**The applicability of competitive advantage theories to the port of Rotterdam**

Bachelor thesis

Author: Michelle Slobbe

Supervisor: Dr. Michiel Nijdam

Erasmus Universiteit Rotterdam

Section Urban, Port and Transport Economics

August 2013

**Table of Content**

**CHAPTER 1: INTRODUCTION…………………………………………………………………………………2**

* 1. Background…………………………………………………………………………………............................2
  2. Research question……………………………………………………………………………………………3

**CHAPTER 2: METHODOLOGY…………………………………………………………………………………4**

**CHAPTER 3: WHICH SORTS OF COMPETITIVE ADVANTAGE THEORIES CAN BE DISTINGUISHED?..............................................................................................................................6**

3.1 The five forces model – by M. Porter………………………………………………………………....6

3.2 Theory of Core Competences – by C.K. Prahalad and G. Hamel……………………………7

3.3 Resource-based theory – by J. Barney……………………………………………...........................8

**CHAPTER 4: WHAT ARE THE DIFFERENCES BETWEEN FIRMS AND PORTS?..............................................................................................................................................12**

4.1 Characteristics of a firm………………………………………………………………………………….12

4.2 Characteristics of a port………………………………………………………………………………….13

4.3 A comparison of firms and ports…………………………………………………...........................14

4.4 Consequences for the applicability of the competitive advantage theories to ports…………………………………………………………………………..................................................17

4.5 Applicability of the individual competitive advantage theories to ports……………………………………………………………………………………………………………...18

**CHAPTER 5: TO WHAT EXTENT CAN COMPETITIVE ADVANTAGE THEORIES BE APPLIED TO THE PORT OF ROTTERDAM?............................................................................21**

5.1 Introduction to the port of Rotterdam………………………………………………………….....21

5.2 Application to the port of Rotterdam……………………………………………………………....23

**CHAPTER 6: CONCLUSION AND DISCUSSION………………………………………………………..30**

**REFERENCES………………………………………………………………………………………………………..32**

**APPENDIX……………………………………………………………………………………………………………34**

Chapter 1: Introduction

1.1 Background

In recent history, the port of Rotterdam has been the busiest port in the world, measured by cargo tonnage. In the following years, several Asian ports passed Rotterdam on the rank list of the busiest ports, wherein Singapore took over the first position. The top 10 of this rank list consists of 9 Asian ports and 1 European port, which is the port of Rotterdam (Appendix 1). The prominence of the port of Rotterdam also follows from the fact that it is the biggest en busiest port in the so-called ‘Hamburg – Le Havre range’, where the competition of the port of Rotterdam is focussed (Kreukels & Wever 2008). This mainly follows from the respective market shares of the port of Rotterdam and its biggest competitor, the port of Antwerp. In 2012, the port of Rotterdam has a market share of 37,5% in the Hamburg-Le Havre range, whereas the port of Antwerp has a market share of 15,7%[[1]](#footnote-1).

As a consequence of that, the port of Rotterdam has the most important position in the participation of European ports in world trade. For the Dutch economy it is very important as well that the port of Rotterdam holds its position in world trade, as it contributed in 2011 for 88.649 to the direct employment and created 13.057 billion direct added value (Nijdam et al., 2011). To be able to hold or strengthen its position, the port of Rotterdam should develop quickly, as other European ports develop as well. From the rank list, it appears that Rotterdam has strong competitive advantages compared to other European ports. Strengthening and utilizing these competitive advantages more, can contribute to the position of the port of Rotterdam in world trade.

Economists have developed several competitive advantage theories that can be used to show the possibilities for strengthening the competitive position. However, these theories focus on firms and not on ports. The structure of a port is different than the structure of a firm. Ports are for example often (partly) owned by the government, which leases port areas to companies that want to settle there[[2]](#footnote-2). The port authority uses a lease construction in order to stay in control of the area.

Firms on the contrary are often not owned by the government, but in private ownership.

Besides the ownership of a firm or port, other factors influence the characteristics. When the characteristics of firms and ports are compared, it becomes clear that differences exist, but similarities as well. As a consequence of that, it is scientifically relevant to research how and if these theories can be applicable to ports.

Next to the fact that the characteristics of a port and a firm influence the applicability of competitive advantage theories to a port, the characteristics of the theories itself influence this applicability.

The influence of all these different factors and characteristics already show the difficulties that arise when looking at competitive advantage theories in the light of a port situation. However, the applicability of competitive advantage theories to ports can contribute to strengthening the position of ports, which in turn is likely to stimulate the national economy. This stimulation of the national economy can for example be realised by the improved attractiveness of investing in the port or by jobs that had to be created in order to be able to cope with the extra work resulting from the strengthened position. The likeliness of stimulating the national economy through applying competitive advantage theories to the port of Rotterdam shows the practical and social relevance of this research.

1.2 Research question

This thesis will focus on the applicability of the firm-based competitive advantage theories to ports, looking at the port of Rotterdam in particular. Therefore, the research question is as follows: *What is the applicability of competitive advantage theories to the port of Rotterdam?*

To be able to answer the research question, a division in sub-questions has been made:

* *Which sorts of competitive advantage theories can be distinguished?*
* *What are the differences between firms and ports?*
* *To what extent can competitive advantage theories be applied to the port of Rotterdam?*

Chapter 2: Methodology

The goal of this research is to apply competitive advantage theories to ports. Because these theories focus on firms, it is considered necessary to split the research question into three different sub questions.

The first sub part that will be researched is the one on the multiple competitive advantage theories (see chapter 3). For collecting information on these competitive advantage theories, a literature review will be executed following two steps (Hart, 1998). First, information will be gathered and summarized. Second, this information will be interpreted in the light of the research question. In this part, the interpretation can be seen as providing an overview that contains the characteristics of each theory, divided in three categories.

First, they see competitiveness using different perspectives, from external to internal and a combination of those. Next to that, they focus on different factors that can contribute to the competitive position, such as the industry, core competences or resources. Finally, they assume different factors to directly influence the possibilities for developing a competitive advantage.

After that, a sub part on the differences between firms and ports will follow (see chapter 4). Determining their respective goals, functions, characteristics and factors of influence, will form this comparison. For determining these differences, again a literature review is being used. The information resulting from this literature review will be interpreted in the light of competitiveness.

When the results on the differences between firms and ports in chapter 4 are combined with the overview of the competitive advantage theories in chapter 3, it can be determined which theory fits the characteristics of a port best. This part can be found in section 4.5.

The research question is formulated for the case of the port of Rotterdam. In the final sub part, competitive advantage theories will be applied to the case of the port of Rotterdam (see chapter 5). The application contains a review of the existing competitive advantages of the port of Rotterdam in the light of the competitive advantage theories. Supported by these results, a suggestion for strengthening the competitive advantage position will be done in the light of those competitive advantage theories.

This means that a single case study will be performed. However, this case study will only be descriptive and thus qualitative, as no empirical research will be performed (Baxter & Jack, 2008). The case study could be seen as a single case study, as only the port of Rotterdam is tested to the competitive advantage theories.

**Limitations of the research set up**

Even when taking into consideration that the interpretation of the literature and the case study are performed with care, there still exist some limitations to the research set up. For the literature review and the case study, which both is a descriptive and qualitative research, the following limitations exist:

* There is no statistical evidence for the outcomes or expectations, as no empirical research will be performed.
* There are no possibilities to generalize the findings. This means they cannot be assumed to be present in other cases as well.
* The findings are not standards, as they are just suggestions or expectations.
* A single case study approach is not completely reliable; multiple case studies should be performed in order to come to a strong and reliable conclusion.

The previously mentioned limitations should be taken into account when reading the following parts.

Empirical research would provide a stronger basis, but is outside the boundaries of this conceptual research. Therefore, this research set up is assumed to be the best for answering the research question.

Chapter 3: Which sorts of competitive advantage theories can be distinguished?

Different competitive advantage theories can be distinguished. Some focus on an external analysis, like the five forces model of Porter, others focus on an internal analysis, like the resource-based theory of Barney. The theories do not only differ when looking at these perspectives, but they differ in focus and factors of influence as well. Because of these multiple differences, this chapter will provide a clear overview of their characteristics.

In the field of competitive advantage theories exist three well-known theories:

* The five forces model– by M. Porter
* Theory of Core Competences – by C.K. Prahalad and G. Hamel
* Resource-based theory – by J. Barney

In the following section, first the five forces model by Porter and second the theory of core competences by Prahalad and Hamel will be reviewed. Third, the resource-based theory by Barney and the related relational view of Dyer and Singh will be reviewed. Finally, Table 1 will provide an overview of the characteristics of the reviewed theories.

3.1 The five forces model – by M. Porter

The five forces model is a basic ‘checklist’ for a company to determine its strategic position and competitive advantage possibilities (Grundy, 2006).

Following from the name of the model, Porter (2008) states that the possibility of creating competitive advantage is depending on the following five forces:

* Threat of new entrants: when there is a big threat of entry, it is likely that prices will go down, which lowers the possible profits. However, there could be barriers to entry, such as economies of scale, capital requirements, unequal access to distribution channels and incumbency advantages. These barriers to entry protect the profits of the incumbents.
* Intensity of rivalry: when there exists fierce rivalry, it is likely that prices will be discounted, which lowers the possible profits. Next to that, it can cause competition in other areas, such as competition on the speed of introducing new products, on advertising and on service quality.
* Bargaining power of buyers
* Bargaining power of suppliers
* Threat of substitutes: a high threat of substitutes could cause lower prices. This is because of the fact that when a substitute of the product or service exists, customers will switch to the substitute when the price of the original product is too high in their perception.

