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Port Foreland Collaboration

by

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Acknowledgements

Personally, I am very interested in the Northwest European seaport market power equilibrium as a proud inhabitant of Rotterdam with a Dutch merchant mind-set. As a professional consultant in the Ports & Shipping industry I am also serving several stakeholders which act in this maritime ecosystem and I think it will be very beneficial to bring in my commercial knowledge and experience and cross this with the existing relevant academic literature, frameworks, methodologies and my own study & research.

This however I can certainly not do by my own and for that reason I would like to acknowledge several persons in this section of my thesis which have helped me to not only bridge the gap between the commercial and academic world but also supported me with my 2,5 years Maritime Economics and Logistics journey.

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Maarten van Berkel

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Abstract

Seaports have always been an important node in the global supply chains. The port's hinterland has been thoroughly researched and described but for the port's foreland this is less the case. The port foreland is described as the ocean-ward mirror of the hinterland, referring to the ports and overseas markets linked by shipping services from the port. In this research the different types of port foreland collaboration for the three main ports in Northwest Europe is being studied to answer what the drivers and the expected outcomes of this phenomenon are for the respective port authorities of Hamburg, Rotterdam and Antwerp. Based on the literature study around collaboration in general and port foreland collaboration specifically a conceptual framework for internationalization strategies of port authorities is being used and applied in a multiple case study approach. This framework consists of the following three steps: 1) selling the port worldwide, 2) controlling the international supply chain where they are part of and 3) to gain benefits for the port itself and is applied for all overseas partnerships and joint-ventures/participations. For these case studies the researcher has conducted a qualitative desktop research to obtain all relevant recent port foreland collaborations from the ports of Hamburg, Rotterdam and Antwerp. Afterwards interviews with representatives from the three ports and with members from the academia (from Germany, the Netherlands and Belgium) have been held to validate these findings and elaborate on the arguments and drivers of these collaborations.

The outcome of this study has been analysed in order to answer the sub research questions and the main research questions. The ports under study are all active in their port foreland area however for a variety of reasons. The Port of Hamburg Authority has worldwide commercial representation for commercial purposes and a few memoranda of understanding with overseas ports. Their main drivers are for their local community to benefit from this (meaning the positive externalities should outweigh the negative ones), to have direct access to and influence on digital port innovations and to secure cargo flows with Eastern Europe and Russia. The Port of Rotterdam has institutionalized their port foreland collaborations in order to extend their network and knowledge base, to growth their revenue flow and to serve their customer base. Lastly the Port of Antwerp Authority is aiming to secure trade flows to and from their home port, support local companies, brand reputation and recognition and resource development by engaging into port foreland collaborations. Interestingly the Port of Antwerp is active in the same regions (Oman and Brazil) as where the Port of Rotterdam has already established partnerships/participations in the years before.

The three ports under study are located in each other's proximity but all found their own right to exist in the port foreland collaboration space and have identified drivers unique to them to engage into this. There is no direct rivalry overseas and the respective port authorities grant each other their initiatives although overlapping drivers (and benefits) like cargo volume growth or resource scarcity might in the future impact other ports negatively.

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1. Introduction

Northwest Europe is a very condensed area with multiple metropolitan regions accommodating a large and wealthy consumer base with a population around 300 million inhabitants. In order to serve this base most global shipping networks depart to or from one or more seaports in this area from other ports worldwide. To optimize this supply chain the shipping lines are seeking for the most efficient options – both in the sense of time and costs – to route their ships with the aim to serve their direct customers (agents, freight forwarders, etc.) and their customer's customers. Northwest Europe can be served from multiple ports which are, except for the UK, mainly landlord style ports meaning the port authorities are leasing out their land to commercial parties who in their turn conduct their operational activities. Most of these ports serve a contestable hinterland (opposite to a captive hinterland where a port has a natural establishment) and compete with each other to be the preferred port of call or to act as a so-called hub port (De Langen, 2007). However only one or a few ports in this region can act upon and are able to obtain this title. The port authorities, shipping companies and terminal operators all have different preferences and strategies which result in a diversified and complex landscape.

1.1 General context

Whereas in the shipping industry a continuous collaboration (or some say consolidation) is taking place the ownership structure of the Northwest European port authorities has been very stable over the last decades. Also the commercial parties active in the ports (e.g. container terminals, tug and pilotage companies, freight forwarders, etc.) are consolidating which makes it hard for the individual port authorities (PA's) to get a grip on these actors. A good example is the redirection of container cargo flows to other terminals or ports due to the footloose characteristics of this trade flow.

There are multiple reasons why port authorities would like to gain back power over the maritime actors operating on their properties. Improving sustainability, stable revenues and better stakeholder services are the most important ones.

In order to do so there is a tendency towards more port authority collaboration and the joint realization of captive hinterlands. Within Northwest Europe this can be pushed through the European Union, starts intrinsically from the PA's themselves or other ways might be found to establish this (e.g. alliances, conferences or industry association).

In other parts of the world this type of collaboration has already matured. In China both hub-and-spoke ports as well as major non-hub ports can coexist due to the large geographical coverage and low frequency of services (Wang & Ng, 2009). The North Adriatic Port Association (NAPA) is an association consisting of four coastal ports located in the north of the Adriatic Sea aiming to form an European logistics platform under the coopetition model (North Adriatic Port Association, 2013). Lastly several Atlantic Canadian ports starting to engage into coordination and cooperation initiatives in the area of joint marketing, support of operations and joint insurances (Brooks, et al., 2009).

1.2 Relevance and research scope

The seaport – hinterland connection has been part of multiple assessments, academic research and feasibility studies in the past (Wang and Ng, 2013) but with this thesis the researcher would like to focus on the possibility of foreland-based collaborations based out of the Northwest European region. The definition of a port foreland in use for this thesis is obtained from a research paper by Rodrigue & Notteboom (2006):

"The term foreland is the ocean-ward mirror of the hinterland, referring to the ports and overseas markets linked by shipping services from the port. The foreland is above all a maritime space with which a port performs commercial relationships. It includes overseas customers with which the port undertakes commercial exchanges. The foreland is measured by the share of a port, or a group of ports, being taken over their foreland relatively to the forelands of other ports. It defines the interactions of a port with elements of the global economy. As the global economy expanded, the foreland of ports became increasingly complex."

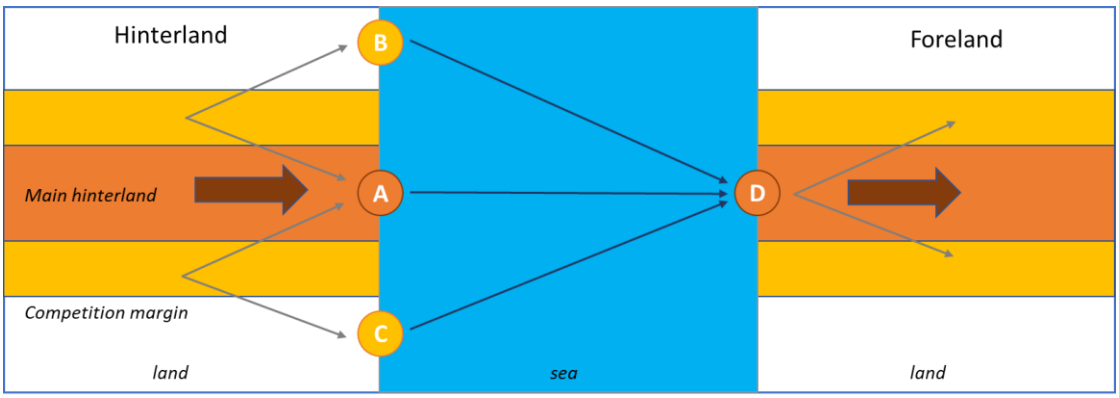

FIGURE 1 PORT HINTERLAND AND FORELAND OVERVIEW (RODRIGUE & NOTTEBOOM, 2006)

In 2010 Wang & Ng described the connectedness of Chinese container ports with international foreland markets. The conclusion of the article goes into the specific Chinese situation where hub-and-spoke ports as well as major non-hub ports can coexist due to the large geographical coverage and low frequency of services for certain cargo types. More important and interesting are the suggestions made by the authors on further research topics. They indicate that for other highly developed and condensed regions (like the Hamburg - Le Havre range) a similar study could be conducted using the same methodology and also the dominating impact of 'super' hubs on the individual port authorities when striving for survival are being addressed.

Although this thesis will not replicate the same study for the Northwest European region their conclusion is one example where a certain type of port collaboration is at hand. In this thesis the subject under study is the impact of port foreland collaboration in Northwest Europe, explicitly the port cities and related port authorities of Hamburg, Rotterdam and Antwerp.

This research is relevant for port authorities, (management of) shipping lines and terminal operators and industry analysts. It builds upon previous academic research by Rodrigue & Notteboom and Wang & Ng and the academic community might be able to act upon some of the recommendations for future research or apply the used methodology at another region or area.

Certainly the research will be used to lecture Deloitte's Port Center of Excellence professionals and taken up as thought ware in the Deloitte University Press (DUP). Where possible I will present the outcome at a relevant seminar or congress.

1.3 Research questions

After identifying the relevant fields of interest based on earlier studies the researcher has defined one main research questions and four sub research questions in order to study this topic further and contribute to the academic knowledge base in this area. The main research questions that this research aims to answer is the following:

What are the drivers of port foreland collaboration and the expected outcomes for the port authorities in Northwest Europe?

The essence behind this research question can be obtained by answering the following sub research questions:

SQ1: What type of port collaboration exists and what does the current situation look like?

SQ2: What are the drivers to engage into a port foreland collaboration?

SQ3: What are the different outcomes if ports collaborate and what is expected?

SQ4: How will the current status-quo between the ports under study be impacted?

1.4 Research design and methodology

As indicated in the previous section there are a limited number of (academic) publications and related quantitative researches done on port foreland collaboration. For this reason the researcher will focus on a qualitative study to answer the main research question and related sub questions.

The underlying study will use a qualitative methodological approach: a multiple case study approach, and each case which will consist of two parts. The first will be a desktop analysis using secondary data and the second part will consist of in-depth interviews, hence collecting and analysing primary data. Given that the (sub) research questions are more explorative in nature, a theory testing - rather than theory building - methodology is appropriate to apply for this research. The combination of the two proposed qualitative data gathering methods within each case will allow the researcher to gain more comprehensive insights into the research problem of port foreland collaboration motivations and expected outcomes. Multiple case studies allow to have a somehow broader conclusive impact than a single case (Eisenhardt & Graebner, 2007), especially when considering the fact that the researcher will exclusively focus on the three major ports in the Northwest European range of Hamburg - Le Havre. Within each case the

researcher will apply a dual qualitative data analysis approach as described underneath and further in chapter 3.

The first qualitative part will mainly consist of secondary qualitative data research by studying and analysing relevant publications, industry publications, existing case studies, seminar/congress publications and other scientific literature sources. Additionally, all port strategy documentation of the considered hub ports (Hamburg, Rotterdam and Antwerp) will be studied around their port foreland collaboration approach and stratagem. This will lead to a holistic and conclusive understanding of the different types and actors in the area of port foreland collaboration which will be appropriate for the continuation of the research.

The second qualitative part will consist of primary qualitative research by means of interviewing relevant stakeholders from the port authorities as well as academic resources, in order to have an objectivity check and not to focus only on potentially biased actors. Six interviews are conducted which is shown in the following table:

TABLE 1 OVERVIEW OF INTERVIEWEES

Port	Port Authority	Academia
Hamburg		
Rotterdam		
Antwerp		

By having interviews with representatives of the PA's the researcher will gain further insight into the intrinsic motives, reasoning and ambition of their port foreland collaboration initiatives and this can be linked and benchmarked towards the earlier performed results of the secondary qualitative research. The profile of these port representatives are employees working in the strategic/international office and the interviews with the academic representatives will give a more objective view of the intended initiatives of the abovementioned ports and will be evaluated in the bigger schema of potential collaborations. Preferable the PA interviews will be conducted before the academic ones.

1.5 Thesis structure

This thesis consists of five chapters of which this paragraph is the last one for the introductory chapter. The next chapter will go deeper into the different port actors and types and drivers of port collaboration and competitiveness in order to give an answer to sub research questions one and two.

The third chapter will explain the relevance of conducting a multiple case study for this research, describe the case studies of the Hamburg, Rotterdam and Antwerp port area and introduce the interviewees.

In the fourth chapter the results of the desktop research and interviews will be presented and matched against the earlier researched literature and theories. Also generic port foreland collaboration initiatives and characteristic found and discussed during the interviews will be presented and the potential application towards the Northwest

European status-quo situation. This will give an answer to sub research questions 3 and 4.

In the final chapter the researcher will present the key findings by a clear and concise conclusion. Furthermore the research limitations of this study will be described and a proposal will be made for further future research suggestions on this topic.

This thesis also has two appendices at the end. The first one (appendix A) is presenting all the interview questions – both the generic ones as well as the port specific ones – which have been used for the interviewees and the second one (appendix B) gives an overview of the desktop analysis approach including all used search criteria.

Port Collaboration

This chapter will describe the different types of port collaboration, the drivers to engage into port foreland collaboration, the most important port actors and the collaboration forms. This will be done based on previous studied collaboration frameworks from the perspective of the port authorities (PA's) and their interaction with other major port related stakeholders like port terminal operators and the shipping line companies (SC) as these three parties are extensively working together in a triangular relationship. In the last section of this chapter the obtained information will be applied to the port foreland collaborations which will lead to the theoretical framework to be tested with the case study.

2.1 Port collaboration definition and typology

As subject for this thesis port foreland collaboration is under study. In this section the researcher will describe the relevant academic literature around collaboration in general and then apply this to the ports sector.

2.1.1 Definition

The definition of collaboration is elusive and it is often difficult for organizations to put collaboration into practice and assess it with certainty. It reaches from once-off mutual work duties, via joining forces or shared values towards strategic partnerships and hence covers a wide spectrum of cooperation types. In the end collaboration is a relation between two or more parties with compatible or additional interests or aims where the relationship is foreseen to be of reciprocal advantage (Wortelboer - Van Donselaar & Kolkman, 2010). Although elusive an increasing number of organizations are coming together to address complex business and societal issues that would otherwise not be attainable when entities are working independently. An example is for instance the reduction of the worldwide carbon footprint or the reduction of non-recyclable plastics. The most purposeful collaboratives express the collaborative effort as the primary method for achieving ideal short and/or long-term goals (Gadja, 2004).

Hesselbein & Whitehead (2000) conclude that there is an ever increasing need for individuals, organizations, government agencies and community groups to come together in order to address complex issues that society faces nowadays. It is clear that none of these individuals can succeed on its own and hence collaboration is of pivotal importance to achieve a set out vision. With collaboration an inter-agency dialogue can take place, resources can be shared or centralized, common interventions can be developed and resources can be made available and sustained (Ibid).

There are however several levels of collaboration that organizations (and others) engage into, depending on the purpose, potential synergies and issues at hand. From one end of the spectrum there is low integration and only focus on sharing information and exploring interest whereas on the other end of the spectrum there is high integration between two or more actors with plans to achieve mutual goals whilst maintaining separate identities.

The following framework shows the collaboration theory set out above reaching from low, via medium to high integration and information sharing. The furthest point of integration

has been defined by Bailey & Koney (2000) and is named 'coadunation' meaning one party in a collaboration will relinquish any autonomy in order to strengthen a surviving organization. An example of this is the case of the Port Metro Vancouver in Canada which has been integrated in a larger port authority (Notteboom, et al., 2018).

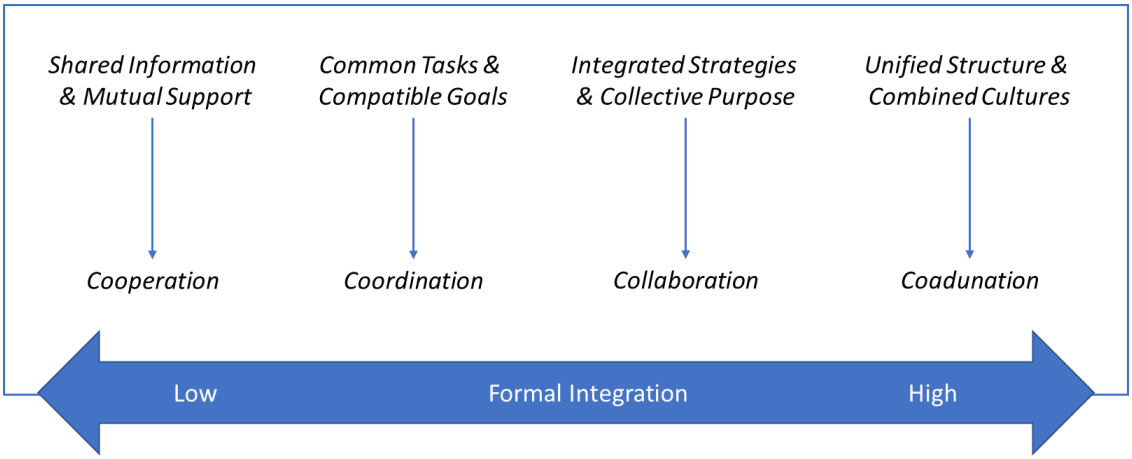

FIGURE 2 COLLABORATION THEORY (BAILEY & KONEY, 2000)

The time and duration of collaboration can differ per situation/scenario. As one might expect the higher the formal integration the longer the (intended) duration of a collaboration effort like for example a strategic partnership will last. This is however not been proven empirically and hence will come back later in this thesis when studying the specific collaboration theory for the port industry. Based on the above collaboration can be seen as a powerful strategy to achieve a vision otherwise not possible to obtain if independent entities working on their own.

