping is synonymous with Maersk Line. Domestic short sea liner services, so-called “packet shipping”, thrived from 1890 until around 1970 (Mortensen et al. 2002).

With the opening in 1894 of the Copenhagen Free Port, the United Steamship Company inaugurated the Copenhagen-New Orleans Line, but contrary to expectations Copenhagen did not become a major international centre for liner shipping. This was one reason why Danish shipowners early on decided to focus their attention outside of Denmark and specialize as cross-traders. Among other things, this gave Danish shipping an advantage in chartering and commercial ship management, which has extended into the present day Danish shipping industry. Danish shipping companies are still cross-traders: more than 95 percent of all Danish operated seaborne trade is carried out as transshipment between foreign ports and very few Danish owned or operated ships ever at a Danish port.

By the outbreak of World War I the structure of the modern Danish shipping industry was firmly established. This was also the time when a maritime cluster emerged in Denmark as a result of Danish shipping companies’ investments in shipyards and marine equipment manufacturing. Shipbuilding started out as a response from shipping companies to lack of shipbuilding capacity in otherwise booming shipping markets. Marine equipment emerged so as to serve the major shipyards. The Great War was exceptionally prosperous for Danish ship owners. Denmark’s neutrality status made it possible for Danish ship owners to maintain control of their fleet and thus reinforce their position in global shipping. To maintain this advanced position, Danish ship owners were forced to build their own shipyards. Three major Danish shipyard specialized in steel constructions had been founded in the late 19th century (B&W, Frederikshavn Shipyard, and Elsinore Shipyard & Engine Works), but the years around the Great War saw substantial entry of new shipyards in Denmark. With the exception of B&W, they were founded and owned by Danish ship owners and vertically integrated

into the A. P. Moeller-Maersk Group, J. Lauritzen, D/S Norden, the EAC and DFDS. This laid an important foundation for the inter-industry linkages that are today the stamina of the Blue Denmark.

From around the mid-1800s the North Atlantic Ocean had become the new centre of world seaborne trade, with grains being exported from the United States to Europe. The merchants of Rotterdam were strongly represented on the North Atlantic route first through the liner shipping company Holland-America Line (HAL) and later through the liner company Nedlloyd. Once the rulers of international bulk shipping, the Dutch turned their attention mainly to the liner trades, and so did other traditional maritime nations such as Germany, France, Italy and the United States. The Scandinavian countries together with Great Britain and Greece were initially strong in the tramp trades, although many Danish shipowners, as previously discussed, soon started focusing on liner shipping.

The ports of Amsterdam and Rotterdam had been important to the expanding trading system of the Dutch merchants in the Golden Age. The foundation for their development as modern ports, however, was laid in the latter part of the nineteenth century, a period in which most northern European ports had to adapt their infrastructure, built railroad stations, construct docks and so on to accommodate dramatic changes in transport systems and commodity flows as well as innovation in ships and shipping technology. As part of their accommodation to these changes, both ports decided to dig out new access channels through the dunes to the sea. Rotterdam got connected to the sea through the New Waterway built between 1863 and 1872 (but planned as early as 1731), and Amsterdam got connected to sea first through the North Holland Canal built in 1824 and later through the North Sea Canal, which was dug out through the dunes of Breesaap between 1865 and 1876. These investments were important drivers behind the development of the ports and supported the transshipment function of the Netherlands.

By the mid-19th century Rotterdam was already one of the largest ports in world, mainly because it provided a natural entrepôt for the prosperous Dutch cross-trade between Germany and Great Britain. Through the period from around 1880 until the outbreak of the Great War, the port experienced a rapid increase in throughput and developed its function as a transit port connecting the industrial power of Great Britain with that of Germany (Laar 2003). In contrast to Amsterdam, it was able to attract increasing volumes of trade, especially of the more bulky imports, without having a large shipping industry of its own. Amsterdam depended much more on a strong locally-based shipping industry (Broeze 1996).