The review of the forces shows that when a force is strong, the probability of earning high profits is low. Because of this, Porter (2008) provides the strategic option to position the company where the forces are weakest.

Besides this strategic option, the company can choose the strategy of building defences against the forces, or the strategy of responding to expected shifts in the power of the forces.

These strategic options show that according to this theory, every strategy a company can follow is focused on positioning itself only taking into account external factors, namely the five forces.

Next to that, this theory focuses on a production company operating in one industry. This follows from the fact that every part of the theory involves only one industry. It also follows from the goal of the theory, which is achieving long run industry profitability. Next to that, the theory does not consider it as an option to move out of an industry. Namely, when an industry becomes less profitable, a company can try to change the industry structure (Porter, 2008). Changing the industry structure changes the five forces in turn, which could positively influence the profitability.

3.2 Theory of Core Competences – by C.K. Prahalad and G. Hamel

The theory of core competences by Prahalad and Hamel (1990) is build on the following definition of a core competence: *‘a core competence is the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies. It is about the organization of work and the delivery of value, communication, involvement and deep commitment to working across organizational boundaries. It does not diminish with use’*. This extensive definition shows that it is a broad concept. To be able to get a hold on the concept, three conditions that have to be met in order to be able to speak of a core competence are formulated.

A core competence (Prahalad & Hamel, 1990):

* provides potential access to a wide variety of markets
* should make a significant contribution to the perceived customer benefits of the end product
* should be difficult for competitors to imitate

This theory focuses on the ability of managers to create these core competences. The core competences should be turned into core products, which in turn are transformed into end products. The theory basically states that managers are at the core of the creation of the final end products. That makes the theory totally dependent of managers of a company. This also follows from the fact that executives are judged on identifying, cultivating and exploiting the core competences that make growth possible. Finally, it follows from the fact that the real source of advantage is considered to be the ability of the management to consolidate corporate wide technologies and production skills into core competences that empower individual businesses to adapt quickly to changing opportunities (Prahalad & Hamel, 1990).

The theory states that when the core competences are determined, they could be used to invent new markets, quickly enter emerging markets or dramatically shift patterns of customer choice in established markets (Prahalad & Hamel, 1990). This focus on core competences and their intended use shows that the theory views the situation from the point of view of a company that is or can be involved in different industries.

Besides the focus on a company that is possibly involved in different industries, the theory is based on an innovative company. Namely, the competitiveness of a company follows from its ability to build, at lower cost and more speedily than competitors, the core competency that can create unanticipated products (Prahalad & Hamel, 1990). This also means that the theory focuses on a company that is able to provide different products or services.

3.3 Resource-based theory – by J. Barney

The competitive advantage model by Porter is based on an external analysis, where the focus lays on the opportunities and threats in the market. The theory of core competences by Prahalad and Hamel focuses partly on an external analysis, partly on an internal analysis. This internal focus can be derived from the fact that one of the conditions for a core competence is that it should be difficult to imitate for competitors. That is part of the strengths and weaknesses of the company itself, whereas the other two conditions focus more on opportunities and threats, which is an external analysis. The resource-based theory by Barney is only based on an internal analysis, thereby focusing on the strengths and weaknesses.

This theory thus focuses on firm resources. Barney (1991) has deviated from the traditional definition of this concept with the following definition: *‘firm resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness’.*

To determine whether or not a firm resource has the potential of sustained competitive advantage, which means that when a value creating strategy is being implemented any current potential competitors cannot simultaneously implement it and competitors are unable to duplicate the benefits of this strategy, four criteria have to be fulfilled (Barney, 1991):

1. Valuable: when a resource enables a firm to conceive of or implement strategies that improve its efficiency and effectiveness
2. Rare: the resource must not be possessed by large numbers of firms
3. Imperfectly imitable: when other firms do not possess a resource, they must be unable to obtain them. There exist three reasons for imperfect imitability:

* Unique historical conditions, which means that the development of resources is dependent of certain happenings in history that cannot be duplicated by other firms.
* Causal ambiguity, which means that a firm does not understand the link between resources and their sustained competitive advantage. A consequence of the fact that the firm itself is unknowing is that other firms are unable to understand the link as well, which makes it imperfectly imitable.
* Social complexity, of which examples are the organizational structure and quality relations among managers. These resources are imperfectly imitable because they are firm specific. Other firms could try to attract the managers, but that does not guarantee the same achievements.

1. Non-substitutable: there must not be a strategically equivalent valuable resource that is not rare or imitable. When such an equivalent resource does exist, other firms are able to conduct the same strategy with this equivalent resource. In this case the resource will not lead to sustained competitive advantage.

These criteria are also known as the VRIN criteria, because of the first letter of each criterion.

Next to this basis of firm resources, the theory depends on another assumption: resource heterogeneity and immobility (Barney, 1991). Namely, when the opposite is the case, it means that every firm has access to the same resources because of their homogeneity and mobility. With access for every firm to the same resources, sustained competitive advantage cannot be achieved.

An extension of the resource-based theory of Barney will be reviewed as well. This theory is the relational view by Dyer and Singh, which focuses on the achievement of sustained competitive advantage based on inter-organizational relations. With the achievement of sustained competitive advantage, relational rent can be earned. The theory uses the following definition of relational rent: *‘a supernormal profit jointly generated in an exchange relationship that cannot be generated by either firm in isolation and can only be created through the joint idiosyncratic contributions of the specific alliance partners’* (Dyer & Singh, 1998)*.*

In this definition, the resource-based view becomes partly visible. Namely, the criterion of imperfect imitability is clearly present.

This theory states that one or more of the hereafter summed up actions could contribute to achieving the goals of creating sustained competitive advantage and earning relational rent through interorganizational relationships (Dyer & Singh, 1998). It is likely that the probability of earning relational rents increases when all four of the following actions are being executed simultaneously:

* Investments in relation-specific assets
* Substantial knowledge-sharing
* Complementary resource endowments
* Effective governance

Each of these actions will be reviewed in the following part, as there are several sub actions that has to be undertaken in order to be able to earn relational rents.

**Investments in relation-specific assets**

A relation-specific asset can be defined as: an asset that is specialized in conjunction with the assets of an alliance partner (Dyer & Singh, 1998). There are two parts that can influence the ability of earning relational rents, which are the duration of the safeguards and the volume of interfirm transactions. The duration of the safeguards could contribute because some investments are very capital-intensive, so in order to make it profitable for both firms, the duration of the safeguards must be long enough. Next to that, the volume of interfirm transactions could contribute because of the possibility for economies of scale and scope.

**Substantial knowledge-sharing**

The definition of interfirm knowledge-sharing is: a regular pattern of interfirm interactions that permits the transfer, recombination, or creation of specialized knowledge (Dyer & Singh, 1998).

Partner-specific absorptive capacity and incentives to encourage transparency and discourage free riding could positively influence the profitability of substantial knowledge-sharing. The profitability could be dependent of partner-specific absorptive capacity because it means that a firm can recognize and assimilate knowledge from an alliance partner. When a firm cannot recognize the value of knowledge or does not know how to use it, the knowledge-sharing becomes less useful. Incentives for knowledge-sharing could influence the profitability because knowledge-sharing is cost intensive to execute. When sufficient (financial) incentives exist to share knowledge, firms are more likely to be willing to incur the costs.

**Complementary resource endowments**

The concept of complementary resource endowments can be defined as: distinctive resources of alliance partners that collectively generate greater rents than the sum of those obtained from the individual endowments of each partner (Dyer & Singh, 1998).

The role of organizational complementarities to access benefits of strategic resource complementarity and the ability to identify and evaluate potential complementarities could influence the opportunity of earning relational rents. It is clear that the ability to identify a firm with complementarities could contribute to earning relational rents. However, this may be difficult to determine because of imperfect information and the difficulty of valuating the resources of the other firm. Not only resource complementarities could influence the probability of earning relational rents, organizational complementarities could contribute as well. These are among others decision-making processes and information systems.

**Effective governance**

The use of effective governance is to lower the transaction costs (Dyer & Singh, 1998). Because of these lower costs, the probability that firms will invest in for example relation-specific assets could rise.

The possibility for governance to contribute to earning relational rents is likely to dependent on the ability to employ self-enforcement rather than third-party enforcement governance mechanisms and the ability to employ informal versus formal self-enforcement governance mechanisms. When self-enforcement governance is being used, the costs are likely to be lower compared to third-party enforcements, which usually comes down to a lawyer constructing a (costly) contract. Formal self-enforcement governance consists of more capital-intensive actions compared to informal self-enforcement governance. Because of this, informal self-enforcement governance could contribute more to relational rents. It is next to the lowest costs likely that it is more difficult to imitate the informal self-enforcement governance as well, because of their social complexity.

Finally, after the review of the different competitive advantage theories, Table 1 provides an overview of the characteristics of each theory. With this overview, the similarities and differences between the theories become visible. It for example shows that the theory of core competences and the resource-based view both work from an internal perspective and include in-imitability as a factor of influence, which are similarities between these theories. However, it also shows that the rest of the characteristics of these two theories are different.