Pallis and Kladaki (2016) quote in their research paper around port collaboration a study from Snow (2015) where three levels of collaboration are presented, being competition, cooperation and collaboration. These three also reflect a chain of evolving relationships between two (or more) organizations and aligns with the above presented collaboration theory. These forms of collaboration are the most recent and sophisticated trend and the result of the highly globalised economy where the essential rapid diffusion of information produces a rethinking of the traditional hierarchical organizational forms. In this collaborative form the trust between interacting partners has to be high and organizations should have an intrinsic motivations to work together and are oriented towards specific and mutually determined objectives through an intense, open and shared exchange of information and communications (Ibid).

Within the port industry collaboration takes place on all earlier indicated levels mainly within the port itself, regionally or with the hinterland. Port foreland collaborations remain scarce but are increasingly building due to the role of ports in the global supply chain networks. In a foreland collaboration study from 2009 the authors identified 25 Chinese ports which had strong regional and inter-port relationships where some ports turned into

major cargo hubs whereas others covered a shipping niche market. The underlying rationale is that in the near future policy makers can assess and foresee the economic well-being of regions and with that improve effective policies (Wang & Ng, 2009).

2.1.2 Collaboration types and typology

In this section the researcher will apply the above theory towards the port landscape by presenting a port-specific collaboration model.

As indicated ports serve as an interface between the sea and land. In an ideal situation the port is situated near the major trade routes as well as close to the hinterland. Due to geographical restrictions and political or social differences there are only a few ports which are situated in this sweet spot, like for example the ports of Singapore and Houston. Most other ports are either located near a major shipping network but lack a large captive hinterland or the other way around. Ports that are neither located near one of these characteristics will be managing very small cargo volumes (e.g. Kralendijk Port on Bonaire) or are built-for-purpose ports for shipping only one or a few specific types of cargo (e.g. Port of Alumar in Brazil where bauxite is processed into aluminium and shipped afterwards).

When ports compete for either hinterland or maritime traffic it is important to obtain a certain level of cargo flow to reach economies of scale by having more frequent shipping and greater density of hinterland services. This way this port can become a regional gateway but this will need a deliberate strategy. In a working paper from Brooks, McCalla, Pallis & Van der Lugt (2009) this situation is described for several peripheral ports in Atlantic Canada and they present the concept of improving the integration and coordination in hinterland transport networks and the concept of port cooperation. The first is being described as ‘coordination’ along the supply chain network and the latter and ‘cooperation‘ between the ports in the proximity.

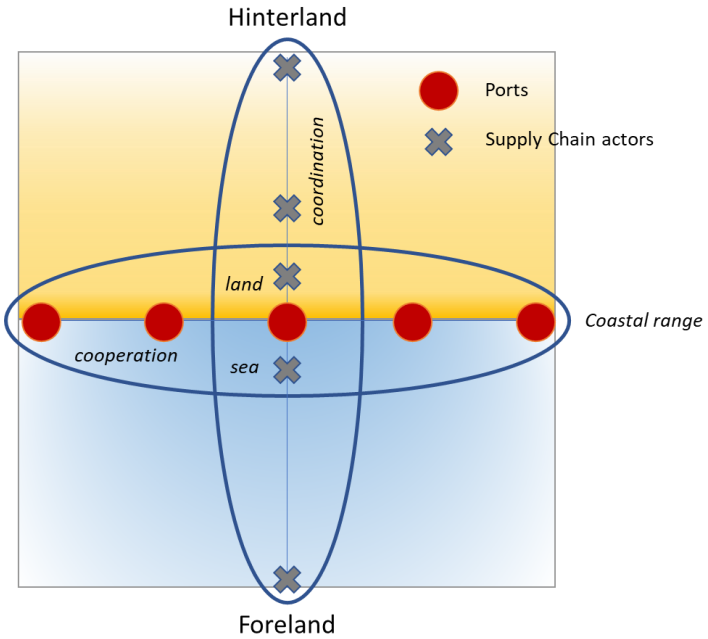

FIGURE 3 PORT COOPERATION AND COORDINATION (BROOKS, ET AL. 2009)

Port coordination

In the situation that a port is vertically coordinating the hinter- and foreland it orchestrates the end-to-end supply chain as much as possible to create a competitive advantage for itself. The more efficient all supply chain actors (shippers, warehousing, customs, rail and barge terminals, etc.) work together the lower the coordination costs (Brooks, et al., 2009). There are several coordination mechanisms to achieve this as studied by Van der Horst and De Langen (2008):

TABLE 2 FOUR COORDINATION MECHANISMS AND COORDINATION ARRANGEMENTS (VAN DER HORST & DE LANGEN, 2008)

Coordination mechanism	Possible coordination arrangements
Introduction of incentives	Bonus, penalty, tariff differentiation, warranty, auction of capacity, deposit arrangement, tariff linked with cost drivers
Creation of an interfirm alliance	Subcontracting, project-specific contract, standardized procedures, standards for quality and service, formalized procedures, offering a joint product, joint capacity pool
Changing scope	Risk-bearing commitment, vertical integration, introduction of an agent, introduction of a chain manager, introduction of an auctioneer, introduction of a new market
Creating collective action	Public governance by a government or port authority, public–private cooperation, branch association, ICT system for a sector of industry

Underinvestment(s) in these coordination mechanisms can lead to suboptimal infrastructure solutions, peak loads at the terminals, fragmented cargo flows, underutilization of assets and inefficient information exchanges all hindering the effectiveness of the supply chain (Van der Horst & De Langen, 2008). This drives the vertical coordination role from the port point of view.

Port strategies should include investments and stakes outside the port area in order to get a better control over the other actors and to obtain a possibility to introduce the coordination mechanisms. The general port ownership model – as an independent governing body – can make it difficult due to political or financial reasons and hence cannot always be applied successfully. Some positive examples though are the investments from port authorities into inland intermodal terminals at the ports of Barcelona (PA in Zaragoza and Toulouse) and Melbourne (inland rail terminals) (Van der Horst & De Langen, 2008). Port foreland investments examples are less to be found and will be discussed in more detail in the remaining chapters of this thesis.

Cooperation

Ports are cooperating over the horizontal access with neighbouring ports to better use assets in terms of efficiency, scale and scope, to improve competencies and to gain positional advantages that may potentially expropriate the competition. Cooperation between ports is a common strategy in order not to waste scarce resources (people, time and money) competing against each other hence they are segmenting market and coordination functions amongst them as a counterbalance to dominant market powers

(Brooks, et al., 2009). The cooperation can involve single one-off projects or multi-year strategic alliances and cover only one to a manifold of topics. There is no one best approach on port cooperation and the execution can be either formal (legal agreements, memorandum of understanding) of informal (information sharing, joint studies). The following table will give an overview of formal and informal cooperation types in the areas of marketing & business development, operations, administrative and regulatory areas:

TABLE 3 PORT COOPERATION ACTIVITIES (BROOKS, ET AL. 2009)

Activity	Formal	Informal
Marketing and Business Development	• Joint advertising and promotional activities • Establishing a joint marketing agency	• Seeking joint clients • Exchange of experts • Promote the use of each other's facilities
Operations	• Common training agreements • Joint application of new communications technologies[1] • Port development planning[1] • Partnerships with other actors[1] • Joint development of similar operating practices[1]	• Information exchange on terminal management • Sharing of information on port development • Exchange of experts • Joint studies
Administrative	• Port representatives participating in other ports • Joint investments in hinterland infrastructures • Joint management of port expansion • Formation of (inter)national cooperative organizations	• Technical assistance in port management • Common positions at international fora
Regulatory	• Joint environmental protection initiatives • Coordinated investment in safety and security	• Information sharing on environmental programs

An example of increased cooperation between ports can be found at the ports of Seattle and Tacoma (United States) which have created a marine cargo operating partnership "The Northwest Seaport Alliance" to make their gateway one of the most attractive in North America (UNCTAD, 2017). This is an example of a formal activity including a joint leadership team and governing bodies. Another example of less formal cooperation is the EcoPorts – currently European Sea Ports Organisation (ESPO) – initiative as a main environmental initiative of the European port sector initiated by a number of proactive ports back in 1997. The founding principle of EcoPorts is to create a level playing field on environment through cooperation and sharing of knowledge between ports (EcoPorts, 2018).

[1] These cases might also develop in a less formal format

Port cooperation and coordination will be studied further in this thesis around the port foreland collaboration initiatives for the ports of Hamburg, Rotterdam and Antwerp in the next chapters.

2.1.3 Collaboration drivers

According to the Oxford Dictionary a driver is "a factor which causes a particular phenomenon to happen or develop". Therefore, a driver can be treated as a reason why ports take part in collaboration initiatives. Port collaboration can roughly be divided into two driver types: “Common Threat” versus “Common Need”. The first one is shared among neighbouring ports in the same way when facing a loss of combined market share and the emergence of a common competitor. The second one is also shared between them, but when facing identical internal and external requirements, such as improvement of hinterland access, community relations and port environment (Inoue, 2018).

This section will go into more detail on the reason why ports engage into collaboration and specifically list the drivers and (dis)advantages from the economical and from the society point of view

Economic drivers

The most prominent reason for engaging into any type collaboration is to increase profit from a business perspective (Wortelboer - Van Donselaar & Kolkman, 2010). The port ownership structures however might influence this driver as ports do not necessarily want to increase their own profit but they aim to increase the profit within their ecosystem. To do so they have to beat the nearby competition by securing cargo flows which in turn brings prosperity, leading to a better occupancy rate and load factor of transport equipment, better service with a higher geographical coverage, or a broader network of modalities and activities (transport, warehousing, value-added logistics/value-added services, etc.) (Ibid).

Overseas port collaboration improves efficiency as well as both ports/countries have an interest to make the transhipment costs as low as possible in order to make products financially viable for their consumers (Kumedrzo, 1992). Additionally co-operation will exists between ports as they act as two ends of a logistics corridor and aim to optimise goods’ traffic between the two regions (Pallis & Kladaki, 2016).

Another economical driver for port collaboration is to avoid duplication in facilities through a more comprehensive planning process that rationalizes the use of assets of the merged authorities (Notteboom, et al., 2018)

Societal drivers

From the governmental perspective of societal prosperity port collaboration can mean economic development and also sustainability (Wortelboer - Van Donselaar & Kolkman, 2010). Economic development drivers have been described above but this will lead to improved job securities of which the society will benefit from as a whole.

Ports and port areas have a sheer negative impact on maritime externalities, being congestion, air pollution (CO_2, NO_x and SO_x) and spillages and by port collaboration these externalities can be reduced by e.g. knowledge transfer and/or shared policies.

From the political arena also pressure is put on port collaboration; especially if these ports are regionally adjacent or located in one country. Examples of merging port authorities are the setup of North Sea Port (consisting of an equal merger by the Port of Ghent and Zeeland Seaports in respectively Belgium and the Netherlands) and the merger of all the Indonesian Pelindo ports in the early 90s.

Other drivers

One important driver why ports seek collaboration has to do with the market-related trend of the consolidation of their business associates. The emergence of global terminal networks and the consolidation among the ocean carriers leads to the need for ports to take countermeasures by cooperating themselves and establish bargaining power. The ever increasing ship sizes puts pressure on the port infrastructure and handling capabilities. If the overseas ports invests in this so have the receiving ports to do as well in order not to miss out (Notteboom, et al., 2018). By collaboration ports can fund these investments and steer or divert cargo flows to the most optimal port locations. If all ports need to do this for themselves this would never become economical feasible.

One more factor that can be treated as a driver for collaboration is the technological development of port facilities. Due to the increasing specialization by focusing on the for instance container or the chemicals sector investments are expensive and the set-up barrier of a new service is high (Wortelboer - Van Donselaar & Kolkman, 2010). If a port wants access to such a market collaboration is the most efficient way to do so.

TABLE 4 PORT COLLABORATION DRIVERS (AUTHORS' OWN ELABORATIONS)

Economic	Societal	Other
Increase profit/revenue	Political pressure	Improve services quality
Gain market share	Sustainability	Execute bargaining power
Improve (asset) efficiency	Job security	Technological development

Based on the above driver types it can be concluded that port authorities are seeking several advantages to engage into any form of collaboration. For international collaboration with their foreland these merely comes down to three main goals which they would like to achieve. These three are 1) selling the port worldwide (seeking customer base), 2) controlling the international supply chain where they are part of and 3) to gain benefits for the port itself by e.g. knowledge build up, revenue generation or new business opportunities (Dooms, et al., 2013).

2.2 Port actors

Collaboration within the port can be viewed from three different involved party angles, being the port authorities, the terminal operators and the shipping companies, These parties are forming a triangle where collaboration is of essence in order to successfully execute their work duties but the force field between these three parties might be biased. Although this type of collaboration is one within the port area instead of with the foreland it is important for this study to understand this dynamics and identify the main port actors as well as all the other freight related actors like agents, freight forwarders, etc. and the

more maritime related actors (see section 2.2.4 for these). In the following section the port authorities, the terminal operating companies and the shipping lines will be described. For the latter two we focus on a sub cargo flow, namely the container haulage, as these are comparable for the three ports under study.

2.2.1 Port authorities

Landlord port authorities tend to be government steered administrative bodies which are closely tied to their geographic location. Only a few port authorities rule beyond their own territory and especially in the Hamburg – Antwerp range all PA's are port based (Hamburg Port Authority, Port of Rotterdam Authority and Antwerp Port Authority). These PA's operate under the landlord port authority model meaning they concession land to private terminal operators. A landlord port authority is in most cases an independent entity under public law established by specific legislation (World Bank, 2016). It enters into contract with private parties (including the earlier mentioned concession agreements), enforces standards and sets rules and regulations applicable within the port area. The port operations are not handled by the PA's themselves anymore but by private companies. Nowadays the landlord port is the dominant port model in large and medium-sized ports (Notteboom, 2006).

Although these port authorities are merely home-based they act in an international industry by definition as they facilitate worldwide cargo flows on their premises. In a 2013 conference proceeding Dooms et al introduced a conceptual framework for the international strategy of port authorities and distinguished between the inward internationalization and the outward internationalization. This first one is defined by all the operations that international organizations perform in the home base of the port authority like the terminal investments, tug boat services and warehousing development by major international players. Port authorities usually apply an aggressive or innovative communication strategy to attract these players in order to boost investments and cargo volumes as well as improving the port's international visibility and reputation.

The second one is the proactive internationalization of a port authority and usually follows the earlier inward strategy. An outward strategy can go both ways: either from the port towards their hinterland or from the port towards their overseas ports. This latter one is the result of the port's foreland collaborations as the outward strategy consists of multiple potential collaboration steps (operating modes) that a port can take in its foreland, ranging from establishing commercial representation to a foreign direct investment. In this thesis the types of collaborations as mentioned in table 5 will be further researched in the case studies.

TABLE 5 PORT AUTHORITY INTERNATIONAL OUTWARD STRATEGY (DOOMS, ET AL., 2013)

Step	Operating mode	Description
1	Establishing commercial representation abroad	In this step the PA is expanding its international network and gains insidership into specific markets. Also with this strategy inward investments might be triggered and cargo flow is being attracted
2	Transfer of port specific knowledge	This step illustrates the export of a port authority's knowledge which can be leveraged internationally by the means of port consulting services or port management activities. This can be

Step	Operating mode	Description
		supplied to build a relationship with the overseas port community, gain insidership and/or to generate revenue from these services.
3	Foreign direct investments in the form of a joint-venture of participation	The last step is the most far reaching outward international strategy and consist of a formal investment through a financial participation. This operating mode is not seen widespread but examples will be discussed in further detail in chapter 4 of this thesis.

It is indicated that an inward international strategy is a stepping stone for a port authority to become internationally outward active as they can leverage their customer base (e.g. the Port of Rotterdam Authority which is teaming up with mining giant Vale in Brazil). Furthermore the operating mode steps indicate a sequential activity but reality has shown that port authorities might start with a foreign direct investment or that they remain at the first step (commercial representation) without the intention to extend their strategy.

2.2.2 Terminal operating companies

In this section the terminal operators that handle container terminals are being discussed as this is the type of cargo flow that is widely available in all ports around the world and a competitive area for the three ports under study. Terminal operating companies (TOC) perform the transhipment (either sea-land or sea-sea) and value added logistics activities. They will be an illustrative example for the other cargo flow related TOC's in these three ports though there the competition is less fierce. The TOC industry has been characterized by internationalization in the past decade as an answer to the ever continuing consolidation activities of the liner companies. They operate their fixed assets – being the terminals – in the port area with the liner companies on one side and freight forwarders, agents and logistical service providers on the other side.

TOCs are privately owned firms who through a tendering process obtain the right to provide terminal services. Reason that PA's have been divesting the operations themselves merely has to do with the rise of containerization and the development of container terminals which require substantial financial resources to invest and specialized knowledge to obtain (Olivier, et al., 2007). Terminal concessions are normally given for a single terminal in a port area which still allows competition between several TOCs within the breakwaters of a port. In 2013 the top 5 terminal operating companies had a worldwide market share of 30% but this number is growing by the dominant rise of the Chinese container port sector (Lloyd's List, 2017). The largest terminal operators from 2016 can be found in the following table:

TABLE 6 TERMINAL OPERATORS MARKET SHARE (STATISTA, 2016)

Rank	Organization name	Market share
#1	China Cosco Shipping	12,2%
#2	Hutchison Port Holdings	11,3%
#3	APM Terminals	10,2%
#4	PSA International	9,6%
#5	DP World	8,9%
Total		**52,2%**

China Merchant Port Holdings has just dropped out of this list but is expected to enter impressively with their aggressive merger and acquisitions strategy through stakes in CMA CGM's Terminal Link and many more (ibid). Within Europe the top TOC's handle more than 70% of the total container throughput which illustrates the consolidated and mature nature of this market (Pallis, et al., 2008).

The terminal operator industry is – in comparison with the liner industry – a profitable business with yearly EBITDA's[2] of over 30%, however investments in cranes, quay walls, hinterland connections and the terminal area itself might calving off some of these returns. Normally the obtained concessions are for a longer term in order for the TOC's to earn back their investments. This duration though is part of the negotiation process itself. A longer concession can have benefits over a shorter one or the other way around. The arguments for these however go beyond the scope of this thesis (Pallis, et al., 2008).

