CHALMERS

Berg Propulsion and the Brazilian shipping industry

Network strategies on a regulated market

Master of Science Thesis in the Master Degree Program, Supply Chain Management

JOHAN GUNNARSSON

JACOB PETTERSSON

Department of Technology Management and Economics
Division of Industrial Marketing
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden, 2013
Report no. E2013:106

REPORT NO. E2013:106

Berg Propulsion and the Brazilian shipping industry

Network strategies on a regulated market

JOHAN GUNNARSSON
JACOB PETTERSSON

Supervisor, Chalmers: Anna Dubois
Supervisors, Berg Propulsion: Christer Olofsson & Emil Cerdier

Department of Technology Management and Economics
Division of Industrial Marketing
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2012

Berg Propulsion and the Brazilian shipping industry
JOHAN GUNNARSSON & JACOB PETTERSSON

Master's Thesis E2013:106

Department of Technology Management and Economics
Chalmers University of Technology
SE-412 96 Göteborg Sweden
Telephone: +46 (0)31-772 1000

Chalmers Reproservice
Gothenburg, Sweden 2013

ABSTRACT

Over the last few years the Brazilian shipping industry has seen a significant growth. New oil findings outside the coast of Rio de Janeiro have started a refurbishment process of the shipyards in Brazil, and the semi-state controlled energy company Petrobras have planned to increase their fleet size by almost 700 vessels of different types before the year 2020. This makes for a lucrative market for companies in the shipping industry all over the world, and several major actors have expanded their operations within Brazil. However, there is one specific characteristic making the Brazilian market more difficult to operate on for foreign companies: the local content requirements imposed by Petrobras and the government. In short, these regulations force companies that want to do business with Petrobras to source a maximum of 40 % of the components' value from outside Brazil whilst sourcing the remainder locally.

This thesis was carried out at Berg Propulsion, a high-quality Swedish propeller system manufacturer with manufacturing facilities in Sweden and Singapore. The company has offices and representatives all over the world and expressed an interest in investigating the increasing potential of the Brazilian offshore market and possible ways of entering it. The purpose of the thesis was therefore to explore and evaluate the Brazilian shipping industry and its environment by identifying its market potential and characteristics. By processing the market and industry data, several strategies regarding how Berg Propulsion should most favorably structure their position within the Brazilian shipping network are presented.

To fulfill this purpose, data was collected via a range of interviews and extensive market research. Furthermore, a theoretical framework consisting of industrial network theory was developed to be used as a model of analysis. The result of the analysis suggested that albeit the growth of the Brazilian offshore shipping market is somewhat uncertain and heavy regulated with local content requirements, its potential is vast and well worth looking into. The different strategies Berg Propulsion should conduct all coincide with tying closer bonds with local suppliers by combining their resources. The goals of the strategies also coincide by being means to gain access to the resource base of local suppliers and their position in the Brazilian offshore shipping network.

Keywords: local content requirements, industrial network theory, offshore oil and shipping industry, Brazil

ACKNOWLEDGMENTS

This master thesis was carried out at the business development department at Berg Propulsion's offices in Gothenburg, Sweden between March 2013 and August 2013. The thesis is the final part of the master degree program Supply Chain Management at Chalmers University of Technology and was carried out at the Division of Industrial Marketing.

We would like to thank our supervisor at Chalmers, Anna Dubois. She has continuously given us her time and interest in form of encouragement and ideas.

We would also like to thank our supervisors at Berg Propulsion, Christer Olofsson and Emil Cerdier. Both of them have supported us throughout the work of the thesis by taking time of their busy schedules to discuss our various questions and wonderings.

Lastly, we would like to thank everyone we have interviewed during the course of this thesis and of course everyone at the Berg Propulsion offices who have supported and welcomed us in their workspace.

Gothenburg, August 2013

_____ _____

Johan Gunnarsson Jacob Pettersson

TABLE OF CONTENTS

1. INTRODUCTION

In the following chapter a brief situational and contextual description of the study, the study object and the research questions of the study is presented. A background description of why the Brazilian shipping market is of interest is shown, followed by a presentation of Berg Propulsion in general as well as their situation on the Brazilian market in specific. Furthermore the chapter introduces the purpose and problem analysis as well as the research questions that will be the used as a starting point for the thesis.

1.1. Background

In today's globalized market one of the most important resources for a company is its network. The suppliers, customers and other stakeholders are important factors for a company's success. This becomes even more evident and important when investigating the possibility to enter or expand on a market on which the company has had little business before.

New markets equal new networks which in turn equal different actors, power structures and business relationships that need to be considered. The identification of the network's structure and distribution of resources and activities along with the identification of one's own structure and distribution of resources and activities is also necessary to be considerate of. Understanding the new network along with your own existing network and the contributions you bring are necessary components of new market entry.

The shipping industry is a highly volatile industry, with peaks and downs closely connected to the state of the world economy. Even though the close link to the world economy the response is lagging as a result of the long time-to-delivery. The order for a new vessel is placed as long as three years before it is to be delivered, why there is sometimes a high output of completed vessels even though the economy as a whole is going through a tough time. On the other hand, the orders being placed during a low point in the economy may result in a low output of completed vessels during a year when the economy is stronger. Considering the global scale of the market it also differs a lot between years where the vessels are sourced from, a situation that is also connected to a lag in response time, see figure 1 from Shipbuilding Forecast Club, 2013.

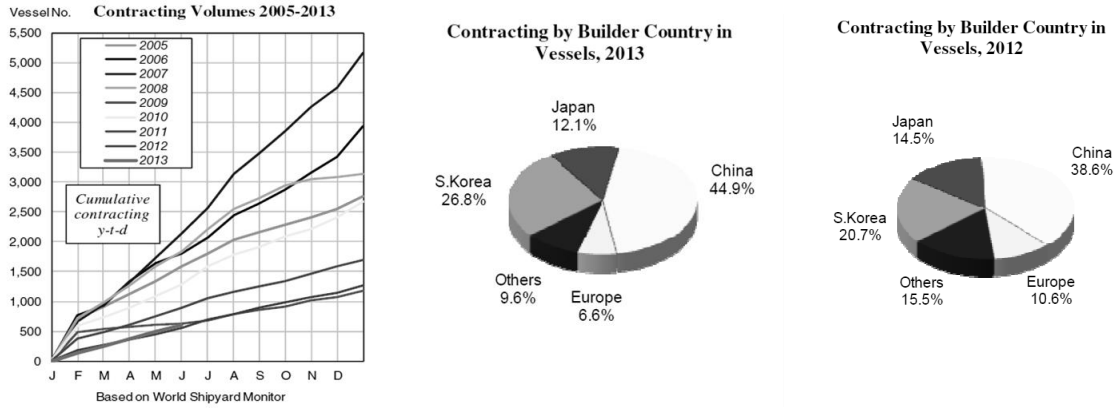


Figure 1: Contracting volumes by year and country (Shipbuilding Forecast Club, 2013)

In an 18-month period of time from 2008 to 2009, the Brazilian energy corporation Petrobras discovered several vast oil reserves in the Atlantic Ocean outside of the Southeast Region. The oil reserves were deemed to be among biggest in the world and propelled the status of Petrobras and Brazil (Economist, 2011a). The discoveries resulted in a rapid expansion of the Brazilian oil market as well as large expectations to profit on it. In turn, this also triggered an increasing need of oil shipping abilities and expectations of it growing exponentially. The need for oil tankers and drilling ships, as well as the necessary support vessels in Brazil practically exploded with new oil findings, leading to several companies in the offshore industry taking interest in the Brazilian market.

Brazil's economic position and political situation has undergone large changes in the recent decades, as the GDP increased from USD 15 billion to USD 2500 billion between 1960 and 2012 (Trading Economic, 2013) and at the same time saturating the before-high levels of poverty rate, child mortality and illiteracy. The relatively large bank of natural resources have always been an asset for Brazil but the industrialization of the nation have been a slower process than in Western countries in comparison. In attempts of expanding the internal economy via stimulating regional growth and urbanization, the Brazilian government has on numerous occasions issued trade regulations in different industries. The regulated trade has affected the import economy by introducing large tolls, thus demanding international companies interested in the large national market of Brazil to use local workforce and content if they were to avoid paying the large tolls (WTO, 2013).

With the new findings of oil and the increase of the potential market for companies within the shipping industry in Brazil many companies sees opportunities there. Petrobras, and the Brazilian government, has issued a minimum of 60% local content requirement for vessels that are going to operate for Petrobras on the extraction of the new oilfields. That means that if a vessel is to operate in connection to the oil findings, at least 60% of its value must be sourced from within Brazil. This is a way to protect and stimulate not only the economy as a whole, but also the local workforce and technical capability. However, the Brazilian shipping industry had been largely overseen for decades, why the know-how and the technical ability of the local producers is somewhat lacking in comparison to shipping industries in other countries. To secure the quality required by Petrobras, shipyards and shipbuilders are forced to source some components from other parts of the world. This leads to a business environment where the contractors first look for what components they can source with acceptable quality inside the country, and then what needs to be sourced from other parts and still having the required 60% local content. However, to gain a competitive edge, some companies within the shipping industry are evaluating the possibility or have already started to re-locate production to Brazil. What this means is that these companies will be classified as local, and their components are falling under the locally sourced category. For companies producing the same components elsewhere this means that the demand for their products will fall unless they are distinctively superior in some way, and even this is not a guarantee for business because of the strict local content requirements.

Berg Propulsion is a world-leading propeller manufacturer for larger vessels. The company headquarter is situated on Öckerö outside Gothenburg and divides it production on two sites;

the multi-production site in Singapore and the more technologically advanced site outside Gothenburg. Berg Propulsion is currently doing business in South America, primarily in Brazil, but has no production in the country. With financially stronger and more diverse competitors like Rolls Royce and Wärtsilä, who have or are going to implement local production sites in Brazil, Berg faces a risk of losing business as a result of lacking competitiveness. If indeed the Brazilian market will continue to grow at a high rate, this is a relatively large and important market for a producer like Berg Propulsion. Since they are not being classified as a local producer, Berg Propulsion must find another competitive advantage or try to become more of a local producer to stay competitive. The different ways of staying competitive is closely linked to the network Berg Propulsion is operating in, and how these relations and actors can help with the different possible solutions.

1.2. Problem analysis and purpose

When the Brazilian shipping industry and Petrobras announced their grand plans of expansion in the early 2000's, the interest of the global shipping industry in Brazil increased rapidly. A market with seemingly high potential that has been partly ignored during the 1980's and 90's were being redeveloped which could correlate with possibilities of hefty revenue increases. Berg Propulsion was not indifferent to this wind of change and sensed a new business opportunity on the verge of breaking out.

As the market of shipping in Brazil was relatively new in the sense that it was underdeveloped and –explored, its characteristics in form of capability, business environment and potential are lit with uncertainty in comparison with the stability of traditional shipbuilding industries in Japan, China or Korea. When attempting to enter a market of that stature, companies must pay close attention and thoroughly investigate its characteristics to be able to gain share and achieve competitive advantages. An unexplored market also equals a new business environment in the sense of new customers, new suppliers and new relationships even though the shipping industry is a global industry. An analysis of a business environment includes the customer-side, its potential and power, as well as the structure of the supply-side and external factors such as legislation and regulation. Berg was therefore intrigued and obliged to not only explore the economic potential of the Brazilian market of shipping industry but also its business environment.

The purpose of this thesis is therefore to explore and evaluate the shipping industry in Brazil to identify its potential and its environment. This market and industry research will be foundation for evaluating and suggesting different concepts of increasing Berg Propulsion's operations in Brazil. Based on the present state and future development of the Brazilian shipping industry market, different ways to operate in order to achieve competitiveness will be presented. By performing network analysis on stakeholders in the Brazilian shipping industry and understanding Berg's position in their own network, different options for Berg of combining resources and performing activities will yield different possibilities of entering the Brazilian market of shipping. In order to fulfill the purpose, the problem has been broken down into three research questions (RQ#) as can be seen in figure 2.

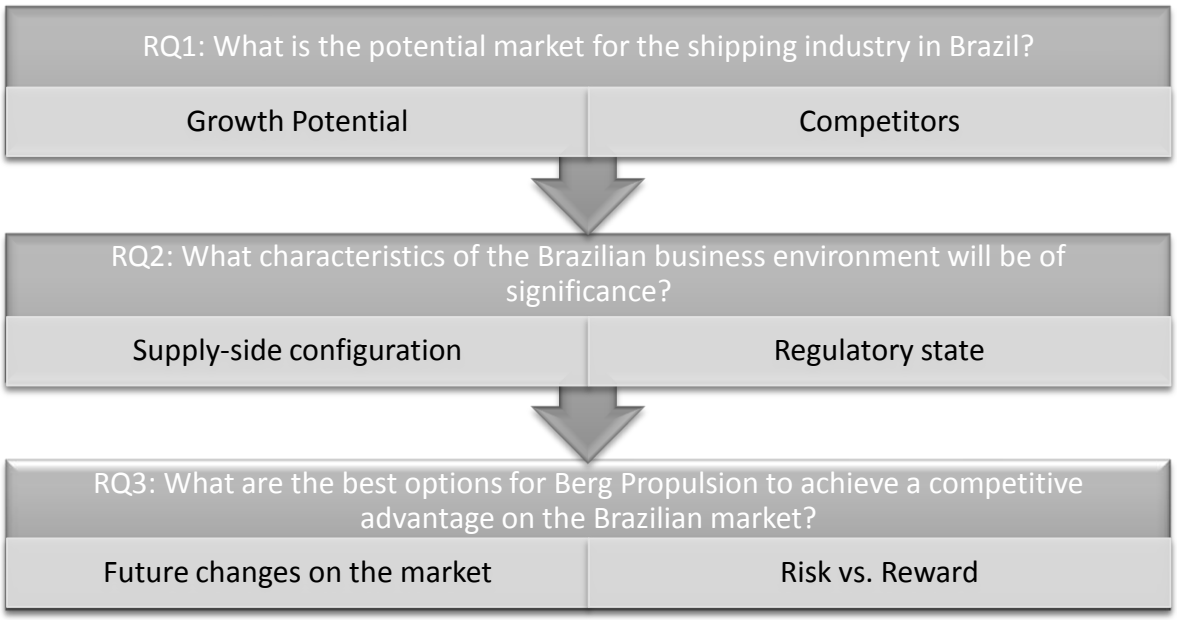


Figure 2: Research questions

RQ1 regarding the potential market of the shipping industry in Brazil is to be answered via analyzing the supply and demand of the market. This requires knowledge about the customer-side of the Brazilian shipping industry in terms of demand, power and economic strength. It also requires understanding and exploring the direct competitors' capabilities as well as potential supplementary actors. Answering this question helps to not only identify the market potential but also the industry network, the actors involved and the activities and resources they offer.

RQ2 regarding the business environment of the shipping industry in Brazil is to be answered via analyzing the external factors of the market. This requires knowledge about the legislative state and the configuration and status of the local supplier base and infrastructure of the Brazilian shipping industry and market. Answering this question helps not only to identify the market characteristics and upstream supply chain structure but also the external factors of the industry network in terms of its dependencies and externalities.

RQ3 regarding Berg Propulsion's specific actions to gain competitive advantages on the Brazilian market is to be answered via analyzing the potential and business environment of the Brazilian shipping industry market answered in RQ1 and RQ2. Furthermore, it will expand on how Berg's offerings in the industrial network can be structured depending on its risks and rewards. This will be depicted via exploring different scenarios of the market's development and will thus differ depending on the different scenarios explored. The strategic outcome of the scenario depiction will also enfold into more operative ways of Berg Propulsion to structure their position in the Brazilian shipping network.

1.3. Structure of the report

The report starts off with a background of the situation, followed by an explanation of the network theories that are to be used. Following that is a descriptive chapter about Berg

Propulsion and one regarding Brazil and the specific market characteristics relevant to the company.

The previously presented information will be used in the analysis, which will be followed by a chapter presenting the different possible scenarios and what the different options will result in. The last chapter means to present the conclusions and the authors' own recommendations for the company based on the scenarios identified.

2. THEORETHICAL FRAMEWORK

The theoretical framework presents the model for analyzing the focal point of the report, i.e. Berg Propulsion, and the subject the focal point is projected on, i.e. the Brazilian shipping industry. The theoretical framework is the industrial network theory and begins by explaining how business networks are structured and identified. The framework then expands by explaining the ingoing variable of a network and how they influence each other. Furthermore, the external effects and dynamics of business networks are presented.

The industrial network theory was chosen as model for the theoretical framework as it highlights market complexity both on an overall but also on a specific level. Industrial network strategy possesses dynamic possibilities to depict how companies are connected in chains of events and can also be used to focus on a specific business relationship. Furthermore, the industrial network theory is advantageous to use when understanding how actions, both internal and external, affect companies and the way they perform business.

2.1. Network overview

> *"No company is an island in the world of business."* (Ford et al, 2011)

The nature of business relationships has changed due to how the more rapidly innovative industries such as IT affects business transactions, relationships and industry strategies to be more responsive. One of the outcomes is that firms in higher degree specialize their operations and rely on the resources of other firms. This creates a web-like cluster of bonds and links between different companies where they combine their own internal resources with others' internal resources. This increasingly common structure has been described as "networks of value-adding partnerships" (Anderson et al, 1997). The business network depicts how the different firms involved are related to and dependent on each other. One model of depicting and analyzing the bonds and links is the Activity-Resource-Actor Model (ARA-model). The ARA-model explores the business network through three dimensions of linkage. The variables defining the dimensions of the model are activities, resources and actors. The relations and interactions between the variables are what constitute the structure of the network (Gadde, 2004). The quote "no company is an island in the world of business" by Ford et al (2011) is a starting point for understanding how a company interacts with other companies in an business environment and more so how companies require to interact with other companies in order for them to be a successful actor in a business network.

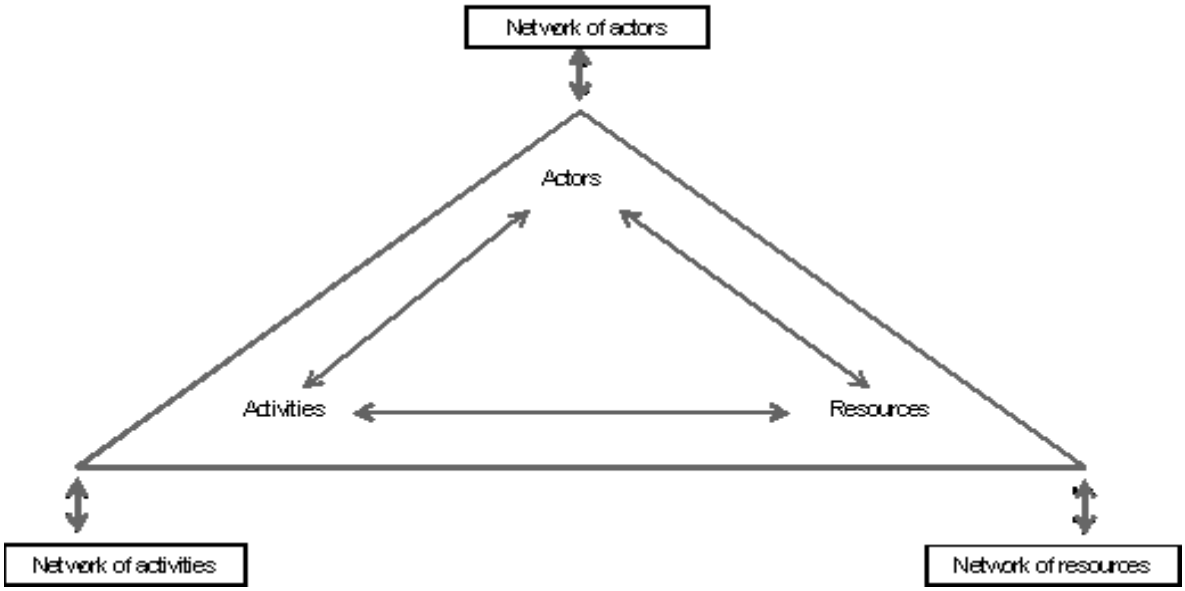


Figure 3: The ARA-model (modified from Håkansson & Johansson, 1992)

Håkansson & Johanson (1992) depicted a model showing the basic structure of the network of the different dimensions, see figure 3. The three nodes of the triangular model are the three different dimensions of the ARA-model. The model also shows that the different dimensions connect between them. The two-way arrows connecting the different dimensions together are part of understanding and depicting how they together create benefits and create interdependencies. The dimension connections are also of help when one identifies and depicts the network structure. The separate boxes connecting with the three nodes are the networks that the three dimensions are part of. The different dimensions of one firm connect with the corresponding dimensions of another firm, creating networks. The connection in the actor dimension is said to be actors bonding with other actors. The connection in the resource dimension is said to be resources tying with other resources and the connection in the activity dimension is said to be activities linking with other activities. Together, the different dimensional connections create the entire network.

When depicting the connections between the three different dimensions, the depiction creates an intricate and cluster-like pattern of linkage between firms in terms of how actors connect their different resources and activities. This model of depiction is quite different than models of depicting distribution chains, which are more concerned of physical flow between actors and thus more linear by nature. The depicting process starts with choosing one actor as focal point of the network. The actor being the focal company is the starting point of exploring and depicting the network which is done by first exploring and depicting the focal company's activity links and resource ties. The linked and tied actors become the next stage of the network and the process of exploring and depicting their activity links and resource ties they share with other actors can begin. Understandably, the network grows exponentially and becomes larger and larger the more activity links, resource ties and actor bonds that are explored and depicted. Therefore the limitations and specifications in relation with the focal company become important when depicting the network.

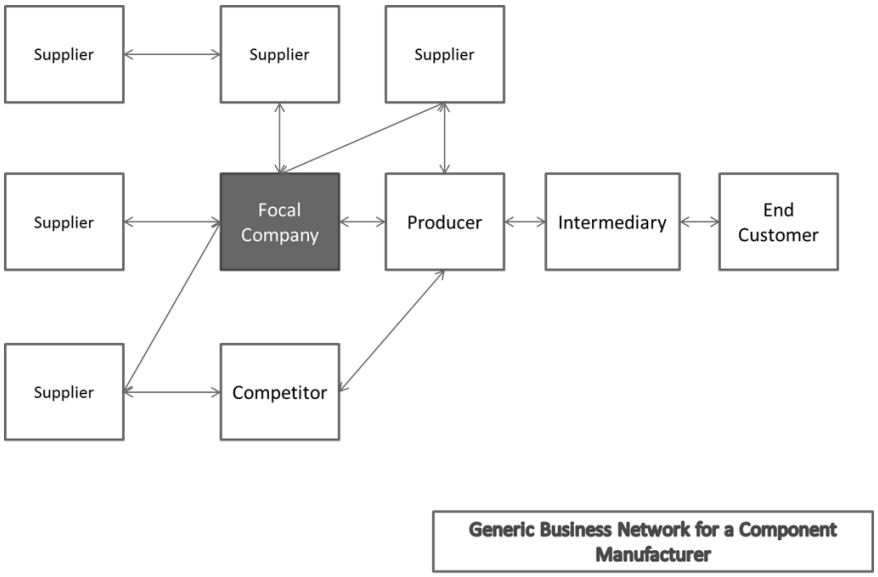


Figure 4: Generic business network for a component manufacturer

In figure 4, a generic business network is depicted according to the ARA-model. The filled red box is the focal company for the network and is a first-tier supplier for a manufacturing company, the box labeled "producer". The other boxes depict other relevant actors of the network from the focal company's perspective; their suppliers, competitors and the end customer. The lines between the actors are the actors bonds which show how they tie resources and link activities.

2.2. Network variables

The three variables of the ARA-model are the cornerstones of understanding the network. The variables relate to each other as they together constitute the comprehensive picture and structure of the network. The relational changes in the actor dimension are explored via how it affects their activities and resources. In the activity dimension, the emphasis is to explore interdependences between the network actors. The interdependence of activities also affects the dimension of resources, where the control and combining of resource are deciding factors.