**Table 1**: Theory characteristics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Five forces model | Core competences | Resource-based view | Relational view |
| Perspective | External | Internal | Internal | External + Internal |
|  |  |  |  |  |
| Focus | Industry | Core competences | Resources | Inter-organizational relations |
|  |  |  |  |  |
| Factors that influence the possibility of competitive advantage | - Threat of new entrants | - Potential access to multiple markets | - Valuable | - Investments in relation-specific assets |
|  | - Intensity of rivalry | - Contributes to customer benefits | - Rare | - Knowledge-sharing |
|  | - Bargaining power of buyers | - In-imitable | - In-imitable | - Complementary resource endowments |
|  | - Bargaining power of suppliers |  | - Non-substitutable | - Effective governance |
|  | - Threat of substitutes |  |  |  |

Chapter 4: What are the differences between firms and ports?

Competitive advantage theories focus on firms. To be able to evaluate the applicability of these theories on ports, a clear overview of the relevant differences and similarities between firms and ports is given below. This overview contains characteristics of firms and ports, which can be defined by their mission or goal and their organisation (Penrose, 1959). In the first part the characteristics of firms will be reviewed, in the second part those of ports. Third, a comparison of these characteristics is made. After that, the consequences of these results for the applicability of the competitive advantage theories to ports are reviewed. Finally, the applicability of the individual competitive advantage theories to ports is reviewed. This part will show the theory that fits the characteristics of a port best.

4.1 Characteristics of a firm

The classical theory of the firm states that a firm has one primary goal: profit maximization (Simon, 1979). That an entrepreneur aims at maximizing its profits is in fact one of the most fundamental assumptions of economic theory. A critique on this statement is that this goal is dependent of the ownership of the firm. When a firm is privately held, the reasoning of profit maximization as the primary goal can be followed. However, when a firm is publicly held, for example maximum welfare may be the primary goal instead of profit maximization. Because of the fact that private and public firms often have different goals and characteristics, which will take two different evaluations, here the focus will lay on large private firms. Next to the assumed goal of profit maximization, a firm is also considered to have the goal of continuation of the firm.

A private firm has profit maximization as its primary goal. This goal is among others influenced by these factors and sub goals:

* Risk and uncertainty: firms always face the risk of going bankrupt. Next to that, their behaviour is influenced by the uncertainty of the fast developing markets and quickly changing economic situation. A consequence of this is that a firm will be very motivated to be efficient in order to survive.
* Long run survival: some firms do not aim at profit maximization, but at the probability of long run survival (Chamberlain, 1990).

Next to the goal or mission a firm wants to achieve, a firm has a function in the economy. The function of a firm is to provide products or services to their customers.

There are multiple factors that characterize a firm. However, in the following part only the characteristics that are relevant in the light of competitive advantage theories will be reviewed.

First of all, a firm can be seen as one entity in which people work together to achieve specific goals. Every employee can be held responsible for the work executed in order to achieve these goals, and is supervised by colleagues.

Second, firms can have multiple legal forms. As only large firms are considered here, the two possible legal forms are a Limited company (as the Dutch B.V.) or Public Limited Company (PLC, as the Dutch N.V.). The Limited company and the PLC have shareholders, meaning that multiple people or other firms own the firm. Next to that, those forms of firms are ‘legal persons’, which means they have most of the legal rights and obligations a natural person can make use of. The daily business and organisation is not in the hands of the owner, but of the management. However, the management does have an obligation to explain their actions at shareholder meetings.

There is only one management (department) in a firm, which focuses on that one company and their goals.

Besides these organisational characteristics, the assumption is made that a large firm is influenced by the following external factors: customers, suppliers and competitors.

4.2 Characteristics of a port

A port has the following goal: stimulating transhipment of goods, increasing value added, boosting local employment and maximizing operating profit (Suykens & Voorde, 1998).

This goal is the general goal of the port cluster. Next to this, the port authority contributes to the goals of a port. Especially when the port authority is owned by the (local) government, additional goals are formulated. This is the case in the port of Rotterdam, where the national government and the municipality of Rotterdam hold shares in the PLC of 30% and 70% respectively. These goals of the port authority, which are influenced by the (local) government, are to boost the economy and to enhance regional or social policies (Suykens & Voorde, 1998). The goal of boosting the economy is a logical goal, as a port often is assumed to be the driving force behind the economy (Suykens & Voorde, 1998).

A port has different functions. It is a regulator, landowner and an operator (Cullinane et al., 2005). These different focuses are mainly to make a smooth transfer of freight between sea and land transportation possible (Jansson & Shneerson, 1982). Off course, distribution is not the only area in which a port functions. A port provides products and services, and is for a large part responsible for the import and export in the national economy as well.

The first and an important characteristic of a port is the realization that a port is a cluster of interrelated economic activities, a port cluster (Haezendonck, 2001). This means that in the daily management, the interests of multiple actors and stakeholders must be taken into account. These different actors and stakeholders are government agencies, port authority and port companies (Haezendonck, 2001). The general group of stakeholders all have their interests, but the group can be enlarged. When assuming that the port authority is privatised, which means it has shareholders, their interests must be taken into account as well. This could give difficulties, as from all those interests some may conflict. When these interests conflict, some of them have more power in the bargaining process than others. Taking the port of Rotterdam as an example shows the power of the port authority, which governs the port and runs the daily management. The port authority focuses on the port strategy and goals, in which multiple stakeholders are involved. The port authority is namely a link in the international logistic chain, but it has to take the interests of for example the management of the individual firms into account as well (Goss, 1990).

However, recent studies show that actors in the port expect the power of the port authority to decline whereas the power of port companies will increase (de Langen, 2007). This could be a consequence of the little possibilities to formal control the port authority has. The weak formal control follows from the fact that many different companies involved in different industries operate in the port, which all have their own management.

Next to multiple interests of stakeholders in the port, external factors influence a port cluster as well. De Langen (2007) has shown this for the port of Rotterdam: environmental protection, urban development, labour conditions, resident interests and overall regional economic development as opposed to port development. These external factors have positive or negative consequences, which can change over time. The port of Rotterdam has a history of problems with high labour costs, whereas urban development and overall economic development appears to go hand in hand with the development of the port of Rotterdam (de Langen, 2007). These external factors influence the port cluster as a whole. The individual port companies notice the consequences of these factors as well, but suppliers, customers and competitors also influence them.

In a port cluster, it is likely that agglomeration economies will be achieved. In such a port cluster, multiple firms involved in various industries and markets locate near each other. Of course, this agglomeration is for a large part dependent of the natural advantage of access to the water. However, other determinants can create agglomeration economies as well, such as labour market pooling, input sharing and knowledge spillovers (Rosenthal and Strange, 2007). With knowledge spillovers, port companies involved in the same industry can exchange information in order to innovate and develop faster. Input sharing is most favourable for port companies that can share suppliers, thereby lowering the costs. Finally, labour market pooling can exist because of the easiness for workers to switch and for employers to fire, which also contributes to the efficiency. When these three determinants of agglomeration economies can be achieved in a port, this may attract customers.

4.3 A comparison of firms and ports

The following section provides a stepwise comparison of firms and ports. First, their goals are discussed. Second, their functions are reviewed and third the characteristics are discussed. Finally, the factors of influence are reviewed. Table 2 provides a schematic overview of this comparison.

**Table 2**: A comparison of the goals, functions, characteristics and factors of influence between a firm and a port.

|  |  |  |
| --- | --- | --- |
|  | Firm | Port |
| Goals: | - Profit maximization | - Maximizing operating profit |
|  | - Continuation of the firm |  |
|  |  | - Boosting local employment |
|  |  | - Stimulating transhipment of goods |
|  | - Increasing value added | - Increasing value added |
|  |  | - Boosting economy |
|  |  | - Enhance regional/social policies |
|  |  |  |
| Functions: | - Provide products and services | - Provide products and services |
|  |  | - Regulator, landowner and operator: distribution |
|  |  | - Mainly responsible for import/export |
|  |  |  |
| Characteristics: | - One entity | - Cluster with multiple stakeholders |
|  | - Strong formal control | - Weak formal control |
|  | - One management | - Port authority + management of individual companies |
|  |  | - Agglomeration economies |
|  |  |  |
| Factors of influence: | - Customers | - Customers |
|  | - Suppliers | - Suppliers |
|  | - Competitors | - Competitors: external and internal |
|  |  | - Environmental protection |
|  |  | - Urban development |
|  | - Labour conditions | - Labour conditions |
|  |  | - Resident interests |
|  |  | - Overall regional economic development |

Profit maximization is the primary goal of a firm. A port does not have one primary goal, but a fusion of multiple goals. However, one of the goals of a port is maximizing operating profit, which is similar to profit maximization. Next to that, firms have additional goals as well.

A difference that influences the goal and decisions of a firm, but does not influence the goals and decisions of a port cluster, is the risk of bankruptcy. A firm can go bankrupt, but it is very unlikely that the same would happen to a port. Off course, individual port companies in the port cluster strive for continuation, which influences their decisions. The decisions of all the port companies together, based among others on this risk, likely influence the port as a whole as well. This means that the port cluster is indirectly influenced by the decisions individual port companies make in order to avoid bankruptcy.

The remaining goals of ports are mainly on the level of the regional or national economy. It is not likely that a firm formulates goals for the region or country it operates in.