Terminal operating companies that handle other cargo types like dry or liquid bulk, commodities, chemicals or coal are also privately owned companies (sometimes owned by the mining companies themselves) that rent commercial space in the port area. Here however the interests are much more vested as this type of cargo normally is in need of more special handling or logistics constraints and or that reason is not present in every port. This is in line with the earlier presented port coordination theory.

2.2.3 Liner companies

Also in this section the focus will be on describing one specific cargo related industry players in order to illustrate the forcing field where the PA's are working in.

The container liner companies, or liner companies, are privately owned organizations responsible for the shipping of containers from the port of departure to the port of destination. In 2017 the total seaborne container trade has shipped over 140 million 20-foot equivalent units (TEUs) coming from just over 42 million TEU in 1997. This illustrates a steep increase over the last twenty years, however this growth has not been equally steady. The majority of the containerized shipping is done internationally with the major trade flows going east – west (serving Asia and Europe) but the other trade lanes are picking up quickly as well (Intraregional, north – south, etc.). Question is if this growth

[2] EBITDA = 'Earnings Before Interest, Tax, Depreciation and Amortization' and a metric used to evaluate a company's operating performance

can sustain now that the merchandise trade flows are growing at a slower pace than GDP (UNCTAD, 2017).

The liner industry is characterized by multiple facets and has been severely hit by the recent worldwide economic crises started in 2008 and the subsequent effects like the bankruptcy of Hanjin Shipping in 2017. The industry started to consolidate and rationalized optimal capacity in order to reduce costs (ibid). Two clear outcomes of this are the ongoing mergers, acquisitions and alliance-forming as well as the ordering of ever larger containerships. This leads to a situation where only a few big companies have a large part of the worldwide market share. The largest container liner companies measured in June 2018 can be found in the following table:

TABLE 7 LINER COMPANIES MARKET SHARE (ALPHALINER, 2018)

Rank	Organization name	Market share
#1	APM-Maersk	18,5%
#2	Mediterranean Shipping Company	14,7%
#3	CMA-CGM Group	11,7%
#4	Cosco Shipping Co Ltd	9,1%
#5	Hapag-Lloyd	7,2%
Total		**61,2%**

On the sixth place the newly created Ocean Network Express (created based on a joint venture between the Japanese carriers “K”Line, MOL and NYK and recognizable on their clear magenta coloured ships and containers) with a market share of 7,1% recently joined the ranking resulting in even more market concentration.

The trend of consolidation has started two decades ago and the rationale behind this are the possibilities to obtain economies of scale and growth market share inorganically. Furthermore the liner companies have been forming alliances to share capacity and routes but they are individually still able to compete on price. This grouping into alliances gives the respective members also an advantage of economies of scale but the market is getting more concentrated. Concentration in the container liner industry market based on research indicates that the Herfindahl-Hirschman Index (HHI)[3] has increased more than 70% between 2014 and 2016 which suggest a moderately concentrated market. This concentration is however measured in general and can vary per voyage route and/or location (Sanchez & Mouftier, 2017). The current three container liner alliances are in works since April 2017 and looks as follows (including market share):

[3] The Herfindahl-Hirschman Index (HHI) is a measure of the size of firms in relation to the industry and an indicator of the amount of competition amongst them

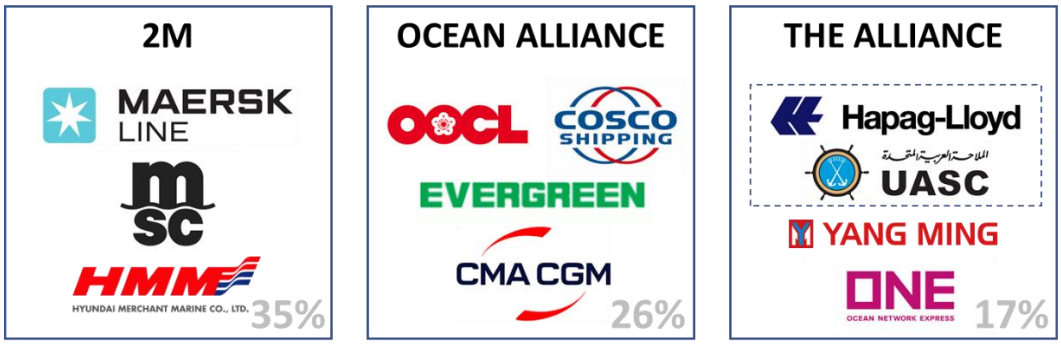

FIGURE 4 OVERVIEW LINER ALLIANCES INCL. MARKET SHARE (ALPHALINER, 2018)

The risk that is seen in this industry is that these alliances will be able to dominate every single trade flow lane as a result of global presence and large market power. In the last twenty years however there is no evidence that this has been achieved and the reason is that all liner companies immediately price in all the benefits from their consolidation efforts leading towards lower rates and margins and larger payback periods on their investments (Drewry, 2018).

The second characteristic of the liner industry is the growth in average vessel size. Several liner companies have ordered multiple >20.000 TEUs container ships and the orderbooks are continued to being filled (Knowler, 2017). The rationale behind this for the liner companies are current fleet replacements, low building costs by the Asian shipyards and the reduction of unit costs per TEU. According to Drewry analyst Neil Davidson (2018) the results are that there is a sheer overcapacity in the market which means that the shippers cut rates in order to boost their utilizations and cover their operational expenses in the short run. As the transportation costs for manufacturing products are negligible these lower rates will not raise the demand hence in the long run the liner business model is rather unhealthy. The need for lower costs by leveraging the economies of scale is hence evident for the shippers but it comes with a downside for their business relations.

On the customer side more freight is needed to fill one ship which results in a less frequent trip schedule. Also the number of ports where these Ultra Large Container Vessels (ULCV's) can be serviced due to their dimensions is limited however they tend to visit as many ports as possible during a round trip in order to disguise the overcapacity. On the upside less fluctuation in freight rates, better pricing because of economies of scale and more efficient and extensive services offered by the lines companies would be in favour of the client (UNCTAD, 2017).

For shipping companies in other areas of cargo handling there are much more players in the market which means that the oligopolistic market condition that is seen in the container industry is not applicable to for instance oil or breakbulk shipping. All these individual companies however negotiate with the TOC's and PA's around tariffs, slots, etc. which closes this intertwined loop.

2.2.4 Other port actors

In the port area more actors are active which operate in the maritime sector with intermediate services. These services can be provided by the port itself or by independent intermediary parties. As the focus of this research is not on these they are briefly discussed in this section

TABLE 8 OTHER PORT ACTORS (AUTHORS' OWN ELABORATIONS)

Port actor	Description
Pilotage	Service provided by a pilot with local knowledge and skills which enables him/her to conduct the navigation and manoeuvring of the vessel in and approach towards the port
Towage	Service provided by tug boats which move larger ships that either should not or cannot power themselves in and out of the port area
Cargo-handling	Involves the movement of cargo in and around a port. This includes marshalling services (the receipt, storage, assembly and sorting of cargo in preparation for delivery to a ship's berth) and stevedoring services (the loading of cargo onto and discharging cargo from ships)
Customs	Governing body clearing cargo and collecting tariffs in order to move goods into or out of an economic territory

2.3 Collaboration and competitiveness

As a port is essentially a sea-land interface (and vice versa) several types of collaboration can be distinguished, either horizontally or vertically as discussed in section 2.1. McLaughin and Fearon have published an article in 2013 based on the outcome of an international expert forum for ports planning and maritime logistics in Antwerp, Belgium. They have developed a conceptual cooperation/competition matrix to indicate the response strategies of ports to inter-port rivalry, taken from the viewpoint of the port authorities. On one axes the degree of competitive rivalry is plotted and on the other axes the degree of cooperation. This has led to the following model:

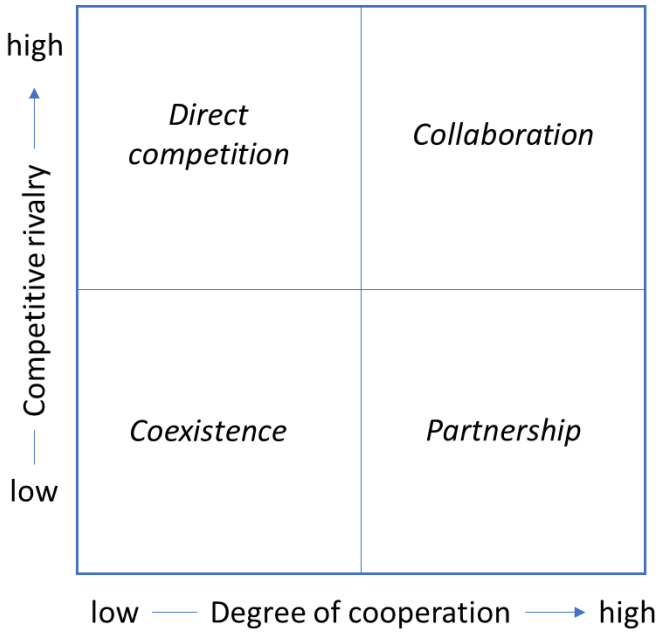

FIGURE 5 COOPERATION/COMPETITIVENESS FRAMEWORK (MCLAUGHIN AND FEARON, 2013)

Direct competition

In the direct competition quadrant ports/port authorities decide not to engage in any major economic exchanges but choose for an isolated existence with only limited information exchange with their competitors. With a high competitive rivalry and a low degree of cooperation these type of ports are normally located in close proximity of each other or compete on the same contestable hinterland. Any market share improvement of one port will have a negative impact on the rivalry ports. Action that is taken is giving one of the ports a benefit over the others as all parties' interests cannot be satisfied, or reconciled simultaneously (Mclaughlin & Fearon, 2013).

Direct competition can exist due to long traditions of protectionism or territorial behaviour without any investments outside the port's own premises. The close proximity makes these ports compete for the same resources, being (national) funds, resources, subsidies or investments (Notteboom, 2009) on the one hand and shipping lines, terminal operators and – in general – cargo flows on the other hand.

As the port authorities of ports under direct competition are operating with their primary interests in mind there is a general tendency that in the face of intensified global competition and new opportunities and threats collaboration is increasing (Mclaughlin & Fearon, 2013). In order to collectively benefit from market opportunities or to prevent joint deterioration of the market this trend is inevitable in an industry with global players in the shipping industry and amongst the terminal operator companies.

Examples of ports under direct competition in the container industry are the Hamburg – Le Havre range consisting of Hamburg, Rotterdam, Antwerp and Le Havre with the complementary ports of Bremerhaven, Amsterdam and Zeebrugge (Notteboom, 2009). Another example is the competition between the ports of Singapore and Port Klang (Malaysia) in Southeast Asia. These two ports compete to position themselves as an

important link within the container shipping value chain between Far East Asia and Europe for transhipment activities, connecting special trade routes and regions and seek for shippers from the peninsula to handle their containers through either one of these ports (Notteboom & Yap, 2012).

Coexistence

In the coexistence quadrant ports are aware of each other's position but they do not aim to threaten each other. These type of ports are mostly smaller than the ones under direct competition and specialize in a certain way; either through niche cargo shipments, a specific hinterland base or complementary services (Notteboom, 2009). By specialization both have the right to exist along each other. Ports under coexistence exchange some information between each other and may refer buyers or sellers to the other port. Joint promotion, resources and infrastructure sharing and collaboration with joint ventures give these ports opportunities. The coexistence normally leads to specialized ports in the vicinity (e.g. cacao in Zaandam and petrol in Amsterdam – both in the Netherlands).

In today's competitive and global marketplace it is very difficult for ports to coexist as international players are seeking for cost reductions (hence economies of scale) and innovations. On the longer term these smaller type of ports will not be able to withheld their advantage without any (political) interference or local/national cooperation. For this reason Mclaughlin & Fearon (2013) argue that the coexistence state is temporary before ports are moving to the right side of the quadrant by higher cooperation in the collaboration or partnership quadrants.

Collaboration

In the collaboration quadrant ports are mutually benefiting from cooperation activities and actively exchange information amongst themselves and with buyers and/or sellers. The (legal) form of a port collaboration is normally a strategic alliance or joint venture and the length of the collaboration is short to medium term as long as the length of a project or the overall mutual benefit from the collaboration. Alliances might be formed as a response to strategic motives like cost efficiencies, risk reduction, market entry or bargaining power countermeasures. Under collaboration agreements ports remain their independent autonomy but are able to obtain a bigger benefit then the sum of their individual contributions (Mclaughlin & Fearon, 2013).

Collaboration in ports are widespread and can be very well compared to the port cooperation concept that has been studied by Brooks, et al (2009). Collaboration is able to succeed better when both parties have a heterogenous resource base and form inter-organizational relationships whilst still be able to act as an individual organization (Coleman, 1990). The latter part is an advantage as if a break-up occurs both parties can go back to the normal way of operation without too much interference (although obviously losing the benefit of the collaboration). Experiences, knowledge and lessons learned can be taken along and can form the basis of future collaborations.

For ports collaboration can also be a threat as they do not want to run the risk that at another location competitive advantages arise at the cost of their own port. In order to counteract on this threat a co-opetition is a typical form of collaboration. This is a combination between competition and cooperation where competitors reach a form of

collaboration with reciprocal advantages. Such a strategic alliance could make all partners more vulnerable and dependent upon each other but at the same time together stronger with respect to others. According to Wortelboer – Van Donselaar & Kolkman (2010) the aims of co-opetition as the following:

- Rationalization of management by pooling production resources, marketing, accounting system, etc.
- Sharing risk, particularly in the field of investments in transhipment material and terminals
- International expansion with more influence on the whole logistic chain
- More bargaining power with respect to governments, investors, shipping companies and stevedores ('countervailing power')
- Improved services to customers; a private port terminal thinks of service in terms of increased profit. Public terminals or port authorities will think especially in terms of an increase in the contribution of regional prosperity and welfare

Partnership

Port partnerships are in characteristic similar to port collaboration, however the timespan is normally longer term (> 10 years) and the intent is a more formal integration, potentially leading to merging of port authorities or highly integrated development of port regions (Mclaughlin & Fearon, 2013). When ports merge or intensively work together this has an impact on the surrounding supply chain ecosystems through a stronger regional competitive position based on longer term planning, joined investments and/or development of strategic initiatives. Also society can benefit from partnership investments by internalizing or reducing of external costs caused by port activities, prevention of market power abuse (Wortelboer - Van Donselaar & Kolkman, 2010) as well as benefit from the port income which is paid out in dividend to the governing bodies.

A clear example of a port partnership is the merger of the ports of Malmö (Sweden) and Copenhagen (Denmark) on both sides of the Øresund in 2001. The rationale was to create a stronger market position and create opportunities after the opening of the new land bridge between both countries as this could mean an end to the traditional border traffic and an immediate decrease in the two ports' cargo turnover and passenger traffic (Copenhagen Malmö Port AB, 2012).

The conclusion from Mclaughlin & Fearon (2013) on the four types of port collaboration is threefold and will be tested in the remaining chapters of this thesis in the light of the port foreland collaboration for the ports of Hamburg, Rotterdam and Antwerp:

1. "Direct competition and preserving old, traditional inter-port rivalries is not an appropriate or sustainable strategic response for dealing with globalized competitive dynamics. Increasing collaboration or partnerships is the way forward"
2. "Many coexistence ports without a strong current value position will perish unless they seek complementary synergies and regional partnerships. Collaboration or partnership is the way forward"
3. "Seeking collaborative opportunities is a flexible and realistic way of cooperating for the short and medium term. Longer-term regional port partnerships are also a way forward for port networks in many regions"

What is evident from the above is that all these four types are mainly relevant for ports which are situated in close proximity of each other. These four typologies will in this study however be used to indicate the level of collaboration between overseas ports.

2.3.1 Port collaboration levels

When ports decide to engage in any form of collaboration they do so on various levels:

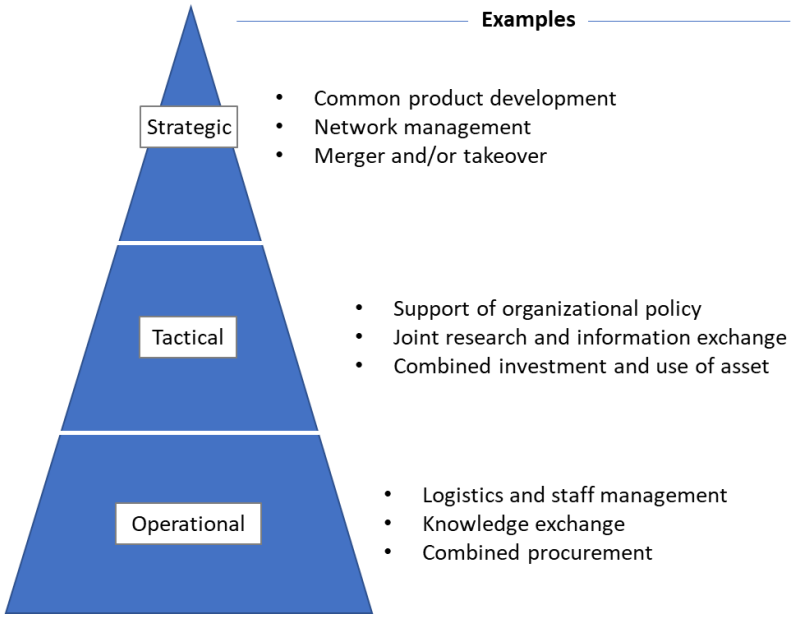

FIGURE 6 PORT COLLABORATION LEVELS (AUTHORS' OWN ELABORATIONS)

These levels can be an indication of the foreseen length of the collaboration where the strategic site of collaboration tends to be longer term (towards partnerships) and the tactical and operational collaboration tends to be short to medium term. There is however no strong academic proof for this.

