A STRATEGIC STUDY:

Utilization of the Wintergas fleet for shipping Ethylene gas and BTX+S chemicals in China, South Korea and Taiwan

This paper is done as a part of the undergraduate program at BI Norwegian Business School. This does not entail that BI Norwegian Business School has cleared the methods applied, the results presented, or the conclusions drawn. Bachelor in International Marketing.
In cooperation with

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Executive Summary

The purpose of our study is to guide Norgas in the commercialization of the Wintergas (WG) fleet. We will do this through gathering, systematization and analysis of data and information. The Wintergas fleet consists of three ships: Cathinka, Pan and Camilla. The ships are smaller and wider than Norgas’ existing vessels, but have the ability to carry both chemicals and petrochemical gases. Their features are unique and could potentially be a source of competitive advantage for Norgas.

Norgas is currently struggling with the commercialization of their new concept, partly due to a weak chemical market, but from our point of view, also because they are lacking important internal resources. Furthermore the authors will provide Norgas with analysis of the external environment and the company itself. This thesis includes both the collection and analysis of primary and secondary data. The case study research involves in-depth which were done by the authors. We have found that the petrochemical shipping industry is overall attractive and the demand for shipping services is growing with the growing GDPs in the selected countries. However, we have identified some mismatches between the key resources and capabilities needed to be able to succeed with the Wintergas concept, and those of Norgas.

Based on the analytical part and our interview findings, a sound strategic plan has been crafted to enable Norgas to reach their operative and strategic goals. The two proposed trade route goes from Taiwan to China and from South Korea to China. It can earn Norgas a Time Charter Yield (TCY) of 12,000USD per day, given that they find cargoes that go in that pattern and a customer. The authors have recommended Norgas to implement and make use of their new CRM system, which is currently not in use.

This Customer Relationship Management system can be a vital asset to the company in order to provide superior service to their customers, and building strong relationships. Furthermore, it has been recommended that Norgas employs people with extensive knowledge and network within the chemical market, and ensure thorough education of the commercial employees.
Acknowledgements

It is a pleasure to thank those who made this thesis possible. This project would not have been a reality if not for everyone that has kindly helped us in different parts of the project process. We will especially give our attention to some key people.

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Furthermore we want to thank our interviewees who have shares their knowledge and opinions with us. We have been met with smiles, openness and a sincere desire to help. They have provided us with knowledge, understanding and information we would not have been able to gather on our own.

Lastly, we owe our deepest gratitude to Mr. Clive Choo, our eminent supervisor who has been available any time for guidance and supervision. He has been supportive and most importantly, patient with us. We could not have reached the finish line without your help!

Singapore, April 2011
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1. Introduction

1.1. Purpose of study

The purpose of our study is to guide Norgas in the commercialization of the WG fleet. We will do this through gathering, systematization and analysis of data and information.

The Wintergas (WG) fleet was an idea that first saw daylight in 2009, when Norgas Pan and Norgas Cathinka\(^1\) set sea. The ships are called combined vessels, meaning they can carry both gas and chemicals simultaneously. The technology is unique, but so is the cost structure. The commercialization of the fleet has been slower than expected and the idea has yet to prove profitable. In addition to this challenge, the market has changed since the project was started. The chemical market is currently experiencing a downturn and operators are struggling with the low prices in this market. Concerning the cost structure it is required more complex cleaning of the tanks and licensing of the crew on the vessels. This makes a fleet less able to compete on price. The vessels are forced to only carry ethylene gas due to the tight chemical market and this is currently not profitable. To operate a combined fleet it is necessary to have a “double expertise”. This meaning: knowledge, information and relationships in both the gas and the chemical market. Norgas has their core business in gas shipping, mostly Ethylene, and to successfully operate the WG fleet, the challenge lies in the chemical market.

We will propose a trade pattern between favorable ports. The pattern will be based upon adequate production of and demand for the products. We will be suggesting a strategy, which might help Norgas to take better advantage of the North East Asian market.

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\(^1\) Norgas Pan and Cathinka are 2 out of 3 vessel in the WG fleet
1.2. Motivation
We are motivated to do this study by the significant importance and contribution of the shipping industry to Norway’s GDP and GNP. Shipping is one of the biggest industries in Norway, it is a tradition and the trade goes way back in history. Norwegian companies control approximately: 23 percent of the world's cruise vessels, 19 percent of the world’s gas carriers, 19 percent of the world's chemical tankers and 10.5 percent of the world's crude oil tankers (The Norwegian Shipowner Association, 2011).