However, the goal of increasing value added is relevant for both firms and ports. For ports it is mainly because the consequence of increasing value added is an increased quality of the product or service. That consequence is important for a firm as well, but increased value added also contributes to the profits and continuation of the firm.

The function of a firm is on average a simple one: providing products and services. The function of a port is more extensive, and therefore more complicated as well. A port off course provides products and services, just like a firm. However, a port has an important function in the national and regional economy as well. The main responsibility for the import and export of a country is an example of this. Next to that, a port does not simply provide a product or service. Besides this operating function, the port authority owns the land and regulates the activities of the different actors inside the borders of the port cluster.

One clear characteristic of a firm is that it is one entity, in which formal control among employees and managers is present. The only party a firm has to account for are shareholders. A port is a cluster of economic activities. In this port cluster, there cannot be spoken of one entity, as it is a fusion of multiple actors involved in various industries and markets. Because of the presence of multiple stakeholders, which are part of their own company or organisation, it is almost impossible to execute some form of control. Off course, this control is one of the tasks of the port authority, but they cannot be expected to control every actor intensively.

A firm only has one management (department), which focuses on the goals of that single firm. When looking at a port, multiple managements need to be taken into account. The port authority in the port of Rotterdam has its own management in order to achieve the formulated goals, as it is run like a commercial company (Van der Lugt et al., 2013). Next to that, the managements of the multiple individual port companies influence the operations inside the port cluster, which therefore needs to be taken into account as well.

A characteristic of a port cluster is the existence of agglomeration economics. This is not a characteristic of an individual firm, but it is not impossible for a firm to achieve agglomeration economies. However, that is among others dependent of the industry the firm is in and the easiness of comparable firms locating near each other. Thus, it is possible for a firm to achieve agglomeration economies, but it is not a characteristic.

Firms and ports are influenced by some external factors. The typical external factors a firm is influenced by are customers, suppliers and competitors. A port cluster is influenced by these factors as well. Competitors are an extraordinary factor in the context of ports. This is because a port cluster faces competition of other port clusters, but port companies face competition inside the boundaries of the cluster as well.

Next to the external factors a firm faces as well, the external factors environmental protection, urban development, labour conditions, resident interests and overall regional economic development influence a port cluster.

It is unlikely that a firm will be confronted with most of the above-mentioned external factors often. However, labour conditions, can both influence a firm and a port. Labour unions have gained great power in port areas, causing relatively high labour costs (de Langen, 2007). A firm can be influenced by labour unions as well. However, the power of labour unions changes with the economic situation. When the labour market is tight, labour unions have more power than in the situation of a spacious labour market. The power of labour unions in port areas is not that much dependent of the economic situation.

4.4 Consequences for the applicability of the competitive advantage theories to ports

A port and a firm have similar goals. This is shown by the fact that they strive for profit maximization and increasing value added. They are both influenced by the risk of bankruptcy as well, although a port cluster is indirectly influenced through the individual port companies. A difference is that a port cluster has additional goals, which are mostly on the regional or national level.

In the functions of a firm and a port, it became clear that both firms and ports provide products and services. However, the responsibilities of a port on the regional and national level show as well.

The characteristics of firms and ports show differences. A firm is one entity, whereas a port is a cluster of economic activities. Next to that, there exists formal control in a firm, which is not or weakly present in a port cluster. Third, a firm uses a management that focuses only on that company and their goals, whereas a port cluster needs to take multiple management departments into account. Finally, a port is characterized by agglomeration economies.

Firms and ports show an overlap in the factors of influence. This is the case for the influence of customers, suppliers and competitors. It became clear that the factor of competitors has a stronger effect on ports. Next to that, a port is influenced by multiple regional and urban factors. The only similarity between a firm and a port in these factors is the one on labour conditions. However, the labour conditions do have a stronger effect in a port cluster.

In conclusion can be said that a firm and a port are different in some aspects, but show an overlap in their goals, functions, characteristics and factors of influence as well.

In contrast with a firm, a port faces the problem of the influence of the national and regional government on their goals and functions. Because of that, a port cannot always freely choose its actions. Next to that, the implementation of actions might be difficult in a port, because of the multiple managements of the different stakeholders. The additional factors of influence of a port are on the (national) government level as well.

A consequence of this could be that some actions that lead to a competitive advantage for firms might not become a competitive advantage in the case of a port. However, because of the multiple overlaps, competitive advantage theories can be applied to ports.

4.5 Applicability of the individual competitive advantage theories to ports

In this section, the characteristics of ports are combined with the characteristics of the individual competitive advantage theories. The review of this combination of characteristics will show which theory fits the characteristics of a port best. First, the five forces model will be reviewed, second the core competences theory and finally the resource-based view and the relational view.

**Five forces model**

This model focuses on the industry level, with a production company operating in one certain market. A port is a cluster of economic activities, spread across different industries and markets. When this competitive advantage theory will be applied to a port, an analysis of every market or industry the port is involved in has to be made.

Next to that, Porter (2008) sees each of the forces as a threat for achieving a competitive advantage. However, some of these forces may have a positive effect in the context of a port. The forces of the threat of new entrants and intensity of rivalry provide examples. A port is a cluster in which companies are located near each other. Because of that, agglomeration economies could be achieved. New companies entering the market can enlarge the agglomeration economies, which would be a positive effect for the port as a whole. The same accounts for the intensity of rivalry. For the companies already in the market, the intensity of rivalry likely means less profit. However, it would have a different effect on the port as a whole. Namely, with a high intensity of rivalry efficiency is likely to rise. This means the price will go down, which makes the port as a whole more attractive for potential customers. Those factors show that a port is very different to the production company this theory focuses on.

Table 2 has shown that ports are more influenced by external factors of influence than firms. However, the external factors this theory focuses on could have a positive influence on competitiveness in a port, whereas it negatively influences the competitiveness of a firm. There is an exception to this difference, namely when looking at individual port companies. The forces could negatively influence them, which is similar to the firm this theory focuses on.

In conclusion can be stated that the five forces model can be applied to individual port companies, but it is likely that problems rise when it will be applied to a port cluster.

**Core competences theory**

When it comes to the applicability of this theory to ports, the focus on the ability of managers is a difficulty. The port authority governs a port. When comparing this to a company, the port authority can be seen as the management of the port. The port is cluster of economic activities involved in different markets and industries. Therefore it is impossible to put the main responsibility of the creation of new products or services for all these markets and industries completely on the managers. The port authority focuses on the achievement of long-term goals for the port as a whole.

The theory demands commitment to the work and cooperation between the divisions in a company as well. When this is translated to the situation a port is in, a second difficulty comes up. A port is a cluster of economic activities and thereby of different companies, of which some are in the same industry and market. However, this does not mean these companies are always willing to cooperate. Inside the borders of a port, as opposed to a company, competition takes place.

The purpose of the theory is to use core competences to govern the long-term dynamics and potential of a company. These dynamics mean that the company must move quickly in and out of products, markets and business segments (Prahalad and Hamel, 1990). This clearly shows the focus on companies, as it is not likely that a port as a whole is able to move quickly in and out of products and markets, let alone business segments. However, the theory could be applied to individual port companies that are providing products or services that allow them to move quickly. This could for example be a company providing information systems. Such a company could be able to move from for example the container industry to the chemical industry. However, it will still be difficult for a port company to move in and out of products and business segments.

**Resoure-based view and relational view**

The resource-based view focuses on firms. However, following from the basis of this theory, namely resources, it can be applied to the port as a whole as well. An example of a resource of a port is namely the geographic location, which can give a port sustained competitive advantage. The conditions a resource needs to fulfil to be able to become a competitive advantage, namely value, rareness, in-imitability and non-substitutability, can each be determined for the port as a whole and for the individual port companies.

Next to that, examples of the resource-based view being applied to a port exist. This has been done for the ports of Singapore and Antwerp. That gives an indication of the applicability of the theory to ports as well.

A port can be viewed as a whole, but it can be seen as a cluster of economic activities as well. In this view, the relational view can be applied, reviewing the individual firms. There are multiple industries and markets in the port, with multiple firms per industry. With that, the individual firms can increase their profitability when executing one or more of the actions mentioned above. When the profitability of these individual firms increases, this will be visible in the profitability of the port as a whole as well.

The port authority, which represents the port as a whole, may be able to assist an individual port company with the execution of one of the above-mentioned actions. For the action of finding a company with complementary resource endowments this might be difficult, but for investments in relation-specific assets, substantial knowledge-sharing and effective governance assistance from or cooperation with the port authority should be possible. When the port authority can cooperate with individual port companies, which might make it easier to achieve a competitive advantage, this is likely to cause an increase in profits for the individual port company and for the port as a whole.

The review of the applicability of the individual competitive advantage theories to ports has shown that the five forces model could be applied to individual port companies, but not to a port cluster. The core competences theory can be applied to individual port companies that are able to move quickly, but is not well suited to be applied to a port cluster as well. Finally, it has shown that the resource-based view and the relational view are well suited to be applied to individual port companies and to a port cluster.

There sometimes exist contradictions between the resource-based view and the relational view. For example, the resource-based view states that a resource should not be shared with another firm, as the relational view states the exact opposite (Barney, 1991). However, the decision whether or not to share resources is dependent of the potential of profits. Even when there sometimes exist contradictions, it can still be concluded that the resource-based view and the relational view can be combined and are well suited to be applied to ports. This is mostly because of the fact that the theories complement each other. Namely, the resource-based view is best suited to improve the competitiveness of the port cluster, whereas the relational view is best suited to improve the competitiveness of a port company. Besides, it is also possible to apply the resource-based view to the individual companies and the relational view to the port cluster.