2.3.2 Port foreland collaboration forms

In the above section the four different types of collaboration have been described indifferent of the horizontal or vertical collaboration. This section will focus on the foreland part of port collaboration and will introduce the last framework to conclude this literature study.

In their 2010 study around foreland based regionalization authors Rodrigue and Notteboom describe the regionalization paradigm concerning the evolving role of intermediate hubs, being the foreland-based regionalization where intermediate hubs capture maritime hinterland. They use their earlier developed port system development model with the focus on phase 5 (decentralization and the insertion of intermediate hubs) and phase 6 (regionalization towards gateway ports). For completeness the complete model is depicted underneath:

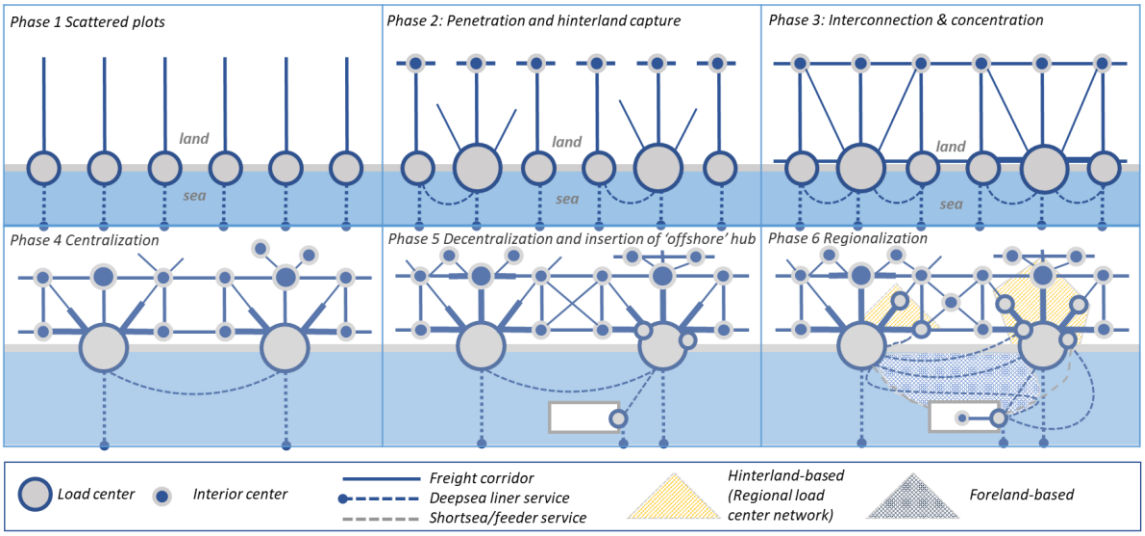

FIGURE 7 PORT SYSTEM DEVELOPMENT MODEL (RODRIGUE & NOTTEBOOM, 2005)

This model illustrates the development of a single port towards a network of ports serving the hinterland and the need to create a regional load centre which can be perceived as a port foreland collaboration. This model however is based on ports within the same region and does not take into account overseas ports. Their conclusion is that with the advantage of the creation of a seaport's foreland, namely the bundling of cargo flows, will lead to traffic stability at the intermediate hub and enables smaller ports to become part of the larger international shipping networks. The risk will be that intermediate hubs will be easier to replace due to missing captive hinterland cargo flows. Two disadvantages remain as ports will not be willing to settle as a feeder port and continue to aim at direct calls and it is unclear if port foreland regionalization will remain or is just a transition phase in the port system development model. For this research this model will be tested for the ports of Hamburg, Rotterdam and Antwerp but this will not be the core of this research.

For the sake of this study the researcher is focussing on the port foreland collaborations of the three earlier mentioned port authorities based on the earlier discussed framework of McLaughin and Fearon (direct competition, coexistence, collaboration and partnership). For overseas ports the first two are however not relevant as there is no contestable hinterland which needs to be shared or cargo flows that need to be competed for. This results in the two forms that will be studied under the case studies and these are the width and depth of foreland collaborations and partnerships. The main diversifier here is the level of formalization of the collaboration form (Bailey & Koney, 2000) and the three distinct types which will be described hereunder:

Memorandum of Understanding (MoU)

A memorandum of understanding (or sometimes called a twinning agreement) is a popular, widely used type of communication tool which most of the times describes an intent or joint policy position to collaborate and share knowledge but do bind the parties

in any mandatory or enforceable fashion. It is used often in a political setting where the port authorities can show their best intents but will work on the details later. Also MoU's can be the start of a more formalized partnership or joint-venture type of collaboration.

Partnership

A port authority partnership is a collaboration form where two or more parties bind themselves to a joint goal or ambition. This is mainly done is a specific area like sustainability, lobbying, technology, etc. but does not contain any financial arrangements (this definition is used in this study). A partnership is a complex instrument for delivering practical solutions to societal and community issues and for that reason will most of the time have a limited lifespan.

Joint-venture / investment (participation)

The furthest collaboration form (apart from a merger which is less relevant for overseas collaboration) is a joint-venture or participation that a port authority can engage into. This type of collaboration comes with financial arrangements meaning that a port authority is taking a portion or full ownership over an overseas port. This type of collaboration is mostly for a longer term compared to the above and is fully formalized.

2.4 Research scope for this thesis

This last part will frame the literature and theory set out in this second chapter and will link this to the multiple case study approach which will be conducted as one of the research methodologies in this research.

For all the port foreland collaboration initiatives that will be identified for the port authorities of Hamburg, Rotterdam and Antwerp the researcher will indicate the collaboration type and level based on the three port internationalization steps as mentioned by Dooms et al (2013): establishing commercial representation abroad, transfer of port specific knowledge and foreign direct investments in the form of a joint-venture of participation. The form that these will be in are in line with the three types described be Bailey & Koney (2000) being memorandum of understanding (MoU), partnership or joint-venture / investment (participation). This information will be obtained from both the interviews and desktop research and will be used to give the relevant background in order to answer the research questions. Based on the above typologies and degrees of collaborations the researcher will validate if the theory is applicable to the practical use-cases or that the theoretical frameworks have to be altered/extended.

The first and foremost focus remains on the foreland collaborations (the vertical integration to coordinate along the supply chain) according to the model of Brooks et al and how the current knowledge can be applied to this. The most important subject under study is the rationale behind the collaboration types in order to distillate the driver(s) of this initiatives and the subsequent outcomes of the current port authority collaborations. In the final chapter the theoretical framework and the obtained qualitative data and information will come together to see if how this fits the existing frameworks.

3. Case Studies

In the first chapter of this thesis the research question and the related sub research questions are stated. In this chapter the methodology will be described how to answer these questions and how the conclusions will be derived. Section 1.4 already introduced the two used research methodologies, being a multiple case study approach with in-depth interviews to collect and analyse primary data and desktop analysis using secondary data.

3.1 Case study approach

Case studies have been used in the academic world for over centuries as an aid to describe, teach and explain research in multiple different fields (Yin, 1981). They are an appropriate tool when the 'why and 'how' question is being asked, when there is limited control over the event and the focus is on a contemporary event within a real-life context. The use of case studies allows the researcher to examine the knowledge utilization process and ultimately to recommend and design appropriate policy interventions. Case studies are a way to study knowledge utilization and have the following characteristics:

TABLE 9 CASE STUDY CHARACTERISTICS (YIN, 1981)

#	Characteristic
1	A series of decisions that occur over a long period of time, with no clear beginning or end points (i.e. not sharply delineated from their temporal context)
2	Outcomes whose direct and indirect implications are too complex for single factor theories
3	A large number of relevant participants
4	Situations that are special in terms of agency context, historical moment in time, and other key elements

As Yin describes there are two basic case study designs, being a single case study or a multiple case study. In the situation of a single case study valid tests can be provided likewise critical experiments. Multiple case study design is used when the believe is that the same phenomenon exists in a variety of situations. In this latter event every case study will be conducted on its own but the combination of outcomes on the same topic is intended to form the basis for replicating or confirming the results.

Aim of this thesis is to contribute to the phenomenon of port foreland collaboration hence the multiple case study approach has been chosen. Literature confirms that the use of three or four case studies is sufficient; if a certain phenomenon has been shown to occur in all these cases the following step is to develop a general explanation or synthesis across these cases and potentially even extrapolate beyond (Hersen & Barlow, 1976).

The multiple case study is a suitable methodology for this thesis finding as the 'why' and 'how' question is not being answered in the available academic literature and hence will be directly obtained from the relevant stakeholders. Furthermore port foreland collaboration is a phenomenon already taking place in real life and hence is impossible to control in a theoretical research setting. In order to drive a meaningful conclusion out

of this thesis the researcher has decided to study three cases, being the port foreland collaborations of the ports of Hamburg, Rotterdam and Antwerp (all individually) and combine and analyse the results afterwards. These three ports have been chosen as they are all three internationally recognized seaports in each other's vicinity and subsequently compete for the same trade flows into the contestable hinterland. There is capricious cooperation and collaboration between these ports to date which might give interesting insights in the way they are securing cargo flows and turnover using their foreland.

FIGURE 8 PORTS OF HAMBURG, ROTTERDAM AND ANTWERP WITHIN EUROPE

Executing a case study analysis is done in several steps which will be replicated in this thesis as well. Starting point is defining the research question(s) and selecting the cases. After this the data collection methodology design is being developed and the researcher will enter the field to obtain the needed data and information. After the data gathering the analysis takes place which might lead to a reshaping of the research question. The outcome will be compared with the existing literature and similarities or conflicts will be discussed which ultimately will lead to a closure of the research – potentially including future research recommendations (Eisenhardt, 1989).

This thesis will make use of two data gathering techniques to come to a valid multiple case study approach. The first one is a desktop analysis of available and relevant information to describe the research framework which is typified as secondary data collection and the second one are interviews with key informants being typified as primary data collection. Both are qualitative data sources and will be described further in the next sections.

3.1.1 Desktop analysis

Starting point is the desktop research using several sources, being academic articles, port annual reports, port strategy documentation, professional literature (e.g. Nieuwsblad Transport, Maasmond Maritime and other specialized magazines), academic knowledge exchange platforms like Porteconomics.eu and other online media (retrieved from Google Media). This desktop research is input for the theoretical framework in chapter 2 as well as for preparing the interview content for the three case studies.

Desktop research is a proven research methodology once this is executed in a systematic and repeatable way. For this study the researcher has attempted to make use of the Atlas.ti software to execute a qualitative content analysis of large bodies of textual data from the sources mentioned above; however this has proven not to be successful due to the sheer volume of irrelevant 'hits' so it has been decided to execute this analysis manually. This gave the researcher the possibility to find all port foreland collaborations from the past years for all three ports including potential future initiatives. Per case the used sources will be described in detail as there is no one unanimous source describing all three at the same level of detail. As indicated in the second chapter all the initiatives that will be studied will be clubbed in the following three collaboration types:

1. Memorandum of understanding (MoU)
2. Partnership
3. Joint-venture / investment (participation)

As all the different collaborations under study might name and/or type their collaboration differently a table with all the terms and the mapping to the above three forms can be found in Appendix B.

3.1.2 Interviews

Conducting interviews is a proven method to collect data directly from the source and will give an unprecedented insight into the cases. They can lead to ample and new information (Yin, 2014) and will be the prime source for answering the research questions in this thesis. Drawback could be that interviews are easily biased based on the interviewer's professional background, preparation and/or interview techniques. Also the interviewee can have multiple (hidden) agenda's or might not be able to clearly bring over his or her opinion to the interviewer. In this research two persons will be interviewed per case study (so per port) in order to counter the potential biased view of either the port authority representative or the academic expert. Additionally the earlier conducted literature study will mitigate any potential biased interview outcome by the researcher.

For the interviews a list of basic questions will be prepared beforehand which will be used in the interviews for all three ports. Based on the individual port situation and the earlier retrieved information, port-specific questions are prepared to obtain more detailed knowledge on port foreland collaboration. Based on the given answers the interviewer can proceed with more in-depth question where applicable. The used interview question can be found in appendix A of this thesis.

3.2 Port of Hamburg

The Port of Hamburg is situated 120 kilometres inland at the Elbe river in Germany and processes around 9,000 ship calls per year. Last year 136.5 million tons of cargo has been handled including 8.8 million TEUs, which makes Hamburg the 3rd largest container port in Europe (Port of Hamburg, 2018). The hinterland is mainly served by rail and road due to a relatively limited waterway structure in the wider hinterland.

For the desktop research the following sources have been used to obtain the secondary source data:

- Website Port of Hamburg port authority
- Website Hafen Hamburg Marketing e.V. – port association documentation
- Port of Hamburg annual reports (2015 and 2016 available in English)
- Hamburg Port development plan to 2025
- Google smart search relevant publications[4]
- Academic literature

For obtaining the primary source data the following persons have been interviewed:

Name	Function	Port authority/Academia
Mr. Björn Pistol	Head of Port Strategy Hamburg Port Authority (HPA)	Port authority
Prof. Dr. Michele Acciaro	Associate Professor of Maritime Logistics, Kühne Logistics University - Wissenschaftliche Hochschule für Logistik und Unternehmensführung	Academia

FIGURE 9 PORT OF HAMBURG INTERVIEWEES

3.3 Port of Rotterdam

The Port of Rotterdam is directly situated at the Northsea coast in the estuary of the Nieuwe Waterweg in the Netherlands and processes around 30.000 seagoing and 105.000 barge vessel calls per year. Last year 467.4 million tons of cargo has been handled including 13.7 million TEUs, which makes Rotterdam the largest container port in Europe (Port of Rotterdam, 2018). The hinterland is connected by waterways, road, rail and pipeline connections.

For the desktop research the following sources have been used to obtain the secondary source data:

- Website Port of Rotterdam port authority
- Annual reports 2008 - 2017 (2008 till 2013 in Dutch, afterwards in English)
- Government policy documentation on port development
- Google smart search relevant publications
- Academic literature

[4] See appendix B for the complete list of exact search terms

For obtaining the primary source data the following persons have been interviewed:

Name	Function	Port authority/Academia
Mr. René van der Plas	CEO of Port of Rotterdam International (PoRint)	Port authority
Dr. Larissa van der Lugt	Executive Director, Urban, Ports and Transport Economics (RHV BV), Erasmus University Rotterdam	Academia

FIGURE 10 PORT OF ROTTERDAM INTERVIEWEES

3.4 Port of Antwerp

The Port of Antwerp is situated 80 kilometres inland at the river Scheldt in Belgium and processes around 14.400 vessel calls per year. Last year 223.6 million tons of cargo has been handled including 10.4 million TEUs, which makes Antwerp the 2nd largest container port in Europe (Port of Antwerp, 2018). The hinterland is connected by waterway, road, rail and pipeline connections.

For the desktop research the following sources have been used to obtain the secondary source data:

- Website Port of Antwerp port authority
- Annual reports 2008 - 2017 (Combined between Dutch and English)
- Google smart search relevant publications
- Academic literature

For obtaining the primary source data the following persons have been interviewed

Name	Function	Port authority/Academia
Mr. Luc Arnouts	Vice President Director International Relations Port of Antwerp	Port authority
Prof. Dr. Michaël Dooms	Professor Management and Strategy, Vrije Universiteit Brussel	Academia

FIGURE 11 PORT OF ANTWERP INTERVIEWEES

In the next section of this thesis the above presented desktop research and interview outcomes will be described in the results.

4. Results

This section of the thesis will present the results from both the interviews and the desktop research which will be used to answer the main research question and related sub research questions in the final chapter. The results are clubbed together per case study and the conclusion will be drawn in the final chapter.

4.1 Port of Hamburg

The Port of Hamburg has only slowly engaged into port foreland collaborations with overseas ports compared to the other two ports under study. One very clear difference with the other two is that the Port of Hamburg authority is not allowed to make any financial investments or take any monetary participations outside the Free and Hanseatic City of Hamburg (Hamburg federal state) by law. The international strategy that the Port of Hamburg Authority (HPA) has for the longer term is shaped around the digitalization of the global logistics chain and the role that the worldwide leading seaports can play in this area by sharing digital best practices and setting quality standards (Hamburg Port Authority AöR, 2016). This strategy can also be found below in one of their collaboration initiatives. In the Hamburg Port Development Plan to 2025 the HPA states that more intense collaboration initiatives will be intensified and relationship will be strengthened in order to open up new growth markets. The way to do this is onsite representation in the fastgrowing countries of Brazil and India and establishing advisory relationships and participation concepts for the Port of Hamburg to take advantage of (Free and Hanseatic City of Hamburg – State Ministry of Economic Affairs, Transport and Innovation, 2012).

An overview of the past and current port foreland collaborations can be found in the following table:

TABLE 10 PORT OF HAMBURG PORT FORELAND COLLABORATION INITIATIVES

Partner	Country	Initiative	Collaboration form	Timeline	Objectives
Port of Los Angeles	United States	Port of Los Angeles	Memorandum of understanding	Since 2013	Knowledge sharing and exchange, training
Multiple Ports	Multiple countries	Sister ports	Memorandum of understanding	Since 1992	Knowledge sharing
Rosmorport	Russian Federation	Rosmorport	Memorandum of understanding	2013	Knowledge sharing and exchange, training
Multiple ports	Multiple countries	ChainPORT	Partnership	Since 2016	Knowledge sharing and exchange. Environmental sustainability, IT infrastructure development

Port of Los Angeles

A memorandum of understanding between the Hamburg Port Authority and Port of Los Angeles Authority has been signed on June 6, 2013 for a period of five years. In this period both ports agreed to share strategies and discuss best practices on topics ranging from port infrastructure, environmental and security challenges and strategies to enhance trade competitiveness. One of the spin-offs of this collaboration is the creation of the ChainPORT initiative which will be discussed in a following paragraph. The main drivers to engage into this collaboration form has been to discuss interest and concerns on equal footage without fear of giving away competitive advantages due to the sheer geographical distance which means there will be no competition on cargo flows between these ports. On the other hand it is also not foreseen that cargo flows between Los Angeles and Hamburg will intensify as a result of this collaboration. Both ports specify themselves as leading seaports and expect to benefit from their collaboration by sharing best practices with regards to equipment and new technologies. Compared to the Port of Hamburg the Port of Los Angeles is also bounded by the Californian State Law that it cannot invest in port infrastructure outside its own home base.