The methodology and findings from this study might be useful to other Norwegian companies intending to enter this part of the market. We want to deliver a study that can function as a base for further research on the challenges we identify. This extremely global industry contributes to, and facilitates world trade, which makes this an inspiring industry to study and analyze.
2. **Literature Review**
This section will give a brief introduction of the shipping industry, an explanation of the petrochemical segment and the products we have chosen to focus on. Further a short presentation of Norgas and the Wintergas fleet. Continuously we will review the theoretical frameworks we intend to use in our analysis. A description of these theories and frameworks can be reviewed from the appendices.

2.1. **Shipping Industry**
The shipping industry facilitates world trade by transporting cargos through designated sea routes. The global shipping industry is regulated by the International Maritime Organization and the industry can be broadly classified into:

- **Wet bulk**: This includes the transportation of crude oil and petroleum products (including petrochemicals).
- **Dry bulk**: This involves the shipment of iron ore, coal and grain.
- **Liners**: Which carries small shipment of general commercial freight.

![Figure 1 - Container port](image)
The shipping industry boomed after the opening of the Suez channel in 1869. In the 1970s and 1980s the container shipping took off, and the trade between Asia and Europe became more and more important. The industry is said to be a catalyst for economic development, as it facilitates approximately 90% of world trade. Adam Smith argued the economic significance of the shipping sector saying that it offers a cheap mode of transportation, helping to open up larger markets (Economy Watch,2011).

In terms of safety and environment, shipping is considered the safest and most environmentally friendly form of commercial transport. The industry is possibly one of a kind amongst industries involving physical risk, because commitment to safety has long pervaded all deep sea shipping operations. Shipping was amongst the very first industries to adopt widely implemented international safety standards (Marine Sector,2011). The threat from piracy attacks (mostly east African coast) has increased in the last couple of years. However the warning systems and knowledge about the piracy has contributed to the fight against the pirates.

Without shipping the import and export of goods on the scale necessary for the modern world would not be possible. Seaborne trade continues to expand, bringing benefits for consumers across the world through competitive freight costs. Due to the growing efficiency of shipping and increased economic liberalization, the prospects for the industry’s further growth continue to be strong.

2.1.1. Petrochemical segment

Petrochemical shipping is perfectly derived from the production and demand for petrochemicals. Therefore, we will briefly explain this sector. The Petrochemical industry consists of two major divisions. The primary industry produces basic chemicals such as ethylene, from oil or gas. The secondary industry converts the basic petrochemicals into materials that may be directly used by other industries (The Canadian Encyclopedia,2011).

Petrochemicals play a very important role in the modern world whereas standards of living are dependent upon a significant degree of domestic petrochemical production. For those who may
not know, petrochemicals are essential for the production of a diverse set of products, such as; plastics, polyester, nylon, perfume, paints, solvents, gunpowder, different kinds of medicines, and many more. The financing of petrochemical projects tends to follow a highly cyclical pattern. This pattern is largely governed by world prices such as the price for crude oil, which drives the price of the feedstock, and the rationale of producers who tries to exploit the benefits of economies of scales by building huge plants. Therefore, the petrochemical cycle tends to peak on an average between 6-7 years. (The Monetary Authority of Singapore, 1999)

2.1.1.1. **Olefins, Ethylene and BTX+S**

We are not able to focus on all petrochemicals when helping Norgas to best utilize their combined vessels. In close cooperation with Norgas we have therefore decided to focus on the chemicals that are easiest to clean and with high shipping activity. The products we have chosen to focus on are therefore Benzene, Toluene, Xylene and Styrene Monomer (BTX+S), and the gas ethylene. Below we will briefly explain some characteristics of Olefins and Aromatics, which are groups of petrochemicals.

- Olefins are an unsaturated chemical compound with at least one carbon-to-carbon double bond.
- Olefins are resistant to deterioration from moisture and chemicals.
- Ethylene gas is an Olefin.
- Aromatic hydrocarbons that have a liquid form are called Arene and are characterized by a double and single bond between carbons and hydrogen.
- The term aromatic relates from a physical mechanism with the colorless liquid that has a sweet smell.
- BTX+S chemicals are Aromatics.
- Aromatics are used in production of other petrochemicals including styrene, phenol and different polymers. Many of the different aromatics are commonly used to create other aromatics. (ICIS, 2011) and (KBR, 2011).
**Ethylene**

<table>
<thead>
<tr>
<th><strong>Cas. No:</strong> 74-85-1</th>
<th>![Ethylene molecule]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chem.</strong> $C_2H_4$</td>
<td></td>
</tr>
<tr>
<td><strong>Abbreviations:</strong></td>
<td>Acetene</td>
</tr>
<tr>
<td></td>
<td>Bicarburetted hydrogen, Ethene, Etileno</td>
</tr>
</tbody>
</table>

**Table 1 - Ethylene details**

Ethylene is an organic compound in gas form that has the chemical formula $C_2H_4$. Ethylene is the simplest olefin, because of its easy double bond of just two carbons. It is an unsaturated hydrocarbon like the other Alkenes, and it is very light. Ethylene is the world’s most popular Olefin, and it is used in many different industries ([ICIS,2011](#)).