Chapter 5: To what extent can competitive advantage theories be applied to the port of Rotterdam?

It has shown that competitive advantage theories can be applied to ports in general. In this section, the applicability of these theories will be tested for the case of the port of Rotterdam. The resource-based theory and the related relational view of competitive advantage will be applied extensively to the situation at the port of Rotterdam, as it showed that these theories fit the characteristics of a port best. The other theories, the five forces model and the core competences theory, will be applied as well, but shortly. The outcomes of this application are expectations and suggestions, as no empirical research is conducted.

First, the port of Rotterdam will be introduced by showing its characteristics, actors and most important industries. After that, the competitive advantage theories will be applied to the port of Rotterdam. Finally, a suggestion to improve the competitiveness of the port of Rotterdam is provided.

5.1 Introduction to the port of Rotterdam

With an annual throughput of 450 million tons of cargo in 2012, the port of Rotterdam is the largest port in Europe and the fifth port worldwide. The port of Rotterdam has even been the busiest port in the world for several decades. The development of the port started in the fourteenth century, resulting in an area of 40 kilometres and 12.500 ha now, including the new Maasvlakte II[[3]](#footnote-3). One big advantage of the Maasvlakte II is that it became possible for the largest ships to moor 24 hours a day, because of the deep waterways. In the Hamburg-Le Havre range, the port of Rotterdam is the only port that is able to provide this service. That new service gives the port of Rotterdam an advantage over its biggest competitor, the port of Antwerp.

For the further development of the port, the Rotterdam Mainport Development project is set up. This project is responsible for the construction of the Maasvlakte II, the creation of 1000 hectares of new nature and recreation areas and for the improvement of the existing port area[[4]](#footnote-4).

The port authority and the port companies are the most important stakeholders in the port of Rotterdam. The port authority is responsible for the daily management and the long-term goals of the port[[5]](#footnote-5). It has two shareholders: the municipality of Rotterdam and the national government, taking a part of 70% and 30% respectively. This means that the municipality of Rotterdam and the national government can influence the formulation of goals and daily management of the port through the port authority.

Table 3 shows the top five most important industries for the port of Rotterdam, measured by market share in the Hamburg-Le Harve range, where the direct competitors of the port of Rotterdam are located (Port Authorities, 2012). Table 3 provides the market shares in the most important industries for the port of Rotterdam of the port of Antwerp as well, as that is the biggest competitor of Rotterdam (Appendix II).

**Table 3**: market share per industry for Rotterdam and Antwerp.

|  |  |  |  |
| --- | --- | --- | --- |
| Industry | Year | Rotterdam | Antwerp |
| Crude oil | 2011 | 62,8% | 3,1% |
|  | 2012 | 65,9% | 1,7% |
|  |  |  |  |
| Liquid bulk | 2011 | 50,4% | 11,7% |
|  | 2012 | 52,5% | 11,1% |
|  |  |  |  |
| Bulk | 2011 | 44,5% | 10,1% |
|  | 2012 | 45,5% | 10,0% |
|  |  |  |  |
| Iron ore + scrap | 2011 | 47,4% | 3,6% |
|  | 2012 | 44,5% | 3,7% |
|  |  |  |  |
| Mineral oil products | 2011 | 40,4% | 16,4% |
|  | 2012 | 41,8% | 16,3% |
|  |  |  |  |
| Total throughput | **2011** | **37,0%** | **16,0%** |
|  | **2012** | **37,6%** | **15,7%** |
| \*Measured in metric tons | | | |

Source: annual report PA Rotterdam.

The market share in total throughput of Rotterdam shows that the port is much bigger than the port of Antwerp. Next to that, the table shows that the most important industries for the port of Rotterdam are not the industries in which the port of Antwerp is the biggest. The only industry that is important for the port of Rotterdam and in which the port of Antwerp has a relatively large market share, is the mineral oil products industry. Other industries that are important for the port of Antwerp are containers and breakbulk, which are the eight and ninth most important industries for the port of Rotterdam respectively.

From these recent numbers can be concluded that the industries that are important for the port of Rotterdam do not correspond to the most important industries of the port of Antwerp, which is its biggest competitor. However, there is one exception to this, namely in the container industry. Although this is the eighth most important industry for the port of Rotterdam, the market share still was approximately 29% in 2012. For the port of Antwerp, this was 24% (Port Authorities, 2012). The exception lays in the fact that the port of Rotterdam has been the biggest container port of Europe for a long time. Now, fierce competition from the port of Antwerp almost equalled their market shares. However, with the new Maasvlakte II and its deep waterways, the port of Rotterdam might be able to increase its market share in this industry. That could cause the industry to return to the top five most important industries for the port of Rotterdam.

5.2 Application to the port of Rotterdam

The application of the competitive advantage theories to the port of Rotterdam will start with the five forces model and the core competences theory. This application will be short, because of the limited applicability of these theories to the situation of a port. After that, the resource-based view and the relational view will be applied extensively, as these theories fit the characteristics of a port best.

When the five forces model is applied to a port, it has shown that this is only possible for an individual port company. Namely, the forces could influence the competitiveness of a port cluster positively through agglomeration economies. Examples of individual port companies that do not have the advantages of agglomeration economies are companies that build ships and companies that repair ships. The main reason for the fact that they do not have these advantages is that there are not many of these companies located in the port area. This means for example that they cannot share suppliers with other companies, which is one of the sources of agglomeration economies. As a consequence of that is the five forces model applicable to these companies. Therefore, taking the strategic options of building defences against the forces, responding to expected shifts in the power of forces and of positioning the company where the forces are weakest into account could improve the competitiveness of these companies.

The application of the core competences theory is only possible for individual port companies that are able to move quickly in and out of markets. Examples of these companies in the port of Rotterdam are companies that provide information systems. It could be possible for these companies to create one or more competencies that fulfil the criteria the theory states. One of these criteria is that the competency should provide potential access to a wide variety of markets. That criterion is difficult to fulfil for most of the port companies, but could be possible to achieve for companies that provide information systems. When the criteria the theory states are fulfilled, namely that the competency provides access to a variety of markets, contributes to customer benefits and is difficult for competitors to imitate, the competitiveness of these companies is likely to improve.

When the port or a port company creates a resource that fulfils the VRIN-criteria and when the actions determined by the relational view are executed, a competitive advantage according to the resource-based view is likely to be achieved. However, the nature of port competition is changing, causing new factors to influence the competitive position of a port. The new factors that influence port competitiveness are, among others, technological progress, computerization, growth of EDI, joint-ventures, alliances, flexibility, global logistics, deregulation and the concerns about the environmental impact of transport and port activities (Haezendonck, 2001). When looking at these new factors in the light of the resource-based view and the relational view, it becomes clear that some factors can be seen as resources, whereas others can be seen as inter-organizational relations. Examples of resources could be technological progress, global logistics and computerization; examples of inter-organizational relations could be joint-ventures and alliances.

The application of the resource-based view and the relational view on the port of Rotterdam requires several steps. First, the most important resources and inter-organizational relations will be discussed. Second, the future plans of the port will be discussed in the light of competitive advantage theories and the competitiveness of the port. Finally, the opportunities for the port will be reviewed.

When looking at the history, present and future of the port of Rotterdam, the importance of its resources becomes clear. They made it possible for the port to become an important hub in the network of the transport of goods[[6]](#footnote-6). The resources that distinguish the port of Rotterdam from other ports in the Hamburg-Le Havre range are:

* Geographic location
* Maritime access
* Hinterland accessibility **Figure 2**: The Ruhr area



**Figure 1**: Hub function of the port of Rotterdam



Source: <http://mainportdelta.osage.nl>

Source: [www.ethesis.net](http://www.ethesis.net)

Figure 1 shows the importance of the geographic location of the port of Rotterdam. The port clearly functions as an important hub in the network of the transport of goods. The other two important resources of the port support this hub function. The maritime access contributes to the hub function through the easiness for large ships to enter the port. Because of the deep waterways in the Europoort and Maasvlakte area, it is even for these large ships relatively easy to moor and load and unload. The establishment of the new Maasvlakte II even made it possible for these large ships to moor 24 hours a day. This could strengthen the hub function and thereby the competitiveness of the port of Rotterdam.

Next to that, the hinterland accessibility contributes to the hub function of the port. This is because of the modal shift possibilities for inland distribution. These modal shift possibilities consist of the sophisticated road network in the Netherlands and its hinterland, the railway network with the Betuwe route connecting the Netherlands with Germany, pipelines and the inland navigation through the rivers the Rhine and the Meuse. These rivers make it possible for relatively large ships to transport goods to the hinterland. Figure 2 shows this hinterland, which consists of among others Germany, Belgium, France, Great Britain and Scandinavia. Figure 2 also highlights the Ruhr area in Germany, which is an important destination in the transport of goods.

The hub function of the port of Rotterdam is assumed to be the reason that it is the largest port in Europe. However, according to the resource-based view, in order for it to be a competitive advantage it has to fulfil the VRIN-criteria. When looking at the resources that contribute to the hub function separately, it cannot be said that they fulfil these criteria. However, table 4 shows that when these resources are viewed combined and thereby the hub function is viewed as a resource, the VRIN-criteria are fulfilled.