Also according to the interviewees both ports perceive themselves as 'World ports' and are both located in a very dense area serving millions of customers close by. The type of challenges around sustainability (renewables), efficiency and logistics excellence that this results into are relevant for both ports and is worked on jointly. One other reason the HPA is engaging with the port of Los Angeles is the proximity to world-class digital developments at Los Angeles' doorstep in Silicon Valley. Many of the technology companies housing in that area work together with the Port of Los Angeles to provide and test their digital services. The Port of Hamburg is benefitting from this by improving their asset efficiency and by fuelling their digital initiatives. This collaboration is expected to be renewed in the near future.

Sister ports

The second port foreland collaboration initiative is the bilateral partner port network that the Port of Hamburg authority has set up between themselves and Busan Port Authority (since 2012), Tanzania Ports Authority (since 2007), Kaohsiung Harbour Bureau (since 1999), Shenzhen Municipal Port Authority (since 2007), Yokohama Port Public Corporation (since 1992), Administatcion Nacional de Puertos Montevideo (since 2005), Port of Halifax (since 2004), Port of Gothenburg (since 2015) and Port of Bronka (since 2015), Shanghai International Port (since 2004) and the Port of Söderham by means of memoranda of understanding. From the literature there is some criticism on how this concept of sister ports is applied by the Port of Hamburg Authority as these lack any specific and formal pattern based on the available information and none of the knowledge sharing sister port initiatives are linked to concrete activities and results (Pallis & Kladaki, 2016). The researcher also has tried to find empirical evidence of these collaboration results by taking the lens from the respective sister port but did not succeed in this. According to one of the interviewees multiple ports would like to be connected to the Port of Hamburg as they are seen as leaders in port management and other ports can benefit from this. Reason that they are leaders is that the Hamburg port is a very complex and space-constrained area which needs a strong port governance in order to succeed. The

HPA is showing that they are capable of doing this successfully and are seen as best in class.

Additional sister ports will be established based on the “Hamburg port development plan to 2025” as the relationship between the Port of Hamburg and ports in Brazil and Russia will be tightened by the means of partnerships so these partner ports can benefit from the knowledge of the Port of Hamburg’s experts and in return it offers Hamburg tangible advantages by the means of close process and IT integration with common standards to develop important efficiency potentials and facilitate the processing of goods with their partners (Free and Hanseatic City of Hamburg – State Ministry of Economic Affairs, Transport and Innovation, 2012). This latter partnership has concrete goals and will be measured in the future.

The main drivers for the Port of Hamburg authorities to engage into these sister port’s initiatives are mainly to secure liner services to and from Hamburg to their sister ports (mainly for Busan, Shenzen, Montevideo, Halifax and Shanghai) and the exchange of technical staff (Yokohoma). The securing of liner services however can only be influenced partly by port authorities as mainly the liner companies themselves and terminal operators drive these service schedules and the port authority has no direct stake in this (as described earlier in section 2.2).

It is expected that the Port of Hamburg Authority will continue to expand its network of sister ports but this will be tied more and more to the ChainPORT initiative.

Rosmorport

In 2013 the Port of Hamburg Marketing e.V (the communication department of the HPA) and the Moscow based FSUE Rosmorport have signed a memorandum of understanding during an annual reception in Saint Petersburg. The goals of this cooperation are the exchange of information on the plans for development and modernization of port capacities, contribution to the development of trade between the two countries, elaboration of educational programs for professional development of Russian and German specialists in port industry, organization of information exchange on the vessel services, development of sea feeder traffic and logistic services and organization of experience exchange to increase the energy efficiency of port capacities and implement renewable energy sources for the energy supply of the port facilities (FSUE Rosmorport, 2013).

Reason for the Port of Hamburg to engage into this collaboration is the strategic importance of Russia as a trade partner and the need to keep good relationships. By means of container cargo Russia is the second largest trade partner with over 400.000 TEU annually (number one being China with >2.500.000 TEU) and the same holds for other cargo types (Hafen Hamburg e.V., sd). Where other ports – and countries – currently having difficulties to keep up the relationship with Rosmorport due to political influences HPA is able to keep them lukewarm as there is not too much visibility from Germany as a country on the port of Hamburg in contrast to Antwerp and Rotterdam from respectively the Belgium and Dutch governments.

ChainPORT

The ChainPORT collaboration initiative initially started in the Port of Hamburg as a pilot project of their innovative SmartPORT concept. This concept aims to push the optimization of the traffic and goods flows through IT solutions ahead which reaches from IoT/sensor technology and analysis to forecasting and smart efficiency process improvements on a number of subjects (navigation, parking, shore power, maintenance, etc). Based on these experiences, the thought of the future-oriented, intelligent port is jointly developed further by the Port of Hamburg and Port of Los Angeles and resulted in an international network between ports in 2015. This initiative goes beyond the traditional bi-lateral port partnerships by setting up a future oriented network of partner ports (currently the Port of Hamburg and the Ports of Busan, Antwerp, Barcelona, Felixstowe, Indonesia, Los Angeles, Montreal, Panama, Singapore, Shanghai, Shenzhen and Rotterdam) who can jointly take on subjects and develop innovations together. The overall goal is to improve the global efficiency of maritime transport by sharing the use of intelligent systems and data with other ports to ensure sustainable growth. Additionally the handing of ever larger containerships will be jointly discussed and solutions for better planning of their port calls developed. The third joint goal is the approach towards sustainability where smart digital solutions can help the environment and society by setting joined standards and the exchange of knowledge.

The ChainPORT collaboration is embraced by both foreland and competitive ports which makes this an ambiguous initiative to further study for this port foreland collaboration research.

From the four collaboration initiatives above it can be concluded that the Port of Hamburg is certainly not blind for their foreland ports but they are acting conservative and traditional in this area. The main reason for this is that they have to walk the line of the Hamburg municipality and cannot act at arm's length. The focus is first and foremost attached to the local community and addresses the fundamental question on what a port authority should strive for. Earlier investment initiatives in e.g. the Jade-Weser port situated in the Elbe estuary has been withdrawn by the Hamburg political parties (both the CDU and Grünen party) and the state of Lower Saxony and the city of Bremen now own this port. There was a twofold future vision from the academic and from the port authority interviewee as potentially the Port of Hamburg authority might turn into a limited company (GmbH in German) and can start exploring more financial investments (a.o. in port foreland) or it might be that in 50 years' time the port of Hamburg will have been transformed in a spoke port with a very strong local and logistical focus. Potential negative externalities from port foreland collaborations will have a large influence on their future way forward.

4.2 Port of Rotterdam

The Port of Rotterdam has been an early adaptor in port foreland collaborations and is gradually building out their overseas network. The dedicated Port of Rotterdam International office (PoRint) is a department within the Port of Rotterdam Authority and is able to mobilize teams of experts based on the needed collaboration type. By acting in the international maritime scene, the Port of Rotterdam Authority creates economic and social value for the Netherlands in general and especially for the Rotterdam region. The

major goals are to offer Dutch companies opportunities abroad, to learn from international best practices, to uphold the reputation of the Rotterdam maritime cluster and to achieve financial returns from its international activities. The Port Authority fulfils various roles in this: as an advisor, supplier, port manager and as an investor (Port of Rotterdam International, 2018). To do so PoRint is building a portfolio under the name of "World Port Network" of ports that are developed and operated in partnership with the Port of Rotterdam Authority. This portfolio must consist of ports in growth markets with a good geographic distribution, of sufficient size and with activities in petrochemicals, energy, transport and logistics area. With these ports, the Port of Rotterdam Authority wants to build close customer relationships in the form of participations (joint ventures) and global strategic partnerships (Havenbedrijf Rotterdam N.V., 2012). An overview of the past and current port foreland collaborations can be found in the following table:

TABLE 11 PORT OF ROTTERDAM FORELAND COLLABORATION INITIATIVES

Partner	Country	Initiative	Collaboration form	Timeline	Objectives
Sohar Industrial Port Company	Oman	Sohar Port and Freezone	Joint venture / participation	Since 2002	Port growth
TPK Logistica S/A	Brazil	Porto Central	Joint venture / Participation	Since 2014	Infrastructure development and port growth
Ceará	Brazil	Port of Pecém	Joint venture / participation	Since 2017	Infrastructure development and port growth
Suape	Brazil	Port of Suape	Memorandum of understanding	2008 - 2010	Explore joint venture and new port governance
PT Pelabuhan Indonesia I (Pelindo I)	Indonesia	Port of Kuala Tanjung	MoU to be converted into JV/participation	Since 2015	Infrastructure development
IPC and JakPro	Indonesia	Port of Jakarta	Memorandum of understanding	Since 2016	Port growth
Port of Constanza	Romania	Port of Constanza	Memorandum of understanding	2011 - 2014	Explore joint venture and new port governance
Positra	India	Port of Positra	Memorandum of understanding	2009 - 2010	Explore joint venture
SKIL Infrastructure Limited	India	Port West	Joint venture / participation	2008 -2010	Infrastructure development

Partner	Country	Initiative	Collaboration form	Timeline	Objectives
Rosmorport	Russian Federation	Rosmorport	Memorandum of understanding	Since 2011	Port infrastructure development
Nangang Industrial Port Complex	China	Port of Nangang	Memorandum of understanding	2011 - 2012	Explore joint venture and new port governance

Sohar Port and Freezone

The first port foreland collaboration that the Port of Rotterdam Authority has engaged into is a 50/50 joint venture with the Sultanate of Oman into the Sohar Industrial Port Company (SIPC) in 2002 to develop and manage the port of Sohar after an earlier port consultancy assignment. This port is situated in the Strait of Hormuz on an important shipping route and in between the cities of Dubai and Muscat. The concession has been extended in 2007 and now runs till 2042. In 2009 the joint venture Sohar Industrial Development Company (SIDC) has been setup to develop and manage the special economic freezone which started in 2010. The 2017 annual report of the Port of Rotterdam Authority specifies that currently over 50 million tons of cargo is shipped yearly, Rotterdam-based customers and Dutch maritime companies have supported the design, development and operations of the port of Sohar and value has been created by the origination of over 24.000 jobs. On the financial side the return on investment has been 10 years and the joint venture is now steadily contributing to the Port of Rotterdam's financial results (Havenbedrijf Rotterdam N.V., 2018).

According to the interviewees the longer term strategy is now revenue generation – as the port has reached it's payback time – and resource capability development in port governance and management for Port of Rotterdam Authority staff by offering them interesting expat experiences and international career opportunities. Additionally PoRint is aiming to continue investing in and developing of an industrial and chemicals cluster to serve their current client base. Challenge will be the blurring relationship that this will turn into as some of their other Rotterdam-based customers might feel left behind if PoRint does not involve them or serve their needs abroad.

Porto Central

Based on earlier research and analysis done by PoRint around the Brazilian government's master plan of 22 ports insidership has been obtained which has led to the decision to engage into the development of Porto Central. In 2014 the Port of Rotterdam Authority and TPK Logistica S/A (part of Polimix, a leading concrete manufacturer in Brazil) have signed a joint venture agreement to develop a greenfield port 'from zero' in the Brazilian state of Espirito Santos, just north of Rio de Janeiro, to ship oil, gas, dry bulk, containers and breakbulk cargo. The main goal is to connect Brazil to the international markets by developing and managing the port of Porto Central in a competitive, efficient, safe and sustainable manner. In the 2017 annual report the Port of Rotterdam Authority has indicated that good progress has been made in the commercial and technical space however the team on the ground is still working towards an

investment decision as the construction of the port infrastructure is expected to start in 2019 (Havenbedrijf Rotterdam N.V., 2018). This last statement has been nuanced by one of the interviewees to a time period of approximately two years.

The main challenge remains the financial funding of the port development activities where commitments have to be given by some major oil companies before other parties will step in. Also the collaboration with a private company (which makes this a private public partnership with financial interests) will bring additional risks which not too many parties are keen on to take. On the other hand Port Central will be able to cover almost two-third of the Brazilian captive hinterland and it has the potential to become the largest South-American hub for direct exports to China where the Port of Rotterdam can team up with their customers (e.g. Vale) which will result in a better relationship and potentially increase cargo flow for the Rotterdam area. This last part however is a positive side-effect instead of a primary goal.

Port of Pecém

The port of Pecém is an already existing port closely situated near Fortaleza and owned by the state of Ceara, Brazil. It has a clear growth potential after a feasibility study has been conducted earlier by PoRint. This study has indicated that thorough improvements in the professionalization of the port, the port management and adjacent industrial complex is necessary to materialize this potential. In August 2018 the Port of Rotterdam Authority has indicated that they will invest €75 million in the joint venture to obtain a 30% participation and bring in deep port expertise and knowledge to transform the port of Pecém from a regional cargo handling facility to the logistics and commercial node of Northeast Brazil. Both investments in the Brazilian ports of Pecém and Porto Central are complimentary as they are geographically dispersed by 2500 kilometres, serve a different hinterland and partly aim for different types of cargo flows. For this collaboration the main reasons have been indicated as first and foremost revenue generation and resource development (like for Sohar). Significant additional cargo flows from and to Rotterdam are not foreseen for the near future.

Port of Suape

In 2008 the Port of Rotterdam Authority has signed a memorandum of understanding with the port of Suape (located near Recife, Brazil) to draft a masterplan for this port for the coming twenty years. In the meantime discussions took place if a partnership would have potential. In 2010 this has led to a memorandum of undertstanding to explore a potential joint venture and a new port governance structure. In the 2011 annual report however no notion of this collaboration has been made anymore as the detailed analysis made evident that no healthy business case could be made for a potential collaboration/investment due to a difficult (political) governance structure.

Port of Kuala Tanjung

The Port of Rotterdam Authority has been exploring to engage into a joint venture with the Indonesian state-owned port management company Pelindo I to develop a deep-sea port in Kuala Tanjung situated in the province of North Sumatra at the Malacca strait. Based on a feasibility study in 2017 the potential of the social-economic value that can

be obtained is high however there are stringent commercial and financial challenges for this project. Currently the Port of Rotterdam Authority is discussing how these challenges can be overcome and is negotiation on the terms and conditions with the Indonesian authorities how to continue the collaboration to end-up in a constructive joint venture. Political statements by both the Indonesian and Dutch prime ministers have brought this potential collaboration in a rapid but according to the interviewees nothing concrete has been agreed upon yet.

Port of Jakarta

To develop the port of Jakarta the Port of Rotterdam Authority has signed a memorandum of understanding with the state-owned Indonesian Port Company (Pelindo II) and the Jakarta based ground moving company JakPro in 2016. This MoU consists of the support of a consortium made up of mainly Dutch companies who are undertaking a feasibility study on potential port developments, especially for the so-called O-, P- en Q- islands. In order to support this work the Port of Rotterdam authority has opened an office in Jakarta. Tighter collaboration (e.g. by means of partnership or joint-venture) is currently not opportune.

Port of Constanza

The Port of Rotterdam Authority has signed a memorandum of understanding with the Port of Constanza in 2011 to deliver port management services to the Constanza port management authority the year after. However due to the changed political situation this has been delayed and in 2014 the Port of Rotterdam Authority has indicated that a joint-venture is not opportune. (Havenbedrijf Rotterdam N.V., 2015). Based on the interviews however PoRint has indicated that interest is renewed as Eastern Europe is a focus area in the current international strategy. Challenges however remain in the political area and corruption practices which makes it difficult to roll-out a good governance approach[5].

Port of Positra

In 2009 the Port of Rotterdam Authority has signed a memorandum of understanding with the port of Positra, situated on the west coast peninsula of the Indian continent, to provide technology and knowhow. The year after however this project turned out to be unsuccessful and the Port of Rotterdam is shifting its attention to other Indian ports. An analysis has indicated that no healthy business case could be created which could make allowances for a further collaboration (e.g. by means of partnership or joint-venture).

Port West

The Port of Rotterdam Authority and SKIL Infrastructure Limited (a leading infrastructure development company in India), have entered into a memorandum of understanding in December 2008 with respect to the greenfield development of an all-weather deep-sea port in Dwarka in Gujrat, named Port West, close to the earlier mentioned Port of Positra. This agreement sets out a joint feasibility study and investigations for the port

[5] The term ‘good governance’ is widely used and defined but in this context it is meant that the collaboration form has to be transparent whilst trust and legitimacy are kept at a high standard.

development. Currently this project is in the process of obtaining clearance under requisite Indian environment laws before construction can commence. However the collaboration with the Indian Maritime Board to obtain these clearances has been proven very difficult which made PoRint decide not to pursue this collaboration any further.

Rosmorport

In 2011 the Port of Rotterdam Authority and the Moscow based FSUE Rosmorport (a federal state unitary enterprise) have signed a memorandum of understanding to explore a strategic partnership and a mutually advantageous relationship in port infrastructure development and realization of joint investment projects (FSUE Rosmorport, 2010). In the literature no additional information has been found and from the interviewees the researcher has learned that collaborations are not actively pursued from the side of the Port of Rotterdam Authority. Although not literally stated the assumption is that this has to do with all recent diplomatic incidents over the last five years.

Nangang Industrial Port Complex

The Port of Rotterdam authority has signed a memorandum of understanding with the Nangang Industrial Port Complex near Beijing in 2011 to deliver port management services and to explore the possibility of a future joint venture. In 2012 however only port consultancy assignments have been performed and implicitly the participation desire has deteriorated (Dooms, et al., 2013).