**Benzene**

<table>
<thead>
<tr>
<th><strong>Cas. No:</strong> 71-43-2</th>
<th>![Benzene molecule]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Un No:</strong> 1114</td>
<td></td>
</tr>
<tr>
<td><strong>Chem.</strong> $C_6H_6$</td>
<td></td>
</tr>
<tr>
<td><strong>Abbreviations:</strong></td>
<td>Benzol, Bonzole, Crude</td>
</tr>
<tr>
<td></td>
<td>Benzene, Cyclohexatriene, Phene, Phenyl Hydride.</td>
</tr>
</tbody>
</table>

**Table 2 - Benzene details**

Benzene is one of the simplest aromatic hydrocarbons with the chemical formula $C_6H_6$. Benzene is a natural constituent of crude oil, and is considered to be one of the most basic petrochemicals. The chemical group is Arene, which is a generalized structure of a hydrocarbon. Benzene is used to produce several different petrochemical intermediates. Some of these are Styrene, Cumene, Phenol, Ethyl-Benzene and Nitrobenzene ([ICIS,2011](#)) and ([ICIS,2011](#)).
**Toluene**

| **Cas. No:** 100-88-3 | ![Toluene structure](image) |
| **Un No:** 1294 |  |
| **Chem.** C$_7$H$_8$ |  |
| **Abbreviations:** Anisen, Benzoen, Methacide, MethylBenzol, Methylbenzene, Retinnaphta |  |

Table 3 - Toluene details

Toluene is a clear water-insoluble liquid chemical with the formula C$_7$H$_8$. Toluene is an aromatic hydrocarbon, which is used as a solvent and as an industrial feedstock. It has a smell that can resemble of paint thinners. Toluene is a mono-substituted benzene derivate, which means that a single hydrogen atom from the benzene molecule has been replaced with CH$_3$. The main use of toluene is to produce benzene and xylene by using different cracker$^2$ technologies (ICIS, 2011).

**Xylene**

| **Cas. No:** 1330-20-7 | ![Xylene structure](image) |
| **Un No:** 1307 |  |
| **Chem.** C$_8$H$_{10}$ |  |
| **Abbreviations:** Dimethyl benzene, Xylol, Orthoxylene, Metaxylene, Paraxylene |  |

Table 4 - Xylene details

Xylene is a mixture of isomers, and is the ground base for the Dimethyl benzenes Ortho-xylene, Meta-xylene and Para-xylene. These three isomers have different carbon atoms from the Methyl group attached. Like aromatic hydrocarbons, the liquid is clear, colorless and has a sweet smell. Xylenes is refined from crude oil in a process called alkylation$^3$, but is also produced from coal carbonization. It can be extracted from Benzole as well. Xylene is often used in the production of solvents, rubbers and leather (ICIS, 2011) and (ICIS, 2011).

---

$^2$ A device that splits molecules from gas and liquids into atoms

$^3$ A process were light gases hydrocarbons are refined and combined to produce higher octane components
Styrene

<table>
<thead>
<tr>
<th>Cas. No: 100-42-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Un No:  2055</td>
</tr>
<tr>
<td>Chem. C₈H₈</td>
</tr>
<tr>
<td>Abbreviations: Cinnamene, Cinnameol, Monostyrol, Phentlethen, Styrol, VinylBenzene</td>
</tr>
</tbody>
</table>

Table 5 - Styrene details

Styrene is a cyclic hydrocarbon with the chemical formula C₈H₈. It is an organic compound that is colorless, with a sweet smell and an oily liquid form. Styrene is often called Styrene monomer, which is the precursor to polystyrene and other copolymers. Styrene is produced by a catalytic alkylation of benzene with ethylene or Ethyl benzene. The main use of Styrene is to produce other Homopolymers and Copolymers like Polystyrene, Butadiene styrene and different rubbers and resins. (ICIS,2011) (ICIS,2011)

2.1.1.2. Derived demand

As mentioned, the demand for petrochemical shipping services is derived from the demand for products that needs gas and chemicals in their fabrication. The demand for these products is again derived from the demand for the end product. The demand for shipping of our chosen products; ethylene and BTX+S, is derived from end products such as plastics, polyester, nylon, perfume, paints, solvents, gunpowder, different kinds of medicines, and many more.