Actors own and control resources and/or activities. By utilizing the resources into performing activities, the actors create relationships with other actors while at the same time developing and expanding the internal organization. Principally, an actor strives for expanding its control and influence of the network. In order for one actor to gain some control another actor must lose some control. This equals not only situations where actors compete but also to situations where mutual interest and gain between some actors can lead to cooperation. (Håkansson & Johanson, 1992)

The actor dimension can be illustrated by the fact that actors fuse resources activities with each other to create valuable entities. This highlights that no actor, or firm, is independent but rather that its accomplishments and contributions is affected by or affect others. Throughout the ongoing business interaction processes, actors create bonds between each other. The bonds highly reflect the activity links and resource ties the actors have between, but also the social context of which the various interactions have been made (Gadde et al, 2010).

Håkansson & Snehota (1995) argue that the development of actor bonds correlates with the actors forming mutual trust, commitment and attributing to each other's' identities. The argument continues by stating that business relationships require some portion of trust and commitment in order for it to better handle uncertainty and complexity. The argument of trust as a necessity for actors to bond and business relationships to develop has been presented in numerous articles (Morgan & Hunt, 1994; McQuiston, 2001). However, studies have also shown that business relationship and actor bonds can be related to power imbalances between actors (Hingley, 2005). The theory of power imbalance means that actors in business relationships not necessarily require trust to cooperate but rather cooperate because they require each other's resources and/or activities. The theory stresses that albeit shared goals and objectives and mutual commitment are vital parts of business relationships and actor bonds, the notion of asymmetrical dependencies and power imbalances are also important.

Activities are events where one or more actors combine resources in order to either transact the ownership of resources or develop the existing resources into new resources. The activities performed between two actors create an activity chain of new activities between other, relating actors within the network. (Håkansson & Johanson, 1992)

The interdependency of activities between firms in supplier network relates to activities between the buying firm and its suppliers but is also to some extent interdependent with activities undertaken between sub-suppliers. The customer specifications require a specific configuration of the activities between the buying firm and its supplier(s), which in turn equals that the activity configuration between the supplier and the sub-supplier(s) needs to be modified. Such activity modification of the configuration requires viable benefits for the supplier and downstream in the supply chain. If the influence of the buying firm is large enough, the modifications of the activity configuration need to be made at the supplying actors in order for them to be a part of the network. However, if the influence of the customer does not encompass the suppliers' influence, the customer most likely needs to adapt and adjust their activities accordingly. Regardless of which actor that needs to adapt, activity configuration and reconfiguration closely relates to interdependence between the actors. The configuration of activity often implies different kinds of interdependency. The interdependence caused by configuration of activities can be characterized as serial, dyadic or joint. Serial interdependence relate to if the activities need to be undertaken in a specific order. Dyadic interdependence relates to which extent the activities have been adjusted and configured in relation to each other. Joint interdependence concerns if configuration between two activities relates to a third activity. (Gadde et al, 2010)

Resources can be defined by their ownership; either they are fully owned by one actor who then solely can utilize it or it is owned by several actors who together can utilize it. Resources are defined by them being heterogeneous; i.e. they have characteristics which can be combined with other resources. (Håkansson & Johanson, 1992)

Resources can, according to the 4R-model presented by Håkansson & Waluszewski (2002), be categorized into four categories; the physical resources of facilities and products and the organizational resources of business units and business relationships. Facilities are the

technical systems used in distribution such as the physical infrastructure, vehicles and equipment. Products are the output of the manufacturing context that links the user context. Business units consist of the organizational value of the firm's competence and capability while business relationships are the interaction with external clients. The different resource categories can be within the boundaries of the firm, i.e. internal, or outside the boundaries of the firm, i.e. external. Through combining internal resources with another firm's internal resources, the firm can gain capabilities otherwise unattainable or create new and/or additional value through the combination of resources. The inter-utilization of resources also relates to interdependency. Resource combination between company boundaries is a necessity for economization of resources and thus requires some linkage between actors. It also creates interdependency among them.

In some networks it is distinctive that certain resources and activities are more critical than others as they to a higher degree affect the performance of other activities and are required in order for some resources to be combined. By controlling these resources or activities, the actor doing so will have certain leverage power in the network. This activity or resource equaling control is called "hierarchization vector" and can be utilized by the actor in possession of it to transform the control it implies into power exercise over other actors in the network (Håkansson & Snehota, 1995). By doing so, it coerces actors to modify their activities or combine their resources in a more preferable manner from the controlling firm's point of view in order for them to be part of the network.

2.3. Network dynamics

Networks consist of actors which are bonded together by tied up resources and linked activities. The actors execute different transactions across their respective boundaries by performing activities and combing resources. However, transactions occur on markets and markets are identified by the social structure enabling buyers and sellers to match supply and demand (Aspers, 2011). As the transactions of the involved actors in a network are performed on markets, the markets' social structure encompasses the network by setting frames, standards and limits. This means that networks are dynamic in two dimensions. Firstly, network dynamics is changed by how the different actors interact, i.e. how they combine their resources, which activities they perform and how these actions create interdependencies. Network dynamics is also affected by external factors set by either market practitioners, such as very powerful actors, or external stakeholders, such as governing institutions and legislators. A network is therefore never a stable structure, but rather a dynamic structure, continuously affected by organizational changes and process (Håkansson & Snehota, 1995).

Actors who perform transactions on a market are thereby exposed to and influenced by the business environment that the market's structure creates. The business environment is composed by a number of external factors which together set the conditions and limitations actors need to consider. These factors can be divided into several different categories dependent on their nature. One common way of categorizing the external factors is the PEST framework. PEST stands for Political, Economic, Social and Technical factors and is commonly used in the fields of market research and estimation (Chapman, 2011). Later

renditions of the framework stipulate that for example Legal, Environmental and Ethical factors are to be considered as stand-alone factors as well.

Examples of political factors could be tax policy, labour law, trade regulations and political stability. Economic factors include economic growth, inflation, interest and exchange rate while social factors include cultural and health aspects such as way of doing business, career attitudes, population growth and economic distribution. Technical factors include R&D activity, automation and rate of technological change. All of these factors share interdependencies and are necessary to explore in order for a firm to understand the totality of the business environment. In the prolonging, the factors also reveal a firm's opportunities and possibilities to enter the business environment and favourably position themselves in the business network.

Actors in a network are thereby continuously exposed to change. Håkansson & Snehota (1995) define three strategies of coping with change depending on its characteristics. The three strategies are coupled with an antipole and it can be argued that their correlation is cyclic, meaning that the antipoles also can be viewed as strategies for coping with change. The three strategies and corresponding antipoles are; structuring – restructuring, specialization – generalization and heterarchization – hierarchization. The three strategies are related to how the different dimensions of the network – namely the actor-resource-activity structure – are connected which can be displayed in figure 5.

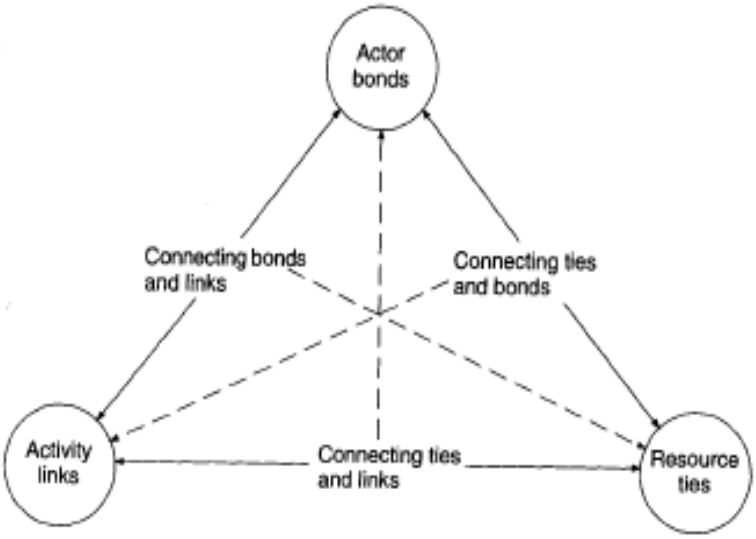


Figure 5: Håkansson & Snehota (1995) model of coping strategies in networks

The first coping strategy is related to how resource ties and activity links are connected in terms of the efficiency of their output-input. Firms naturally strive for higher resource efficiency, i.e. utilizing lesser and/or fewer resources for the same output. This leads to a more structured network as the links and ties become elaborated and complex, resulting in tighter and deeper interdependencies. If the change is not thoroughly grounded in the bonds, the "old" network most likely will modify their activity links in the direction of reshaping the actor bonds in the "new" network, restructuring the network's activity links and resource ties.

The second coping strategy relates to how actor bonds and activity links are connected in terms of to what degree actors strengthen their bonds through activity links. It is thereby also a telltale sign for where and how activities are allocated in an actor network. Specialization strategy implies that an actor focuses on a specific set of activities for a set of counterparts, adapting to a specific stage in an activity chain and thereby causing stronger bonds with certain actors. The specialization strategy's antipole generalization is when an actor tries to broaden its activity scope by performing activities in several places of the activity chain. The two different strategic concepts also comes at a price; specialization makes it more difficult to create new actor bonds in other parts of the activity chain whereas generalization makes it harder to strengthen their actor bonds in the original activity chain as it may create conflict of interest.

The third and last strategy of coping with change is related to how actor bonds and resource ties are connected in terms of the strength of resource ties. Hierarchization, as mentioned, is when one actor possesses an especially valuable resource with many and strong ties to other actors and their activity links and/or resource ties. Heterarchization is the coping of the valuable resource, where new resource ties are made through new combinations, working around the hierarchical resource and actor. The heterarchization – hierarchization process is often thought of being cyclical over time, as new heterarchical resources takes the place of old hierarchical resources and after a certain time period strengthening its ties to other actors and becoming hierarchical.

3. METHOD

The following chapter will describe how the process with writing this thesis commenced, followed by an explanation of how the sources and types of data and information was selected, how the data then was collected and finally how it was processed.

3.1. Research process

When the thesis was initiated at Berg Propulsion via meetings with the company supervisors and at Chalmers University via meetings with the university supervisor, the research process was initiated. Through the meetings with the company and university supervisors, the rough work of setting the study's problem analysis and purpose as well as outlining the methodological approach and timeframe of the report could be done. This amounted for the including parts of the planning report.

Through the initial contact with the Business development division at Berg Propulsion, it was expressed that Berg had an interest in the Brazilian shipping market as it just recently experienced a boom in demand and that the technical level of the local manufacturers at the same time been rumored to lack in quality. The fact that the Brazilian shipping industry was regulated by local content requirements and that direct competitors to Berg recently had announced plans of starting up facilities in Brazil had increased the interest in Brazil further. Berg therefore had an interest in understanding the exact potential of the Brazilian shipping market, the trade regulations and obstacles of entering it and the possibilities of overcoming said regulations and obstacles. This was specified in the three research questions which were to be answered in the thesis. In order to do so, quantitative and qualitative data collection on the specifics of the Brazilian market was required. The process of the research is depicted in figure 6, where the red blocks represent the major processes of the study and their corresponding white boxes their corresponding actions to be made to perform the processes.

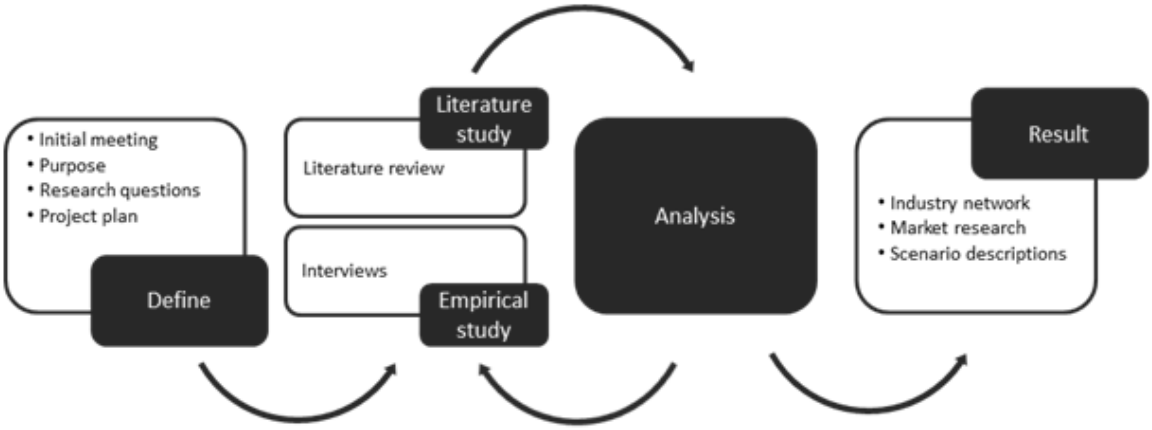


Figure 6: Research process

After meeting with the university supervisor at the Division of Industrial Marketing at Chalmers University, it was decided that the study needed to be made according to a model which would help to simplify and define the scope as well as making the different factors defining the scope more clear. After investigating a number of different models to implement on the situation, the network perspective was decided together with the university supervisor. The network perspective was deemed most suitable for the study as it helps to clarify external and internal dependencies and factors affecting a business network. As the research in itself in part was to identify and define a, in Berg's perspective, new network, namely the Brazilian shipping industry, as well as means to enter that network, a network model for explanation was the best choice. As a network analysis opts for analyzing different ways of creating links and bonds between the actors, the model also contributed positively when used as an analytical tool.

In order to firstly understand Berg's current position, their existing network as well as their internal resources and activities, an initial round of meetings and interviews was held. Interviews with personnel from and field studies at the company's different subdivisions included the Division of Business Development, Division of Finance, Division of Strategic Sourcing and Purchasing, Division of Logistics and Division of Manufacturing. This helped to paint a comprehensive picture of Berg propulsion. The investigative methods in this round ranged from free-form discussions to structured interview, and summaries of the interviews can be found in the appendix.

In order to understand the Brazilian market potential and the network surrounding it, quantitative and qualitative data collection in form of extensive market research and in-depth interviews with external actors (i.e. not Berg personnel) was initiated. The quantitative data was continuously collected and was used as base for the qualitative data collection. The collected data helped to answer the research questions regarding the potential of the Brazilian market as well as the regulatory nature and the supply chain structure of it.

The two sets of data, the internal data concerning Berg and the external data concerning the Brazilian shipping market, was combined in order to draw up an extensive network in detail along with Berg as an actor in the network. The intent was to clarify not only the different external factors influencing the network's actors but also to present how Berg through different ways of utilizing their resources and performing activities could be a part of the network. This included the identification of several scenarios which would affect Berg and the network in different ways. The different scenarios were deducted through the quantitative and qualitative data collection and sketched according to their probability.

Regarding the research question of how Berg would enter the Brazilian market; this was addressed in terms of the value their resources and activities would create for the existing network according to the different scenario depictions. The exact strategies of how Berg should adjust their portfolio of resources and activities through developing relationships with various actors were sketched in accordance with classic network strategies, and no extensive research regarding to the probability of success of the strategies was performed. This was due

to the fact that the results of the strategies suggested based would be beyond the scope of thesis, which was discussed with both the company and the university supervisors.

3.2. Data collection

The data collected which laid the foundation for the answering and analysis of the thesis' research questions ranges from firm data concerning Berg Propulsion's activities and resources to external data concerning primarily the Brazilian shipping industry and the external factors influencing it. The data itself is both of qualitative and quantitative nature. The collection process to gather the data included both empirical methods, mostly through interviews but also through some field studies, and literature study. The data collection process will be further explained in the two following sections where the first one focuses on the literature study and the second one focuses on the empirical study

3.2.1. Literature study

In order to answer the research questions, data needed to be gathered. The literature study was aimed to gather enough information to manage an exhaustive market research of the Brazilian shipping industry and set the foundation for mapping the Brazilian network. The literature study included searching databases, reading official documents and industry journals as well as some academic textbooks and reports for a theoretical framework.

Use of data	Data source	Collection of data
Brazilian industrial environment generally, including current status and projections	Economic journals, official reports	Chalmers database and public web engines, official homepages
Brazilian shipping industry specifics, including current status, projections, involved actors etc.	Official reports, industry journals, official listings	Chalmers database and public web engines, official homepages, shipping register listings
Regulatory environment, including local content requirements	Government official reports, academic reports, industry journals	Chalmers database and public web engines, official homepages
Berg Propulsion external data, including competitive situation	Annual reports, internal brochures, industry papers	Public disclosure, Chalmers database and public web engines
Berg Propulsion internal data, including financial data, production environment etc.	Annual reports, internal brochures	Public disclosure
Model of network analysis	Academic textbooks, reports and papers	Chalmers Database

Table 1: Collected data from literature study

Table 1 illustrates the main areas examined and analyzed, the various types of data that have been used to gather information about the respective area and the different procedures of collecting the data. The specific data used can be overviewed in the list of references. As can be seen in the table, the sources of data vary and the procedure of collecting the data does as

well. Worth mentioning is that in almost all the topics, empirical data have played some role in further explaining a topic or further strengthening already gathered data. Further worth mentioning is that the possibilities of public access databases and web engines have played a large part in the data collection, foremost for industry specifics and corresponding up-to-date numerical data. The search string in databases and public web engines included "*Brazilian deep water oil*", "*Brazilian shipping*", "*Petrobras*", "*offshore shipping*", "*inland waterways*", "*local content requirements*" and variations of these as well as using the search strings as etiquettes if possible on economic, daily and industry journals internal search engines.

As the first research question concerns market potential of the Brazilian shipping industry, a large portion of relevant and up-to-date numerical data was required. Further information regarding historical numerical data and projection data was also required. The empirical and theoretical background for this question was therefore mostly based on quantitative data collected from official reports from stakeholders and official ship register listings to control and compare with the numerical data. However, qualitative data concerning the industry was also collected. The research question also included investigating suppliers who directly compete with Berg Propulsion, why also company specific data of three chosen competitors are included.

The second research question concerns the market's industrial and regulatory environment. The data used for this question was also to some extent of a quantitative nature but also required more explanatory and contextual data. This included official government documents on rules and regulations as well as industry analysis from both internal and external expertise. Some academic reports concerning the historical background and spread of the utilized regulations was also assessed.

The third research question concerning Berg and their possible entry on the market was contextually based on the answers of research questions one and two. However, the data directly applied to the analytical research of the question was in part construed from traditional textbook strategies with contextual background from industry analysis.

3.2.2. Empirical study

The empirical study was conducted in part as complement to the literature study and in part as a means of collecting primary data from expertise situated either in the Brazilian shipping industry or in the network surrounding the shipping industry.

Interviewee	Date	Length (min)	Discussed topics
Mikael Ståhl, Counsellor at Swedish Embassy of Brazil	23/5 – 2013	80	Brazilian industry, market potential, macroeconomics
Lars Magnusson, Vice President of SweBras	23/5 – 2013	60	Brazilian industry, market potential, macroeconomics, local content requirements
Luis de Mattos, Commercial Manager at Local Content Classifying Agency RBNA	23/5 – 2013	60	Local content requirements, industry potential and economics

Michael Braun, Tug and Salvage Segment Manager at Caterpillar Marine Power Systems	24/5 – 2013	80	Local content requirements, industry potential and economics
Fredrik Pettersson, Welder at Berg Propulsion	24/4 – 2013	90	Berg Propulsion production flow (interview + field study)
Pär Hallgren, Strategic Purchaser at Berg Propulsion	6/5 – 2013 10/6 – 2013	90	Berg Propulsion sourcing strategies, BOM structure, product portfolio
Emil Cerdier, Project Manager at Berg Propulsion	Continuously	-	Berg Propulsion sales strategies, production flow, internal and external logistics
Christer Olofsson, Manager of Business Development at Berg Propulsion	Continuously	-	Berg Propulsion sales strategies, general supervision

Table 2: Collected data from interviews

The external interviewees were approached by e-mail and interviewed via telephone. The selection of the interviewees stemmed from our original contact at the Swedish Embassy, Mikael Ståhl, who put us in contact with expertise in Sweden-Brazil relations, Brazilian business environment and industry specialists. The internal interviewees were face-to-face meetings and conducted in the office space at Berg. The range of the interviewees' competence naturally rendered the interview topics being different which in turn rendered that the data collected from the different interviews were to be sorted under different categories, as can be seen in table 2.

The set-up of the interviews was a mixture of structured and semi-structured interviews where an interview guide (see appendix) was handed out, which had general and broad questions concerning research question one and more specific questions concerning research question two. The broader and more general questions were meant to be viewed as frames for the interviewees, to stimulate a discussion rather than ticking them off one at a time. According to Bryman & Bell (2003), the semi-structured interview enjoys the flexibility that the interviewee can expand the subject which is preferable if the interviewee has larger expertise than then interviewer. In the same reasoning, the semi-structured interview correlated well with the topics discussed, such as macro- and microeconomics of the Brazilian industry in general and shipping in particular as well as future projections of its state, as many factors both external and internal affects their nature. The more structured questions regarding Brazilian regulatory environment with particular focus on local content requirements were narrower in its scope as the topic itself is more precise and narrow in its nature. Bryman & Bell states that interviews with a clearer goal often prosper from narrower questions. As the goal of these questions was to define and clarify the regulatory environment, the questions benefited from being more precise themselves.

3.3. Methodological discussion

The research of this study was principally, as can be viewed in the problem analysis in chapter 1, a two-part study; both a study of the market potential and industry characteristics of the Brazilian offshore shipping and an outline of the Brazilian shipping network and Berg

Propulsion's possibilities and options of connecting with it. The two parts are obviously connected; the network structure is dependent on the potential and characteristics of the Brazilian shipping industry and its business environment which in turn affects Berg Propulsion's options and possibilities of connecting with it. The three research questions, as well as the structure and order for them to be analyzed, were chosen with regards to that notion. Regarding the three competitors chosen as objects for comparison and analysis for Berg Propulsion to benchmark against, they were chosen in accordance with the company supervisors at Berg Propulsion. They felt that these three chosen competitors (Wärtisilä, Rolls Royce and Schottel) were the three largest direct competitors as well as three companies who had declared interest to enter the Brazilian shipping industry.

When studying a network and a national market externally, there is always going to be some difficulties and some limitations to the scope and possibilities of the research. As the research process was not able to be conducted on the market of study, i.e. Brazil, certain impressions and nuances have most probably got lost on the researchers. The interviews conducted are therefore necessary not only as sources of raw information but also as sources of understanding the complexity of the Brazilian shipping industry. It also of important to point out two factors regarding the interviewees; firstly, all of them are in some way connected to the Northern European region and secondly, the industry specialists are connected to the first-tier supply side. Considering these factors, their statements regarding the Brazilian economics and offshore shipping industry should also be seen in that light. Albeit the factors have in some way limited the structural analysis of the network they have also been beneficial to the very same. Despite not being limited by language barriers, the fact that the interviewed industry specialists were connected to both Northern European ways of doing business and the first-tier supply side of the shipping industry helped gaining perspectives that were alike what Berg Propulsion most probably would experience and would be interested in.

Furthermore, some more empirical studies with certain actors in the business shipping network would have been of interest to achieve painting an even more comprehensive picture of the network. Example of such actors would be local second- or third-tier suppliers, shipyard managers or personnel from Petrobras' offshore shipping department. Interviews with personnel at these nodes would be beneficial in terms of getting different perspectives about for example the business relationships and interactions on the market or the supply chain efficiency of the industry. The reasons for not interviewing personnel from these nodes are many apart from not being able to conduct the study at the spot. These include language barriers as well as lack of time. The limitations of not being able to conduct interviews with these actors have also affected the research regarding Berg Propulsion's strategic and operative options of connecting with the Brazilian shipping network. As for example no extensive supplier base search has been made first-hand, the network structure is most likely more generalized than in reality. Limitations and assumptions of such nature are clearly stated in the text. The identification and interaction with key personnel at these nodes is evidently a recommendation for Berg Propulsion personnel to pursue in the future if they are willing to go further with their Brazilian venture.