Dredging became a peculiar trade in the Netherlands from around the 1850s. The industry formed around leading dredgers in Rotterdam, such as Adriaan Volker Baggermaatschappij and Hollandsche Aanneming Maatschappij, which had profited greatly from the construction of the New Waterway and dredgers in Amsterdam, especially the Amsterdamse Ballast Maatschappij, which were founded for the construction of the North Sea Canal. Before that time, dredging had been a handicraft performed by an individual using simple tools such as spades, wheelbarrows, barges, and a cart (sometimes with a horse to drag it). A specific dredging tool – the mud mill – had been invented in the Netherlands in 1589, which enabled the operators to bring soft soil above water level. In the earliest days, the mud mill was powered by a treadmill driven by manpower, but from around 1620 it was improved so that horses could replace man. Around 1800 the first steam driven dredgers were constructed by Dutch

shipyards. These became the antecedent of large scale dredging, but it took about half a century before this new dredging tool had entirely replaced horse driven mills. Around 1870 dredging had become a capital intensive enterprise, and the industry consolidated into larger companies. There is direct lineage from these companies to the Van Oord, which is the leading Dutch dredging company today.

Post-World War II Developments

It is clear from the above that in the first half of the twentieth century the Netherlands had again become a strong maritime nation with leading companies in shipping, shipbuilding, ports, marine equipment, dredging and yachting. At the outbreak of the Second World War, it had one of the largest merchant fleets in the world and carried on a profitable trade with its colonies and with other countries. After the Second World War, however, the Dutch maritime industries were at the verge of extinction. During the war the Dutch merchant fleet was drastically reduced and many sailors killed. Many of its vessels had fallen victim to U-boats, bombers, and pirates in the Atlantic Ocean. The shipbuilding industry was partly dismantled as equipment and supplies had been transferred to the German occupiers. Finally, before the end of the war the Germans destroyed a major part of the Rotterdam port-infrastructure and its equipment (Molenaar 2003). Since the war the importance of the shipping industry may have gradually diminished in the Netherlands. Dutch shipowners were strong in general cargo shipping, but with the loss of the Dutch colonies after WWII the Dutch also lost the profitable cross-trading business in the Far East.

With its specialization in liner shipping the Netherlands missed out on the great opportunities following from the post-world war expansion of the bulk shipping markets and the development of the bulk carrier. Neither did the Dutch shipowners partake in the rapidly growing oil tanker shipping markets. Instead, they became strong in container shipping, and they were able to carve out lucrative niche shipping markets such as heavy lift, reefer and forest products. In the European context Dutch shipowners were among the first-movers in container shipping. The 1960s saw the majority of the leading Dutch liner shipping companies merging, eventually creating the giant liner shipping company Nedlloyd in 1970. In 1981 Nedlloyd acquired the KNSM and thus came to represent almost the entire Dutch intercontinental liner shipping industry (Driel 1992). By the late 1990s a strong concentration process was taking place within the international container shipping industry, caused by a combination of large infrastructural and cash demanding demands and the obvious need for smoothing out business fluctuations in a ways different from the old liner shipping conferences. Nedlloyd was an active player in this process. In 1996, it acquired the venerable British shipping company P&O Containers, making the new company, P&O Nedlloyd one of the largest container shipping companies in the world.

Heavy lift vessels are specially designed ships used for the transport of a wide variety of heavy or large items of cargo. The sector can be divided into a number of categories, of which the Dutch are particularly strong in offshore heavy lift operations (carrying rigs, barges, modules, drill tenders, jackets and mooring systems and so on) and maritime infrastructure heavy lift operations (carrying dredging equipment, dry docks, bridges, tunnels, cranes and so on).

The Dutch regained power in other maritime industries. The shipbuilding industry started building very large tankers and specialized vessels such as dredgers and

passenger vessels, but also simple short sea ships. The dredging industry experienced remarkable growth in the post-war period, so that today several of the world's leading dredging companies are located in the Netherlands and together with associations and supporting institutions form a regional dredging cluster around Delft. In the post-WWII period the Dutch dredging industry has been gradually more concentrated. In 1969 the near-century old Amsterdamse Ballast Maatschappij merged with Nedam Aanneming Maatschappij, thus creating Ballast Nedam Baggeren. In 2001 this company merged with Rotterdam-based Hollandsche Aanneming Maatschappij and thus formed Ballast HAM Dredging and Marine Contractors. This company merged with the Van Oord Groep in 2003 and since then the Dutch dredging industry has been entirely dominated by this new Van Oord.