All the initiatives above are based on collaborations with overseas port development, knowledge sharing and potential investment opportunities. Since January 2018 the Port of Rotterdam Authority is widening from greenfield projects to brownfield projects by extending activities under the their Digital Business Solutions (DBS) business unit. Over the years several IT applications have been developed in-house (e.g. Portbase, Nextlogic, Pronto and Navigate) and the port authority's aim is to commercially market these. DBS wants to connect to the digital developments that are ongoing which will influence the overall playing field of logistics and ports (Havenbedrijf Rotterdam N.V., 2018). In 2017 several market exploration studies and visits have been performed (amongst others to the Port of Aqaba, Jordan) but this has not yet resulted into signed contracts with overseas parties. For this reason the researcher will leave this new initiative outside the further research.

As can be concluded from the above section the drivers of the Port of Rotterdam Authority to engage in port foreland collaboration are knowledge sharing, (financial) participation and strengthening the commercial ties with current customers, creating the possibility of recruiting new customers and resource developments. They will do this both with greenfield and brownfield development. The 2016 annual report stated that the international participations in Oman and Brazil already contributed €8,9 million to the financial results (Havenbedrijf Rotterdam N.V., 2017). Based on the interviews it has become apparent that PoRint's strategy will be less ambitious then earlier with the aim to have five foreign (foreland) investments in 2025, which means an additional two based on their current portfolio. Their focus will remain on the BRIC countries but is broadened

by Eastern Europe which will start to play a more active role in the foreseen logistical shifts as a result of China's belt and road initiatives (The Belt & Road Initiative's Impact on Global Logistics, 2018).

On top of the strategic investment areas the researcher learned that additional collaborations might be foreseen in Curacao (driver is mainly the kingdom relationship), Turkey (currently providing port consulting services), South-East Asia (Vietnam, Thailand, Malaysia as potential counteract on China's influence in this region), Egypt and Mozambique. Port and relationship development in all these countries take a long time to mature and potentially materialize so PoRint will remain to seek additional opportunities in the future.

4.3 Port of Antwerp

Since fifteen years the Port of Antwerp is working as an 'active' landlord port and as a driver of change by improving efficiencies at the port as well as influencing practices along the wider supply chain. Antwerp's key success factors include that they are widely connected to the worldwide foreland, they are located in the heart of Europe providing them with excellent hinterland connections and their dedication to value add has led to their customers developing a strong sense of trust in their port (National Transport Commission, 2013). The above can be seen in the number of foreland collaboration forms that the Port of Antwerp Authority has engaged into. Just like the Port of Rotterdam the Port of Antwerp Authority has set up a dedicated international division (Port of Antwerp International – PAI) in 2010 to strengthening the port of Antwerp's international presence. Their strategy is to support in the development of port and logistical infrastructure in the Middle East, India, Africa, Southeast Asia and Brazil by helping to build a port in a professionally, efficient and sustainable manner. They do this from short-term, one-off study and research assignments (advisory-style) to long term investments. Every project should be conducted under the good governance code and add value for both parties.

The Port of Antwerp foreland collaborations are managed from three different angles, being from the port authority itself, from the APEC-Antwerp/Flanders Port Training Center and from the Port of Antwerp International. The PoA authority has published a list with all the international agreements that these three organizations have but for this research we mainly focus on the PAI ones and a few relevant collaborations in which the authority has engaged itself. The individual collaborations from APEC consist of (commercial) training agreements which for the sake of this research are omitted.

An overview of the past and current port foreland collaborations can be found in the following table:

TABLE 12 PORT OF ANTWERP FORELAND COLLABORATION INITIATIVES

Partner	Country	Initiative	Collaboration form	Timeline	Objectives
Office National des Transports' (Onatra)	Congo	Port of Matadi	Development aid collaboration (via MoU)	Since 2003	Knowledge sharing, port growth and infrastructure development

Partner	Country	Initiative	Collaboration form	Timeline	Objectives
Montreal	Canada	Port of Montreal	Memorandum of understanding	Since 2013	knowledge sharing and port growth
Secretaria de Portos da Presidencia da Republica	Brazil	Main Brazilian ports	Memorandum of understanding	Since 2015	knowledge sharing and port growth
San Pedro	Ivory Coast	Port of San Pedro	Joint venture / participation	Since 2011	Infrastructure development
Rosmoport	Russian Federation	Rosmoport	Memorandum of understanding	Since 2012	Environmental sustainability, logistics & hinterland and infrastructure development
Essar Ports	India	Ports of Hazira, Vadinar, Salaya and Paradip	Joint venture / participation	Since 2011	Logistics & hinterland and port growth
Guangzhou	China	Port of Guangzhou	Memorandum of understanding	Since 2015	Commercial growth
Banjul	Gambia	Port of Banjul	Memorandum of understanding	Since 2018	Port advisory
Douala	Cameroon	Port of Douala	Memorandum of understanding	Since 2018	Port management, training
Port of Duqm Company	Oman	Port of Duqm	Joint venture / participation	Since 2012	Port governance
Port of Baku	Azerbaijan	Port of Baku	Memorandum of understanding	Since 2015	Knowledge sharing, training and port governance
Prumo Logística	Brazil	Port of Açu	Joint venture / participation	Since 2017	Port growth

Port of Matadi

The Port of Antwerp Authority has engaged into a ‘sisterport’ agreement with the Office National des Transports’ (Onatra) in Congo to jointly repair, redevelop and support the Port of Matadi. This port is the country’s most important maritime port as it handles 90% of the maritime traffic and is situated on the inland Congo River with a direct rail connection to the capital of Kinshasa. Due to the historic relations between Belgium and the Democratic Republic of Congo the Belgium government and the Worldbank have

freed up funds to re-build the port after the second civil war that has ended in 2003 as part of a wider development aid program. The Port of Antwerp Authority has set up a dedicated 'Congoteam' to improve and sustain the relationships between all parties and to oversee that all the investments in training, infrastructure and renewed port governance are spent well. On the other side the Port of Antwerp is benefitting from the can-do mindset of the Congolese people and Belgium companies are able to invest or take a concession in Matadi. Since 2006 additional repair work has been carried out in the adjacent port of Boma as these two ports work complementary and are used by the shipping companies according to the berthing capacity available in each. Longer term aim of the Port of Antwerp Authority is to switch the ports of Matadi and Boma from a service port to a landlord port so the private sector will start investing in superstructures, cargo handling and all other commercial activities. This will leave Onatra responsible for the general management of the port, the basic infrastructure and the nautical access. The port authority expects that Antwerp will continue to deliver technical support in the near future but no further collaboration in the form of a foreign direct investment is foreseen.

Port of Montreal

In 2013 PAI and the Port of Montreal (Quebec) have signed a memorandum of understanding which was extended by three years in 2015. The aim of this collaboration is to benefit from the Comprehensive Economic and Trade Agreement (CETA) which is in place to ease the trade between Canada and the European Union and to launch Quebec to become a logistics hub between Europe and the United States. The interviewees indicated that this collaboration is mainly build based on personal relationships and aim is to develop digital collaboration initiatives (e.g. blockchain study in progress) and improving cargo flows. This last one have already significantly increased as a result of this collaboration.

Main Brazilian ports (Secretaria de Portos da Presidencia da Republica)

Both subsidiaries of the Antwerp Port Authority (PAI and APEC) have signed a memorandum of understanding with the Brazilian port authorities to offer local seminars in the main Brazilian ports and introduce the train-the-trainer concept for sustainably embed the port knowledge in Brazil. Currently this collaboration is materializing in the port of Santos (Sao Paulo) by conducting trainings from a locally situated APEC school but from the PAI point of view no additional collaboration forms are foreseen for the near future.

Port of San Pedro

A privileged partnership agreement with financial interests has been signed in 2011 between the Port of Antwerp Authority and Port Autonome de San Pedro, Ivory Coast. The aim of this agreement is to collaborate intensively in the areas of technical support, training, commercial activities and investments. In 2016 this agreement has been renewed with the aim to develop at regional level to become a logistics hotspot for handling commodities such as fertilizers, cashew nuts and cacao. San Pedro is the first foreign port where investments are made by PAI (35% ownership) as this port represent enormous potential benefits for the Port of Antwerp which is already the market leader

for West Africa (The Maritime Executive, 2016). The main driver for the Port of Antwerp to engage into this relationship has been to please one of their major customers SEA-invest (Belgian-based leading worldwide operator in the world of terminals for dry bulk, fruit and liquid bulk goods) which uses this port for many of their services. From the interviewees no information has been obtained around the financial results of this collaboration.

Rosmoport

PAI has signed a memorandum of understanding with FSUE Rosmoport in 2012 to work together in port development, the expansion of the transport and logistics network and attracting investments in port infrastructure and sustainability, mainly in the area of renewable energy (FSUE Rosmorport, 2012). Currently PAI is conducting port consultancy services but the challenge is to further team with Rosmorport due to political tensions. The city council of Antwerp (sole owner of the Port of Antwerp) is leaving the port management at arm's length but does have a direct influence due to their seat in the board of directors. For now they are favouring the economic interest above the political ones and do not intervene but any political or diplomatic incident might swap this priority which makes this a risky collaboration for the longer term.

Port of Hazira (Vadinar, Salaya and Paradip) - Essar Ports

In 2011 the PAI visited the Indian west coast and established a memorandum of understanding with Essar Ports (part of Essar Global Fund Limited which is an Indian conglomerate and an active investor in the metals & mining, energy, infrastructure and services industries). Goal of that MoU is to jointly work together as strategical partners to develop several port projects in India. This collaboration is mainly focussed on advisory, investments, training and the strengthening of the commercial relationships. The first focus was on the Port of Hazira on the Indian west coast and has extended afterwards to the ports of Vadinar, Salaya and Paradip (this last one is situated on the Indian east coast). Afterwards training of Indian port professionals by APEC/Flanders Port Training Center have been conducted in the established training center. This collaboration has been based on friendly ties of Port or Antwerp officials and member of staff from Essar ports and in order to strengthen this ties PAI has invested €25 million in 2012. Three years later however legislation forced Essar ports to withdraw a part of their company from the local stock exchange and the Port of Antwerp sold its participation for almost €33 million. The company became part of the bigger Essar Group of which another subsidiary – Essar Steel – has declared bankruptcy in 2018. This has had an impact on the cargo flow between the Essar ports and the Port of Antwerp which earlier went up due to their collaboration. For the future the interviewees indicate that both organizations will continue to work together on the ongoing engagements as they initially have been set out but without a financial investments (so back to partnership level).

Port of Guangzhou

The Port of Antwerp Authority and the Port of Guangzhou signed a memorandum of understanding in 2015 to increase commercial collaborations by intensifying the economic links between the two ports adopting a joint commercial approach. This should

result in a larger number of direct calls for both ports then the current two calls. Based on the interviews however no significant increased cargo flow has been seen till date but Port of Antwerp subsidiary APEC has set up the Guangzhou-Antwerp Port Training and Consultancy Co as one of their three facilities outside Antwerp (others are APEC do Brasil in Santos and JNPT-Antwerp Port Training and Consultancy Foundation in Mumbai, India).

Port of Banjul

As part of the PAI strategy to focus on potential collaborations between the port of Antwerp and ports in the Middle East, India, Africa, Southeast Asia and Brazil an advisory role is currently under execution at the Port of Banjul, Gambia. Goal of this role is to execute an analysis how the ports can collaborate even more closely in the future by leveraging the Antwerp port knowledge and the increasing developments in international trade in the West African sub region (Transport World Africa, 2018). As this study is currently in progress no further information has been shared.

Port of Douala

With the Cameroon port of Doula a memorandum of understanding has also been signed in 2018 to explore the possibilities of cooperation between the Port of Antwerp and ports in West and Central Africa (as is the case for the Port of Banjul as well). In this specific MoU the support of the development of Douala Port has been called out by leveraging Antwerp's port management and training capabilities. For Antwerp this collaboration can result in the strengthening of their market position of direct shipping services from and to West Africa and secure their gateway to Europe (Africa Business Communities, 2018). As this study is currently in progress no further information has been shared.

Port of Duqm

One of the first activities of the newly established Port of Antwerp International has been the signing of a memorandum of understanding in 2012 with the Sultanate of Oman for the development of the port of Duqm which is situated on the Eastern shore at the Arabian Sea. Both companies have engaged in a 50/50 joint venture in the newly created Port of Duqm Company (PDC) which will develop the port and exploit a distribution hub. The concession agreement between Port of Duqm Company and the Omani government was signed in December 2012 after the port has become operational earlier that year, making PDC responsible for managing the port for a period of 28 years. A number of Antwerp-based companies already operate here, and further activities are planned.

Engaging into a joint venture with the Sultanate of Oman for port development has a clear resemblance with the development of the port of Sohar by the Port of Rotterdam one decade earlier. Some say that PAI has chosen to do so as a copycat action (and could use the Rotterdam development as an argument in their business case) whereas others say that this development is about supporting the Antwerp client base in the petrochemical industry by creating synergies in this cluster. For the midterm PAI is expecting to receive a healthy yearly revenue from this participation but it is not expected that they will continue to partner in the longer term.

Port of Baku

In 2017 the Port of Antwerp Authority and the Port of Baku, Azerbaijan signed a memorandum of understanding agreement to further develop the Baku port and the associated logistics zone which is located on the border of the Caspian Sea and is a node in the new silk route. Also training will be performed by APEC/Flanders Port Training Center. Based on the interviews no current activities are ongoing and it is to be seen if these will be explored any time soon.

Port of Açu

Since 2017 PAI has taken a $10 million participation in the Port of Açu in return for 1,176% of the shares. This port is located near Minas Gerais in the industrial heart of Brazil just north of Rio de Janeiro and is operational since 2014. The port is privately owned by Prumo Logística, a Brazilian multi-business company created in 2007 to optimize the development of Brazil's energy and infrastructure sectors. The goal of this participation is to secure the cargo flow and the customer base between Brazil and the Port of Antwerp for the longer term. At the same time the Port of Antwerp will also carry out several advisory assignments. End of 2018 PAI can decide if it want to take a larger participation in this port (Port of Antwerp, 2017) but this has not yet been communicated at the date of conducting this research (the interviewees are however positive about the prolongation of this partnership). The Port of Antwerp has chosen to participate in Açu due to the congestion in the port of Santos which might redirect traffic form the contestable hinterland to the more northern located Açu port and brings to the Port of Açu expertise and knowledge in operations and development of a port-industrial complex. In line with the Port of Antwerp strategy to develop their employees internationally they offer several expat positions for young professionals which they can bring back to the home base after a few years. This process however has just started and no experience with returning professionals has materialized yet.

From the above it can be seen that the Port of Antwerp and their two international subsidiaries are very active in the port foreland collaboration area. Historically they have lagging a bit compared to the Port of Rotterdam but they are catching up after some 'me too' actions (literally quoted from one of the interviewees). PAI is very well aware that there is only a limited number of landlord model ports worldwide where they would be able to actively invest/participate. However they have an ambitious growth path to achieve their strategy of securing cargo flows (India and Africa), developing their talent (Brazil, Oman), boost their international reputation and generate revenue out of their foreland collaborations. This last driver is however not yet in place as the investment's payback time are still ongoing. According to the interviewees this is a drawback for Antwerp compared to Rotterdam as the latter has already a steady revenue flow and can free up funds for exploratory studies and new investments. Antwerp still has to prove that it can manage foreign participations in a profitable way which hampers potential future investments.

4.4 General results

All the above results from the port foreland collaborations by the ports of Hamburg, Rotterdam and Antwerp can be seen as an attempt of these ports to remain relevant in the global port world. Reason for this conclusion is that part of the interview questions that the researcher has been discussing has been firstly around the generic (respective) port strategies and secondly a zoom-in on the port foreland and the subsequent collaboration initiatives. Based on these first questions some more result around port foreland collaboration will be given in this section.

Between the three ports under study there is clear direct competition around cargo flows and (commercial) investment decisions. All three ports compete for container flows either for final destination or as a transhipment hub and the competition dynamics can be seen very well in this market due to the footloose characteristics of this cargo type. For some bulk materials this is also the case but here already some specialization can be seen so there is a coexistence in this market. Antwerp positions itself as a major value-added hub for the minor bulk product, Rotterdam is known for the major coal and iron ore terminals and Hamburg is specializing in suction cargo with silo capacity. In chemicals Rotterdam and Antwerp are competing for future investments to extend their chemicals cluster. From a distance however (based on symposium debate around the belt and road initiative) it can be argued that both ports act as one chemicals cluster due to the interwoven product movements by barge, iso-container and pipelines between the two. Rotterdam is more leaning towards the base chemicals spectrum (heel stock) whereas Antwerp is processing more speciality chemicals. There are however multiple facets where these ports are collaborating like sustainability, lobbying, standardization and technology. These four aspects sometimes come together or have an cause-and-effect impact on each other.

Sustainability

On the sustainability aspect all three ports are taking initiatives to reduce pollution and share the successful ones with each other through EcoPorts (create a level playing field on environment through cooperation and sharing of knowledge between ports). Clear example is the reduction of (cruise) ship emissions by pricing policies

Lobbying

As these three ports have a significant overlapping contestable hinterland – and hence interests in equal treatment – they do team up in order to influence national or European decision makers. Either in a consortium, port roundtables or through the European Sea Ports Organisation (ESPO) so that common interests are being heard. Examples of this are creating a better understanding of the role and importance of port authorities (and hence the public's opinion based on job creation and prosperity/welfare arguments), unfair state-aid by other nations to their home ports and the call for more infrastructure spending from the EU in infrastructure connections to and from ports and port-industrial complexes to remain globally competitive.

Another area where Hamburg, Rotterdam and Antwerp are starting to work together is in creating a single voice to the three main (container) shipping networks trying to take away some of their bargaining power but due to the earlier discussed footloose characteristics

of this cargo flow and the vested interest in terminals from some of these shippers there is no strong answer to them as of yet.