3.4. Amendment

Lastly, an external factor of great relevance occurred during the course of writing this thesis. The first of July, 2013, Berg announced that the company was being acquired by the American corporation Caterpillar Inc., and that they from that part in time will be a part of Caterpillar's marine division. This came as a complete surprise for the authors of this thesis, as the deal was being kept secret by the responsible people to avoid leaks and to not disclose any information before the deal had been completed. The announcement came when approximately 80% of the time for writing the thesis had passed, which left little to no room for reworking the entire thesis. Instead, it was decided to finish the thesis with the premises that were stated from the beginning. That is, with the former structure of Berg Propulsion as the focal point of the analysis.

A rework of the thesis to adapt to the new situation, with Caterpillar as the focal point would mean that basically all of the interviews conducted with the company would have to be scratched and new ones would have had to be scheduled and conducted, and there was simply no time for this. The acquisition altered Berg Propulsion's network position and their possibilities and options for entering the Brazilian shipping network drastically. The business environment and market potential of the Brazilian shipping industry are however still the same, as well as the theoretical framework for the network theories used. The most significant changes with Caterpillar as focal point would have been the new possibilities for expansion and the possible strategies for the operations in Brazil since Caterpillar has an entirely different set of economic muscles compared to Berg Propulsion, and the fact that Berg Propulsion is/was a relatively small company was what often limited the different strategies.

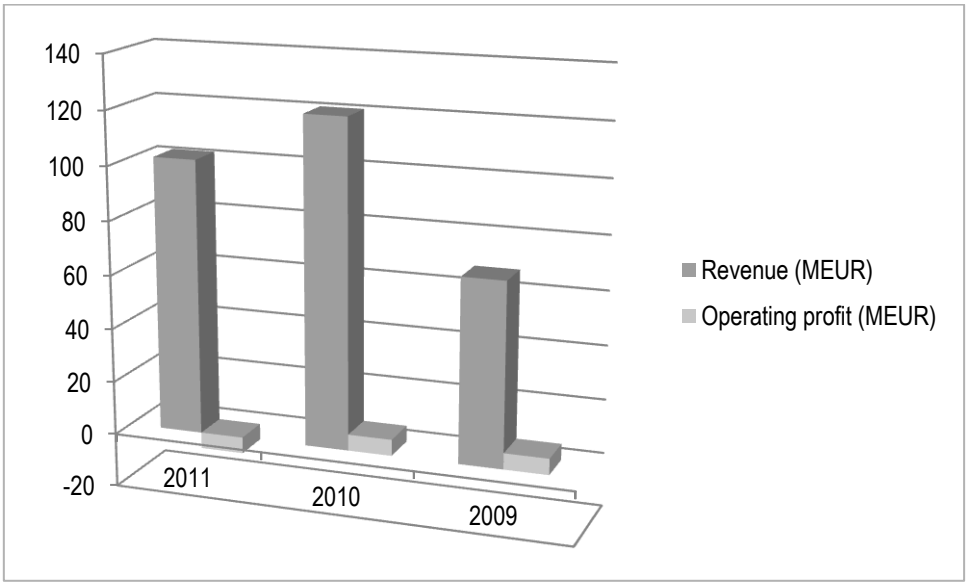
To somehow include the new situation in the thesis to it was decided by the authors to add a chapter at the end of the thesis after the conclusions. In this chapter the new situation is explained, and the consequences of the acquisition are discussed. This is followed by an analysis regarding what this could mean for the different strategies previously presented and finally the chapter briefly presents a set of new strategies that are more adapted to the company's new situation.

4. BERG PROPULSION

This chapter regards the company in focus for the thesis; Berg Propulsion. The chapter will present Berg Propulsion company description, ranging from financial information, product assortment, supply management and way of doing business. This includes depicting how Berg today structures their position in a general business network. Furthermore, the chapter will present three of the larger competitors to Berg Propulsion; Rolls Royce, Wärtisilä and Schottel. Information and data regarding Berg Propulsion have been collected through continuous dialogue with Berg personnel, semi-structured interview sessions with key personnel (see table 2) and internal documents such as annual reports, e-mails etc.

4.1. Company description

Berg Propulsion is a propeller designer and manufacturer seated in Gothenburg, Sweden. Besides the headquarters situated in Sweden, Berg has an additional production facility in Singapore as well as 13 sales offices situated across the Americas, Asia, Africa and Europe. Altogether, Berg Propulsion employs approximately 340 people. Berg was founded in 1912 in the archipelago of Gothenburg where they delivered propulsion systems for smaller fishing and leisure boats. After reaching near-bankruptcy in the 1990's, Berg was acquired and restructured in 1999. At that time Berg employed 35 people and delivered 17 propeller systems yearly, numbers that in ten years increased to employing 340 people and delivering approximately 350 systems yearly (Wiklund, 2009; Berg Propulsion, 2012).



Year	Revenue (MEUR)	Profit (MEUR)
2009	68	6
2010	121	6
2011	101	-6

Figure 7: Graph and table of revenue and operating profit for Berg between 2009 and 2011 (Berg Propulsion annual report 2012)

During the years following the acquisition, Berg's revenues have grown substantially and created a much more stable foundation in comparison with the previous situation. Despite

this, the volatility of the shipping business can be seen in the net figures. As figure 7 shows, revenue and operating profit shifts rather heavily from year to year.

Berg conducts sales on a global scale. Despite from them having manufacturing plants in both Sweden and Singapore, they also have sales and/or service offices across the world. Figure 8 shows the percentage of Berg's sales across the globe. As can be seen, the more traditional shipping industries of Eastern and South-eastern Asia as well as Western Europe are the most prominent locations of sales. The segments labeled "Other" include the Americas, Africa as well as the other parts of Asia and Europe. It should be pointed out that Berg's share of sales in South America amounts for very small sales percentages.

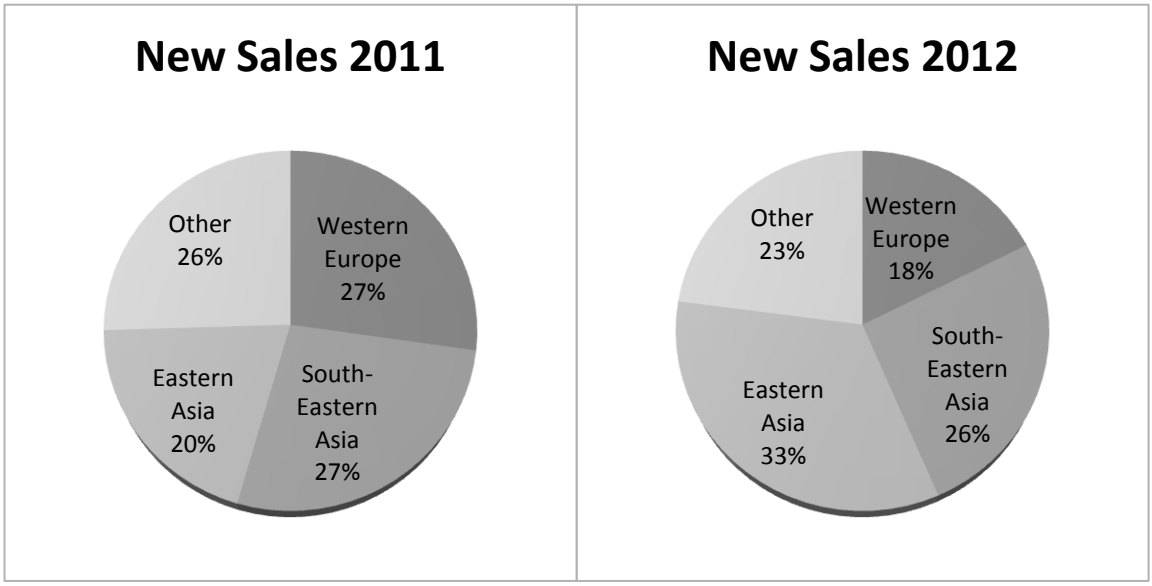


Figure 8: Graph of new sales data categorized geographically (Berg Propulsion internal data)

4.2. Product description

Berg Propulsion delivers propeller systems which in principal consist of the propeller blades, hub, shaft and often gear box, bow thrusters and shaft alternators. However, Berg does not manufacture all of the including parts, but instead have multiple suppliers and partners who deliver some parts and Berg then sells the complete system. Berg manufactures three principal propeller system designs; Controllable Pith Propulsion (BCP), Azimuth Thrusters (BAT) and Transverse Thrusters (BTT). The propeller designs differ in areas of application as well as in terms of size, weight and product complexity. The BCP is a propeller system with a comparatively shorter shaft where the propeller is fixed. The vessel's movement is steered by a rudder placed behind the propeller. The BCP system is a traditional propeller system heavily deployed for e.g. transatlantic offshore vessels and inland barges. The two other systems BAT and BTT both employ the thruster technology. Both of the systems are more complex than the BCP system as well as larger as the propellers are mounted on a larger and longer shaft. Furthermore the thruster technology allows the propeller to be rotated 360 degrees which makes precision steering easier which is useful for e.g. docking. Precision steering is especially demanded for e.g. offshore support vessels and tugs where it is essential with high

safety and efficiency. The principle difference between the BAT and the BTT is the placement of the two systems. Whereas the BAT is mounted in the back of the vessel the BTT can be mounted practically anywhere on the vessel in tunnels and can thus be used as a complementary design to a traditional BCP system, for being used for example as side thrust.

Furthermore, Berg has increasingly tried to extend their offering to include an entire life-cycle package where not only the system but also installation, restoration and repair are services being offered. The notion of being able to offer life-cycle systems has grown stronger since the restructuring of the company in 1999. This has allowed Berg to take part in the after-sales market which has showed to be profitable, providing 15-20 % of the total revenue from 2010-2012. The offering of immediate service has also required Berg to be globally present why the global sales offices often include maintenance and/or installation staff.

4.3. Production and supply

In general terms, the two production plants in Sweden and Singapore are differentiated as to which propeller systems they manufacture. The Swedish plant has less shop floor space than the Singaporean plant why the Swedish plant produce the BCP systems and the Singaporean plant produce the two thruster systems. The BCP systems are traditionally the most demanded propeller system for the robustness and simplicity to install but the increasing market of offshore support and tug vessels have created a surge for thruster systems in general and BAT systems in particular. The complexity of the thruster systems compared to the BCP system can also be showed in the respective bill-of-material structures. The BCP system requires approximately 100 components whilst the thruster systems require approximately 600 components.

The manufacturing of a propeller system is affected by high material costs and bulky components and finished products. Production is therefore not called off until customer order is placed and pre-paid. For the same purposes, few if any components are kept in stock at the plants, since supply orders are not called off until customer orders are called off. The production lead-time for a product is thereby highly interrelated with the different suppliers' production lead-time. In general, suppliers' production lead-time is about 16 weeks.

Components are sourced globally mostly from Europe and Asia. The European suppliers are mostly suppliers of raw material such as bronze and steel moldings for the propeller blades and shafts whilst the Asian suppliers are mostly suppliers of technical and hydraulic components for e.g. gear boxes and clutches as well as seals. According to strategic purchaser Pär Hallgren, Berg has a policy of choosing "suppliers of proven quality and delivery precision". Berg has no sourcing strategy in particular concerning the geographic location of their suppliers and has therefore accepted longer transport lead-times. Furthermore, the transportation costs are comparatively small portions of the total cost of material as well as the eventual costs of repairing installed components if they were of poor quality.

Major cost-driving components (% of material cost)
Molded blades (11,9%)
Lower gear (8,2%)
Nuzzle (7,7%)
Casting (6,8%)

Amongst the components used for the different thrusters there are a few that are carrying most of the material costs. Amongst these are for example the molded propeller blades and the nuzzles that Berg Propulsion purchase from their suppliers.

Shipbuilding and thus propeller system manufacturing is also very reliant on quality assertion as ships needs to be fully licensed and cleared by a third party. The third party is one of a few specialized licensing houses who are authorized to control, assert and approve the quality of the different components used in the ship. If the level of quality does not suffice the standards set by the licensing houses, the ship is not granted license and thus not authorized to be used at sea. This puts extra pressure on the shipbuilder to, in turn, put pressure upstream the supply chain. The pressure for sufficient quality is therefore a critical factor for Berg when they choose their suppliers and something that needs to be assessed on an early stage when new, unproven suppliers are chosen as partners.

Berg shares some suppliers with their competitors. This is particularly evident for high-cost, low volume products such as bronze molded propeller blades and shafts as well as for highly specialized products such as seals. These products would be too time consuming and to costly be produced in house, but Berg still have their own specifications and blueprints which makes their products different compared to their competitors even though they share suppliers. For companies wanting to be classified as local content in Brazil the supplier situation has to change. As will be showed later on in the thesis, it is not enough to assemble the parts in Brazil if they are manufactured elsewhere. Companies aiming to be local content must find suppliers within Brazil. This includes Berg Propulsion if they are considering starting up production in Brazil, which will be a significant change considering that Berg have very customized solutions with specifications and designs that the suppliers must follow.

Currently Berg Propulsion has a small office in Brazil. They have no assembly or production on site, which makes none of their products included under the local content concept. Furthermore, no sales representatives are stationed in Brazil. Instead sales personnel are flown in from Sweden when a sale is to be made in Brazil. The Swedish sales force also manages the Brazilian customer relationships from Sweden. They do however perform services in Brazil; technicians go with the products and help the shipyards with overseeing the installment of the propeller system.

4.4. Business Network

The shipping industry differs from other industries in several ways. First of all, for companies like Berg Propulsion, it is only on rare occasions that they have direct contact with the final customer, the contractor of the vessel. The process starts with the contractor forming a contract with the owner of the ship being built, who then sends out requests of proposal of the vessel they want to have built to several different shipyards. Berg Propulsion does however have contact with the owner of the ship, promoting their equipment and trying to get the owner to suggest Berg components to the shipyards. These shipyards then contact the different possible suppliers of the different components needed for the vessel, such as Berg Propulsion, and sends another request of proposal. After receiving the estimated costs and

designs from the suppliers, the shipyards sends their proposal for building the vessel to the owner, who in turn selects the one they feel is the best suited for the job.

The shipyards have a list of possible suppliers for the different components needed. The list is provided by the owner of the ship, and states which possible suppliers of the different components the owner has "approved" of. As a manufacturer of a propeller system, it is important to be on as many owners' lists as possible to increase the amount of potential orders. What this process also means is that there may be several shipyards sending out requests to Berg Propulsion, for the same vessel. For one single vessel, there may be as many as up to ten requests of proposal to Berg Propulsion from different shipyards, but only one that will actually build the vessel. This is one reason to why the so called hit rate is low in the shipping industry for manufacturing companies. Besides losing some orders to competitors, a large part of the proposals sent will never actually be built.

Another industry specific factor that differentiates the shipping industry from other industries is the classification requirement. The components used in the vessel must receive a certificate from a classification company to be authorized. This classification goes as far back as to the suppliers of the component manufacturers, meaning that Berg Propulsion must have certified suppliers for all parts that carry torque or are structural elements in their products. In reality this is achieved by having a class surveyor visiting Berg Propulsion's plant and approving the components before Berg starts the drawing and design approval to get start the assembly. This limits the amount of available suppliers, and also induces a substantial cost for Berg Propulsion, as they have no saying in which classification company they can use, it is the owner that chooses the classification company. Seeing as the classification is a requirement of doing business, the classification companies is a very powerful player in the system.

For Berg Propulsion specifically, there is also another aspect that is different compared to other industries. Every propulsion system (engine, gearbox, propeller blades, etc.) is customized for the specifications of the ship it is designated for. That means that the production is built to order, with no built to stock at all. This gives a high degree of unpredictability in the production, with often irregular highs and lows, based in incoming orders. Furthermore, seeing as Berg Propulsion is merely producing a sub-system of the complete propulsion system, namely the propeller system, they must also collaborate with the suppliers of the other parts of the system to make sure that the dimensions of the components are correct, and that the components will fit together. For other suppliers that delivers a complete propulsion system this does not have to be taken into consideration to the same degree.

Figure 9 shows Berg Propulsion's business network, with their suppliers, and the suppliers they share with competitors. It also shows the companies that produce the complementary components needed for the propulsion system (denoted Component X and Component Y) as well as the classification company, the contractor and the suppliers of other components for the vessel. The arrows connecting the entities in the figure 9 goes both ways, as it indicates a transfer of different resources (cash, components and services, as well as information and communication). The dotted box surrounding Berg Propulsion and the producers of

Component X and Component Y indicates that these entities together is equivalent with a producer of the entire propulsion system, like the competitors system showed in the bottom of figure 9.

The arrow connecting Berg Propulsion and the Owner of the ship is foremost an information and communication bond. Berg tries to influence the owner's decision regarding what propeller system they should make the shipyard select, or at least have on the possible makers list. The classification company shown in the bottom of figure 9 actually controls and approves some of the suppliers to Berg propulsion and the producers of component X and Y as well, but this is usually done in the manufacturing company's facilities, why the arrows are only between these and the classification company.

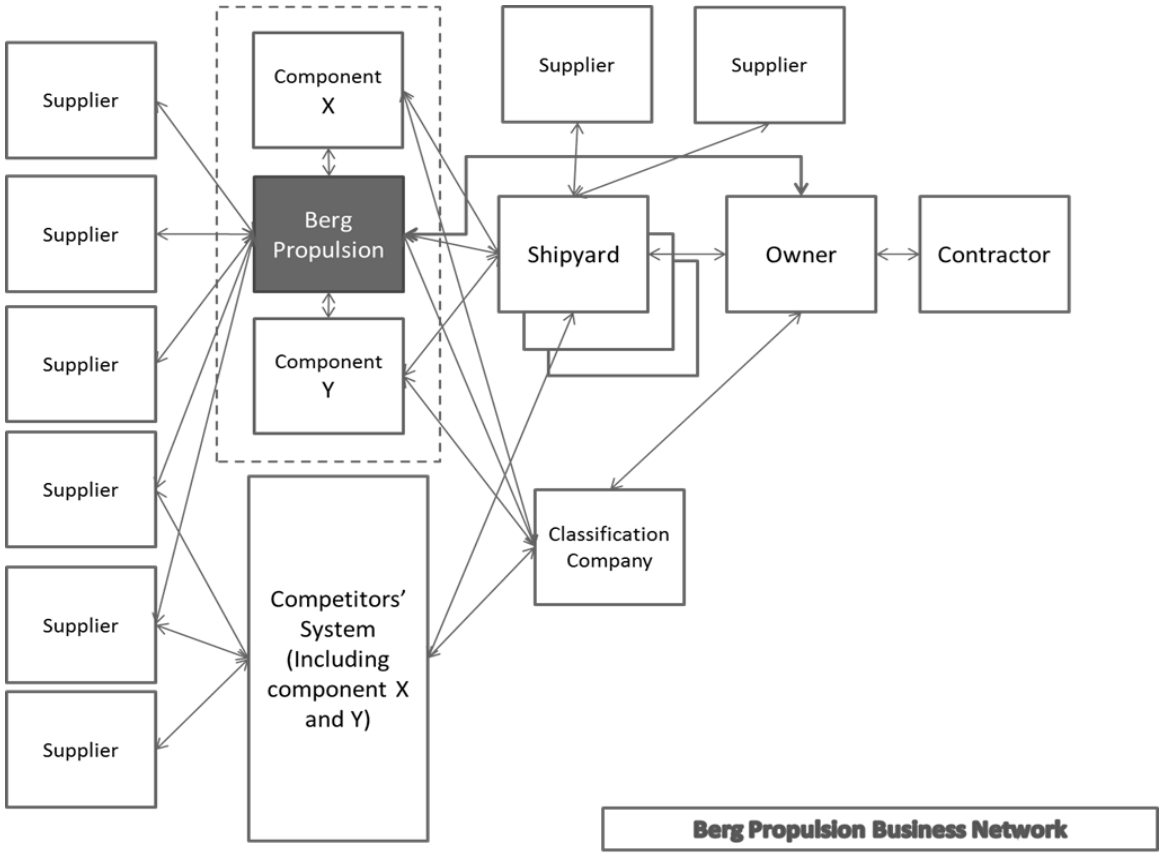


Figure 9: Berg Propulsion business network

4.5. Competitors

Berg Propulsion is as mentioned previously one of the world leaders in propeller systems. While the different competitors often depend on the type on size of the vessels the propeller systems are for, there are some competitors with very similar products and services. Three of Berg Propulsion's main competitors, companies who they compete with on almost every single market segment are Wärtsilä, Rolls Royce and Schottel.

4.5.1. Wärtsilä

One of Berg Propulsion's main competitors is Wärtsilä, the Finnish-based company who specializes in diesel engines and complete propeller systems. Originating all the way back to 1834, the company was renamed Wärtsilä in 1898. Following the name change, Wärtsilä has over the years been conducting business on several different markets and with several very different product types. Starting as a sawmill and iron works company, Wärtsilä has acquired ceramic factories, glass factories, shipyards and more. Some departments have been sold off, and some have created the foundation of Wärtsilä's business today – which is "Power Plants" and "Ship Power" and the related services.

Because of the large variety of products and the vast amount of different markets that Wärtsilä is currently operating on, a straight off comparison with Berg Propulsion will not be particularly useful. For example, the 2012 revenue of the entire Wärtsilä Corporation was MEUR 4 720, and the operating result was MEUR 515. Although it is possible to break down the numbers into smaller parts connected to the different areas of the company, the comparison will still be slightly off due to the fact that Wärtsilä in their "Ship Power" post do not include only propeller systems, but also diesel engines and gearboxes etc. Berg Propulsion only supplies the propeller system, a sub-system of the complete propulsion system which is less costly compared to including the engine in the system as well. This leads to that their sales in this post will be significantly lower than the corresponding at Wärtsilä. It does not necessarily mean that Wärtsilä sells more propeller systems, or have better margins, but with the added income from the engines and the services related to this their sales will be higher.

Wärtsilä has been operating on the Brazilian market since 1990, and has during that time projected and installed 22 different power plants. Their presence on the market is strong, and with both personnel and manufacturing sites on the scene, they are less affected by the local content concept compared to competitors like Berg Propulsion. In mid-2014 Wärtsilä's new manufacturing plant will be operational, located about 300km north of Rio de Janeiro. The plant is fully owned by Wärtsilä, who invested MEUR 20 in the plant, securing the preconditions of manufacturing according to the local content requirements. It is specifically designated to serve the increased demand on the offshore market, much caused by Petrobras expansion due to the new oil findings. This will further strengthen Wärtsilä's position on the Brazilian market, and make them an even bigger player on the offshore market. (Wärtsilä, 2013)

4.5.2. Rolls Royce PLC

One of Berg Propulsions largest competitors, who also have the strongest presence on the Brazilian market, is Rolls Royce PLC. Rolls Royce is divided into four different divisions, namely: Civil Aerospace, Defense Aerospace, Marine and Energy. The 2012 revenue for the Rolls Royce PLC was about MEUR 13 251, making it a very large global actor, with economic muscles that are significantly stronger than Berg Propulsion, Schottel and Wärtsilä.

Rolls Royce has been operating in Brazil since 1959, and currently employs more than 500 people in Brazil. On the marine market, Rolls Royce is one of the biggest actors. There are

currently over 100 Platform Supply Vessels (PSV) and Anchor Handling Tug Supply (AHTS) vessels equipped with Rolls Royce equipment, and more than 15 rigs and drill ships equipped with Rolls Royce products. The Brazilian Navy also operates 25 vessels with Rolls Royce equipment. Besides the marine industry, Rolls Royce also has large market shares in all of their other product segments, making them a strong player on the Brazilian market.

According to Rolls Royce themselves, which is also evident by the amount of vessels that are currently equipped with Rolls Royce components, the relationship with key players such as Petrobras is very strong, and they plan to expand their presence on the Brazilian market, mainly in offshore oil and gas activities for the marine and energy sectors. The increased presence in these sectors is expected to increase the revenues for Rolls Royce on the Brazilian market by 100 % by 2020. (Rolls Royce, 2013)

4.5.3. Schottel

Another competitor of Berg Propulsion is Schottel, the German based propeller manufacturer. Their product lines are very similar to Berg Propulsion's making them a direct competitor. The company is also more similar Berg Propulsion in size, with 800 employees in Germany and 1000 employees worldwide, but with revenue of MEUR 313 for the entire Schottel Group for 2012 (Schottel, 2013). Schottel has been present on the Brazilian market since the 1970's, and over the course of the nearly forty years of operations in Brazil they have acquired considerable advantages compared to new entrants on the market. By being present early and for a long period they have both relationships with manufacturers and contacts with government officials.