The marine equipment sector benefitted from the developments in shipbuilding and dredging and has developed into a separate Dutch industrial stronghold with a number of world leading companies (e.g., IHC Holland is the world's market leader in the design, fabrication and supply of equipment and services for the dredging and alluvial mining industries, serving some fifty percent of the world market).

Offshore exploration activity started in the North Sea in the 1960s and became importantly connected to the Dutch shipping industry, which was in the forefront with offshore supply vessels (OSV). While British shipowners had proven unwilling to fully commit to OSV operations in the North Sea, the Dutch made a considerable commitment from an early date and hence got a first-mover advantage in this soon to be profitable sector (Jamieson 1998). The Dutch company Smit-Lloyd BV, formed in 1964, was one of the pioneers in providing marine support services to the offshore oil and gas extraction industry and became a major OSV operator in the North Sea and elsewhere.

Danish shipping has changed dramatically since WWII. Prolonged loading times in ports and the struggles to exploit scale economies on general cargo vessels meant that the profitability of traditional liner shipping came under pressure in the late 1960s and early 1970s. Danish shipping companies had long traditions in tramp as well as liner shipping with rather small general cargo vessels, but through large investments in bulk carriers, product tankers and container ships this structure changed dramatically in twenty years from the mid-1960s to the mid-1980s. Danish ship owners, including Maersk Line, were generally laggards in container shipping.

The Danish pioneer in container shipping was the EAC, which had received four large container ships in 1971 and 1972, but the company proved unable to exploit any possible first-mover advantages. Maersk Line received its first fleet of container ships in 1975-1976. Having learned partly from the failure of the EAC, Maersk Line combined its investments in container ships with huge investments in ports and onshore infrastructure and thus created a successful container trade system that linked North America with South East Asia. It was not until 1987 that the company started acquiring other container shipping companies, but a strict focus on container shipping coupled with an aggressive merger and acquisition strategy would subsequently be a hallmark for the company ultimately turning it in to the number one container shipping company in the world. In 1993, it acquired all the liner activities of the EAC and in 1999 it acquired first the South African container shipping company Safmarine and later the American container shipping company Sea-Land Corporation. The integration of Sea-Land into Maersk Line was eased by the long-term operational cooperation that had existed between the two companies, particularly on the transatlantic routes. In 1993

Maersk had also initiated an alliance with the British shipping company P&O Containers, but this alliance was terminated in 1996 when P&O merged with Nedlloyd. In 2005 Maersk acquired P&O Nedlloyd, which at the time occupied about six percent of the container market against Maersk's twelve percent.

Towards a framework for comparing (similar) clusters in different countries

A number of important observations follow from the analysis in the previous sections. Obviously, maritime clusters may take a very long time to develop. Indeed, history matters in the evolution of clusters. This insight is not new, but that clusters may actually take several hundred years of coming into being is a startling fact that may not fit well in current policy debates on cluster promotion and development. Small and unforeseen events of history can lock an economy in to a particular path that may or may not be the best among alternatives (David 1985). Historical imprints have proven decisive for the ways in which companies or even entire industries evolve over time. The conditions and practices that exist at the time of the founding of a new company are known to influence the competitive behavior and organizational development of that company in complex ways (Boeker 1989, Holbrook et al. 2000, Klepper 2002). Such path dependency of socio-economic change has been demonstrated for the unfolding of industry clusters (see, e.g., Mayer-Stammer 1998) and for the development of cluster-based economic policies (Nauwelaers 2001).