**Table 4**: Resources port of Rotterdam tested using VRIN-criteria (Gordon, 2005)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Resource: | Hinterland accessibility | Maritime access | Geographic location | Hub function |
| Criterion: |  |  |  |  |  |
| Valuable |  | Yes | Yes | Yes | Yes |
| Rare |  | Yes | Yes | Yes | Yes |
| In-imitable |  | Partly, but difficult and costly | No, but difficult and costly | No, the location of Antwerp is not exactly the same, but very much alike | Yes |
| Non-substitutable |  | Yes | Yes | Yes | Yes |

The port of Antwerp can imitate the hinterland accessibility through the road network, the railways and pipelines. The inland navigation through the rivers the Rhine and the Meuse however, cannot be imitated. Next to that, it will be very costly to develop the infrastructure in the way it is done in the Netherlands and objections of inhabitants and environmental organisations must be taken into consideration as well.

The maritime access can be imitated as well, for example through widening and deepening the waterways. However, this is very costly and will likely take a lot of time, again taking in consideration objections of inhabitants.

The geographic location of the port of Rotterdam cannot be imitated exactly, but the port of Antwerp is very closely located to the port of Rotterdam. When viewing this in the light of the global transport of goods, it is approximately the same geographic location.

In the review of the hub function, the three important resources of the port are combined. The geographic location at the west coast of Europe, supported by deep waterways through which the largest ships in the world find access to the port and the hinterland accessibility, especially through the rivers the Rhine and the Meuse, gives the port of Rotterdam its in-imitable hub function in the network of the transport of goods. The accessibility of the hinterland through the rivers the Rhine and the Meuse is in-imitable, whereas its natural deep waterways and sophisticated infrastructure is very costly and difficult to imitate. It can be concluded that according to the resource-based theory, the hub function of the port of Rotterdam is a competitive advantage.

Besides the resources, the port of Rotterdam has developed and is developing inter-organizational relations. This can be either on the level of the port as a whole, or on the level of port companies.

The port as a whole is cooperating with several countries of which the economy is developing fast, the so-called BRIC countries. These include Brazil, Russia, India and China. Recently, Turkey has been added to these countries, as it is a fast developing country as well.

Within Brazil, Rotterdam has signed a Memorandum of Understanding (MoU) with the port city of Santos. In Russia, a long history of trade exists, mainly in the chemical industry. The city of Rotterdam is cooperating with its Russian sister-city St. Petersburg as well, based on active port-economic relations. The cooperation with India consists of Rotterdam advising the Indian government on the development of ports. Rotterdam in turn can learn from their ICT and logistic skills. It is well known that the port of Rotterdam has a very strong economic relationship with China, especially with its sister-city Shanghai. Rotterdam and Shanghai were already cooperating in the areas of infrastructure and port co-operation, but are now cooperating in the areas of CO2 reduction and soil and water pollution as well. Finally, the relationship between Rotterdam and Turkey becomes clear because of the fast that 7.8% of their population lives in Rotterdam. The cooperation between Rotterdam and Turkey is primarily in the areas of energy and water[[7]](#footnote-7).

Next to port level partnerships, port company level partnerships exist in Rotterdam. Some examples of this will be provided to be able to analyse their possibilities for relational rents according to the relational view.

First, the Russian Summa group and the Dutch VTTI created a joint venture named Shtandart[[8]](#footnote-8). With this joint venture, a new tank terminal is being build. Second, the port authority has a share in the Sohar Industrial Port Company (SIPC) and the Sohar International Development Company (SIDC), both located in Oman[[9]](#footnote-9). With that, the port authority is investing in the development of the port of Sohar. Third, a joint venture between the port authority and the German ARG exist, named RC2[[10]](#footnote-10). This joint venture is created for the transport of ethylene through Germany, the Netherlands and Belgium. Fourth, the port authority and Vopak Chemicals Logistics Europe & Africa B.V. created the joint venture MultiCore. This company was created for the distribution of chemicals and gas. Finally, ShoreTension Holding B.V. was created. This is a joint venture between ECT and All-round Port Services B.V. The company developed a revolutionary system for the mooring of ships, which was achieved with help of the Koninklijke Roeiers Vereeniging Eendracht (KRVE) from Rotterdam[[11]](#footnote-11).

Table 5 shows in which relational view action these partnerships fit, both on the port and port company level.

**Table 5**: Inter-organizational relations in the port of Rotterdam

|  |  |  |  |
| --- | --- | --- | --- |
|  | Level: | Port cluster | Port company |
| Action: |  |  |  |
| Relation-specific assets |  |  | Shtandart, RC2, MultiCore and ShoreTension |
| Knowledge-sharing |  | Brazil, Russia, India, China, Turkey | SIPC/SIDC, ShoreTension |
| Resource complementarity |  |  |  |
| Effective governance |  |  | SIPC/SIDC |

When looking at port level partnership, all five examples can be seen as knowledge sharing. On the port company level, Shtandart, RC2, MultiCore and ShoreTension invested in relation-specific assets, and SIPC/SIDC and ShoreTension shared knowledge. The investments made in Sohar could be seen as effective governance as well, because the port authority is investing capital in the port and gets nothing in return. This might be to clear the road and create trust in order to get a tight cooperation between the port of Rotterdam and the Port of Sohar when it is a developed port, which can contribute to the profitability of the port of Rotterdam.

The latter reviewed resources and inter-organizational relations are already established, and they already contribute to the competitiveness of the port of Rotterdam. The focus in the following part will be on the opportunities for the port. This will be done by first reviewing an existing development project in the light of the competitive advantage theories and second providing an additional suggestion.

It can be stated that all the reviewed competitive advantage theories can be applied to the port of Rotterdam. However, the applicability of the five forces model and core competences theory is very limited. Because of that, the development projects of the port of Rotterdam and the suggestion for improving the competitiveness of the port are reviewed only in the light of the resource-based view and the relational view. This is because it showed that these theories could be applied to the port of Rotterdam on the port cluster level and on the individual port company level, and are therefore also best suited to be used to analyse the development projects and to provide a suggestion for improving the competitiveness of the port of Rotterdam.

There are six big projects the port of Rotterdam is working on[[12]](#footnote-12). These projects mainly focus on an expansion of the port area. The best example of this is the construction of the Maasvlakte II. Such an expansion of the port area enlarges the physical resources of the port of Rotterdam. These resources can be reviewed in the light of the resource-based theory. If the goal is to turn them into competitive advantages, the VRIN-criteria need to be fulfilled again. After the review of the existing resources of the port of Rotterdam it has been determined that solely the geographic location does not fulfil the VRIN-criteria. As the expansion of the port area is just an enlargement of the location, this on itself is not likely to lead to a competitive advantage. However, the enlargement of the port area can contribute to the hub function of the port of Rotterdam. Next to that, the creation of new business areas can lead to agglomeration economies, which contributes to the profitability of the port of Rotterdam and with that its competitive position.

The review of the development projects of the port of Rotterdam showed that most of the development is focussed on expansion, in land and in business areas. It became clear that these expansions are likely to have a positive impact on the competitive position of the port of Rotterdam. However, with the changing port competition, solely increasing capacity might not be enough. The possibilities to expand are not infinite as well. Because of that, other opportunities for strengthening the competitive position of the port of Rotterdam should be explored. A suggestion will be provided in the following part.

As capacity cannot be enlarged infinitely, opportunities for making better use of the existing capacity can be explored. One way through which this could be possible, is through the use of sophisticated information systems. At this moment, 28 IT companies are active in the port of Rotterdam, providing information by making use of their own systems[[13]](#footnote-13). With all these different systems, it might be that the information exchange among actors does not always run smoothly. If all actors in the port could contribute to the development of a few systems that can make the information exchange run more smoothly, this might increase the competitiveness of the port of Rotterdam. Namely, when the information exchange concerning for example the distribution of goods becomes more efficient, that would mean that the speed and quality of the services rises. For the customer this means less costs and a speedier handling, which is likely to increase its satisfaction.

To make the development of such information systems possible in order to make better use of the existing capacity, large investments in knowledge, meaning in research and development and education, are inevitable. The port of Rotterdam already has plans to invest in research, by creating a business area at the RDM terrain where Research, Design and Manufacturing are the core values. This plan could be seen in the light of the relational view. The new knowledge resulting from the research could be shared among port companies, thereby creating relational rents. However, that might not be enough to cope with the fierce competition in the Hamburg-Le Havre range, as they keep developing as well. It could be an option to mobilize the national government and the municipality of the city to invest in (higher) education, in order for the port of Rotterdam to be innovative and more efficient, thereby strengthening its competitive position. The lobbying for these investments could be effective, as the national government and municipality of Rotterdam both have a share in the port authority of Rotterdam. Next to that, the port of Rotterdam is a very important factor in the Dutch economy, in 2011 contributing for 88.649 to the direct employment and creating 13.057 billion direct added value (Nijdam et al., 2011).

The possible innovations that come out of the investments could fulfil the VRIN-criteria and thereby create a competitive advantage for the port of Rotterdam. Next to that, the knowledge underlying this innovation could be shared among the port actors, which makes it possible to create relational rents.