In an interview with Michael Braun, who previously worked at Schottel in Brazil, he claimed that Schottel currently only have the sales and service function in the country. It is, according to Braun, too expensive and too uneconomic to have manufacturing in Brazil. Not only is it a very high degree of political involvement, but the customs, taxes and expensive labor costs of well-educated personnel makes it not economically viable to have operations within Brazil. Only performing service in Brazil does not however make a company classified as local content. Therefore, Schottel operates under the same premises as Berg Propulsion, with the same advantages and the same limitations, but with a larger already "installed" base on the market.

5. THE MARINE AND OIL INDUSTRY IN BRAZIL

In 2001, the then-Goldman Sachs chairman Jim O'Neill published a paper in which the term "BRICs" was coined. BRICs, an acronym for Brazil, Russia, India and China, was a grouping of four countries which were at the same new stages of advanced economic development and were deemed to have the potential to shift the power balance from traditional western economic powers in their favour. The B in BRICs did experience this economic rise, with an approximate annual growth in GDP of 4% from 2002 to 2010. The Brazilian government maintained this growth whilst at the same time decreasing the large inflation stemming from the 1990's, which were ranging from 15-20%, to more reasonable levels of 4-6% in 2010 (Trading Economics, 2013). The positive economic development went also hand in hand in with a positive social development. United Nations' statistics database shows that Brazil experienced a 61% drop in child mortality rates from 1990 to 2010 and Transparency International grading Brazil's corruption rate from an average score of 2,1 in 1995 ranking them third worst of the examined countries to an average score of 4,8 in 2012 ranking them 69th of 190 examined countries. The Brazilian industry also experienced a heightened international presence and reputation. As of 2013, Forbes listed 36 Brazilian companies on their Global 2000 list. The top-ranked Brazilian company was Petrobras at 20th, a drop from their 4th place in 2011.

Petrobras is a state-subsidized energy corporation headquartered in Rio de Janeiro with links to the Brazilian government. Formerly a legal monopolist, Petrobras is still majority-owned by the government, but its ruling governance is as of 1997 separated. Petrobras' oil extraction rates were increasing on an annual basis from the 1990's and onwards, propelling them into a status of top multi-national company. The global reputation and expectations of the company increased even further in 2008, when Petrobras announced they had discovered vast oil reserves in deep-water fields outside of Rio de Janeiro. The discovery of the Lula field in 2008 was soon followed by five other deep-water oil fields with a 2011 census estimating them to total up to 13 billion barrels (Economist, 2011b). In 2011, approximately 2,5 million barrels/day were extracted in Brazil, a number reported to be doubled by 2020, making them the world's fourth largest oil producing country just below USA (Sebastian, 2012). However, comments were also raised regarding the difficulties of extracting the oil discoveries. In the Lula field for example, the oil field is below 2000 meters of water, 3000 meters of rock and another 2000 meters of pre-salt layers of fossilised ocean.

The less excited voices of the difficulties regarding the oil extraction that were heard in 2008 have in recent time seemed to be more right than before. In 2012, Petrobras reported their first quarterly loss in 13 years. Further obstacles regarding their obligations to payroll 10% of their profit to the Brazilian National University system and local content regulations affecting the supply chain efficiency and infrastructure have been mentioned as reasons for the stagnation (Economist, 2012). The Brazilian national economy has also seen its difficulties after their boom from the 1990's up until 2011; the GDP growth was a merely 0,9% in 2012 with the inflation rate hovering near the top range of 7% (Leahy, 2013). The social development have not been seen as satisfactory in the eyes of the public, when hundreds of thousands protested the public education system, lack of jobs and high taxes in the summer months of 2013.

The discoveries of the oil fields are however still a poignant factor for the Brazilian economy in general and Petrobras in particular. The oil reserves still have the potential of creating thousands of jobs, increasing the GDP growth and making Brazil and Petrobras major actors on the global energy market. The following chapter will further describe the prospects and potential of the Brazilian energy market with the perspective of its offshore shipping industry. This includes the present state as well as the potential. Furthermore, the Brazilian shipping industry in terms of its inland waterways present state and potential will be described. Finally, the characteristics of the Brazilian offshore shipping industry will be presented in terms of the implemented local content requirements strategy.

5.1. Brazilian offshore shipping industry – present

The Brazilian shipping industry has undergone a radical change stemming from investments made just one decade ago. In the year 2000, Brazilian shipping industry employed approximately 1900 workers. The economic decline in Brazil during the late 1970's up to mid-1990's had effectively weakened Brazilian industry in general and thus also the Brazilian shipping industry. In 1979, just before the Second Oil crisis, Brazilian shipping industry employed approximately 39 000 workers, which in the coming 20 years, due to the rigid politics utilized, would be reduced by 97% (SINAVAL, 2012). This industry flux is manifested in figure 10.

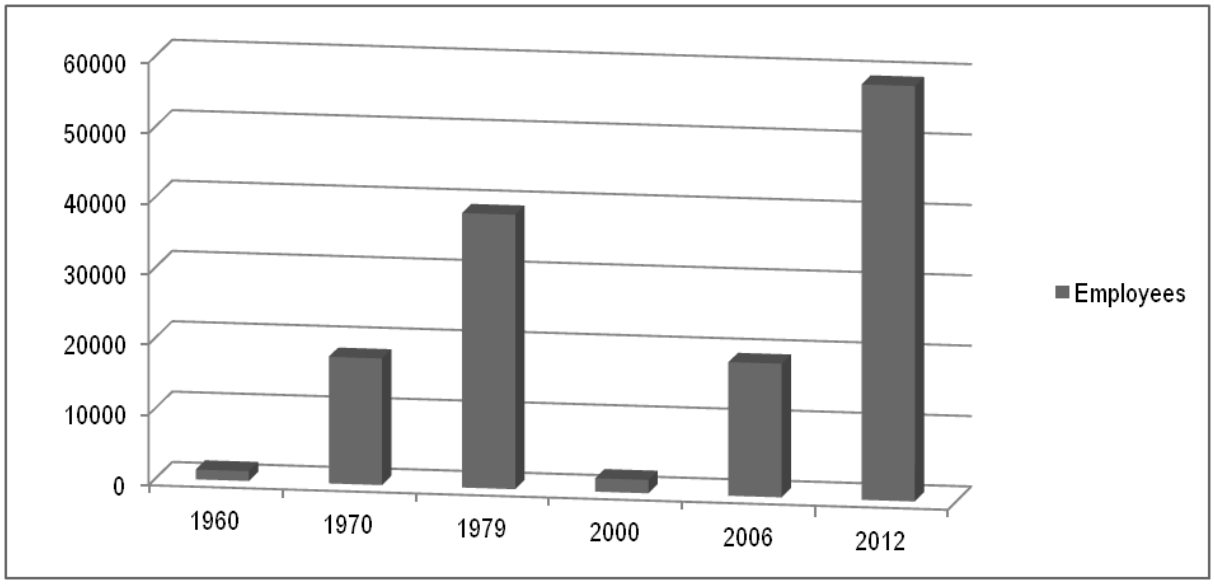


Figure 10: Graph of employees at Brazilian shipyards 1960-2012 (SINAVAL, 2012)

The boom in the Brazilian shipping industry in the recent years coincided, or could be explained, with Petrobras becoming Brazil's legal oil and gas monopolist along with the government's demand of local content (INSTOK, 2010). In early 2012, the Brazilian shipping industry estimated that they employed approximately 60 000 workers. The workers were spread across 47 shipyards in 10 regions which under 2012 produced approximate six million DWT (SINAVAL, 2012).

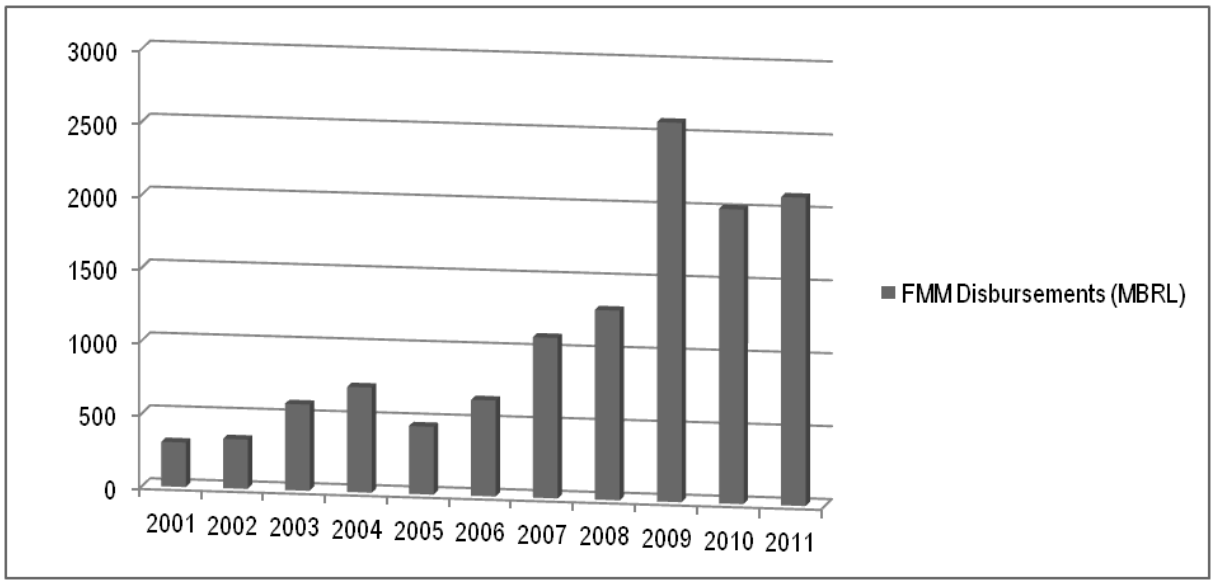
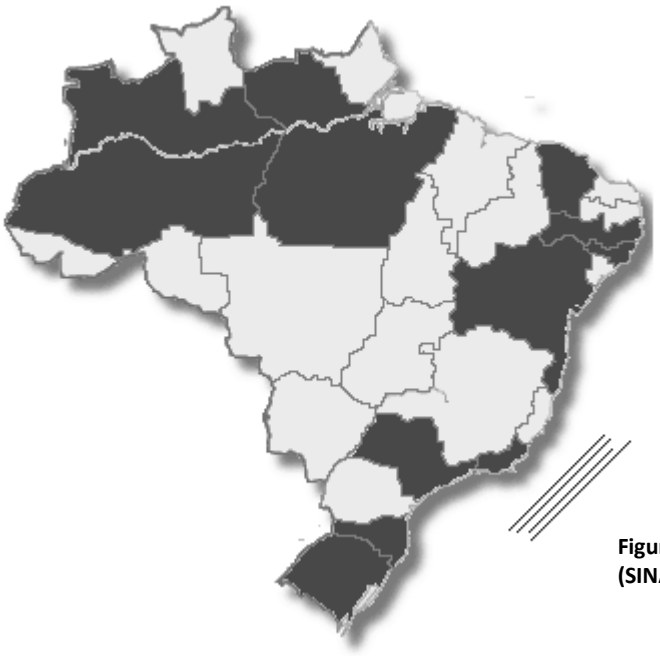


Figure 11: Graph of FMM disbursements from 2001 to 2011 (MBRL) (SINAVAL, 2012)

The expansion was initiated in 1998 when Petrobras' subsidiary Transpetro stated their plans of modernizing and increasing its fleet of offshore vessels including tankers, supply vessels and tug boats. The call for increase in both quality and quantity sparked the near-closed down Brazilian shipbuilding union which saw investments of sizes unseen since the 1960's (INSTOK, 2010). Transpetro alongside with the government organ Brazilian Merchant Marine Fund (FMM) were the two major investors in the rebuilding of shipyards across Brazil. As can be seen in figure 11, the FMM invested nearly twelve billion BRL (approximately USD six billion) in the time period from 2001 to 2011 with Transpetro being the largest customer, expanding their fleet with e.g. 47 large offshore oil tankers in the same time period (SINAVAL, 2012).



Region	No. of shipyards
Amazonas	1
Pará	1
Ceará	1
Pernambuco	2
Alagoas	1
Bahia	2
Rio de Janeiro	21
São Paolo	7
Santa Catarina	4
Rio Grande do Sul	4

Figure 12: Geographical display and table of number of shipyards in Brazil (SINAVAL, 2012)

Furthermore, the rather steep increase of disbursements between 2008 and 2009 coincides with Petrobras' deep water oil findings.

Figure 12 depicts the geographical position of every shipyard in Brazil as of 2012 where the red-marked states have shipyards. The lines depict the area of discovered deep water oil fields. The corresponding table depicts the number of shipyards in every state ranging from north to south. As figure 12 shows, the Rio de Janeiro area is the center of Brazilian shipbuilding with 21 yards that employs approximately 42% of the total shipping industry and produces approximately 22% of the total deadweight tonnage (SINAVAL, 2012). The cluster of shipyards in the Rio area along with the nearby state of Sao Paolo can be compared with where Petrobras have discovered the deep-water oil reserves, which reside outside of Rio de Janeiro stateside.

5.2. Brazilian offshore shipping industry – potential

The offshore shipping industry is deeply interlinked with Petrobras and Transpetro since they are instigators for the large investments to be made in the first place, the actors demanding the large improvements of quality and the largest customer. In Petrobras' plans sketched for the time period 2010-2020, the demand for new fleet vessels included 50 drill ships, 130 oil tankers and 500 offshore supply vessels (SINAVAL, 2012). In Petrobras' plans sketched for the time period 2010-2020, the demand for new fleet vessels included 50 drill ships, 130 oil tankers and 500 offshore supply vessels (SINAVAL, 2012). According to the most recent data in Berg Vessel Information System (BVIS) (gathered 2013-06-12) there are currently 289 vessels built or being built that are managed from Brazil in the time period 2010-2020. A great majority of these are done in cooperation with Petrobras, and dedicated to serve the new oil fields, at least 240 have managers who have some kind of relationship with Petrobras and are therefore relevant in the study. The remaining 49 ships are mostly ore carriers of very large dimensions, serving mining companies and alike and therefore not of interest for Berg Propulsion since they are not capable of delivering propeller systems to vessels of these dimensions. The 240 vessels that are currently under construction or have been completed after 2009 are a mix of mainly three types: Oil Tankers, Drill Ships and Offshore Supply Vessels, see table 3. While the first two categories are self-explanatory, the Supply Vessels include many types of vessels, from tugs to crew ships and patrol vessels.

Vessel type	Targeted	Planned/Built
Oil Tankers	130	40
Drill Ships	50	39
Offshore Supply Vessels	500	161

Table 3: Targeted and planned/built ships in Brazil from 2010 to 2020 (SINAVAL, 2012)

BVIS registers a ship as soon as the keel has been laid by updating its database several times a week from Lloyd's, an official international shipping register database. This means that the ship is under construction and the deal has been made with one of the shipyards and/or shipbuilders. It is therefore also highly likely that the other parts of the vessel has also been ordered or at least signed a contract for. These vessels are therefore considered lost potential from Berg Propulsion's perspective in this theses, and it is from these deduced that there are 440 (500+130+50-240) vessels left to be planned and build for Petrobras to meet their set goals. One must note that the vessels found in the systems are the ones where the construction has already begun, and does not show any potential vessels where a contract has been signed but construction has not yet started. Therefore the remaining potential might be significantly lower than estimated, but unless Petrobras issues new and increased targets for their fleet the potential of this market is not higher than what is showed in figure 13. Berg Propulsion are delivering propeller systems to eight (8) of these vessels. Berg Propulsion can deliver systems to vessels up to approximately 50000 tons in deadweight and although around 42 of the vessels are beyond their capability this is still a very low figure. Berg Propulsion has around 5 % hit rate on their sent order proposals in the rest of the world, compared to a mere 1.7 % of the vessels being built for Petrobras.

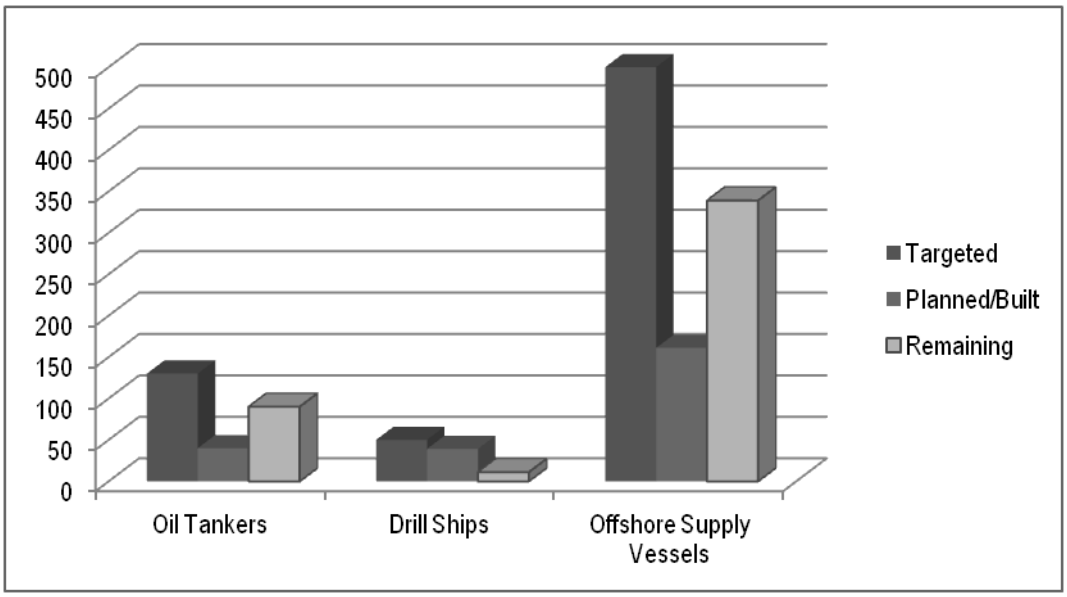


Figure 13: Graph of targeted, planned/built and remaining ships in Brazil from 2010 to 2020 (from BVIS, 2013 and SINAVAL, 2012)

The ship specifications in size and function have also put large pressure on the shipyards and its supply chain actors and subcontractors to meet the demands in time, quality and cost. Regarding capacity, questions have been raised as of the present shipyards can meet the capacity and quality requirements that Petrobras has demanded. The sketched plans for 2017 (Petrobras, 2013) cannot be supported with the present capacity but the Brazilian shipbuilders' union SINAVAL have together with FMM expressed plans for constructing

seven to eleven new shipyards explicitly designed for the manufacturing of vessels used in the exploration and production phase, namely offshore vessels.

The Brazilian marine industry has suffered from supply chain inefficiencies. Analysts claim that poor infrastructure alongside with low capacity and technical capability of the suppliers has affected the industry. The consequences can be seen when comparing the ten year plan Petrobras sketched in 2010 with the factual delivery status of the marine industry.

Regarding supplier capability, a 2012 report from SINAVAL categorized some of the general components of shipbuilding in terms of their criticality. The items were ranged from group A till group G, where group A-items, or rather the suppliers of the items, were highly critical for the supply chain's efficiency. These items require a high level of quality that Brazilian suppliers found difficulties maintaining and thus further local investment or direct foreign investment is needed. In group A, structural steel molding is listed, whereas group B includes more specialized technology such as motors, compressors pumps and propulsion.

The supply chain problems regarding vessel delivery precision have largely been noticeable in the highly technically advanced vessel construction such as floating production units whereas the manufacturing of less technically advanced vessels such as supply vessels has substantially grown in terms of capabilities.

5.3. Inland waterways

Inland waterways as a mean for transportation are interesting in several aspects. Freight ships used for transportation overseas have the benefit of low cost, sustainability and safe transportation, albeit being relatively slow. Inland waterways utilize the same type of transportation method, but with smaller carriers over shorter distances, but usually with a higher speed. This means that some of the benefits and drawbacks are similar to the overseas transportation, but not exactly the same.

The specific benefits gained from the usage of inland waterways as a mean for transportation are dependent on other factors such as the road development, docks and water locks, and the geographical conditions. To be fully utilized an inland waterway channel must be connected to another mean of transportation. It is rarely the case that it is possible to transport a good to the end user by waterway; it usually requires at least one transshipping point where the cargo is loaded onto another way of transportation. Therefore the benefits of an inland waterway cannot be measured solely by the capacity of the waterway itself, but one must also include the infrastructure around it. Despite this, there are some general benefits for waterways that are more or less consistent.

The cost reduction when using waterways compared to road transportation is often substantial, partly because most of the "network" is already in place. Instead of spending money on building roads which takes a lot of time and is costly one can focus on small improvements on the waterways and the existing transportation methods, although some terminals and connecting roads must be constructed. Furthermore, according to recent studies the total external costs of using inland waterways are seven times less than road transportation. This includes accidents, congestion, noise emissions, air pollution and other

environmental impacts (European Commission, 2013). Compared to the overseas transportation the cost is slightly higher due to the smaller vessels.

Improving the inland waterways is also a way of reaching very isolated parts of the country. This means that one can reduce the isolation of very poor people by giving them access to service functions like health care and school, which might have been unavailable before. New markets will also open up that previously have been inaccessible.

Transportation by boat is also more viable when it comes to sustainability. With less emission and fewer accidents as well as a more energy efficient way of transporting it surpasses the common road transport in many ways. In comparison, the energy consumption per km/ton of transported goods by inland waterways is roughly 17% of road transportation and 50% of rail transport consumption. Its noise and gas emission is low and in addition, inland waterway transport ensures a high degree of safety, in particular when it comes to the transportation of dangerous goods. Finally it contributes to the decongestion of the overloaded road network in densely populated regions. (Waterways and Livelihoods, 2013)

5.4. Inland waterways in Brazil

The inland waterways in Brazil make for an interesting subject to study for companies within the shipping industry. The potential for increase is great, and the restrictions for entering the market are not as challenging as in the offshore market.

Currently only 13.000 out of 60.000 km of the Amazon is used which gives a lot of potential for an increase of the usage. This is also shown by the fact that 45.Mtons is transported per year on the Amazon River, but research shows that it has a capacity of around 180Mtons per year. (WWINN, 2013) That is four times the current efficiency, which means that there is an existing capacity for huge increases.

In the beginning of April (2013) the Brazilian president Dilma Rouseff announced plans for setting up a new agency called Hidrobras to oversee Brazil's inland waterway ports, terminals, waterways and locks (Bartlett, 2013). Due to the very low usage of the Brazilian waterways as well as the plans of moving much of the road transportation to rail and water barges instead this is a first step to refurbish the underdeveloped waterways. The plan is to more than double the usage of the waterways within twelve years, see table 4. Besides the new terminals that have to be built, it will also lead to an increase of the transport vessels being built and used, the service required for said vessels as well as the quality of them. The inland waterways market will therefore expand in many areas, the new terminals will have to be connected to roads or rails for further transportation and areas that before were hard to reach will be more easily accessed, opening up new markets for many businesses. Since Brazil still is a nation with a great potential for growth, and is currently growing in a lot of different sectors, the necessity for good infrastructure and the requirements of the same will increase as well. The Amazon River and the inland waterways are therefore providing a lot of possibilities for the expansion and improvements of the infrastructure.

Inland Waterways in Brazil, the Amazon River			
	Current Usage	**Planned increase until 2025**	**Maximum Potential**
Area used in km.	13 000 km	?	60 000 km
Transportation in tons.	45Mtons	>90Mtons	180Mtons

Table 4: Usage and potential for inland waterways in Brazil (WWINN, 2013)

An increase of the usage of the inland waterways will by default also increase the need for transportation vessels on the waterways. This will lead to more vessels being built and the quality of these vessels and the handling of them will need to increase as well. When the traffic increases, so does the need for higher quality since the value being transported increases as well, which will shift the requirements of the propeller systems as well. From merely having to fulfill its purpose, be cheap and easy enough to fix, the requirements will now also include steering capability and fuel efficiency since the amount of transportation will increase.