Standardization and technology

In order to improve port efficiency the ports are working heavily together in setting industry standards which can be applied globally. The one with the most attention is the Port of Hamburg led ChainPORT initiative (see section 4.1) where the aim is to set technology standards for port customers and wider ecosystem. Rotterdam and Antwerp have joined this initiative and they all strive for setting the global standard in order to be seen as a 'world port'. This standardization is also asked for by the shippers in order to reduce the ineffectiveness of all individual port processes and improve reliability of the shipping sector as a whole. Commercially however Rotterdam is in the forefront of marketing out their digital thought ware (through Pronto, Portmaster and Navigate) whereas Antwerp and Hamburg are still considering if they will go this way. One of the interviewees was indicating that Rotterdam is selling itself as a software company which also runs a port which is exaggerated but might show where the future port model is going towards.

Another topic that has been discussed is how important the respective ports value the fact that they remain a hub port in the Northwest European region. For both Rotterdam and Antwerp it was eminent that this is their main strategy and should be strived for over other initiatives. The main arguments were the job creation (e.g. >150k jobs in Belgium) and the spin-off into adjacent businesses like chemicals and logistics. For Rotterdam the Dutch government has indicated that the port is one of the three major hubs (besides Schiphol as an airport hub and Amsterdam Internet Exchange as a digital hub) and hence their licence to operate is to remain a hub port. For the Port of Hamburg the situation is slightly different as they follow whatever their stakeholders perceive as important which could lead to another port strategy in the future. Indicated earlier Hamburg is first and foremost attached to local community and being a hub port is not an ambition on its own.

In the next chapter the researcher will compare the literature findings from the earlier chapters with the results from the interviews in order to be able to answer the research questions.

5. Conclusion

The last chapter of this thesis will provide a summary of the research results and related literature review. The main research question and related sub research questions will be answered and furthermore the research limitations will be listed and suggestions will be done for future research in the port foreland collaboration area.

5.1 Key findings

Port foreland collaboration has been the main topic under study for this research. In the literature this phenomenon is described in the academic context using several collaboration models and publication outcomes which has set the scene for the desktop analysis and the interviews for the three respective case studies. These case studies have resulted in the key findings that will be presented in this section of the conclusion.

For all three port authorities under study it has become evident that port foreland collaboration is a theme that they are actively pursuing by setting a strategy and act upon it, either through memorandum of understandings, partnerships and joint-ventures/participation with overseas ports. This results in different three port foreland collaboration forms just mentioned due to the multiple freedom of movement levels and associated and underlying drivers.

The Hamburg Port Authority is bounded by law to refrain from any investments outside their home base and hence collaborates with their foreland mainly on step 1 and step 2 of the conceptual framework for internationalization strategies of port authorities (Dooms, et al., 2013). This means that they have worldwide commercial representation for commercial purposes and a few memoranda of understanding with overseas ports, being Los Angeles and Rosmorport. The first one is mainly focused on sharing strategies and discussing best practices on topics ranging from port infrastructure, environmental and security challenges and strategies to enhance both trade competitiveness. The latter one is more commercially driven to secure cargo flows into Eastern Europe and Russia. With several sister ports the Port of Hamburg Authority partners by rolling out the ChainPORT initiative which should keep Hamburg in the top rankings of world ports and give them relevance to exists. In the international port sector Hamburg is widely known for its efficient operations, high utilization of assets in a space-constrained area and digital agenda: “if you can manage Hamburg you are best in class”. Interesting finding is however that HPA will first and foremost serve the public need in their home base which means they do not strive for growth or market share necessarily if this contradicts with their shared values. A recent example has been the challenges around the dredging of the river Elbe to accommodate for larger (container) vessels which has been a delicate trade-off between the port growth and the negative impact on the society as a whole. The Hamburg Port Authority would be willing to settle for a spoke type of port if other interests in the community will prevail over the port function.

The Port of Rotterdam Authority has been a pioneer in port foreland collaborations in all its forms. Even before setting up the dedicated Port of Rotterdam International business unit the port already had worldwide representations and was performing consulting services. This was however on an ad hoc basis and not backed up by a firm internationalization strategy. Since the participation in the port of Sohar this has been institutionalized and a clear strategy has been set out and is being followed till date

(although somewhat more conservative in goal setting). In the past years Rotterdam has dropped in the international port rankings by volume but still is undoubtedly the most important port for the Northwest European region. Reasons for this are the strategic location as the Rhine and Maas estuary, the continuous investments in port expansion projects and the industry-wide renowned 'Port of Rotterdam' brand which has been carefully build up in the last three decades. PoRint is aware that it is not able to compete against the aggressive Chinese expansion as part of their belt and road initiative but is still seeking potential foreland collaborations in either the second and third step of the outwards internationalization strategy. Several consulting assignments will give the Port of Rotterdam insights and credibility and the current participations in Oman and Brazil will lead to additional revenue generation, resource development, customer intimacy and port insidership. For the Port of Rotterdam remaining a port hub is of eminent importance as part of the Dutch government's focus on the three main hubs (seaport, airport, digital). The port is in the midst of focussing its attention to the energy transition but is still a major player in the old industry (coal, oil, etc.) which leaves them in a split. Based on this experience at their home base they will be able to export and capitalize on their knowledge in overseas markets and vice versa. Furthermore Rotterdam's Digital Business Solutions business unit gives the port worldwide credibility in the digital area where the Port of Rotterdam Authority is leveraging its brand recognition to deliver additional services. It is to be seen if this will be a profitable business model in the future.

Last case study has been around the port foreland collaboration initiatives of the Port of Antwerp. Here the first international activities have been performed under a Belgium state-wide development aid program for the Democratic Republic of Congo but since 2010 the Port of Antwerp International business unit (in conjunction with sister subsidiary APEC/ Antwerp - Flanders Port Training Center) has focussed on the international port management market. PAI has followed the subsequent steps of the earlier mentioned internationalization strategy for port authorities framework and has clear goals. As in practicality they duplicate many of the PoRint activities (e.g. participations in Omani and Brazilian ports) their aim is to extend the Port of Antwerp brand recognition, offer their resources international working experience and boost cargo flows by following their customer base. Ultimately their international activities have to contribute to bottom-line financial results but there are multiple reason to achieve (and measure) this. As like Rotterdam the port of Antwerp is a major focus area for the Belgian government and is perceived as a direct and indirect job-generating institute for the Flanders area. Especially in conjunction with the related logistics and chemicals cluster they can support the interest of local companies which altogether will boost welfare. Ongoing debate around the negative externalities (e.g. dredging the river Scheldt or the development of the Saefthinghedock) can impact Antwerp's ability to remain a hub port in the future.

For the three ports under study it can be concluded that they are all actively collaborate with their foreland but for sometimes different reasons and with different initiatives. This will be further discussed in the next section then the research questions will be answered.

5.2 Research questions

In order to answer the main research question the focus will be first on answering the sub research questions which serve as a prelude. For clarity reasons the questions will be

repeated from chapter 1 and answered accordingly based on the aforegoing executed research:

SQ1: What type of port collaboration exists and what does the current situation look like?

Port collaborations are existing on both the horizontal as well as the vertical integration axes. The literature learns us that four type of collaborations can be distinguished by port authorities being direct competition, co-existence, collaboration and partnership. These four are characterized by their share volume of competitive rivalry and degree of cooperation. For ports in close geographical proximity all these four collaboration types can be seen (where the above sequence also gives the formality of the collaboration, being partnership – and even merger – as the highest formal collaboration form) on the horizontal cooperation axes. Direct competition and co-existence are less applicable collaboration forms for overseas ports so in this vertical coordination axes collaboration and partnership are more often seen (and no collaboration at all but this is left out).

On the horizontal axes the ports of Hamburg, Rotterdam and Antwerp see each other as competitors in the commercial space where they compete for the same cargo flows whilst serving the same contestable hinterland. A clear example of direct competition can be seen in the container market they serve. For some other cargo flows one is more suited then the other to handle a specific cargo type so here there is some coexistence as well. On other aspects however they work together in order to keep their joint competitive advantages over other port clusters which leans towards the collaboration quadrant.

On the vertical axes all the three port authorities collaborate with both their hinterland as well as their foreland. For the scope of this thesis the hinterland has not been studied so the researcher has only investigated the foreland collaborations. Both types of collaborations can be found but the model has been extended with the stepped conceptual model internationalization strategies to diversify further between the collaboration and partnership types. The first type is establishing overseas commercial representation which all three ports are actively doing by opening sales offices, appointing local sales representatives and participate in trade missions. The second step is to actively transfer port knowledge and leading practices by taking over overseas port management activities, conduct port consulting services or develop infrastructure. These type of collaborations however does not involve any financial participation and is used by all three ports under study, however for various reasons (to be elaborated upon by answering the next sub research question). The last step is a foreign direct investment by the port authority which can be typed as a partnership with financial participation. Both port authorities of Rotterdam and Antwerp do engage into this collaboration form in Oman and Brazil but have slightly different drivers and ambitions for this. The Port of Hamburg Authority is bounded by local law and hence not able to invest outside their home base. This study hence has applied the earlier set port authority international outward strategy as earlier identified by Dooms et al (2013) to the three ports under study and found evidence that indeed all three levels exist and are relevant in port foreland collaborations.

SQ2: What are the drivers to engage into a port foreland collaboration?

For answering this sub research question the focus will be on the different driver types (economical, societal, other) as presented in chapter 2 and the information obtained in the case studies. In the table underneath the summary between these two are presented.

TABLE 13 ECONOMIC, SOCIETAL AND OTHER PORT COLLABORATION DRIVERS PER CASE STUDY

Driver	Port of Hamburg	Port of Rotterdam	Port of Antwerp
Economic	• Improve asset utilization • Secure trade flows	• Revenue growth • Customer intimacy	• Secure trade flows • Boost Port of Antwerp brand
Societal	• Serve local community • Job and welfare creation	• National focus area • Job and welfare creation • Promote Dutch maritime cluster	• Support local (industrial) companies • Job and welfare creation
Other	• Develop best in class digital solutions • Develop sustainability standards	• Port insidership, obtain knowledge • Resource development	• Port insidership • Resource development • Global credibility

For the Hamburg Port Authority the main drivers to engage into port foreland collaboration is for their local community to benefit from this (meaning the positive externalities should outweigh the negative ones), to have direct access to and influence on digital port innovations and to secure cargo flows with Eastern Europe and Russia. The local community will mostly benefit from direct or indirect job creation, welfare growth and sustainability initiatives in the wider Hamburg area as well as direct shipping connections to most parts of the world. In digital port innovations Hamburg is very well situated with the Port of Los Angeles as a partner (and their support from leading tech companies from the adjacent Silicon Valley) and other strong world known business partners. Developments of underwater drones, autonomous trucks, paperless customs clearance and the rollout of 5G in the port will bring the Hamburg port in the forefront of efficient port handling which keeps them globally relevant by setting these standards. To secure the trade flows between Eastern Europe and Russia seems at a first glance as a hinterland collaboration but in the light of the Chinese belt and road initiative the global cargo volumes are expected to shift which can make this geographical area their foreland. At the moment the HPA is already lobbying to become a vital port and logistics hub for this initiative.

For the Port of Rotterdam the main drivers to engage into port foreland collaboration are to extend their network and knowledge base, to growth their revenue flow and to serve their customer base. Building their network and knowledge base is mostly done by providing port consultancy services or port analysis assignments; this way not only their clients but also the Port of Rotterdam itself is building up relevant port knowledge which they can utilize at their home base, at their participations or for other clients. One example of this is a consultancy role that the Port of Rotterdam had for the port of New York / New Jersey where they were able to gain some insidership into the potential developments for shale gas and the potential impact this might have on other energy sources. Revenue generation out of port foreland collaborations is something that is currently already in place as the Port of Rotterdam annual report of 2016 indicated that their overseas participations contributed €8,9 million to the financial results. This is a luxury position for the Port of Rotterdam as it makes future investment decisions easier with this successful track record compared to how the Port of Antwerp International needs to convince their stakeholders. On the other hand it also sets the expectations for future additional

participations that PoRint will engage in as part of their 2025 strategy. The last important port foreland collaboration driver is the customer intimacy that the Port of Rotterdam can build up and which can result into additional third-party (customer) investments in their home base – hence securing future commercial activities – or gives them a competitive advantages in overseas ports by bringing world-class knowledge and leading practices. An example of this last one is the port infrastructure developments in Porto Central and Sohar where the global mining company Vale is teaming up with the Port of Rotterdam in developing super hubs for loading and unloading iron ore. These investments would not have made if the Port of Rotterdam would not have a stake in these ports.

The Port of Antwerp Authority's most important drivers to engage into all three steps of port foreland collaboration are to secure trade flows to and from their home port, support local companies, brand reputation and recognition and resource development. Other than the Port of Rotterdam – where additional cargo flows are a positive bycatch – the Port of Antwerp is steering towards additional (or securing) cargo flows through their port foreland collaborations. These flows are measured at the start and after and for their collaborations with the Port of Montreal, Essar Ports and the ports on the African continent the results show that they are successful. In line with the first driver they are supporting (local) companies that are settled at the Antwerp's home base with setting up overseas logistical trade flows (e.g. for SEA-invest) so these companies are able to build up commercial operations from which the Port of Antwerp will benefit indirectly; either through gaining insidership, job creation and/or brand reputation. This last mentioned driver – brand reputation and recognition – is something that the Port of Antwerp is very determined towards and this is something that is measured as well once PAI is terminating a partnership or divesting a participation. With this no direct revenue generation is accompanied but the belief from the Port of Antwerp authorities is that this will follow naturally afterwards. This is however to be seen as no steady revenue generation from overseas participations is currently contributing to their financial results. Last mentioned driver which has been exclusively at first for the Port of Antwerp (later an interviewee for the Port of Rotterdam mentioned the same) is giving PoA resources the possibility to gain international working experience in the form of expat jobs at one of their participation ports which they can bring back to the home base in a next phase of their career and where the port can benefit from. This program however has only recently started so no conclusion around the result of this initiative can be drawn.

SQ3: What are the different outcomes if ports collaborate and what is expected?

The answer of this research question will build upon the theoretical collaboration frameworks discussed in SQ1 but focusses on the individual port authorities and their role in the worldwide port ecosystems.

The ports under study are all landlord style ports, their respective port authorities are bound to their home base and they are owned by the government (mixture of federal and/or municipal government). For a landlord port the main activity is to lease out their land to commercial parties to conduct their operational activities. The port authorities of Hamburg, Rotterdam and Antwerp however act as active landlord ports as they actively supporting and generating commercial activities for their respective port communities and are able to reconsider their core activities in order to reach their internal and external goals. A role that these port authorities play is as an initiator of port reform initiatives

where the private sector considers the investments and/or risks too high but the port authority is able to mitigate this, examples are the port digitalization (Port of Hamburg) or the energy transition (Port of Rotterdam).

In the international maritime spectrum a home based landlord port is a very small player compared to the international shipping companies (and alliances), the terminal operating companies and other maritime actors in the port area (e.g. tug services, stevedoring and other maritime service providers). For this reason it is important to collaborate both horizontally as well as vertically to counter these external powers. On the horizontal collaboration the three port authorities under study already work together in order to create a level playing field and establish bargaining power. On the vertical access the collaborations have different drivers but are anticipated as favorable (or potentially unavoidable) in order to survive in the more and more globalized port area. Although by definition ports are part of a global network the port authorities recognize that they cannot suffice by only serving their local needs and requirements but they have to be open to the outside world in order to remain relevant and hence survive in the dynamic markets they are acting in.

SQ4: How will the current status-quo between the ports under study be impacted?

With this sub research question the researcher is extrapolating on the current port foreland strategies and combines this with the interview results and found desktop analysis information.

For the Port of Hamburg several futures scenarios are in place with regards to their role in the port foreland. Based on examples from their neighbouring ports it could be that they will reform their port governance in such a way (e.g. setting up a dedicated international business unit) so they are able to further strengthen their ties with their foreland partners by means of foreign direct investments. In their strategy documentation towards 2025 increasing overseas representation, developing growth markets and participation concepts are mentioned so this could mean that HPA is going this way. On the other hand the Port of Hamburg is so closely tied with the local political governance which have a very local importance and rather spent the money in the home base then overseas. This way rather short term initiatives can be achieved (within one political lifespan) instead of longer term investments in potential profitable initiatives (which however cannot directly be harvested by the earlier political decision makers). In either way the Port of Hamburg will remain an international player that should not be underestimated due to the very relevant digital agenda that they are pursuing and are aiming to deploy as worldwide standards.

The Port of Rotterdam Authority – by means of PoRint – is very clear in its international foreland ambitions both from the literature as well as the interviews. In total five overseas participations which will give a steady future revenue for the longer term and port consultancy services as a mechanism to obtain knowledge and stay relevant. Together with their forefront developments in the energy transitions and digital service offerings the Port of Rotterdam aims to remain a very strong world port and a leader in Northwest Europe.

For the Port of Antwerp the future foreland collaborations are slightly more modest then the above but are a truth part of their future strategy. As the drivers are different they also foresee a different growth path. Together with APEC they make a very strong service

offering for ports worldwide which will give them valuable insights to base future foreland collaborations on. Based on the interviews it is expected that PAI will focus on additional participations on the African continent and the Middle East as this is where their major customers are active as well (in agricultural commodity and chemicals). Their Brazilian participation is expected to yield results soon (and additional investments are foreseen) but expectation is that PAI will not remain their ownership stake on the longer term once the cargo flows and customer base have been established.

To answer the sub research question the researcher found that the three ports are competitive at their home base but do not perceive each other competitors in the international foreland collaboration space. There is no 'run' on overseas port partnerships or participations where they compete for offering the same service or participation stakes. It remains remarkable however that in all overseas areas that the Port of Rotterdam has established relationships (either through port management services or participations) the Port of Antwerp is also making an entrance (examples are Oman, India and Brazil). This could indicate that Port of Antwerp is pursuing a follower strategy but this is not officially announced this way; future foreland collaborations will prove this. For now the three ports are satisfied with the current status-quo and the future foreseen and extrapolated strategies do not make the researcher conclude that this will chance in the near future.