There are a couple conditions that make it more likely for these actions and investments to become sustained competitive advantages, next to the criteria summed up in the part on the resource-based view. First, there is interorganizational asset interconnectedness, which means that sometimes relation-specific asset investments can only be profitable because of earlier relation-specific asset investments. Second, partner scarcity can exist. There are normally only a few firms that have complementary resources and are willing to cooperate. When there are no potential alliance firms left, it becomes impossible to imitate firms that do have an alliance firm. Third, there can be resource indivisibility. This exists for example when firms are combining their resources and coevolve them, which makes it difficult to imitate. Finally, the institutional environment plays a role. This is mostly country dependent. A government can namely encourage cooperation between firms, or discourage it (Dyer & Singh, 1998).

These additional factors make clear that early movements for developing alliances can cause higher relational rents, especially in the future. This is shown by the asset interconnectedness and the resource indivisibility. Now, the port of Rotterdam has a strong competitive position in the Hamburg-Le Havre range, but competition from particularly the port of Antwerp is fierce. In order to strengthen its competitive position, it might be a possibility for the port of Rotterdam to create alliances. With these partners, the new knowledge and innovations resulting from the suggested investments can be shared, which could create relational rents.

In conclusion it can be stated that the five forces model could help creating competitive advantages for companies that build ships or repair ships. The core competences theory could be applied to companies that provide information systems, which could improve their competitiveness.

The resource-based view showed that the hub function is the competitive advantage of the port of Rotterdam. From the point of view of the relational view, this competitive advantage lays in the multiple inter-organizational relational that exist in the port, both on port cluster level and on port company level.

Finally, it has been suggested that investing in knowledge and in innovations could improve the competitiveness of the port of Rotterdam. A competitive advantage can be achieved if the resource that is created through these investments fulfils the VRIN-criteria or when relational rents are created through sharing the knowledge resulting from these investments between ports or port companies.

Chapter 6: Conclusion and discussion

The review of the competitive advantage theories showed that they all have different characteristics. They differ when looking at their perspectives, focus and factors of influence. However, when these characteristics are put together, similarities between the theories become visible as well.

Because of the focus of these theories on firms, the differences between a firm and a port were determined. This review showed that firms and ports show multiple overlaps, but differences in their goals, function, characteristics and factors of influence as well. This mainly lays in the fact that the national or regional government influences a port in its goals and functions. This could mean that a port cannot always implement the actions necessary for strengthening the competitive advantage, or that the implementation of these actions are unintentionally influenced by the government.

It showed that the management of a firm is simpler than the management of a port as well, as the management of a port goes through the port authority and through the management of the individual firms, whereas a firm has a management that focuses on the goals of that one company.

In conclusion it can be stated that firms and ports show enough overlap to apply a competitive advantage theory to a port. However, the government or the complicated management structure could distort the implementation of the necessary actions.

After the differences between a firm and a port were determined, it was possible to state which theory fits the characteristics of a port best. It became clear that the resource-based theory combined with the relational view is best suited to be applied to a port. This is because the application of the resource-based view is focused on the port cluster level, but it is possible to apply the theory on port company level as well. The exact opposite is the case for the relational view. The application of this theory is focused on the port company level, but it is possible to apply it on port cluster level as well. The five forces model can only be applied on port company level. The same accounts for the core competences theory, with the restriction that the port company to which the theory is applied is able to move quickly in and out of markets.

When the five forces model is applied to the port of Rotterdam, it becomes clear that it could best be applied to port companies that do not have the advantages of agglomeration economies, such as ship building companies. This is because the five forces influence these companies in the same way as they influence the firms this theory focuses on. The core competences theory could be applied to companies that provide information systems, as they are able to move quickly in and out of markets.

The application of the resource-based view and the relational view to the port of Rotterdam showed that the competitive advantage of the port of Rotterdam in the light of the resource-based view is the hub function. The competitive advantages in the light of the relational view are the different inter-organizational relations, on port cluster and on port company level.

The recent development projects for the port of Rotterdam are mainly focused on the expansion of the port area. Because capacity cannot be enlarged infinitely, a suggestion is given to make better use of the existing capacity. This might be reached through investments in knowledge and innovations, in order to improve for example the information systems at the port of Rotterdam. If the VRIN-criteria are fulfilled, this might create a competitive advantage for the port of Rotterdam. When the knowledge underlying the innovations is shared, this might create relational rents. Additional factors showed that early movements for creating alliances might cause relational rents out of the knowledge sharing to rise.

**Recommendations for further research**

The case of the port of Rotterdam showed that it possesses a resource that fulfils the VRIN-criteria. It might be interesting to research whether this accounts for other ports as well.

Next to that, it could be determined if the formulated suggestions for the port of Rotterdam indeed create a competitive advantage. However, this can only be determined if the suggested actions are executed.

Finally, empirical research that provides statistical evidence would give the formulated conclusion more strength. This could be carried out.

References

Barney, J.: Firm Resources and Sustained Competitive Advantage. *Journal of Management*, Vol.17, No. 1 (1991), pp. 99-120. Published by: Sage publications.

Baxter, P & Jack, S.: Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *The Qualitative Report,* Vol. 13, No. 4 (2008), pp. 544-559. Published by: Nova Southeastern University.

Chamberlain, T.: Capital Structure and the Long-Run Survival of the Firm: Theory and Evidence. *Journal of Post Keynesian Economics,* Vol. 12, No.3 (Spring, 1990), pp. 404-423. Published by: M.E. Sharpe, Inc.

Cullinane, K., Ji, P. & Wang, T-F.: The relationship between privatization and DEA estimates of efficiency in the container port industry. *Journal of Economics and Business,* Vol.57 (2005), pp. 433-462.

De Langen, P.W.: Devolution, Port Governance and Port Performance. *Research in Transportation Economics*, Vol. 17, (2007), pp. 457-477. Published by: Elsevier Ltd.

Dyer, J.H. & Singh, H.: The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *The Academy of Management Review,* Vol. 23, No.4 (1998), pp. 660-679. Published by: ProQuest.

Gordon, J.R.M., Lee, P-M. & Lucas Jr., H.C.: A resource-based view of competitive advantage at the Port of Singapore. *Journal of Strategic Information Systems,* Vol. 14 (2005), pp. 69-86. Published by: Elsevier Ltd.

Goss, R.O.: Economic policies and seaports: Are PAs necessary? *Maritime Policy & Management Journal,* Vol. 17, No. 4 (1990), pp. 257-271. Published by: Peer review integrity.

Grundy, T.: Rethinking and reinventing Michael Porter’s five forces model. *Wiley InterScience* (2006). Published by: John Wiley & Sons, Ltd.

Haezendonck, E. (2001). *Essays on Strategy Analysis for Seaports*. Leuven/Apeldoorn: Garant.

Hart, C. (1998): *Doing a Literature Review*. London: Sage publications.

Jansson, J.O. & Shneerson, D. (1982): *Port economics.* The Massachusetts Institute of Technology.

Kreukels, T. & Wever, E.: Dealing with Competition: The Port of Rotterdam. *Tijdschrift voor economische en sociale geografie,* Vol. 87, No. 4 (September 1996), pp. 293-309. Published by: KNAG.

Nijdam, M., Van der Lugt, L. & De Jong, O (2011). Havenmonitor 2011 [pdf]. Retrieved from <http://havenmonitor.nl/onewebmedia/Havenmonitor%202011.pdf>

Penrose, E.T. (1959). *The Theory of the Growth of the Firm*. Oxford: Oxford University Press.

Port Authorities (2012). Throughput Hamburg-Le Havre range [pdf]. Retrieved from <http://www.portofrotterdam.com/en/Port/port-statistics/Documents/Throughput%20Hamburg%20-%20Le%20Havre%20range%202012.pdf>

Porter, M.E.: The Five Competitive Forces That Shape Strategy. *Harvard Business Review,* (January 2008), pp. 25-40.

Prahalad, C.K. & Hamel, G.: The Core Competence of the Corporation. *Harvard Business Review,* (May-June 1990), pp. 79-90.

Rosenthal, S.S. & Strange W.C. (4th ed.). (2004): *Handbook of Regional and Urban Economics*. Elsevier.