This is a potentially large market for an early mover, while still not operating under as strict local content laws as the offshore sector, foreign producers of vessels components such as propellers, engines and other equipment may find this a lucrative market to enter. In fact, da Matto (2013) claims that depending on the type of vessel, there may be no local content restrictions whatsoever on the inland waterway market. The vessels connected to the oil industry, transporting crude oil or gas for example will still answer to the local content regulations, but other vessels transporting goods like coffee, meat, gold etc. will not answer to the same rules. For these vessels the components may come from anywhere in the world.

5.5. Local content requirements

When countries find natural resources and quickly want to reach economically viable targets for utilizing these resources, the stature of the country influence the strategy for how to do so. One strategy for developing countries to be able to reap the benefits of their resources is to attract foreign direct investment. The benefits of this strategy are that the foreign direct investment raises employment and enhances technology transfer within the developing countries. In order for developing countries to attract foreign direct investment without the power that the investors brings becoming overly influential, local content requirement regulations implementation is a measure that is being used. Local content requirement regulations are laws enforcing foreign investors to use a set proportion of domestically manufactured components in their finished products. This is usually controlled by setting up high tolls or taxes for using non-domestically manufactured components. In order for the local manufacturing companies to produce satisfying quality, the foreign investors need to transfer a satisfying knowledge towards the local manufacturing companies. (Qui & Tao, 2001)

Local content requirements aim for increasing welfare domestically via “leveling the playing field” between local and foreign manufacturers. The justification for such laws such imply that large portions of the benefits the resources give can be utilized by the country actually

deploying the resources. These benefits include not only economic aspects such as profit, employment and technology development but also social aspects such as national self-image and urbanization. The same justification is used to argue that without these regulations, the resources would be drained by multi-national companies which indeed would render a quick economic profit, but not any withstanding benefits for the country (Belderbos & Sleuwaegen, 1995).

The aim of "leveling the playing field" has also been exposed to criticism. Although the regulations do not infringe on WTO trade barrier regulations, critics have claimed that local content requirements foster unequal competition and oligopolistic behavior. The critique is often directed from Western ideology, and describes local content regulations as protectionist policies not aligned with the idea of "free market". Many studies have reached the conclusion that whilst the regulations do help to boost regional development, it does so at higher cost, lesser quality and lower government revenues (Nordås et al, 2003; Belderbos & Sleuwaegen).

Although the cost-benefit analysis of local content requirements is complex and difficult to perform, as the parameters above point at, there exist plans and strategies for successfully implementing the regulations. A 2011 IPIECA study on local content regulations in the oil- and gas industry focused on collaboration and coordination amongst the nation's governing institutions and the involved companies. The study stressed the need for required level of infrastructure which should be invested in both by local stakeholders and the companies in question. Furthermore the study stressed the importance of a genuine regionally development program which in combination with local governing bodies perform effective training, education and accommodation of local workforce. The procurement strategies should include transparent tendering, possibilities for specialized local workforce to conduct joint ventures and clear incentives for high performance rating. All in all, a successful local content requirement venture is a collaborative effort between governing body and company.

The oil- and gas industry is an example of where local content requirements are practiced. As oil and gas make pillars for modern industry and energy worldwide, countries finding oil often are protective of their sought-after resources. As up to 90% of the next 20 years' production of hydrocarbon stems from developing countries, regulations of local content requirements have grown to be a strong and well-practiced strategy in the oil- and gas industry (Baker III Institute, 2007).

5.6. Local content requirements in Brazil – present state

When Petrobras ended their spell as Brazil's legal monopolist in the oil industry in 1997, drafts regarding a local content requirement strategy were drawn up and were ready for implementation two years later in 1999 (Asher, 2012). The reasons for deciding on local content requirements were the traditional; Brazil was in need of foreign investment and expertise in order to utilize the resources and was at the same time interested in boosting their internal economy and infrastructure as well as providing a large number of new jobs for the Brazilian population. Brazil's national agency of petroleum, natural gas and bio-fuels ANP defined their local content strategy as a "contractual commitment of purchasing local goods and services on a competitive basis" with the objective to achieve "development of local

suppliers and technology" and increase local "employment and growth income" (ANP, 2008). When Petrobras then struck the vast fields of deep-water oil reserves, the foreign interest and investments grew exponentially.

The local content regulations have become measures in the concessional bidding rounds of companies that want to work with Petrobras and the oil industry need to go through. The concession used is a tendering process is structured through several bidding rounds which one need to pass sequentially in order to succeed and reach the next bidding round and in the end win the tender. During the 14-year period the regulations have been in practice, their impact has increased, especially under the 2002-2010 social-democratic president Luiz Inacio Lula da Silva of the Worker's Party. Since 2008 a certified portion of value produced according to the local content requirements need to be present in not only products used in ground, shallow and deep water but also in exploratory and developmental intended production. In short terms, the alterations completed the scope of regulations to cover every supplier who directly supplied the oil & gas-industry. In order to be compliant to the regulations, the local content value needs to be accredited for by a third-part licensor, i.e. the ANP. The tendering weight a required level of local content equals 20% of the score in the bidding rounds. If the portion of local content in the winning tender does not satisfy the required levels, ANP have mandate to fine the contractor accordingly. (ANP, 2008; KPMG, 2011)

The stipulation of local content for products are that at least 60% of the value should be originated locally and for services at least 80% of the value should be originated locally. The exact value of local content varies according to the type of vessel being built. Vessels of higher technical requirements, such as drill ships, require 60% of local content, whereas less technically advanced ships, such as support vessels, require from 65 to 70% local content (ANP, 2008). This renders that Brazilian suppliers have a large advantage over international suppliers without production in Brazil and in the prolonging that international suppliers are obliged to invest in Brazilian subsidiaries in order to match that advantage. The rigidness of the regulations and the control of the very same have been observed. Petrobras was in 2011 fined for not being able to prove required amount of local origin in their purchase of off-shore equipment (Reuters, 2011).

In an interview with Luis do Mattos, manager of local content regulations at the Brazilian classification firm RBNA with shipping as specialty, he explained that the definition of value in the regulations is at its core directed towards where the product is manufactured. For example, when calculating the local content percentage, the cost of design and development is irrelevant for the calculation, and workers' salary is included if the production takes place in Brazil. The local content is calculated based on the components used in the production phase. The value thereby originates from the direct material cost, where the total selling price is weighted against the total cost of components purchased elsewhere. Overhead costs of operations are also included in the calculation. When the total cost is categorized as either local or non-local, the portion of costs of non-local components is divided by the selling price. The given number represents the non-local content percentage of the value with the total local content of the value being the remaining costs.

Luis do Mattos further explained by exemplifying:

> *A supply ship is built with the finalized selling price totaling for €100 000. The total direct cost of components purchased in Brazil amounted to €30 000 and the total direct material cost of components purchased elsewhere amounted to €30 000. The cost of rent, utilities etc amounted to €10 000. To calculate the percentage of the ship's local content the direct cost of foreign components are divided over the selling price; i.e. 30%. Thus, the ship accounts for 70% of local content, thereby satisfying the regulated minimum level of 65%.*

5.7. Local content requirements in Brazil – prognosis

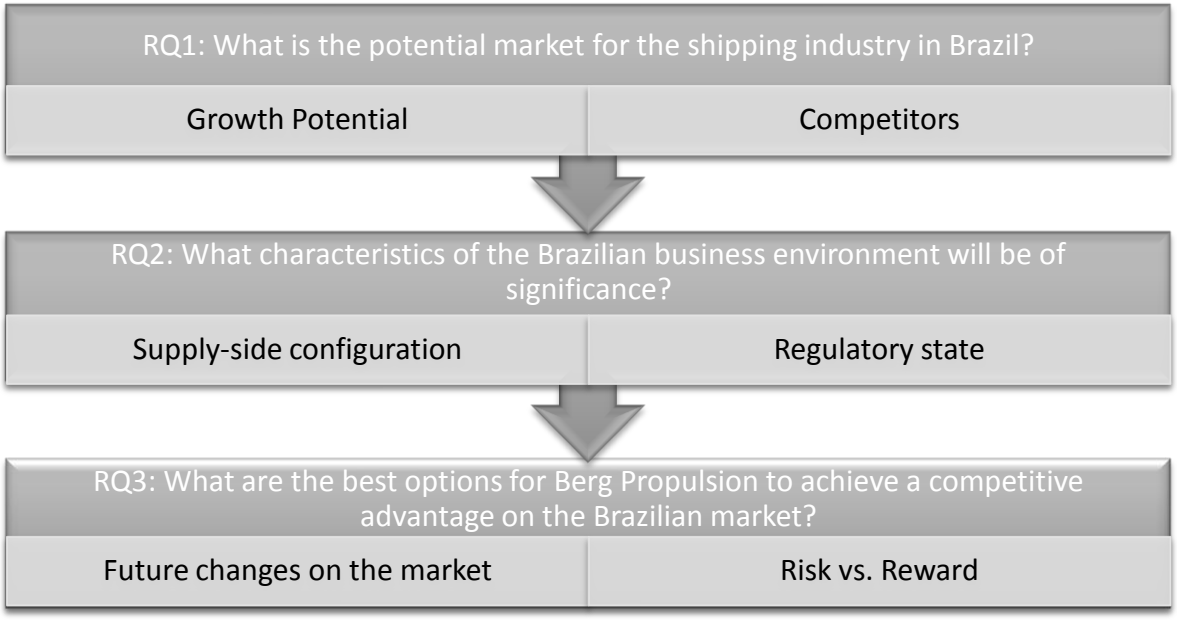
The current rigidness of infringing the local content policy, which the ANP and Brazilian government have showed are, according to industry expertise, not to be changed in a near future. Brazilian president Dilma Rousseff have expressed that she shares the views of the requirements set by former president and Workers' Party-colleague Lula da Silva. Rousseff was energy minister in Lulu da Silva's administration and have stated her belief in local content strengthening Brazil's infrastructure and development (Schneider, 2012). The positive attitude on local content requirements is shared by Petrobras' president Maria das Gracas Foster, who expressed its importance on her very first press conference as president of Petrobras (Leahy, 2012).

Despite the input from industry expertise, Petrobras presidency and Brazilian governance, some industry analysts claim that the rigidness of local content regulations will be loosened sooner than later. Petrobras has failed to reach their annual net targets of total volume of oil extracted in both 2011 and 2012 and at the same time failed to see their supply chain investments to reach the capacity targets originally set. Analysts have pointed that the Brazilian upstream actors, most evident in the technologically advanced offshore industry such as deep-water rigs and large oil tankers, have failed to produce at necessary level of quality in targeted time (Leahy, 2012; Millard, 2012).

Furthermore, Petrobras has indeed been allowed to finger on the rigid local content regulations. In February 2013, a statement was released declaring that Chinese shipbuilder Cosco was granted to manufacture four floating, production and storage off-shore vessels (FPSO's) due to supply chain problems causing delays in the Brazilian shipyards (Oil & Gas, 2013). FPSO's are highly advanced vessels that are crucial for offshore exploration and requires high technical capability in their manufacturing. In April 2013, further issues regarding Petrobras' and the Brazilian governance difficulties to reach their net targets was presented as Petrobras presented its first quarterly loss in 13 years. The reported loss along with the high debts from huge investments in the last four years, opened up for Petrobras in allegiance with the Brazilian government to allow the bidding round for some "unexplored geographical areas" to be open for foreign oil companies (Millard & Lima, 2013).

6. ANALYSIS

The following chapter will analyse the different aspects brought up in the previous sections and connect them to each other. This analysis will be structured through a set order why it is time to revisit the research questions presented in figure 2 in chapter 1.2.



The analysis will be sectioned in three major sections which will concern the three research questions respectively. The sections are named according to the very research question they address. RQ1 is specifically addressed to perform analysis of the Brazilian shipping market potential why economic figures as well as actors on the market are of interest to analyse. RQ2 on the other hand is addressed to perform analysis of how the market is structured in terms of its characteristics which includes the supply-side configuration and the regulatory state.

The output of the two research questions is then paired up in section 3 where RQ3 is analysed. RQ1 and RQ2 are to some extent interdependent why the analysis of the two questions are brought together as parameters for the analysis of Berg Propulsion's strategies to position themselves on the Brazilian market and business network.

Before concerning the three research questions, a brief summary of the Brazilian oil and marine industry will serve as introduction to the analysis. The summary will use the factual base from chapter 5 and present them through the ARA-model of the industrial network theory from chapter 2. The intro will describe the Brazilian offshore shipping network according to the network variables in order to present and identify the predominant actor, resource and activity structure of the network Berg Propulsion wants to be a larger part of.

6.1. Brazilian offshore shipping network

The Brazilian offshore shipping network starts and ends with Petrobras. The semi-state controlled energy corporation is the instigator of the refurbishment of the shipping industry from the near-closed down state of the 1980's. Together with the Brazilian state, Petrobras have spent billions of USD on building up a local functioning shipping industry. The investments have led to creating several thousands of new jobs and dozens of new shipyards

in different regional areas. Petrobras is also by far the largest customer for the shipyards and upstream shipyard suppliers, amounting for over 80% of laid orders in Brazilian shipyards in the time frame 2010-2020.

Petrobras is a semi state-controlled organization, meaning that their purchases are required to pass through public bidding concession rounds. When Petrobras are to purchase a vessel, the offering needs to be passed via all available shipyards which then need to be able to meet up the specifications necessary. The specifications include parameters of quality, time and cost alongside with the special arrangements of percentage of local content. In order for the shipyards to win the final bidding round, their upstream suppliers need to be deemed viable of delivering their goods on the specifications set by Petrobras as well using a minimum of locally produced components.

With Petrobras being the end customer of the network, their power and influence over the network is large. The purpose of the shipping industry's expansion was from Petrobras point of view to produce vessels with a high degree of quality to propel their position on the global oil market by strengthening their ability to extract the deep-water oil findings. The high investments made by Petrobras and the Brazilian state have created large pressure on the local supplier base to be able to meet the expectations. Moreover, this has also created a situation where the suppliers are highly dependent on Petrobras, being that they are by far the biggest customer.

The business interactions in the Brazilian shipping industry are thereby heavily influenced by two factors; firstly, the network is power imbalanced as Petrobras have an immense presence and large finances. As Petrobras is such an influential and large customer, every shipyard requires interaction with Petrobras in order for them to stay in the network. Secondly, the industry dynamics is affected by the legislation of local content requirements. This causes strains in Petrobras' power of the Brazilian shipping industry, but also puts pressure on the industry actors to not only be wary of the quality and cost of their activities and resources but also of their origin.

Even if Brazilian shipyards and industry suppliers are highly dependent of Petrobras, the dependence can also be viewed from both ways. As Petrobras and the Brazilian state have chosen to implement a local content requirements strategy and consequently invested in local workforce, Petrobras have large sunk costs in the Brazilian shipping industry and very high dependence on the shipyards and suppliers to perform. The local content requirements regulate Petrobras to create bonds with local shipyards and suppliers and utilize their activities and resources. This interdependence between Petrobras and upstream suppliers and gatekeepers, makes the network configuration setting tight as the actors are highly dependent on each other.

The factor of local content requirements can also be observed through the demands it has put on both the activity and resource dimension for the suppliers. The requirements is a national strategy with the aim of stimulating Brazilian labor by securing foreign companies to source locally manufactured components and use local manufacturing staff. Thereby, suppliers are obliged to modify their activity configuration and combine their resources in accordance with

the regulations, enforcing them to create bonds with local sub-suppliers whilst utilizing the local supply chain and infrastructure. This local activity configuration becomes a more complex task for foreign investors as it most likely involves creating relationships with new actors which can be somewhat troublesome in utilizing their resources and performing their activities.

The same factor has also put demands on the resource dimension through making certain resources more valuable to attain than others. The 4R-model categorizes resources into four groups; products, facilities, organizational units and business relationships. The local content requirements slant the value of the different categories in favor of the resource category of facilities. By physically operating in Brazil, the actor promotes local labor which is in accordance with the regulations of local content, and makes such resources a competitive advantage. The other three resource categories are thereby not irrelevant for business interaction in the Brazilian shipping network. Product quality, innovative capabilities and business relationships are also vital competitive factors, but their competitiveness is less sharp in contrast with facility presence, which is almost a prerequisite for network interaction.

Furthermore, the investments made in the Brazilian shipping industry have not trickled down with the same speed and effects to the lower-tier suppliers. The lower-tier suppliers, for example suppliers of raw material and specialized components, are often bottlenecks in the less technically advanced shipbuilding projects, such as manufacturing of offshore supply vessels. The fact that more peripheral network actors cause some manufacturing delays at the shipyards due to their somewhat lack of experience and competence is highlighted even more as the investments in the infrastructure of Brazil also have not gone hand in hand with the industrial development. Old roads in combination with inland water and rail traffic in much need of expansion and modernization often leads to difficulties of achieving high distribution performance.

6.2. Potential market for the shipping industry in Brazil

The global shipping industry is a highly volatile market. The difference in percentage between contracted vessels one year compared to the next can differ with several hundreds. This makes the shipping industry, and the offshore branch, connected to a high degree of risk. A blooming area one year may be almost barren the next, depending on a lot of different factors that often is out of the control of the people working in the industry. Because of this unpredictable nature of the industry, a company interested in investing in a new market or expanding on a new or existing market must be very cautious.

The current flourishing of the Brazilian shipping industry is closely connected to the new oil findings in the Rio area. These oil findings have sparked a refurbishment of the shipyards and the shipping industry in Brazil, and seem to be a lucrative market for shipbuilders and manufacturers of related components world-wide. The prospects are looking good; Petrobras have high goals and detailed plans and regulations regarding how to reach them. With a target of 680 vessels to be built before the year 2020, the market is lucrative, and seeing as Petrobras is semi-state controlled, the risk of them not reaching the goals (although not necessarily in time) seems small. 240 of the vessels have already been built, or at least been planned and

contracted. That is more than one-third of the total amount of vessels in slightly less than one-third of the estimated timeframe. The analysed portion of the market is also only the segment closely linked to Petrobras. Regardless if it is tankers or supply vessels, they will all serve a function at the oil fields. With this increase it is also more than likely that there will be an increase in other vessels being built in Brazil. Since the shipyards have been refurbished, and the technology have been brought more or less up to speed with the rest of the world, the shipping industry will continue to be stronger than before the Petrobras initiative even after the ships for Petrobras have been completed. Furthermore, there are still other vessels being built in Brazil, serving other segments of the markets, for example the mining industry and the transportation on the inland waterways. These vessels are not included in this paper, and even if the may not stand for a significant increase, there is a larger potential than what has been shown here. With the planned increase of the inland waterways, and considering the companies that have expanded their operations in Brazil to fulfil the demands of Petrobras and adapt to the local content requirements, it is very likely that the potential of the shipping market in Brazil will continue to be good. All in all it seems like a market worth investing in. There are, however, factors of some concern for companies interested in the market.

All of the targeted goals are directly linked to the amount of oil *found* within the oil fields and no to the amount extracted. It is not yet certain that the technology for retrieving all of the oil is currently available which would be a major drawback for Petrobras. Such a drawback would result in them having to re-evaluate their goals and size of their fleet, and probably postpone some of their operations until such a technology is made available. Add to this the fact that the Brazilian market in itself is unreliable, not only in the growth potential and fluctuations in the economy, but the way of doing business is different compared to what western companies are used to, with exaggerations being common and people tend to promise more than they can actually manage within a certain timeframe. The technological and social uncertainties can also be connected with the recent stagnation of Petrobras and Brazilian economy which may very well affect the planned targets and the means of reaching them. Although these factors raise questions of market uncertainty, one must also be aware of what extraction of the deep-water oil reserves would result in for Brazilian economy. Analysts claim that if Petrobras would reach their extraction targets by 2020, Brazil would become one of the five largest energy providing states in the world which obviously would strengthen state economy and increase domestic and standard of living drastically. The uncertainties still exist, but it is questionable if they will prevail in the long run over the large investments made to conquer them.

The inland waterways market is interesting thanks to the lack of restrictions regarding local content, as well as a mean to enter the market and find potential partners and joint-ventures to be able to move towards being classified as local content. In itself, the market is currently not of great interest for a company like Berg Propulsion. The market is still small, and since the focus is more on cost than quality, a premium supplier of propeller systems like Berg Propulsion might be almost "over-qualified". If this market were located in another part of the world it would most likely be of little interest for Berg Propulsion, but being regarded as a way in on the offshore market makes it more interesting.

Potentially there is a quite large market potential for the shipping industry in Brazil. The potential is however linked to a lot of uncertainties. What further supports the notion of the Brazilian market as a market with a high degree of uncertainty is the fact that even though Petrobras plans to increase their fleet with a large number of different vessels, and the production of a lot of these vessels have already begun, it is still very clear that in comparison with the Korean, Chinese and European market, as well the Japanese, the Brazilian market is still very small. Furthermore, so far in 2013, the Brazilian market actually shows a drop in the amount of vessels being contracted compared to 2012, compared to for example the Chinese and the Korean market as a percentage of the global market.

6.3. Characteristics of the Brazilian business environment

Industrial network theory often stresses the fact that firms and actors cannot be described as islands, but as part of a synergetic network where they interact with other actors and are dependent on interacting with these actors in order to be part of the network. In the same logic, business networks cannot be described as closed systems. Business networks are not only affected by how the directly involved actors restructure their offerings and position themselves, but also by external factors from indirect sources. The factors, often collected under the umbrella-terms "business environment" and "market characteristics", influence the network by setting up limitations the actors need to adapt to in order for them be a part of the network. Thus, the limitations cause the actors involved to structure their resources, configure their activities and position themselves accordingly.

The terms business environment and market characteristics are in practice broad collections of factors influencing the possibilities and options to operate on a specific market in a specific industry. Depicting a business environment is essentially to collect and analyse the specific characteristics and factors that influence and impact a market and industry. The factors that an analysis of a business environment and market characteristics take into consideration are meant to be encompassing the industry and market structure. This means that the factors together depict the limitations actors are required to be aware of and adapt to if they are to act in the industry and on the market.

The factors explored in business environment analysis can be collected from the political, economic, social and technical spectrum, abbreviated PEST factors. The factors represent different spheres which set the conditions for a company to consider and share interdependencies and are necessary to explore in order for a firm to understand the totality of the business environment. In the prolonging, the factors also reveal a firm's opportunities and possibilities to enter the business environment and favourably position themselves in the business network.

When analysing the Brazilian offshore shipping from a PEST-framework, some factors stand out as essential to be aware of for actors striving for entering the network, especially for the situation for Berg Propulsion. Given the high potential for and the high investments in the Brazilian offshore industry which was further examined in the analysis of RQ1, the regulatory state of the industry plays an important role. The largest factor of the regulatory state is the regulations of local content requirements in Brazilian offshore shipping. The regulatory state

is not only a political factor, but brushes all spectrums of the PEST-framework as it influences also the economic, social and technical spectrums of the Brazilian shipping industry.

The concept of local content requirements when delivering maritime products for the Petrobras offshore oil industry is enforced by governmental agencies. In short, the requirements state that no more than 30% of a vessel's selling price is to be accounted for non-locally manufactured components. The intent is to protect domestic industry and workforce by regulating the market in such a way that the use of non-domestic products becomes very costly. At the same time, Petrobras and the Brazilian government have made high investments in shipyard and shipping industry in order for the domestic industry to not only be an economic choice but also a technologically viable choice.

The local content requirements have obviously put pressure on supplier to move parts of their production units to Brazil if they are interested in selling on the Brazilian market. The propulsion industry was in the start-up of the Brazilian shipping industry's refurbishment perceived as a bottleneck product, i.e. a strategically important product which local suppliers could not manufacture at desired level of quality at reasonable price. Propulsion manufacturers could therefore for some time enjoy the fact that their products were not available in Brazil and thereby often being purchased internationally. However, at least two manufacturers, Wärtisilä and Rolls Royce, have both announced plans of re-locating manufacturing sites in Brazil in the near future. These two companies' outputs are thereby viable to be classified as local content, giving them a competitive advantage to other propulsion manufacturers located outside of Brazil. The ability for non-domestic propulsion manufacturers, such as Berg, to sell products in Brazil is thereby rapidly declining. Without adaption to the regulations, Berg is thus forced to match the offered quality of the domestic manufacturers but at a lower price.