Also obviously, geography clearly matters for the development of maritime clusters as an enabling as well as a constraining force. The Netherlands has developed some of the largest ports in the world, and the ports sector is at the core of the Dutch maritime cluster, simply because Amsterdam and Rotterdam are natural entrepôts for intra-European as well as transatlantic trade. Over the past century, the dredging industry in the Netherlands has developed partly in tandem with port expansion, but in a longer term perspective muscle-powered dredging has been a necessity of daily life in the lowlands since the tenth century, basically because they are indeed low and swampy and so ditches and dikes have had to be built, canals have had to be drained and land has had to be reclaimed (Ven 1993). And inland shipping is important in the Netherlands, because historically the rivers as well as the artificial canals, many of which were dug in the seventeenth century, have provided a feasible alternative to other modes of inland travelling, including the railway (Fremdling 2000). Access to natural resources is a feature of geography, which is an important determinant for the development in a nation's shipping. When Denmark lost Norway it also lost its bulky articles for export and this fact has destined modern Danish shipowners to become almost exclusively cross-traders (Kiær 1893).

Finally, we should notice that the micro-foundations of cluster evolution interact in complex ways, so that paying attention to each individually would not provide sufficient background for deliberate maritime cluster development. To give a broad example of such interaction, the local topography of the Netherlands may have been a prime cause for the current strong position of the Dutch main ports but historical incidents, such as the Spanish re-conquering in 1585 of Antwerp and the ensuing act of Dutch rebels blocking the passage from the sea to the river Scheldt, were decisive for Amsterdam to win out in European port competition. The migration of entrepreneurs from Antwerp to Amsterdam that followed from these historical incidents proved

decisive for the subsequent development of the port of Rotterdam, which became the largest continental port in Europe (Driel and Devos 2007).

The analysis thus highlights the importance of understanding the micro-foundations of industry clusters and how such micro-foundations change across space and over time. It should be clear that standard classification schemes will not take us far in this direction. Instead, assessing industry clusters in any particular country and comparing them to (similar) clusters in other countries should attempt to proceed along the following lines.

- *Allow for flexible definitions.* From the above analysis it is clear that maritime clusters, even if very similar on the surface, differ on a number of important basic dimensions, and we should therefore avoid all-encompassing definitions. Most definitions on maritime clusters in EU member states concur that shipping is the industry driving the cluster. However, shipping does not drive all maritime clusters as the above analysis revealed. While it is clearly the driver of the Blue Denmark, the Dutch maritime cluster depends much more on the port sector.¹¹ Moreover, a merchant fleet is not in itself a homogenous group of companies and therefore the shipping industry is not a distinct entity; it consists of ship owners serving either national markets (short sea shipping) or international markets. Whether a maritime cluster is dominated by short sea or international shipping differs across countries. Tramp shipping, which has historically characterized Danish shipping, is very different from liner shipping, which was the hallmark of Dutch shipping since the early 20th century. By the same token, the dry bulk, tanker, general cargo, and specialized markets differ greatly. Heavy lift shipping thus has a peculiar dynamics of its own. Along these lines, the (currently strong) Danish shipping industry is structurally very different from the (currently weak) Dutch shipping industry. These are just illustrative examples. The key insight is that advisors and decision-makers must collect detailed evidence of individual maritime clusters and develop empirical taxonomies of their structure and dynamics in terms of basic dimensions.
- *Distinguish maritime clusters at different spatial scales.* Different maritime clusters have different spatial qualities and so there can be no standardized definition of appropriate geographical scope (see also Jacobs and De Man 1996). The Dutch and the Danish maritime clusters have marked nation-wide qualities but can also be sensibly split up into a number of regional sub-clusters (such as the offshore cluster in Esbjerg, the shipping cluster in Copenhagen, the shipbuilding cluster in the Northern Netherlands or the dredging cluster in the Delft-Rotterdam area), each of which differ on important aspects and therefore calls for more detailed analysis. On the other hand, too narrow conceptualizations should be avoided, as the relevant dynamics are often part of a larger picture. The key is to strike a proper balance between wide and narrow boundaries. In their analysis of the geography of innovation Bunnell and Coe (2001) introduce the interesting concept of “nested scales” to capture the interplay and co-evolutionary dynamics of different spatial levels in the making of an innovation. Even more important, however, is the way that we

¹¹ A country could also have a strong maritime cluster consisting mainly of shipbuilders or marine equipment makers catering to shipowners in other countries. The Dutch maritime cluster is a good example of that too.

conceptualize space. Indeed, the spatial aspects of clustering may pertain less to geography than to a more relational meaning of space (Bathelt and Glückler 2004, Graham and Healey 1999).