RQ: What are the drivers of port foreland collaboration and the expected outcomes for the port authorities in Northwest Europe?

Based on the desktop research and stakeholder interviews the researcher has gained a clear understanding of the port foreland collaboration drivers that the three port authorities under study pursue. For all these three Northwest European port authorities the drive to remain relevant is applicable; however their definition or relevant can be explained in manifold ways. For the Port of Hamburg the important drivers are technological supremacy which they are seeking with their overseas partner Port of Los Angeles and the related ChainPORT spin-off initiative, benefits for their local community either by revenue generating cargo flows, efficiency gains in port operations or minimizing negative externalities and securing cargo flows with Eastern Europe and Russia.

For the Port of Rotterdam the foreland collaboration initiatives are truly commercially driven and remaining relevant for them means revenue generation by overseas participations and obtaining knowledge by providing port management and consultancy services which they can both utilize in their home base. Additionally they are serving their customer base by partnering up in overseas infrastructure investments resulting in a high customer intimacy and commitment in their home base as well.

The Port of Antwerp is aiming to remain relevant by securing and increasing trade flows from foreland collaborations, support their local companies, expand their brand reputation and recognition and develop their resource by offering international working experience.

What can be concluded is that these three ports located in each other's proximity all found their own right to exist in the port foreland collaboration space and have identified drivers unique to them to engage into this. There is no direct rivalry and the respective port authorities grant each other their overseas initiatives although overlapping drivers (and benefits) like cargo volume growth or resource scarcity might in the future impact other ports negatively.

5.3 Limitations

Whilst the researcher has attempted to execute this research in a complete way there are certain limitations and constraint to this study that have to be taken into account whilst interpreting the results.

At first the researchers only conducted three case studies for a worldwide phenomenon which might have resulted in a biased outcome. These three case studies have been limited to the largest Northwest European port authorities which means that in other areas other drivers and collaboration forms might exists which have not been incorporated in this study. The researcher has been mitigating this limitation by specifically adding the geographical location of this study to the scope of the research and make this an implicit part of the case study design.

Secondly the case studies are based upon qualitative research which potentially can biases any outcome due to the subjective interpretation of research results. The available literature and publications on this subject are limited and most of the times written or published by a stakeholder in the port foreland collaboration area and not always by an independent author. Where possible the researcher has indicated the source of certain arguments or facts so the reader can interpret the importance and background of this. Another limitation in the qualitative research design has been the limited number of interviews, being two per case study and hence six in total. In is not possible to capture all arguments, opinions and facts around the wide concept of port foreland collaboration as the interviewees might have a different background or a different understanding of the concept and how it is being applied. Also the profession that the interviewee has might skew the outcome of the interview as some answers might be given more favourable then they in reality are. In order to mitigate the limitation above the researcher has held interviews with both port professionals and port academia to obtain both practical and more theory-based answers to act as a well-balanced way to contribute to this research.

The third and last limitation is the researcher itself who might be skewed due to a manifold of reasons. In the introduction it has already been indicated that the researcher is a proud inhabitant of Rotterdam and hence potentially thinks more positive about his home port then the other two. Also some pre-gained knowledge before conducting this research might have steered the research itself as well as the conclusions. However being open and realistic about these limitations – together with a professional background from the researcher in conducting consultancy services and professional support from the thesis supervisor – has hopefully prevented the researcher from being to narrowminded or prepossessed in order to deliver a non-biased result.

5.4 Further research suggestions

This research is studying a recently introduced and not yet widely researched phenomenon around port foreland collaboration. This makes the possibilities for future research suggestions almost endless but based on the discussions with the interviewees and generally obtained insights the research will make some relevant suggestions.

What could be an interesting research is to replicate this study in another geographical area and test if the outcomes – the port foreland collaboration drivers – are also valid in that specific case. Areas that can be thought of should have the same characteristics around geographical coverage and contestable hinterland, e.g. the ports of Singapore

and Port Klang or multiple Chinese ports around the Zhujiang River estuary (Macau, Gunagzhou, Shenzen and Hong-Kong), alternatively it might be interesting to see the drivers for some of the Brazilian ports that either Rotterdam or Antwerp is participating with.

A discussion that has come up during the interviews is around the driver of client intimacy and how this might turn out. It is argued that if a port authority is partnering with one of their customers that this might have a negative impact on their relationship with other customers in the same industry as they might not feel equally treated or feeling missed out in an (investment) opportunity. An example here might be the relationship which the Port of Rotterdam has with Vale around infrastructure development in Oman and Brazil. This will for sure tighten the relationship between the two and makes that Vale will prevail Rotterdam over the other Northwest European ports. However what would be the impact on the strategy of e.g. Rio Tinto or BHP (direct competitors of Vale). This might be studied within the port context but potentially might be relevant for all industries and sectors.

Another discussion which is more philosophical and can be studied in a wider context as well is why landlord type port authorities should engage into foreland collaborations at all and not leave this to the market. It can be argued that overseas investments and activities could actually be better spend at the home base where the negative externalities (e.g. congestions, pollution) are being experienced and is steered by the local governance. This is something that in the case studies has become apparent and clearly distinguishes the Port of Hamburg from the other two. A further study can get a better insight in the underlying motives and needs in this area.

Lastly the researcher would suggest to combine the study between the foreland and the hinterland collaboration drivers from the port authority point of view as this is where the ports play a role in the global supply and logistic chains. It would be interesting to see if the foreland collaboration drivers contribute to the hinterland requirements as well and vice versa. With the expected shifts in global cargo flows it might be that the clear hinter- and foreland boundaries will blur or eventually even turnaround with all the related dynamics included.

5.5 Conclusion

Coming to the end of this thesis will leave the researcher with concluding the conducted research and reflecting on the outcome.

Based on the conducted research and validated against the existing literature it has become evident that the authorities of the Port of Hamburg, the Port of Rotterdam and the Port of Antwerp all collaborate with their foreland in different ways. All three have commercial representations at strategic locations to secure cargo flows and compete against each other close to the (shipping) source. Port consultancy and management services are also provided worldwide as all these three ports are perceived as best in class and other ports are willing to invest money and time to obtain this knowledge. Both the Port of Rotterdam (by PoRint) and the Port of Antwerp (by PAI) are also making foreign direct investments by taking participations in ports in Oman and Brazil (and more to follow). This means that the port authority international outward strategy has proven to be complete in the three step description and can be used further for future studies.

The main drivers are manifold but can be separated into economical ones, societal ones and other ones. On the economical side the drivers are revenue generation, asset utilization, customer intimacy, securing trade flows and boost brand recognition. On the societal side the drivers are serving the local community, job and welfare creation, promoting the national maritime cluster and supporting local companies. Other drivers to engage into port foreland collaboration are the jointly develop digital or sustainability solutions, obtain port insidership and develop resources.

The three ports under study will set different priorities to these drivers based on their strategies and possibilities but it is unquestionable that they could not do without these foreland collaborations.

What can be learned from this research is that port foreland collaboration has started to develop and mature and is here to stay. Global trends and powers will force all port authorities worldwide to either take an active or a passive approach towards this phenomenon and it is expected that within a decade or two the port hinter- and foreland have been coalesced. What can be seen from this research is that there are differences in the strategy and execution of the overseas collaborations the three port authorities have engaged into but what binds them is that they are aiming to remain relevant now thought different collaboration types and will remain so in the future.

Looking back on the execution of this study the researcher is first of all thankful that he has been able to interview six very interesting and dedicated professionals around the subject of this research and the appealing discussions that have been held during this interviews. With these six people of course also came six opinions and without the ability to track these back to an individual resources the author has tried to explicitly stated these difference where applicable. Furthermore the researcher has found it to be a challenge to search for all relevant and applicable information around the thesis subject using the dedicated qualitative content analysis software but – when decided to execute this manually – really enjoyed studying all the relevant information and point of views on this topic. A clear illustration that port foreland collaboration is a relevant topic to study!

With this thesis the researcher is not only finalizing 2,5 years of Maritime Economics & Logistics but is hopefully also be able to contribute to this relevant field of research, or at least triggered additional research in this area. Collaborations within the port ecosystem will be the key in the near future to remain competitive and counteract on any societal or political pressure. Wherever the Northwest European port authorities can leverage from overseas collaborations the authors opinion is that this is beneficial for all parties involved and should be stimulated as all times.

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Appendix A Interview questions

A. Generic interview questions

Question 1

How do you see the collaboration and competitiveness between the NWE seaports?

Question 2

How does the Port of Hamburg/Rotterdam/Antwerp sees its role in the port foreland area?

Question 3

What are the main drivers for the Port of Hamburg/Rotterdam/Antwerp to engage into port foreland collaboration?

Question 4

How important is it for the Port of Hamburg/ Rotterdam/Antwerp to become/remain a port hub in the NWE region?

Question 5

How does the Port of Hamburg/Rotterdam/Antwerp strategy aligns with the set port foreland collaborations?

Question 6

Do you foresee a change of course in the current Port or Hamburg/Rotterdam/Antwerp foreland strategy?

Question 7

How does the Port of Hamburg/Rotterdam/Antwerp measures the success of their port foreland collaborations?

Question 8

Do you think that the foreland collaboration advantages are actually achieved?

Question 9

Do you experience competition from surrounding NWE ports to engage into overseas collaborations?

Question 10

How do foreland collaboration partners perceive the Port of Hamburg/Rotterdam/Antwerp?

B. Port of Hamburg specific interview questions

Los Angeles

- What has been the rationale to engage into a memorandum of understanding with the Port of Los Angeles in 2013?
- What is the current status of this collaborations?
- What have been the achievements of the last five years? Have results been met? Why (not)?

Multiple sister ports

Busan Port Authority (since 2012), Tanzania Ports Authority (since 2007), Kaohsiung Harbour Bureau (since 1999), Shenzhen Municipal Port Authority (since 2007), Yokohama Port Public Corporation (since 1992), Administatcion Nacional de Puertos Montevideo (since 2005), Port of Halifax (since 2004), Port of Gothenburg (since 2015) and Port of Bronka (since 2015), Shanghai International Port (since 2004) and the Port of Söderham

- What are all these sister port initiatives about?

ChainPORT initiative

- What has been the driver to openly work together on all digital innovations, both with competitive as well as overseas ports?
- How does the Port of Hamburg benefit from this?
- How are the results measured?

Rosmorport

- What is the strategy behind the collaboration agreement with Rosmorport?
- Has the goals from this strategy actually been achieved? What next steps are foreseen?

C. Port of Rotterdam specific interview questions

Sohar port and freezone

- How did this collaboration between PoR and Oman started?
- Are the goals and arguments still the same or have these been changed over time?
- What is the long term strategy for this collaboration (concession runs to 2042)?

Porto Central

- What has been the rationale to engage into the Porto Central development?
- What is the timeline before the port is operational?
- What benefits are expected for PoRint?

Port of Pecém

- What has been the rationale to engage into the Port of Pecém investment?
- When can the expected benefits be achieved?

Port of Suape

- In 2010 an investigation into a partnership took place but in 2011 nothing mentioned anymore. What happened?

Port of Kuala Tanjung

- What has been the rationale to engage into the Kuala Tanjung development?
- What is the current status of this initiative?

Port of Jakarta

- What has been the rationale to engage into the Jakarta development?
- What is the current status of this initiative?

Port of Constanza

- What has been the rationale to engage into a memorandum of understanding?
- What is the current status of this initiative?

Port of Positra

- What has been the rationale to engage into a memorandum of understanding?
- In 2010 it has been indicated that a future collaboration would be unsuccessful; why?

Port West

- What has been the rationale to engage into a memorandum of understanding?
- What is the current status of this initiative?

Rosmorport

- What has been the rationale to engage into a memorandum of understanding?
- What is the current status of this initiative?

Nangang Industrial Port Complex

- What has been the rationale to engage into a memorandum of understanding?
- What is the current status of this initiative?

Are the PoR Digital Business Solutions initiatives (Pronto, PortBase, Navigate, etc.) also seen as a strategy to collaborate in foreland markets?

D. Port of Antwerp specific interview questions

General comment

There are worldwide collaboration initiatives by the Gemeentelijk Havenbedrijf, APEC and Port of Antwerp International; we mainly focus on the PAI ones

San Pedro

- What has been the rationale to engage into the Port of San Pedro investment?
- When can the expected benefits be achieved?

Port of Duqm

- What has been the rationale to engage into the Port of Duqm investment?
- When can the expected benefits be achieved?

Port of Açu

- Since 2017 PoA is participating in the Pot of Acu; what is the rationale behind this?
- End of 2018 an additional investment decision will be taken, what is expected?
- When can the expected benefits be achieved?

Rosmorport

- What is the strategy behind the collaboration agreement with Rosmorport?
- Is it foreseen to turn this collaboration into an investment/participation?

Office National des Transports (Onatra/ Matadi Congo)

- Since 2008 the PoA is supporting the port of Matadi - and later Boma as well - in Congo. What has been the drivers to engage into this collaboration?
- What benefits are expected for the Port of Antwerp?
- What will the future collaboration look like?

Port of Montreal

- What is the current status of the collaboration with the Port of Montreal
- Did the benefits coming out of CETA have been achieved?

Port of Hazira (Vadinar, Salaya and Paradip)

- In 2011 and MoU has been signed and the PoA has invested €25 million to strengthen the collaboration; what is the current status?
- How will this collaboration mature?

Main Brazilian ports (Secretaria de Portos da Presidencia da Republica)

- What is the current status of this collaboration?
- How will this collaboration mature?

Port of Guangzhou

- Twinning agreement has been signed in 2015 to intensify the economic links between PoA and Guanzhou; what is the current status?
- Did the links intensify and what are the material benefits?

Port of Banjul

- Collaboration has started this year; what is the intention of PoA International?

Port of Douala

- Collaboration has started this year; what is the intention of PoA International?

Port of Baku

- What is the current status of this collaboration?
- How will this collaboration mature?

Appendix B Desktop analysis research

For the qualitative desktop research use has been made of internet search engines in order to find and analyse port foreland collaboration specific information sources. The search engines used are both Google and Google Scholar. For the first one the several country domains have been used (google.com, google.de, google.nl and google.be) as the published result in some cases deviated based on the country domain.

For the search results the researcher has genuinely used the first five pages of results where applicable to obtain the relevant documentation and analysed both the web context as well as (pdf) attachments. The judgement if information was relevant or not has been on the discretion of the researcher.

The list hereunder contains the combination of all search terms used. These are the English terms, but the researcher has also used the German and Dutch equivalents in order to find relevant information and translated this in case relevant for this thesis. The order of the words has been used reciprocally where applicable (e.g. 'Hamburg Port Foreland Collaboration' and 'Port Foreland Collaboration Hamburg') and resulted in the same search results.

TABLE 14 DESKTOP ANALYSIS RESEARCH SEARCH TERMS

Port of Hamburg	Port of Rotterdam	Port of Antwerp
Foreland Hamburg	Foreland Rotterdam	Foreland Antwerp
Port collaboration Hamburg	Port collaboration Rotterdam	Port collaboration Antwerp
Port foreland collaboration Hamburg	Port foreland collaboration Rotterdam	Port foreland collaboration Antwerp
Foreland collaboration Hamburg	Foreland collaboration Rotterdam	Foreland collaboration Antwerp
International collaboration port of Hamburg	International collaboration port of Rotterdam	International collaboration port of Antwerp
Foreland collaboration port of Hamburg	Foreland collaboration port of Rotterdam	Foreland collaboration port of Antwerp
Overseas collaboration port of Hamburg	Overseas collaboration port of Rotterdam	Overseas collaboration port of Antwerp
Port cooperation Hamburg	Port cooperation Rotterdam	Port cooperation Antwerp
Port foreland cooperation Hamburg	Port foreland cooperation Rotterdam	Port foreland cooperation Antwerp
Foreland cooperation Hamburg	Foreland cooperation Rotterdam	Foreland cooperation Antwerp
International cooperation port of Hamburg	International cooperation port of Rotterdam	International cooperation port of Antwerp

Port of Hamburg	Port of Rotterdam	Port of Antwerp
Foreland cooperation port of Hamburg	Foreland cooperation port of Rotterdam	Foreland cooperation port of Antwerp
Overseas cooperation port of Hamburg	Overseas cooperation port of Rotterdam	Overseas cooperation port of Antwerp
Port partnership Hamburg	Port partnership Rotterdam	Port partnership Antwerp
Port foreland partnership Hamburg	Port foreland partnership Rotterdam	Port foreland partnership Antwerp
Foreland partnership Hamburg	Foreland partnership Rotterdam	Foreland partnership Antwerp
International partnership port of Hamburg	International partnership port of Rotterdam	International partnership port of Antwerp
Foreland partnership port of Hamburg	Foreland partnership port of Rotterdam	Foreland partnership port of Antwerp
Overseas partnership port of Hamburg	Overseas partnership port of Rotterdam	Overseas partnership port of Antwerp
Port participation Hamburg	Port participation Rotterdam	Port participation Antwerp
Port foreland participation Hamburg	Port foreland participation Rotterdam	Port foreland participation Antwerp
Foreland participation Hamburg	Foreland participation Rotterdam	Foreland participation Antwerp
International participation port of Hamburg	International participation port of Rotterdam	International participation port of Antwerp
Foreland participation port of Hamburg	Foreland participation port of Rotterdam	Foreland participation port of Antwerp
Overseas participation port of Hamburg	Overseas participation port of Rotterdam	Overseas participation port of Antwerp

The following table indicated the grouping of agreement terminology into the three collaboration forms which are identified in the model of this research:

TABLE 15 COLLABORATION FORM GROUPING

Collaboration form	Definition groups
Memorandum of understanding	Twinning agreement, heads of agreement, memorandum of cooperation, collaboration agreement, development aid collaboration, ‘sisterport’ agreement
Partnership	Bilateral partner port network, network of partner ports
Joint venture/participation	Privileged partnership agreement with financial interests

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