The rigidness of the local content regulations has been apparent; fines have been distributed to both shipyards and end customers by the government-controlled supervisory agency. However, several economic analysts have pointed out some factors for less strict implication of the regulations. The factors pointed out are connected to the economic struggles of Petrobras; both in the ending quarter of 2012 and the early quarters of 2013 Petrobras presented regressive profit percentages and even losses, figures unprecedented for Petrobras in the 13 years before. The finances are a direct result of Petrobras' inability to extract the targeted volumes of oil to viable cost. Analysts have linked the regressive finances and in the prolonging the extracting inabilities to the strict regulatory market that Petrobras act upon. The claims are that the local content regulations force Petrobras to contract local suppliers which cannot manufacture at appropriate time and cost. The conclusion has therefore been that the Brazilian government are to be forced to loosen the local content requirements along with other regulatory principles, such as the fact that Petrobras are forced to subsidize the national oil distribution in order to sway off inflation, in order for the semi-state controlled Petrobras to once again show profit. This analysis is however somewhat insufficient.

Firstly, Petrobras have targeted a total of 680 vessels to be manufactured and ready between 2010 and 2020. From numbers pulled from Lloyd's shipping database, 240 of these vessels

have been built or are under construction. The rate of vessel production is thereby rather according to schedule. One could argue that the target itself is insufficient, but the extraction problems are rather more connected to the technical difficulties of extracting oil at such deep water than lack of vessels. The argument of high cost associated with the local shipping industry is however still a problem compared to cost levels of other more established shipping industries. There have been reports of supply chain inefficiencies related to lack of raw material, high production costs and infrastructure difficulties. Furthermore, Brazilian labour cost is comparably high and at the same time lacking experience in comparison with more established national shipping industries. This reasoning must however be compared with a second factor concerning the local content regulations.

The Brazilian shipping industry has during the 2000's seen refurbishment through investments accounting for billions of USD. These investments were collectively made by both the Brazilian government and Petrobras. Critics of the local content regulations must therefore take these very steep sunk costs in the Brazilian shipping industry in consideration when analysing the situation. The investments are done in order for Brazil to protect their local market and create domestic job opportunities. Shifting this policy will not only equal large losses of already sunk costs, but also high prestige loss for the Brazilian government as well as risking the labour protection for an industry employing hundreds of thousands Brazilian workers. This would be a heavy blow for the social-democratic government in charge of Brazil which also have deep ties to the top management of Petrobras. The high sunk costs along with the political prestige and lack of labour protection are just as important factors when discussing a revision of the local content requirements. The political instability in Brazil, as seen in the June 2013 demonstrations against governmental expenditure, will not decrease if the government shifts policies from securing inflation levels and Brazilian labour.

But one question remains; how will the supply chain efficiency at second- and third-tier supplier level affect the local first-tier suppliers? If the rigidness of local content requirements is to be maintained, companies need to re-locate a portion of the manufacturing in Brazil, which have been seen in the cases of Wärtisilä and Rolls Royce. If Berg Propulsion was to follow their path, the effects that the regulations create on the supply chain efficiency are still an issue. This equals high transaction costs for search and selecting suppliers which can match the required technical level at appropriate cost. The investments made in the shipping industry have primarily been directed to the shipyards and have not trickled down with the same speed to lower-tier suppliers. However, the increasing presence of manufacturing first-tier suppliers will slowly but surely create ripple effects in the lower-tier supplier base. An efficient and effective purchasing organization that produces product portfolios and cost/benefit-analysis of the product components is however necessary in order to increase the supply chain efficiency.

6.4. Reaching a competitive position on the Brazilian market

While the analysis of the first two research questions creates the foundation to understand and interpret the Brazilian market and it characteristics the analysis of the third question will link the other two together, and provide a base for the conclusion and future recommendations. As there are many variables on the Brazilian market that are out of a company's control, and these variables will greatly impact the success of future endeavours, different strategies and

options must be analysed or the different possible scenarios that may or may not occur. Therefore, the following analysis of the third research question will be structured as a presentation of several different scenarios, followed by the likelihood of their occurrence as well as suggested ways of adapting if they occur.

6.4.1. Scenario Descriptions

The following section will try to present a number of possible scenarios that are more or less likely to occur. The scenarios are based on four parameters; the degree of expansion on the offshore market, the possible potential of the inland waterways market, the strength of the local content regulations and the strength of the competitors on the market. The parameters make out the basis for the two axis of the matrix presenting the different scenarios.

Based on the different scenarios, four types of strategies have been created to overcome the different challenges in each scenario and to be as competitive as possible. With four different parameters there are vast numbers of different scenarios that could potentially occur. To simplify the use of the matrix, as well as the creation of the different strategies for the different scenarios, the assumption that the expansion of the offshore market and the potential of the inland waterways are correlated is taken. The assumption that the rigidness of the local content requirements and the competitors' position on the market correlates is also made.

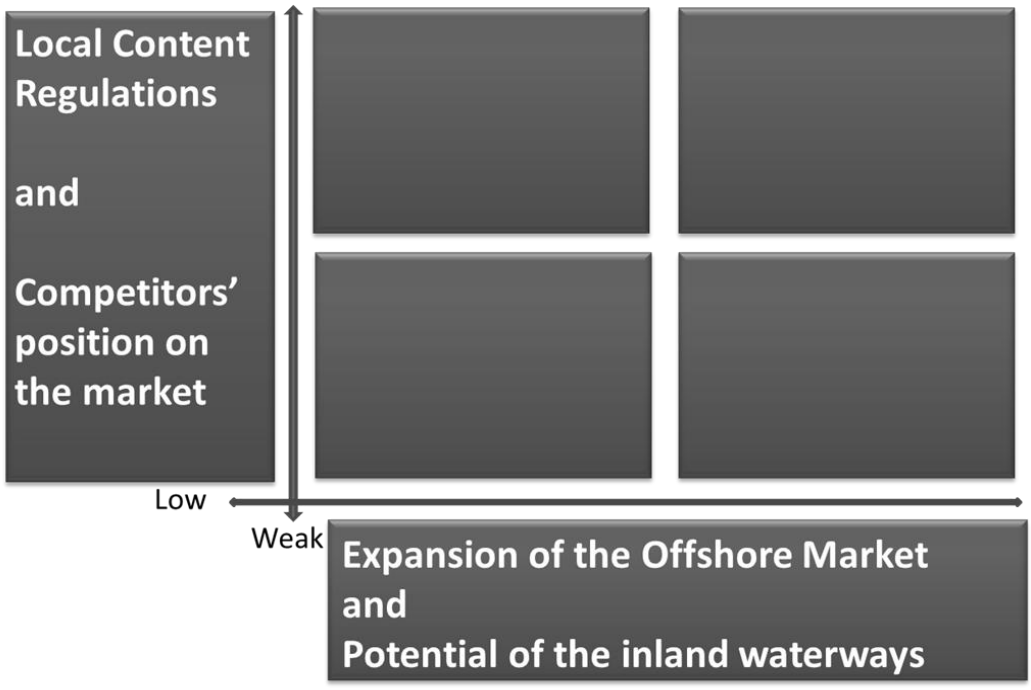


Figure 14: Parameterized matrix

If there is an expansion of the offshore market, it will stimulate the Brazilian economy in general, especially if the motion about the different states paying royalties to even out the economic growth in the country gets accepted. This means that an expansion in the offshore market will create a rise in demand for infrastructure, and since the inland waterways is the

transportation system that Brazil aims to focus their improvement on, the correlation between these two factors is natural. On the other hand, if the offshore market does not expand at a high rate, it does not necessarily mean that the inland waterways will not. But seeing as the potential investment by the government in the inland waterways is mainly to stimulate the infrastructural expansion, and the offshore and oil market is such a large part of the economy, it is likely that this investment will be significantly smaller if the offshore and oil market is not meeting the targeted potential. Furthermore, a small expansion of the inland waterways market will not by itself create enough market potential to be economically viable for Berg Propulsion to invest in, therefore the two markets' possible potential are interdependent, at least for the purpose of coming up with strategies for the different scenarios.

Seeing as the report aims foremost to analyse and suggest ways of improving Berg Propulsion's position on the Brazilian market, the competitors most relevant to compare to are the ones currently on the scene, working on slightly different premises, for example being classified as local content. Competitors that are in the same situation face the same challenges, and in competition against them Berg has the same opportunities as in the rest of the world. From this fact comes the correlation between the strength of local content regulations and the competitors' position on the market. A weaker set of regulations regarding local content then automatically weakens the competitive advantage of the companies that are local content classified.

These interrelations between the four different parameters results in a matrix of four different scenarios, each one in need of a different strategy and different approach to the market. See figure 15.

Figure 15: Scenario matrix

In the case of strong regulations of local content and strong competitors on the market, as well as low expansion of the offshore market and low development of the inland waterways, a *restrictive strategy* is recommended. Seeing as the biggest advantage a propeller manufacturer can have in this scenario is to be local content, Berg Propulsion lacks the strongest selling point. And as the market is not growing at a rate that promotes investments, neither in the offshore market nor in the inland waterways the best strategy is to find other markets with a bigger potential for growth and less restrictions for trade. It is still worth having representatives on the market, just be aware of future changes and possible business, but limit the amount of resources spent on this market until there is a change in either potential or restrictions.

The *responsive strategy* is useful in the event that the restrictions for local content is reduced, as well as the competitors' position, while the market is still seeing a slow expansion in both the offshore and the inland waterways segment. In this situation, it is recommended to be as responsive as possible. While reducing the fixed costs connected to the market since the local content restriction is being reduced and the costs of operating in Brazil is very high in comparison, it is still crucial to have representatives and employees on the ground to maintain and improve the relationships with the shipyards and shipbuilders as there may be more business in the future when the position of the competitors may be weakened even further.

The *offensive strategy* is aimed for the "optimal situation". That is, with lower local content restrictions, weaker competitors and a high growth of both the inland waterways market and the offshore market. In this case, there are a lot of potential market shares to gain, and it calls for offensive thinking. While the local content restrictions may not have been removed

completely, partners and joint-ventures are something to look into. Having a partner can facilitate both the trade itself and the process of becoming classified as local content. This is also a situation where the inland waterways are bound to grow at a rapid pace, opening up an almost brand new market where it is of huge benefit for the company to be an early mover.

When the growth of the market is high, but the local content restrictions are still high as well, an *adaptive strategy* is most fitting. This is the current situation. There is a large potential on the market, with Petrobras on-going expansion as well as the refurbishment of the shipping industry which will potentially lead to a large potential even when the Petrobras part is not included. But seeing as the restrictions are high as well, a company interested in doing business must adapt to the current situation. That means trying to either have a higher percentage local content, or be significantly cheaper compared to the competitors, with a quality that is required. This can be achieved by either partners, having local suppliers with assembly in Brazil, or by starting with the inland waterways market to gain a foothold on the market and then step-by-step move towards the offshore market as well when possible.

It is difficult to with certainty state which one of the four different scenarios presented that are the most likely to occur in the future. Although, according to the analysis made in section 6.3., it is unlikely that Petrobras will reduce the local content restrictions for the offshore market. Therefore, the assumption has been made that the competitors' position will continue to be strong. This leaves us with two different possible scenarios where either the adaptive or the restrictive strategies are the most fitting. Seeing as the shipping industry in general is a highly volatile market, and the Brazilian market in specific is a market connected to several uncertainties and risk factors which was analyzed in section 6.2., the safest way to go would be to use a combination of the adaptive and the restrictive strategies. Although it is worth mentioning that the situation we see today, which is a high potential of the market and high restrictions regarding local content will continue to be the case if all goes according to Petrobras plans. This would suggest the adaptive strategy as the one most fitting for the situation, and some strategies for a successful endeavour for this scenario will be presented below.

6.4.2 Shared suppliers with the inland waterways sector

Trying to get a foothold on the inland waterways market is a good first step. The market is as previously mentioned growing and in need of heightened quality and quantity while at the same time not regulated by local content requirements. The inland waterways market has compared to the offshore market a lower capacity and a less certain growth potential. One of the consequences has been that the market has not been scrutinized by the more powerful actors supplying propulsions systems. Berg Propulsion could therefore as a high-quality manufacturer with less difficulty become a powerful actor in the network. Finding ways to bond with actors on that market is therefore a less complicated way of strengthening Berg's position in Brazil. One suggestion could be to find suppliers that serve both the offshore market and the inland waterways market. See figure 16.

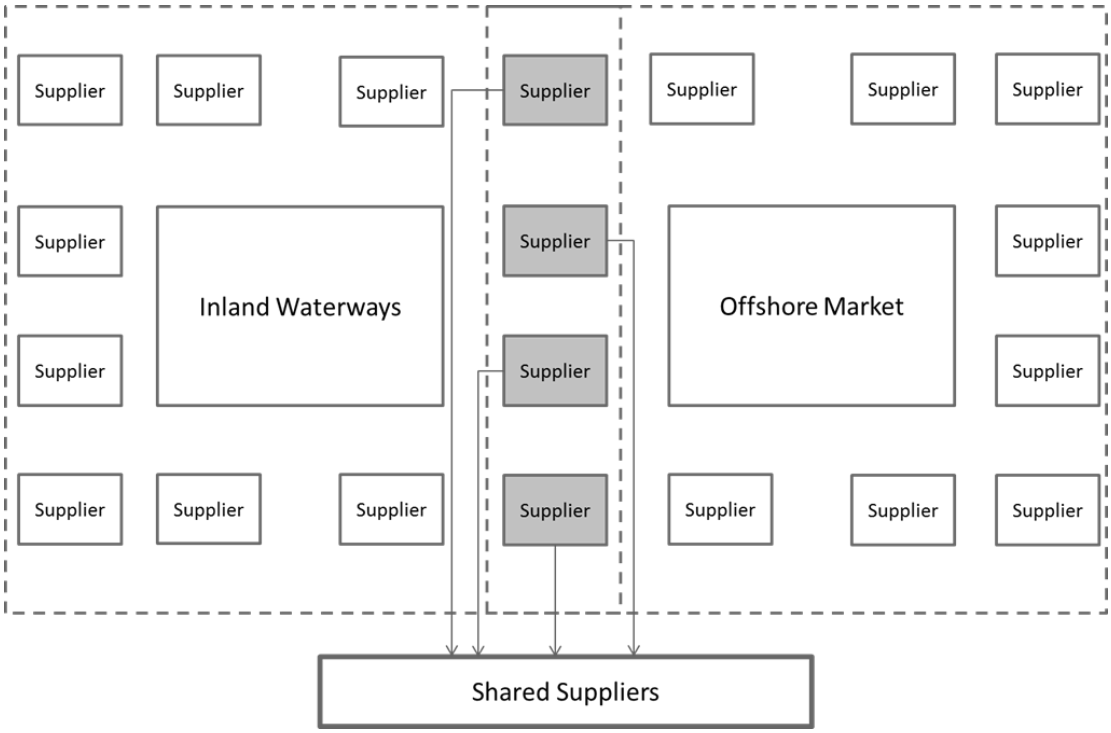


Figure 16: Supplier network of inland waterways and offshore

With a supplier that manufactures equipment that is used both on the inland waterways market and on the offshore market Berg Propulsion can form a relationship that in the beginning mostly aims to serve the inland waterways, but later on can be developed and possibly even turned into a partnership where the local supplier can manufacture equipment for the offshore market as well. This obviously requires a extensive supplier search and selection process of the local Brazilian supplier base. It also requires ways for both Berg Propulsion and the proposed supplier of both markets to be able to combine their resources in a mutually favourable way.

6.4.3. System provider selling complete system

Without the joint-venture or partner, Berg Propulsion will still lack the most important factor for selling on the Brazilian market. Even if the market potential in this scenario is very high, it is still not recommended for Berg Propulsion to invest in a manufacturing facility in Brazil. The fixed and variable costs for an endeavour like this is simply too high, and would not be economically viable. One solution could be to have an assembly plant, where the components are sourced from producers and partners within Brazil. But this is a very expensive process connected to a high risk, and to even consider this Berg Propulsion must before launching the expansion already have a substantial part of the market, as well as having made an extensive market potential research. Another alternative is to find an intermediate actor acting as a system provider, who takes the risk of purchasing Berg Propulsions products, as well as complementary propulsion system components from local suppliers and then offers a complete solution to Petrobras. See figure 17.

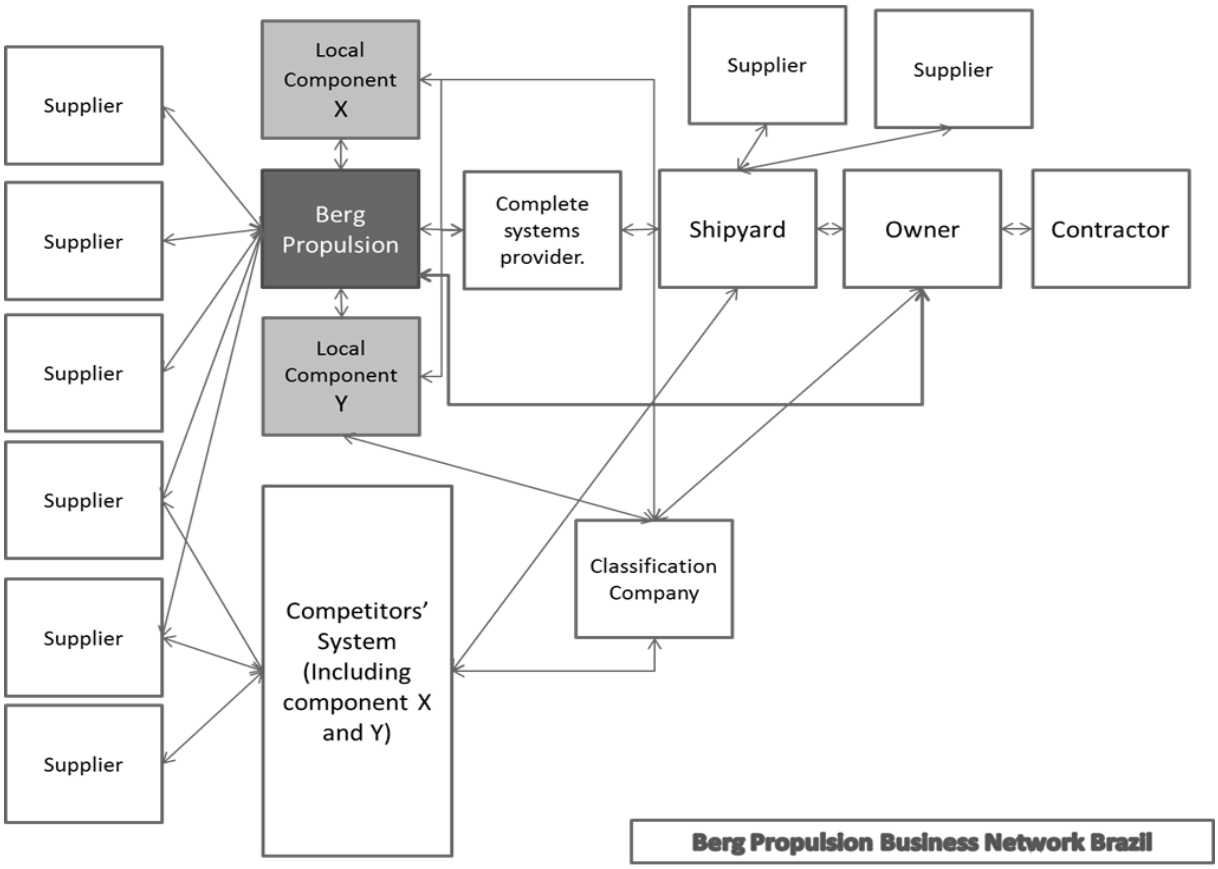


Figure 17: Business network with local first-tier suppliers

This strategy involves Berg Propulsion resource combining with other actors who preferably have some local presence. As previously mentioned, Berg Propulsion manufactures a part of a propulsion system; the propeller. Berg therefore needs to combine its product resource; the propeller, with other actors' product resources; e.g. propulsion engines, to complete a propulsion system. Due to the fact that more powerful actors who can supply complete propulsion systems are on the verge or just have relocated facilities in Brazil, not only Berg Propulsion feel the threats of not being able to supply a sufficiently valuable resource. The same situation goes for the local, less powerful actors who supply other parts of the propulsion system. By combining their product resources, Berg and the local supplying actors can form a resource which can provide the same value as the actors supplying complete propulsion systems.

By doing this, the system provider sells a complete propulsion system with a relatively high degree of local content, but with the lower cost of production Berg Propulsion can keep if they do not have to invest further on the Brazilian market. The production can continue to take place in Sweden and/or Singapore, and the propeller system is then sent to the system provider in Brazil who consolidates it with the other parts from the local suppliers. The entire propulsion system is then sold to the customer in Brazil. Obviously the system provider will need to make some profit as well, which will mean an increase of the final selling price, but the fact that the propulsion system now is local content to a high degree will make up for this and make the solution competitive.

6.4.4. Local suppliers for specific components

Another alternative is to have some local suppliers within Brazil for Berg Propulsions products. Seeing as even just a small degree of local content can be valuable, local suppliers and/or partners can be very rewarding for Berg Propulsion. By having a percentage of the components sourced from within Brazil, they will have some degree of local content in their products. If it is possible to find a local supplier for the components that stand for the highest percentage of the material costs, this alone with assembly in Brazil will lead to a fairly high degree of local content in Berg Propulsion's products. The major-cost driving components were presented in section 4.1. and can be viewed in the table.

Major cost-driving components (% of material cost)
Molded blades (11,9%)
Lower gear (8,2%)
Nuzzle (7,7%)
Casting (6,8%)

Even if the competitors continue to be strong, and the market is not growing as expected, having a local supplier for some parts will make the Brazilian market less restricted for Berg Propulsion, not only during the current Petrobras expansion but also in the future. See figure 18.

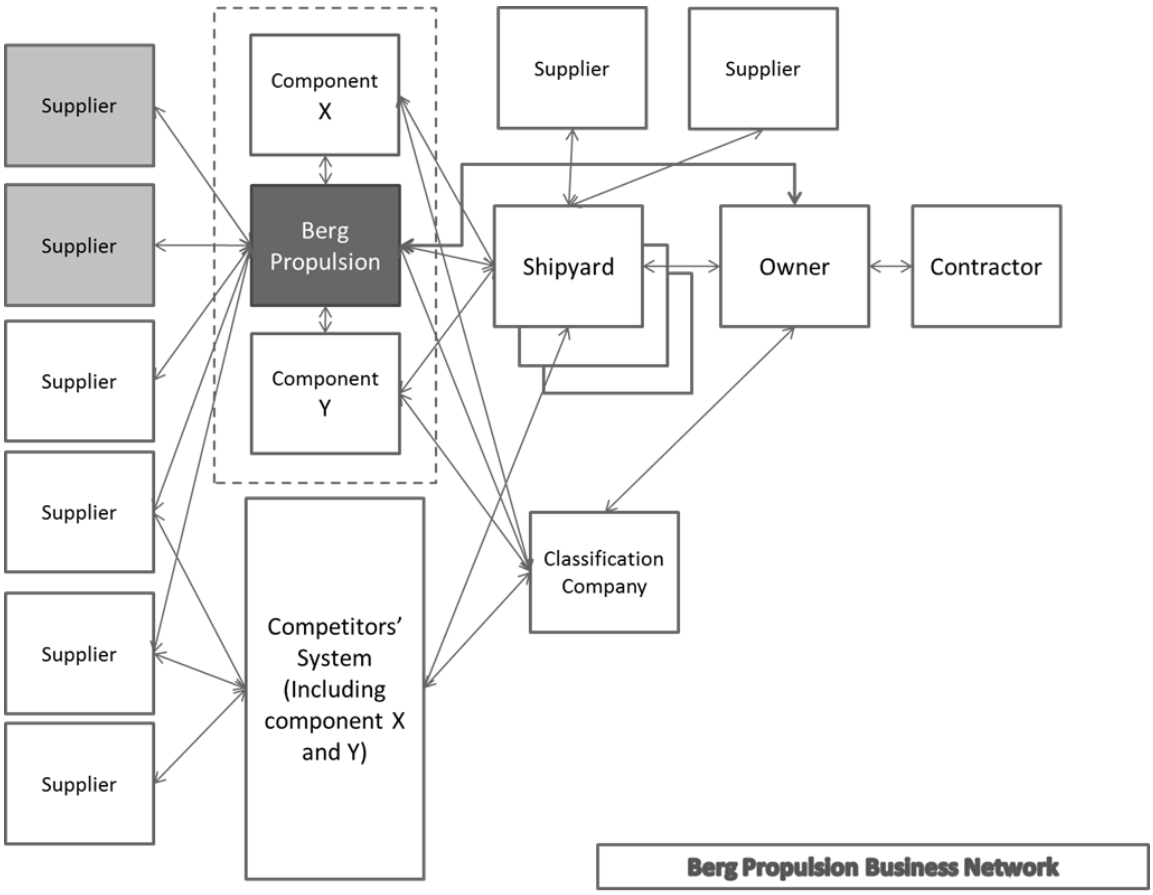


Figure 18: Business network with local second-tier suppliers

A supplier search and selection of these components is a process requiring some cost, time and patience. It is also associated with some facility presence in terms of assembly to satisfy

the local content regulations. This does also require some reconfiguration of Berg's manufacturing activities. Furthermore, as mentioned in section 6.3., the supply chain efficiency amongst lower-tier suppliers has been stated to lack.