- *Analyze the cluster on several dimensions simultaneously.* Economic impact studies that measure the importance of individual maritime clusters are important, but they can inform us of only a minor part of the essential things going on. Particularly, impact studies are generally useful for producing *snapshots* of the – mainly pecuniary – structure of a cluster; at best they can only give vague indications of the true industry cluster *hotspots* and *blind spots*, which are typically of a much more social and institutional kind (see, e.g., Pouders and St. John 1996). Economic analysis of key structural variables should therefore be supplemented by ‘softer’ analysis including social dimensions as well as the cognitive aspect of economic decision making by leader firms.
- *Pay close attention to ‘history’.* A key question could be: what are the historically determined strengths of a particular maritime cluster that have given it a competitive advantage? One may argue that the real strength of Danish shipping is its historically evolved specialization in controlling a large fleet by chartering in foreign owned vessels and thus maintaining flexibility in a volatile world market. Understanding how this specialization has evolved would be essential for understanding the global competitiveness of Danish shipping. Has it been a straightforward process, or has it been rugged and interrupted over time? Has this specialization been a natural outcome of the wider economic structures and institutional set-up of the Danish maritime cluster, or has it been something out of the ordinary? Why did it not develop in the same fashion in competing clusters? Another key question would concern the particular developmental path of a cluster. At what point in time and under which circumstances did the port sector in the Netherlands gain momentum so that it could expand and develop, even as the shipping industry gradually lost much of its former strength.
- *Pay close attention to institutions.* Important questions would centre on the ways the central actors of a cluster are embedded in particular, historically evolved institutional structures that enable and constrain their behavior. What are the social norms and conventions guiding commercial behavior within the cluster? What are the institutional underpinnings, which have evolved alongside the industrial structure of the cluster, allowing it to continuously prosper in an increasingly global economy? For example, it has been argued that the prevailing live-and-let-live creed that has historically characterized Dutch liner shipping companies became a disadvantage from around the 1990s, when a massive entry of new, non-traditional and in many cases financially strong liner shipping companies introduced a higher “coefficient of aggressiveness” into the trade (Driel 2000). How do such institutions emerge and persist over time? Do the forces that make for institutional stability differ over time, or across different nation-states? While rules and laws and their function have often been considered in studies of clusters their normative aspects, such as norms and obligations, or cognitive aspects, such as managerial ideologies, which are otherwise so strongly emphasized in the “new institutionalism in organizational analysis” (DiMaggio and Powell 1991, Powell and DiMaggio 1991, Scott 1995), are rarely taken into account.

- *Maintain mindful openness to new cluster formations:* Much of the literature on maritime clusters focus on existing economic and social structures and hence do not consider the formation of new clusters, or the intermingling of different sub-clusters. However, these issues are paramount to understanding the dynamics and development of clusters. The Blue Denmark looks different today than it did two and a half decades ago. For one thing, Denmark has become a leading seafaring nation with dominance in container shipping and parts of bulk shipping. Denmark now has an important global leader firm; namely A. P. Moeller-Maersk, which became the largest container shipping company in the world when it acquired Safmarine and Sea-land in 1999. The composition of the cluster has changed too. The first analyses of the Blue Denmark emphasized mainly the linkages between the shipping and the shipbuilding industries and briefly noticed the significance of the marine equipment industries. Recent analyses include the offshore oil and gas extraction sector and future studies will most likely also find that other parts of the offshore sector, such as renewable energy, belongs naturally or politically to the cluster. For example, since the world's first offshore wind farm was established in the southern seas of Denmark in 1991 the exploration and exploitation of offshore wind energy has developed into a Danish specialty, which has strong connections to the shipping and marine equipment industries.

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