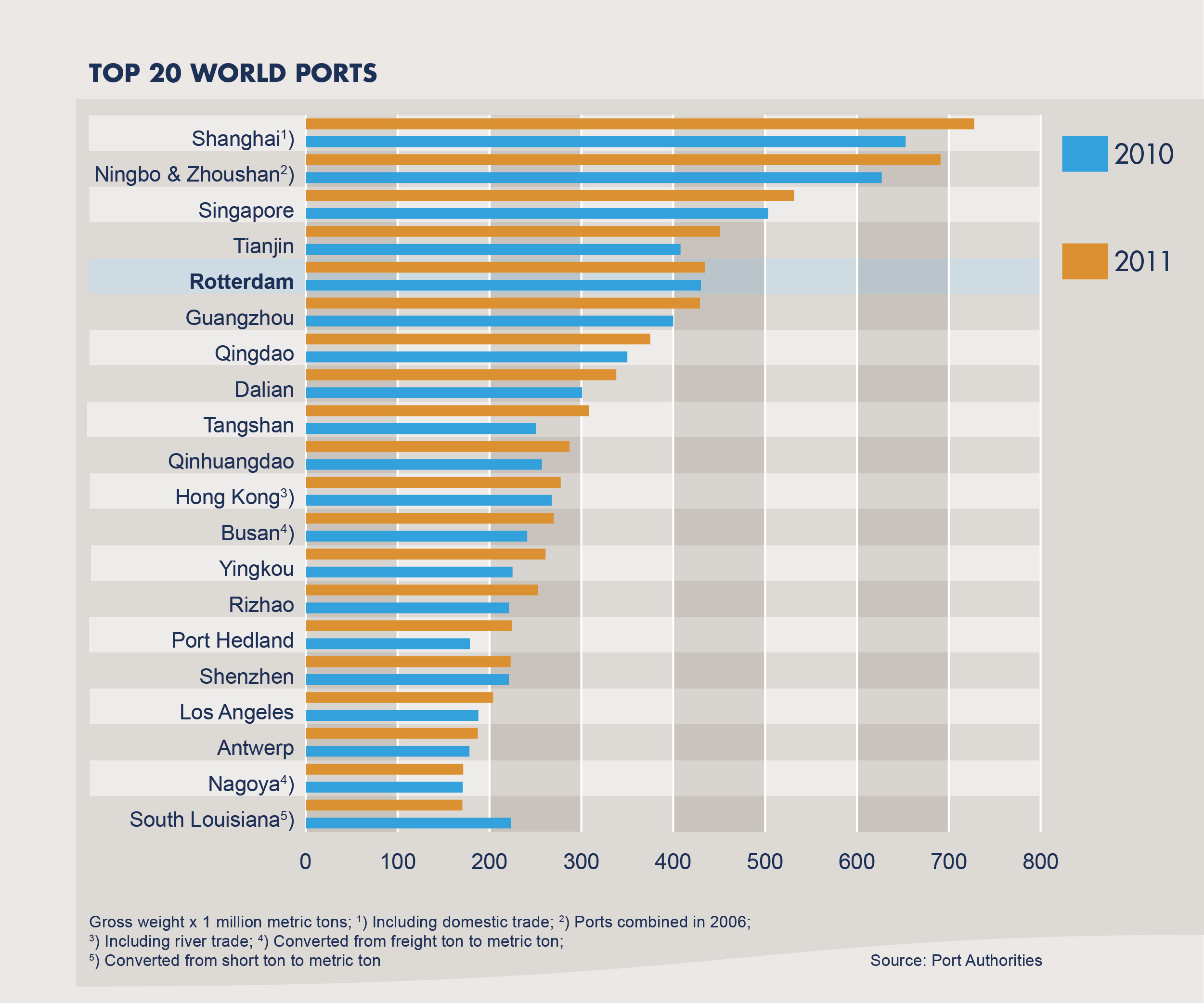
Simon, H.A.: Rational Decision Making in Business Organizations. *The American Economic Review*, Vol. 69, No. 4 (Sep., 1979), pp. 493-513. Published by: American Economic Association.

Suykens, F & Voorde van de, E.: A quarter of a century of port management in Europe: objectives and tools. *Maritime Policy & Management Journal,* Vol. 25, No. 3 (1998), pp. 251-261.

Van der Lugt, L., et al.: Strategy making by hybrid organizations: The case of the port authority, *Research in Transportation Business & Management* (2013), <http://dx.doi.org/10.1016/j.rtbm.2013.06.005>

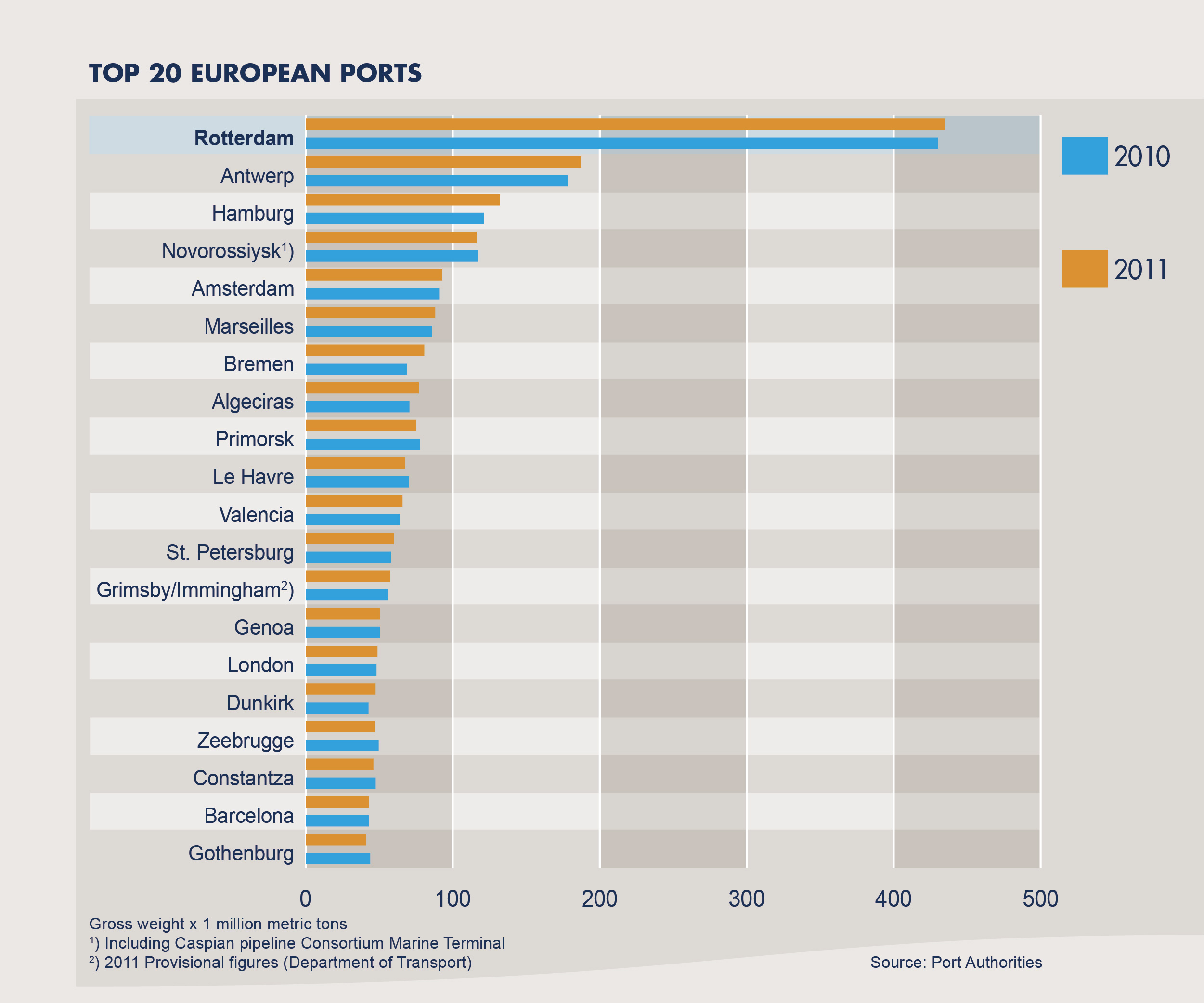
Appendix

1. Top 20 World ports measured in cargo traffic.

Source: <http://www.portofrotterdam.com/SiteCollectionDocuments/201205IL-G003-EN-TOP20-WORLD.jpg> 

1. Top 20 European ports measured in cargo traffic.

Source: <http://www.portofrotterdam.com/en/Port/port-statistics/Pages/other-ports.aspx>



1. Source: <http://www.portofrotterdam.com/en/Port-authority/finance/annual-report/Documents/annualreport-2012.pdf> [↑](#footnote-ref-1)
2. Source: <http://www.portofrotterdam.com/en/Port-authority/our-company/Pages/company-profile.aspx> [↑](#footnote-ref-2)
3. Source: <http://www.portofrotterdam.com/en/Port/port-in-general/Pages/default.aspx> [↑](#footnote-ref-3)
4. Source: <http://www.maasvlakte2.com/nl/index/show/id/23/Project> [↑](#footnote-ref-4)
5. Source: <http://www.portofrotterdam.com/nl/Havenbedrijf/ons-bedrijf/Pages/default.aspx> [↑](#footnote-ref-5)
6. Source: <http://www.portofrotterdam.com/en/Port/port-in-general/port-vision-2030/Pages/global-hub.aspx> [↑](#footnote-ref-6)
7. Source: <http://www.rotterdam.nl/tekst:_economische_groeibriljanten> [↑](#footnote-ref-7)
8. Source: <http://www.shtandart-tt.com/nl/home/> [↑](#footnote-ref-8)
9. Source: <http://www.portofrotterdam.com/nl/Havenbedrijf/organisatie/Pages/buitenlandse-deelnemingen.aspx> [↑](#footnote-ref-9)
10. Source: <http://www.portofrotterdam.com/en/Business/about-the-port/connections/Pages/pipelines.aspx> [↑](#footnote-ref-10)
11. Source: <http://www.portofrotterdam.com/nl/actueel/pers-en-nieuwsberichten/Pages/nederlandse-innovatie-veilig-afmeren-zeeschepen.aspx> [↑](#footnote-ref-11)
12. Source: <http://www.portofrotterdam.com/nl/Over-de-haven/havenontwikkeling/Pages/newdefault.aspx> [↑](#footnote-ref-12)
13. Source: <http://www.rotterdamportinfo.com/it-b0?startat=21> [↑](#footnote-ref-13)