However, due to the fact that more powerful actors supplying complete propulsion systems are relocating in Brazil, the lower-tier supplier base will have to adapt to this situation. This means demands of a higher standard of quality and higher supply chain efficiency. As Berg Propulsion to some degree share suppliers with these actors, especially for the more specialized, cost-driving components such as molded blades, forged shafts and gearboxes, Berg will have possibilities to take advantage of this situation. This requires, as mentioned, both time and cost, but will also make Berg propulsion less interdependent of other first-tier suppliers.

6.4.5. Impact on Berg Propulsion

What impact will these strategies have for Berg Propulsion? Firstly, a change of supplier for some of the components for some of their products means that they will have to find a suitable supplier in Brazil. Most likely this will not be a problem. Since Berg Propulsion already shares suppliers with some of their main competitors, competitors which are currently establishing on the Brazilian market, there are most likely local suppliers of acceptable quality. Berg Propulsions products are however highly customized, and basically made-to-order after the customer's request. They have their own design for the including components like propeller blades etc. and they would therefore have to find suppliers that are interested in adapting to Berg Propulsion's specifications and demands. For this to happen, Berg must likely be an important customer to the supplier, purchasing significant amounts, and having frequent transactions between the companies. Of course, if Berg Propulsion can secure enough business on the Brazilian market to make such a set-up viable this would be a good option for them. It is however not sure that just because Berg Propulsion can be regarded as a "local producer" they will automatically receive a large amount of orders from the Brazilian market. Berg must also communicate the reason of the switch in suppliers to their existing suppliers to maintain the good relationships they currently have.

Currently Berg Propulsion has an office in Brazil responsible for primarily the after-sales market and they handle the new sales from the office in Sweden and it might be a good idea to consider changing this. Right now, every new sale demands that someone from the office in Sweden travel to Brazil and handle the process. The benefit of this is that the "knowledge" and competency of new sales is centralized in Sweden, where it is also cheaper to have the higher posts in the company considering the very high salaries for management in Brazil. It also puts the ones responsible for the new sales closer to the top management and production, facilitating the communication. On the other hand, many sources claim that it is crucial for doing business in Brazil to have a local presence, someone who speaks the language and who has local knowledge. Today, whenever a new deal is to be made the responsible person from Sweden meets up with a local employee to translate, and provide local knowledge. If Berg Propulsion were to have a local employee with the same responsibilities as the ones handling the new sales from the Sweden office it could improve the response time and also increase the perception of the company being locally connected.

7. CONCLUSION

The purpose of this thesis was to explore and evaluate the Brazilian offshore shipping industry and its environment in order to identify the market potential and characteristics. The identification of these parameters would in turn be used as foundation for evaluating and suggesting different options for Berg Propulsion to increase their operations in Brazil. The purpose was fulfilled by collecting data from interviews and extensive market research. The data was then processed through the theoretical framework of industrial network theory in order to model the different options for Berg Propulsion in terms of activity configuration and resource combination in the Brazilian offshore shipping network.

Considering the market potential of the shipping industry in Brazil, its network configuration and growth potential was analyzed. This was done by first identifying the largest actor in the network, Petrobras, and then comparing quantitative figures regarding the industry's historical and present state. This was done by identifying the investments made in the industry, comparing the targeted production numbers with the factual production numbers as well as researching the market of inland waterways. The research concluded that the shipping industry in Brazil is and has been growing significantly since the initiation of Petrobras endeavor to extract the oil from the newly found oil fields. The potential of the market is there and the infrastructure and supporting networks are slowly but certainly getting up to date as well. Furthermore the market potential of the shipping industry will continue to be significantly larger than before thanks to the refurbishment of the shipyards in Brazil. This means that even after Petrobras has reached their target fleet size the market will still be interesting for companies within the shipping industry.

Considering the characteristics of the Brazilian shipping environment, this included researching the most prevalent factor affecting the industry, market and network; the local content requirements. The requirements were analyzed by reviewing their impact on the industry but also the future of the regulations. The regulations have forced companies interested in supplying to the Brazilian offshore oil market to invest in local labor force which has resulted in difficulties for smaller companies like Berg Propulsion with less investment power. During 2012 and 2013 when Petrobras failed to generate profit, critique has started brewing against the local content requirements, implying that the reasons for the weakened stature of the Brazilian oil market were the heavy regulations and that the Brazilian government therefore should consider loosen the regulations. The critique does have some entitlement; the offshore shipping industry has experienced problems regarding high costs, delays, low quality and low supply chain efficiency due to the fact that the investments made in the industry have not trickled down to lower-tier suppliers and infrastructure with the same speed as at the manufacturing stages at the shipyards. However, one must be aware of that both the Brazilian state and Petrobras have billions of USD in sunk costs in the industry and that they both have publicly granted their commitment to the local content requirements on several occasions. An abolishment of the local content requirements would result in losses of both investment and prestige and consequences none of the two parties are willing to take. Furthermore, one must also be aware of that several large first-tier suppliers are in the process of or have just relocated manufacturing facilities in the country. This will in time strengthen

the lower-tier suppliers and thus the quality, cost and supply chain efficiency of the industry network while at the same time upholding the local content regulations.

The two interdependent parameters were then displayed as axes of a matrix which presented four different scenarios for the Brazilian shipping market as well as four corresponding strategies for Berg Propulsion to consider if entering the shipping network. As the market potential for both the offshore and inland waterways shipping was deemed high and the local content requirements were deemed to stay as rigid, especially as foreign direct investment are starting to establish in the country, an adoptive strategy was deemed most favorably. The adoptive strategy at heart requires Berg Propulsion to form bonds with actors already present in the Brazilian shipping network in order to gain access to their existing base of resources and relationships. In order to do so, several strategies of positioning Berg's activities and resources were presented.

One way of positioning Berg is to conduct extensive supplier search and selection in order to identify suppliers which operate both on the inland waterways and offshore shipping market. As the inland waterways market does not apply the local content regulations, Berg could with less difficulties form bonds with actors on that particular market. Due to the lower capacity of the inland waterways market, it is also less scrutinized by the more powerful propulsion suppliers which could mean that Berg Propulsion have an advantageous position to the present propulsion suppliers as a high-quality manufacturer. Tighter bonds with actors present on both markets could therefore open up possibilities of forming future joint operations in the offshore shipping network.

Resource combining with other actors already present on the offshore market could also be a network strategy for Berg to conduct. Berg Propulsion manufactures the propeller system which is part of the propulsion system where also generators and engines are included. As some of the more powerful actors which provide entire propulsion systems are relocating manufacturing facilities in Brazil, actors which provide components of the propulsion system will have less power in the offshore shipping network. If Berg Propulsion were to combine their resources with some of the local actors who supply propulsions system components, they could together form products which could compete with the actors supplying complete propulsion systems.

Lastly, activity configuration of Berg's operations is another option. As mentioned, actors delivering complete propulsion systems are relocating in Brazil. This requires them sourcing from local suppliers which will demand higher supply chain efficiency at lower-tier supplying level. As Berg and other propulsion suppliers often to some extent share suppliers, Berg could take advantage of the heightened lower-tier supplier quality the increasing propulsion supplier presence will result in. This requires some activity reconfiguration and assembly presence, costs that are needed to be further examined. But if the search and selection of suppliers is successful, it could also be a transition with less compromises and partnering conflicts than the two previously mentioned network strategies.

8. CATERPILLAR INC. AND THE ACQUISITION OF BERG PROPULSION

Originating all the way back to 1925, the American corporation Caterpillar Inc. has been a global actor on several different markets. Starting as a manufacturer of tractors, the company today has products in everything from engines, mining equipment, turbines, electric power generators, machines and more. While the machines are still the core product and competence, Caterpillar's strategy of diversifying to stay competitive has been successful. Over the last 22 years Caterpillar has acquired more than 31 companies within different business areas, some which have changed name to include Caterpillar within the brand name, and some are subsidiaries, fully owned by Caterpillar Inc. The 2012 revenue for Caterpillar reached MEUR 50 463, making them an even larger company than Rolls Royce.

The latest acquisition of Berg Propulsion expands the scope of Caterpillar's product segment even further. Caterpillar has not previously had any propeller systems within their product lines, and this acquisition will result in Caterpillar being able to provide a complete solution to their customer when it comes to propulsion for the marine industry, from engines to the propeller blades. Berg Propulsion will henceforth be rebranded Caterpillar as a way to clarify that the complete propulsion system is from Caterpillar.

8.1. Caterpillar in Brazil

Caterpillar established operations in Brazil in 1954, and opened up their first factory nearby Sao Paolo in 1960. In 1976 their second factory was operational, and in September 2010 Caterpillar opened up another huge factory of 50 000 sq. meters. Simultaneously, Caterpillar announced plans of starting up an assembly line for electric generators and diesel propulsion engines to satisfy the local content requirements of the Brazilian offshore oil industry and was in 2012 their propulsion generators were classified as sufficiently local content (Caterpillar, 2012). The product range for Caterpillar in Brazil is very broad, leading to the company having many different suppliers of many different components. While previously only being able to sell some parts of the propulsion system they will now be able to provide the entire system.

8.2. Impact on the Brazilian Shipping market

Berg Propulsion being acquired by Caterpillar leads to new challenges on the Brazilian market, as well as opening a lot of new possibilities. Caterpillar is already strong on the Brazilian market, although not specifically in the marine sector. However, the brand is renowned, and they now have possibilities similar to the ones of Rolls Royce and Wärtsilä – they can provide a complete solution for a propulsion system i.e. combining the propeller and engine systems. Berg Propulsion will provide their expertise regarding the propeller systems which were previously not available for Caterpillar, which will open up new markets for the company, both in direct sales and in the aftermarket. Whilst mostly beneficial, a situation may arise where the complete system of Caterpillar can be regarded as something negative for the customer. Since Berg Propulsion before only provided the propeller system, the customer could select the other components after their own liking. This meant that customers who had for example Rolls Royce equipment could have a Berg Propulsion propeller system. For the Brazilian market in specific this was one of the reasons to why Berg could do any business at

all. Shipyards could select other components, like the engine, from local suppliers, and then have the propeller system made by Berg Propulsion and still meet the local content requirement. Considering a scenario where Caterpillar has no manufacturing for the marine market in Brazil, but still wants to sell the complete system, it might lead to a situation where they are not even eligible for the Brazilian market since the total value of the system is more than the allowed 40 % of the total value that can be sourced from outside Brazil. It is not yet clear how this will be structured, if Caterpillar will allow the selling of parts and not only a complete system, but it must be analyzed how this will affect the business. It would be a good idea to continue to provide the option for customers to purchase only the propeller system from Caterpillar (Berg Propulsion) and select the other equipment after their own liking. Obviously Caterpillar is going to want to sell a complete system as it brings much higher revenue, but in risk of losing sales it is important to also offer partial systems and components.

Caterpillar also have substantially more investment power compared to Berg Propulsion, Caterpillar even has higher revenues than Rolls Royce, meaning that the products previously produced by the small Berg Propulsion now have the means to compete on the same premises as Rolls Royce and Wärtsilä. This opens up for entirely new possibilities regarding investments and financial power, making markets and investments that were previously unattainable more possible. Opening up a manufacturing plant in Brazil was previously not an option for Berg Propulsion as they simply did not have the financial means for such an endeavor. Now it is a realistic possibility, even though it is not necessarily recommended considering the lack of viability of such an operation as has been shown in the previous chapters. There are however some possible problems with an increase of size by this magnitude. First of all, for a relatively small company like Berg Propulsion, it is easier to keep track of all transactions and customers, and thereby also easier to have a personal relationship with them. Berg Propulsion is in fact exceptionally good at providing customer service and reparations for the aftermarket. This is somewhat their core competence, and what in a way separates them from other propeller manufacturers. They have technicians in place with the customer when installing a new product, and expert personal traveling over the world providing services and maintenance on their products. This is much more difficult to achieve in a larger corporation. The number of sales is so much higher, and it is therefore difficult to keep a close track on every customer and provide people on the scene for every new sale. Larger companies are usually also more concerned with cutting costs and reducing waste to optimize the company both on a local and on a global scale, and having personnel traveling with every sale to help with the installation might be a service that Caterpillar does not feel is necessary, or something that they will charge extra for. This is something that Caterpillar has to be aware of, since the competence of Berg Propulsion's personnel and their exceptional customer service is one of their strongest selling points, and one that needs to be maintained after the acquisition.

The size of Caterpillar and their operations will by itself also be beneficial for Berg Propulsion for a couple of reasons. First of all they will now have a much higher possibility of utilizing economies of scale when purchasing for example steel and other components needed

from their suppliers since Caterpillar's other operations also requires steel and similar components. The suppliers that Berg Propulsion currently uses will remain, as the operations is planned to continue as usual. However, for new markets and when expanding on existing markets, Berg Propulsion, or CMPPD (Caterpillar Marine and Petroleum Power Division) can now benefit from the existing suppliers in Caterpillar Inc.'s global network

One of the major changes from Berg Propulsion point of view is how and to whom the company will sell its products. While previously having its own salespeople contacting and selling direct to its customers, in the future the sales will go through Caterpillars dealers, but with support from Berg Propulsions salespeople. See figure 19

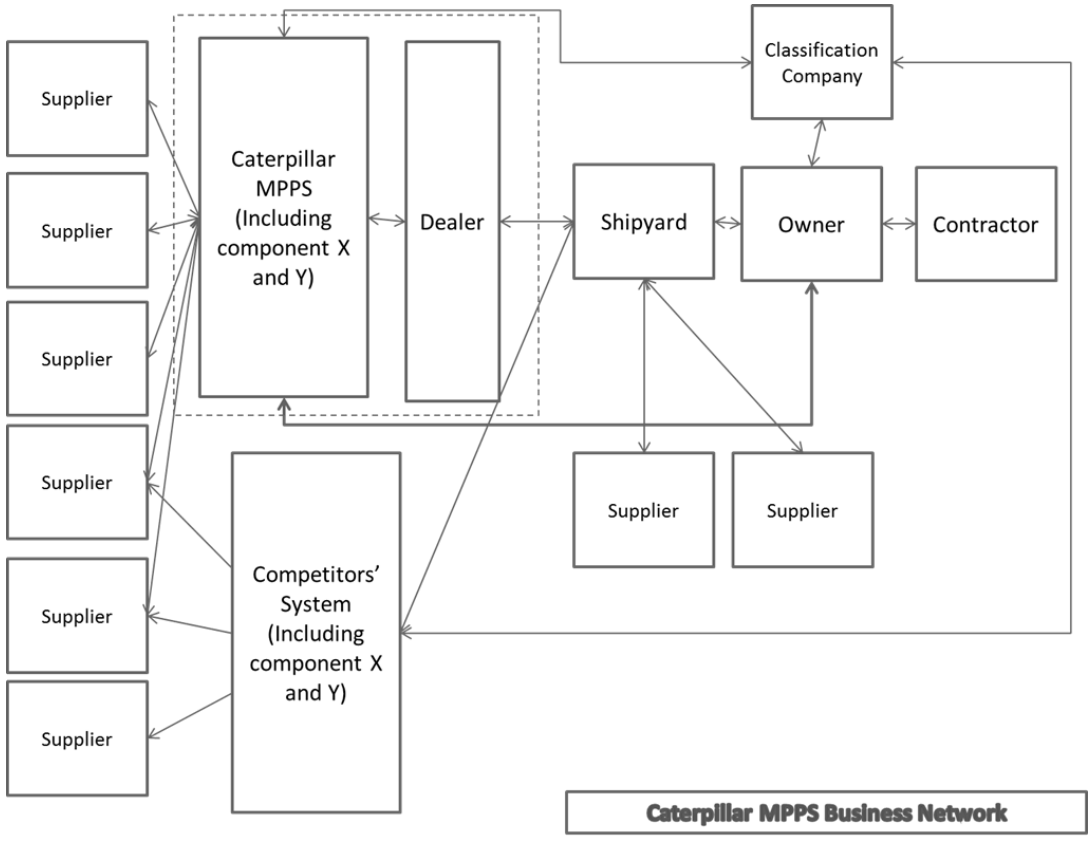


Figure 19: Caterpillar business network

Figure 19 shows the business network for Caterpillar after the acquisition of Berg Propulsion, where they sell the entire propulsion system to the dealer. This includes the propeller system of Berg Propulsion as well as other components manufactured by Caterpillar. This new business network will mean a different business setting, with new opportunities but also new risks. The dealers used by Caterpillar are external companies, not owned by Caterpillar. This means that even though they have a contract with Caterpillar, stating the maximum selling price allowed and other key numbers, they do want to make a profit from the sales. What this might result in is a higher price for the end customers compared to if they bought directly from Berg Propulsion like before. On the other hand, thanks to being incorporated within the Caterpillar group, the propeller systems of Berg Propulsion can benefit from already

established contacts, the fact that they now can deliver a complete propulsion system and the renowned brand name of Caterpillar, as well as lower production costs thanks to economies of scale.

8.3. Impact on the suggested strategies

The strategies presented as possible solutions for Berg Propulsion will have to be re-evaluated after Caterpillar's acquisition. Some options that were previously unavailable are now possible, and some strategies that were primarily based on the fact that Berg Propulsion is a small company are no longer valid. The four different scenarios presented in the analysis are based on circumstances and events that Caterpillar cannot control, and these will not change after the acquisition. What will change however is how the company can handle the different scenarios, and what options are available for the company.

The increase in investment power is one of the most significant changes. While Berg Propulsion previously could not match Wärtsilä or Rolls Royce when they opened up facilities and factories in Brazil, this is now a possible option for Caterpillar. While the research has shown that this is not necessarily a good option, it is an option that now is available for the company. In case the offensive strategy would be the one most fitting, when the market potential is high and the restrictions will be lowered, this could be an option to consider. Investing in an assembly facility could also be an option in the current scenario, where the potential is high as well as the restrictions. Since their propulsion generators were classified as sufficiently local content in 2012, an assembly plant where they assembled the propeller systems as well could be of great benefit when doing business on the market.

The strategy where the inland waterways were the first step of the process of expanding on the market will not be as interesting as before. Seeing as they now have the funds and possibilities to enter the more lucrative offshore market without this "detour" it would be more or less as waste to invest in the inland waterways. The market is still too small to be of interest by itself and with the low demands on quality and high focus on low cost it would not be worth investing in.

The alternative to being local content has always been to provide a product of equally high quality, but to a lower cost. This could still be an option. Seeing as the propeller systems of Berg Propulsion could now under the ownership of Caterpillar Inc. possibly be produced at a lower cost as a result of economies of scale and better supplier networks. If the production costs are lowered, there is room for a decrease in the selling price as well, making the products more competitive on the Brazilian market. Add to this the new sales structure with dealers selling a complete product with the propulsion generators being classified as having a sufficiently high local content degree; it might be a good alternative to not invest more in the Brazilian market at all.

Furthermore, the dealers used by Caterpillar creates a business network much similar to the strategy with the complete system provider suggested in the analysis, see figure 17. Instead of finding suitable producers of components X and Y, this is now done by Caterpillar themselves, which opens up for even more advantages than the ones previously presented.

Economies of scale is of these advantages that can be gained from the new business network, as well as consolidate suppliers, and provide a complete solution themselves, which will facilitate the work with the after-market and the service connected to this as well.

9. REFERENCES

Anderson, E., Day, G. & Rangan, K. (1997) Strategic channel design. *Sloan Management Review*, vol. 58, pp. 59-69

ANP (2008) *The local content regulations for concessional agreement*. ANP Agencia Nacional do Petróleo, Gás Natural e Biocombustíveis; Rio de Janeiro, Brazil. Available at: http://www.braziltexas.org/attachments/files/401/ANP-Marcelo.pdf

Asher, B. (2012) Brazil local content policy inhibits oil development. *Rigzone*, 18th of June 2012. Available at: http://www.rigzone.com/news/oil_gas/a/119419/Brazil_Local_Content_Policy_Inhibits_Oil_Development

Aspers, P. (2011) *Markets*. Polity Press; Cambridge

Baker III Institute (2007) *The changing role of national oil companies in international energy markets*. James A. Baker III Institute for Public Policy; Rice University, Houston TX, USA. Available at: http://www.bakerinstitute.org/programs/energy-forum/publications/energy-studies/nocs.html

Belderbos, R. & Sleuwaegen, L. (1995) Local content requirements and vertical market structure. *European Journal of Political Economy*, vol. 13(1), pp. 101-119

Bartlett, C. (2013) Brazil to establish new inland waterways agency. *Seatrade Global*, 8th of April 2013. Available at: http://www.seatrade-global.com/news/americas/brazil-to-establish-new-inland-waterways-agency.html

Bryman, A. & Bell, E. (2003) *Business research methods*. Oxford University Press; Oxford

Caterpillar (2012) Caterpillar power systems celebrates launch of Brazilian operations. Caterpillar Press Release no. MPPD12PR2. Available at: http://www.cat.com/cda/files/3386241/7/Brazil%20Launch%20v4.doc

Chapman, R.J. (2011) *Simple tools and techniques for enterprise risk management*. John Wiley & Sons Ltd.; Hoboken

Economist (2011a) Brazil's oil boom: Filling up the future. *The Economist*, vol. 156(46), pp. 17-20. Available at: http://www.economist.com/node/21536570

Economist (2011b) Brazil's offshore oil: In deep waters. *The Economist*, vol. 156(46), pp. 21. Available at: http://www.economist.com/node/18065645

Economist (2012) Oil in Brazil: The perils of Petrobras. *The Economist*, vol. 157(48), pp. 18-20. Available at: http://www.economist.com/news/americas/21566645-how-gra%C3%A7a-foster-plans-get-brazils-oil-giant-back-track-perils-petrobras

European Commission (2013) – Inland waterways. Available at: http://www.seatrade-global.com/news/americas/brazil-to-establish-new-inland-waterways-agency.html

Forbes (2013) Forbes Global 2000 list. Available at: http://www.forbes.com/global2000/

Ford, D., Gadde, L-E., Håkansson, H. & Snehota, I. (2011) *Managing business relationships*. John Wiley & Sons Ltd.; Chippenham

Gadde, L-E. (2004) Activity coordination and resource combining in distribution networks – implications for relationship involvement and the relationship atmosphere. *Journal of Marketing Management*, vol. 20(1-2), pp. 157-184

Gadde, L-E., Håkansson, H. & Persson, G. (2010) *Supply network strategies*. John Wiley & Sons Ltd.; Chippenham

Hingley, M.K. (2005) Power to all our friends? Living with imbalance in supplier-retailer relationships. *Industrial Marketing Management*, vol. 34(8), pp. 848-858

Håkansson, H. & Snehota, I. (1995) *Developing relationships in business networks*. International Thomson; London

Håkansson, H. & Waluszewski, A. (2002) *Managing technological development: IKEA, the environment and technology*. Routledge; London

Håkansson, H. & Johanson, J. (1992) "A model for industrial networks" in Axelsson, B. & Easton, G. (eds.) *Industrial Networks: A New View of Reality*. Routledge; London, pp. 28-34

INSTOK (2010) Shipyards in Brazil. INSTOK Official Report June 2010. Available at: http://www.intsok.no/style/uploads/doc/CountryReports/Brazil-Maritime%20Market%20Report%202010.pdf

IPIECA (2011) Local content strategy – A guidance document for oil- and gas industry. IPIECA Global Oil and Gas Industry Association for Environmental and Social Issues; London, UK

KPMG (2011) *A guide to Brazilian oil & gas taxation.* KPMG International Cooperative; Rio de Janeiro, Brazil. Available at: http://www.kpmg.no/arch/_img/9751409.pdf

Leahy, J. (2012) Local supply policy tests Petrobras. *The Financial Times*, 13th of March 2013. Available at: http://www.ft.com/intl/cms/s/0/a2f51e12-60ad-11e1-84dd-00144feabdc0.html#axzz2Sb3qalc9

Leahy, J. (2013) Brazilian president Dilma Rousseff defends records on economy. The *Financial Times*, 16th of June 2013. Available at: http://www.ft.com/intl/cms/s/0/aff5a652-d6a1-11e2-9214-00144feab7de.html#axzz2XQGMMI8Y

McQuiston, D.H. (2001) A conceptual model for building and maintain relationships between manufacturer's representatives and their principals. *Industrial Marketing Management*, vol. 30(2), pp. 165-181

Millard, P. (2012) Petrobras output target at risk as Brazil favors local business. *Bloomberg*, 13th of March 2012. Available at: http://www.bloomberg.com/news/2012-03-13/petrobras-output-goal-risked-as-brazil-boosts-dependence-on-local-supplies.html

Millard, P. & Lima, M. (2013) Petrobras debt crunch buoys Exxon's s prospects in Brazil. *Bloomberg*, 12th of April 2013. Available at: http://www.bloomberg.com/news/2013-04-11/petrobras-debt-crunch-buoys-exxon-s-prospects-in-brazil-energy.html

Morgan, R.M. & Hunt, S.D. (1994) The commitment-trust theory of relationship marketing. *Journal of Marketing*, vol. 58, pp. 20-38

Nordås, H.K., Vatne, E. & Heum, P. (2003) *The upstream petroleum industry and local industrial development – A comparative study*. SNF Report no. 8/03. Institute for Research in Economics and Business Administration; Bergen, Norway

O'Neill, J. (2001) Building better global economy BRICs. *Goldman Sachs Global Economics*, no. 66, pp. 1-16

Petrobras (2013) Petrobras 2020 strategic business plan: 2013-2017 Business and management plan. Petrobras Official Report on March 2013. Available at: http://www.investidorpetrobras.com.br/en/presentations/2013-2017-bp-presentation.htm

Qui, L. & Tao, Z. (2001) Export, foreign direct investment & local content requirement. *Journal of Development Economics*, vol. 66(1), pp. 101-125

Reuters (2011) *Brazil's Petrobras to appeal local content fine.* Reuters, 27th of April 2011.Available at: http://www.reuters.com/article/2011/04/27/petrobras-idUSN2713244020110427

Rolls Royce, (2013), Rolls-Royce has a proud history in Brazil spanning over 50 years, gathered 24th of June 2013. Available at: http://www.rolls-royce.com/country/brazil.jsp

Schneider, H. (2012) Amid slowdown, Brazil turns inwards. *The Washington Post*, 12th of March 2012. Available at: http://articles.washingtonpost.com/2012-12-03/business/35623589_1_brazilian-economy-brazilian-officials-world-economy

Schottel (2013) Schottel Gruppe gathered 15th of May, 2013. Available at: http://www.schottel.de/de/schottel-gruppe/

Sebastian, S. (2012) All eyes on Brazil's oil. *Global Post*, 25th of June 2012. Available at: http://www.globalpost.com/dispatch/news/regions/americas/brazil/120621/all-eyes-brazils-oil

Shipbuilding Forecast Club (2013) Shipbuilding forecast for June 2013. Clarkson Shipbuilding Forecast Club Report June 2013

SINAVAL (2012) Brazil – Offshore and shipbuilding industries overview. SINAVAL Official Report January 2012. Available at: http://www.dk-export.dk/media/SINAVAL-BrazilianShipyardsOverview-Jan2012_EN.PDF

Trading Economics (2013) Indicators for Brazil. Available at: http://www.tradingeconomics.com/brazil/indicators

Transparency International (2013) Statistical database of corruption rate. Available at: http://www.transparency.org/research/cpi/cpi_2001

United Nations (2013) Statistical database of social indicators. Available at: http://unstats.un.org/unsd/demographic/products/socind/

Waterways and Livelihoods Homepage gathered 12th of April 2013. Available at: http://www.ruralwaterways.org/en/gen/home.php

Wiklund, P. (2009) Ny teknik förenklar gränslösa möten. Tomorrow, vol. 2(3), pp. 18-22

WWINN – World Wide Inland Navigation Network, (2013), Brazil Inland Waterways, gathered 9th of April 2013. Available at: http://www.wwinn.org/brazil-inland-waterways,

Wärtsilä, (2013) Wärtsilä to set up new manufacturing plant in Brazil, gathered 22nd of May 2013. Available at: http://www.wartsila.com/en/press-releases/wartsila-to-set-up-new-manufacturing-plant-in-brazil

APPENDIX

INTERVIEW WITH LARS MAGNUSSON AND LUIS DE MATTOS

Date: 2013-05-23

Name/Title: Lars Magnusson Vice President of SweBras Rio the chamber of commerce located in Rio. He is also BD Director of KBR Brazil. **Luis de Mattos**, Commercial Manager for RBNA, the Brazilian classification society providing local content certification.

Companies: SweBras Rio. KBR Brazil. RBNA.

Number of years that the company has operated on the Brazilian market: 15 years

Number of years that You have operated on the Brazilian market or together with Brazilian companies: 15 years

Part one: The Brazilian Market.

- **Entering new markets means a new set of paragraphs which one must adapt to in order to be successful. It can include the general culture, the business culture, payments methods, ways of delivery and communication. What do you think are the most important characteristics for Swedish companies to be aware of when entering the Brazilian market?**
  Starting a factory or plant in Brazil is a huge competitive factor in regards to the local content requirements. Without a factory or production plant in Brazil it is very difficult to be classified as local content seeing as it is the workforce and not the technology that the local content aims to protect. (NOTE: See further explanation later in the interview)
  In order for a company to be viable option for Petrobras, they need to be on Petrobras' vendor list but also most importantly to be in good contact with the shipyards. A joint venture with a Brazilian company is a viable option; combining Brazilian labor with Swedish technology is "best of both worlds", swaying local content requirements and offer quality and price. Look into www.onip.org.br

- **Recently voices have been raised requesting that the profit of for example oil should be more evenly distributed throughout the country. Seeing as the biggest oil operations are located in the Rio area, which is also where the profits mostly go, how would this impact the Brazilian economy? Both in general and in the Rio area in specific? Do you think this is likely to happen?**
  Rio governor does not want to share royalties with non-producing states as this would hurt their investments in infrastructure which in turn would hurt further industry potential. The discussion that is going on right now is whether or not these royalties should also be retroactive or not. This would mean that Rio would have to pay royalties from the oil findings and operations that already have generated an income,

an income that might already have been spent. This would be devastating for the Rio area, and this is what the discussion is mostly about. The future is somewhat seen as a lost cause, there will be royalties of some sort, but these retroactive royalties are the focus because these would have the largest impact on the Rio area.

Part two: Local Content and Petrobras.

- **We understand the concept of "Local Content" as a way to protect the domestic businesses. What are your thoughts of the concept? Is it only (or at least preliminary) connected to the oil/shipping business or does it exist in other market segments as well?**
  Local content is practiced in a lot of different industries, but the classification and certification is uniquely present in oil and gas industry. The concept is a way to protect domestic labor, i.e. that the companies use Brazilian workforce when producing.
  No local content requirement for inland waterways plus there is a huge potential on this market seeing as a lot of effort is going into expanding and improving the infrastructure in Brazil. Inland waterways industry is more price sensitive than quality sensitive.

- **What is included when classifying something as "Local Content"?**
  When calculating local content, the design is not included in the local content calculation, i.e. research can be present in foreign countries. The importance is where the product is produced.
  You take the value of the included components and divide it by the total selling price.
  It is not sufficient to use imported components and then assembly them together, because the components are produced elsewhere, meaning that the labor and man-hours are done elsewhere. You ought to use some Brazilian made components where the workforce is located within Brazil.
  Paradoxically enough, the local content value of components does not include man-hours, merely material and overhead cost is included.
  65 % local content is doable for smaller vessels.

- **Is there a way to work around the "Local Content" concept, and what might they be?**
  "Work around" the concept is not a good way to describe the intention. This suggests "foul play". Instead one should focus on how one can best set up operations to minimize the impact of the local content demands, or maximize the potential gain of being "local content".

- **Do you see any changes being made or likely to be made in the near future to the concept?**
  Regarding lower technology products, like support vessels, Brazil would not minimize the rigidness of local content requirements. Rather they would press the Brazilian

shipyards to meet the demands. The state of Brazilian shipyards is an important flag for Brazilian politicians why they are not willing to restrict their operations by inviting foreign companies.
Regarding higher technology, like massive tankers or drill ships, Brazil has showed they are willing to budge the requirements.

INTERVIEW WITH PÄR HALLGREN

Date: 14/4 – 2013

Name/Title: Pär Hallgren, strategic purchaser specialized in metal forging and molding as well as gears. Furthermore, Pär's tasks involve project management of customized automation of controllable pitch propulsion systems (BCP).

Company: Berg Propulsion

General information:

Berg does not call off production before customer order is laid and pre-paid. This amounts to two things; Berg can manufacture and deliver heavily customized products with clear specifications and Berg cannot keep inventory, perform express deliveries and supply their products with long lead-times.

The Controllable Pitch Propulsion is Bergs' unquestionably most sold product. The thruster systems, both Azimuth and Transverse, are rather new products in their assortment and albeit their revenue share is continuously growing they are currently seen as complementary assortment products.

When building a vessel, the vessel need to be inspected, classified and licensed by third party before being allowed to be used. The third party is a classification & licensing house which is selected by the shipyard and/or shipbuilder. The licensing includes inspecting every direct supplier, such as Berg, and also every ingoing component in the direct material supplied. If a supplier is not deemed to meet the standard level of quality, the vessel is not allowed to be at sea.

Which propulsion type is most commonly used for supply vessels, tugboats and oil tankers?

Berg has never sold propulsion systems directly aimed for floating oil platforms as they do not have that technological competence or the capacity to reach standard levels of size and quality. The Brazilian demand of ships is mainly concentrated around supply boats, tugboats and oil tankers for offshore usage. For these, the azimuth thruster is usually what is demanded as they require less space than controllable pitch propulsion systems but more importantly can offer a higher steering precision which is advantageous when accessing deep-water oil rigs. However, the robustness of azimuth thrusters is often quite lower which could be factor under some conditions. Thus, the implementation of BCP systems for robustness accompanied with transverse thrusters for higher steering precision is also a useful combination for offshore vessels.

What is the bill-of-material for respective propulsion system?

The BCP system is larger than the thruster systems as the ingoing material, especially the shafts, are bigger in volume but there are fewer ingoing components in comparison with the thruster systems. A rough estimation is that a BCP system consists of 100 components whilst

a thruster system consists of approximately 600 components. Due to the lower complexity of BCP systems, e.g. via less components and lower precision-engineering, they require fewer man-hours of manufacturing than the thruster systems. A large portion of the total cost of manufacturing is devoted to material cost, why no components are kept in stock or is called off before customer is laid and pre-paid. This also opts for customization opportunities.

Supplier information:

Berg is a strategic client at some of their suppliers, particularly in the more specialized components such as the water-sealing suppliers. For the more specialized components, Berg share suppliers with their competitors. This includes the larger and heavier forged and molded metal components such as the shaft and the propeller blades. In some cases, Berg purchases components from competitor-owned manufacturers, e.g. in smaller water-seals.

Suppliers are spread around, but generally the sourcing is done in the traditionalistic shipping environments of Europe and Asia. Supplier closeness is not an important factor when sourcing. This is due to many factors. Firstly, transportation costs are relatively low. Secondly, Berg's customer contracts are often stated with long lead-times, commonly practiced in shipping, why delivery speed is less of an issue. Thirdly, the shipping business is rigidly controlled in terms of component quality by certain classification agencies which make the selection of suppliers narrower. Berg's competitive advantage is deeply interlinked with their reputation as a quality supplier. This, in pair with the aforementioned rigid inspection and required classification of every ingoing components, renders that Berg put larger focus on a suppliers' reputation, level of quality and delivery precision than on closeness and delivery speed. Today, in average, Berg suppliers have a material lead time of 16 weeks plus transportation lead time.

Local presence in Brazil/South America:

Presently Berg has a sales and service office in Rio de Janeiro. The sales office's main task is to find new customers and maintain existing customer relationships. The service engineer's main task is partly providing propulsion service for old vessels and partly to assist with propulsion implementation on new vessels. Berg has not for the moment performed any exploration of potential supplier base in Brazil.

INTERVIEW WITH MICHAEL BRAUN

Date: 2013-05-24

Name/Title: Michael Braun, Tug and Salvage Manager of Caterpillar Marine Division

Company: Caterpillar Marine Power Systems, previously on Schottel.

Number of years that the company has operated on the Brazilian market: Schottel started in 1975, and are still present on the market.

Number of years that You have operated on the Brazilian market or together with Brazilian companies: Michael was working for Schottel in Brazil between 2006-2010.

Part one: The Brazilian Market.

- **From the top of your head, what would you say is the biggest or most influential difference between the Brazilian market and the Swedish/European market?**
  European market is an open market whilst Brazilian is rather closed one, a market which is regulated with internal trade and tax rates between the different states. The border patrols are also unfortunately corrupt in comparison with western European standards.
  Furthermore, the Brazilian workforce is generally less educated compared to the European workforce, which is why good workforce is comparatively very expensive – even so with European standards. All these factors leads to a situation where goods produced in Brazil are therefore somewhat expensive since labor costs are high in addition to the different customs and taxes.
  Foreign companies also need local workforce eligible for middle management in order for the company to be connected to the local market.

- **Entering new markets also means a new set of paragraphs which one must adapt to in order to be successful. It can include the general culture, the business culture, payments methods, ways of delivery and communication. What do you think are the most important characteristics for Swedish companies to be aware of when entering the Brazilian market?**
  Language barriers are apparent and substantial, especially in the shipping business. Less than 40 percent of management speaks English properly and further down the hierarchy the situation is even worse, with even less employees that have a functional knowledge of the English language. Therefore, being able to speak Portuguese is if not a requirement at least a factor of some concern when doing business in Brazil.

  There are also differences in payment methods and how to handle these issues for a foreign company doing business on the Brazilian market. There are typically two different kinds of customers; internationally experienced customers that are aware of

credit and loans and less internationally competent companies who are more keen to cash payment and prepayment.
The key for most shipping companies to be successful in Brazil is a good service subsidiary. This is necessary, local presence is a requirement especially considering the complicated structure and politics of the market which needs to be managed and tended with care. Production facilities for propulsion systems on the other hand are often not economically viable due to low volumes and high production costs.
It is also noteworthy that the current high targets of the shipping will not necessarily be met, rather the Brazilian industry is known for overstating. Delays are quite frequent, especially so in the shipping industry.

- **The Brazilian economy is currently the world's 7th largest, but the growth of the economy is and has been slightly questioned. According to the Economist the growth of the GDP is slowing down at a rapid pace, and when subtracting the inflation, the GDP growth is actually negative at the moment. What are your thoughts about the future of the Brazilian economy, both in short term (<10 years) and in a longer term (>10 years)?**
  Short term there will be a growth. In the 2008 crisis, Brazil was hit, but as they have such a large internal market Brazil didn't suffer that much. One must be aware that predictions often are overstated both in negative and positive ways.
  Long term is unsure, due to macro-political changes.

- **Recently voices have been raised requesting that the profit of for example oil should be more evenly distributed throughout the country. Seeing as the biggest oil operations are located in the Rio area, which is also where the profits mostly go, how would this impact the Brazilian economy? Both in general and in the Rio area in specific? Do you think this is likely to happen?**
  Brazil and the Rio area have invested much in local infrastructure, such as electricity and transport routes. Brazil has a young demography and has tried to invest in education programs in order to reap benefits of the young population in the future.

Part two: Local Content and Petrobras.

- **We understand the concept of "Local Content" as a way to protect the domestic businesses. What are your thoughts of the concept? Is it only (or at least preliminary) connected to the oil/shipping business or does it exist in other market segments as well?**
  Brazil has high import taxes but there are some benefits in the marine business. In 1980's, the Brazilian marine industry experienced large cut downs due to the second oil crisis but a boom started in the late 1990's due to the oil and gas exploration investments. Therefore, Brazil has low level of educated marine personnel.
  Marine industry is centered around the Rio area, where most of the decision making is done.

The market for Low volume and specialized products – like the thrusters for example - will not be sufficiently covered with local production due to the lack of knowledge and technical skill.

Schottel was for example producing thrusters in Brazil during the 1970's but closed the manufacturing units in the 1990's as the volume was not sufficient for it to be economically viable to keep the operations in Brazil.
However, quality-secured suppliers that can produce thruster components are most certainly available within Brazil, which foreign companies can cooperate with to achieve the local content minimum requirements.

INTERVIEW WITH MIKAEL STÅHL

Date: 2013-05-23

Name/Title: Mikael Ståhl. Counselor at the Swedish embassy in Brasilia in charge of industrial promotion originally focused in Sao Paolo but focus has increasingly shifted towards Rio de Janeiro. The expansion of Petrobras is the main factor for said shift. Mikael's task is to promote small and mid-size Swedish companies, which do not have the assets to invest in infrastructural facilities, to gain access to the Brazilian market via e.g. introducing them to possible venture partners.

Company: Swedish Embassy

Number of years that the company has operated on the Brazilian market: The Swedish embassy of Brasilia was opened in 1975 and has been operating there since.

Number of years that You have operated on the Brazilian market or together with Brazilian companies: Mikael Ståhl has been working with Swedish-South American business relations through the Swedish Ministry of Foreign Affairs since the millennial shift and has been situated in Brasilia since early 2010.

- **From the top of your head, what would you say is the biggest or most influential difference between the Brazilian market and the Swedish/European market?**
  There are large differences between the Swedish market and Brazilian market. Firstly, the Brazilian market is obviously bigger both in terms of supplier and buyer due to the hefty Brazilian population. This also renders that there are larger economic power. Furthermore, the openness and loosened trade barriers and tolls characterized in Europe via the European Trade Commission cannot be seen in Brazil. The Brazilian market is on the contrary characterized as rather closed and in western terms often as "protectionist", as there are comparatively high entry boundaries, trade barriers and, in some industries, high import tolls.

  The "protectionist" market is defined by the Brazilian industrial politics to be focused on stimulating local production. The trade barriers and import tolls are seen as tools with the intent of making it advantageous for companies, both local and foreign, to build up a sophisticated local industry and enhancing local competence. The goal of the this strategy is three-part; firstly to stimulate local labor via creating new jobs for Brazilians, secondly to anchor the companies in the Brazilian market and thirdly that the companies will be enough grounded in Brazil to invest in product development being made in Brazil which will enhance local competence.

  The Brazilian industrial politics can, from a European view-point, be defined as very regulated but at the same time are the regulations harder to define. Due to political flux and strong state-side local political institutions, the regulations can shift from state to state. Furthermore, the Brazilian industrial politics is rather bureaucratic;

support grants, permissions slips and certificates in bundles are normative for setting shop in Brazil.

Brazilian industrial code of business is slow by nature. Both developmental and decisional processes are often delayed and procrastinated both due to the Brazilian society and due to the large extent of bureaucracy and regulations.

The development of national and local infrastructure have not made the same leaps as the democratization and technology process and thus not kept up with the manufacturing development. Both river- and railway infrastructure need to be invested in in order to satisfy the industrial pace as well as achieving the required level in a sustainable manner.

Regarding the local content requirements of the oil & gas-industry, the view is that they are perhaps too large in scope and perhaps too hastily implemented. This can be seen in the effects with large delays in shipping and technical areas as well as Petrobras failure to reach stated output goals. The politics behind the regulations, with the large monetary and reputational investments which has been made, raising doubt and questions against them is almost politically impossible. Furthermore, local businesses in shipping such as shipyards and local entrepreneurs are worried that Petrobras will steer away from the local content arrangement.

Analysts claim that Petrobras need to resign the policy in order to reach the stated manufacturing and output goals, but to resign from the stated policy will also result in large losses of sunk costs in the shipping industry.

Despite the local content requirements, there have been obvious problems with upstream local suppliers and poor infrastructure. The obvious supply chain problems have been constricting factors not only for Petrobras difficulties to reach output goals but also for foreign companies to invest in industrial solutions in the Brazilian industry.

Due to Petrobras deep interdependence and affiliation with the Brazilian government, some obligatory measures have further complicated their situation. Firstly, the Brazilian government has demanded that Petrobras have to decrease their prices in Brazil by offering subsidized gas in order to keep inflation levels low. Thus Petrobras are forced to sell cheaper within Brazil then what they could earn from the exporting the very same products. Secondly, Petrobras is forced to be a bidding part of every public disclosure regarding the oil & gas sector. This requires heavy administration and is associated with large costs. Thirdly, Petrobras is forced to sponsor universities with a relatively large percentage of its earnings with the intent of promoting local technical competence. This strategy is aiming for creating a quicker win-win situation both for Brazilian industry in general and Petrobras in particular but at the same time it

decreases Petrobras present buying power and liquidity. The question is how much time this strategy will demand before the proceeds can be raked.

- **The Brazilian economy is currently the world's 7th largest, but the growth of the economy is and has been slightly questioned. According to the Economist the growth of the GDP is slowing down at a rapid pace, and when subtracting the inflation, the GDP growth is actually negative at the moment. What are your thoughts about the future of the Brazilian economy, both in short term (<10 years) and in a longer term (>10 years)?**
  The potential of development both in economic and technical point of view is high, but the question is how high it really is? The relative high economic development and increase in BNP during the late 1990's up until now was in high degree emanating from the global price on raw material which increased linearly with the increase of Brazilian technical competence to extract these resources. Therefore, questions regarding what will happen with the Brazilian economy when the raw material is extracted or if the asking price of said raw material stagnates can arguably be raised. However, the democratization process will most likely continue which obviously will provide better conditions for the Brazilian industry and labor force.

- **Recently voices have been raised requesting that the profit of for example oil should be more evenly distributed throughout the country. Seeing as the biggest oil operations are located in the Rio area, which is also where the profits mostly go, how would this impact the Brazilian economy? Both in general and in the Rio area in specific? Do you think this is likely to happen?**
  Currently, there is a bill under review in the Brazilian government stating that the state of Rio de Janeiro must share the winnings and profit made from the oil & gas industry on a national basis with other states. The bill being under review is also proclaiming that the state of Rio must retroactively share gained profit. If the bill is cleared as is, the consequences for the state of Rio would be massive and heavily dampen the expansion plans in the oil & gas sector. However, analysts claim that it is very unlikely if not politically impossible to force Rio to retroactively pay back. Regarding future sharing of profit, the analysts claim that it is very likely that Rio in the future must do so. This will of course have some consequences, as Rio state will have less money to invest in local infrastructure. **.**

- **Do you see any changes being made or likely to be made in the near future to the concept?**
  Brazilian politics will likely be forced to be somewhat more flexible. Important stakeholders are starting to question the rigidness of the local content requirements, an effect of the negative development of the trade balance.