Because of this quite extreme derived demand situation, the financial crisis did not affect the shipping industry before a year or two after the main crisis hit the first countries and companies. In addition, this kind of situation displays the importance of being aware of many factors that could affect future demand for shipping services of gas and chemicals.

2.2. Norgas Carriers AS

“Norgas Carriers AS is a leading integrated shipping company involved in the global transportation of petrochemical gases, liquid petroleum gases (LPG), Chemicals and liquid
natural gases (LNG). Through their offices located in Bahrain, Oslo, Houston, Singapore and Shanghai, they provide leading edge transportation solutions to customers who are major players in the petrochemical industry” (Norgas Carriers AS,2011).

Norgas is a subsidiary under the I.M. Skaugen SE group, which is a Norwegian based global maritime transportation service company. Their main activities are the transportation of petrochemical gases, chemicals, LPG and LNG, as well as the design and construction of smaller, specialized high quality vessels. I.M Skaugen’s business units are Norgas Carriers AS, which is engaged in the transportation of gas and chemicals, Nordic LNG, which is engaged in the distribution of LNG, Skaugen PetroTrans, which is engaged in marine transfer activities, and Skaugen Marine Construction (SMC), which is engaged in the design and construction of ships. This project is carried out in cooperation with Norgas Carriers AS.

Norgas’ current fleet consists of 17 different gas carriers where each vessel can ship up to a range from 5,000 to 10,000 cbm\(^4\) per journey. Norgas’ services are so far unique within the petrochemical shipping industry, in which they can ship both ethylene and chemicals at the same time. The operations of Norgas have during the last 10 years been mainly focused on the Middle East region coordinated from Norgas’ Bahrain office. Today Norgas faces a different market. The 21\(^{st}\) century demands a new orientation towards the South East Asian region and the Far East region. Demand and production of petrochemicals on a world bases has been shifted to new markets. Due to this, Norgas have during recent years changed their major trade lanes by including the South East region and the Far East to their main market (Norgas Carriers AS,2011).

2.2.1. Business model

To get a better understanding of Norgas’ services, we have identified the need, the service and their customers. Norgas is a service transporter of petrochemicals, and the need of their services appears when it exist a deviation between the supply and demand of petrochemicals in countries or cities. The need for either import or export occurs ergo transportation services like

\[4 \text{ Cubic meters}\]
Norgas’ are in demand. The main service provided by Norgas is the actual transportation of petrochemicals. This service is used to transfer the petrochemical to the place of demand, in this case by sea. There are also other elements provided as a part of their main service, such as crew, unique vessels properties, after sales services etc. The consumers are those who requests transportation services of petrochemicals. Typically customers are production units, as they use petrochemicals in production of other goods, such as plastics.

2.2.2. The Wintergas fleet (WG)

There are three WG ships (Pan, Cathinka and Camilla), two in business and one still waiting to be fully completed and authorized. The ships are designed and built as combined gas and chemical carriers. The WG ships are built at Taizhou Wuzhou Shipbuilding in China, under management, coordination and supervision by Skaugen Marine Construction. The unique design makes the WG vessels in possession of something rare. The vessels are able to carry chemicals in the integrated tanks, and simultaneously carry a full load gas cargo in the cylindrical tanks. The WG ships are the only vessels in the world designed with this ability, and to carry both gas and chemicals will introduce “a new generation of combined gas and chemical tankers”. The WG ships will fly Singaporean flag, be classed by Germanischer Lloyd and will comply with all relevant rules and regulations, including U.S. Coast Guard requirements. The vessels are smaller than other ships in the Norgas fleet, thus the possibility of transporting cargo on rivers in addition to and coastal trade. The WG carriers are designed to meet charterers\(^5\) demand for all possible combination cargoes of chemicals and gases, and there are no limitations with regards to DWT\(^6\) (Norgas Carriers AS, 2010).

2.2.2.1. The unique features of WG

The WG ships are shorter and wider than Norgas’ other ships. As mentioned by Bård Norberg in an interview “This is mainly because we wanted them to be better fitted for some of the terminals in China and Yangtze River” (see appendix). They are also intended to go on shorter hauls and are designed in a way to optimize and facilitate this. But most importantly they are

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\(^5\) A charterer is the part who either rents a ship, or acquire shipping cargo space during a voyage

\(^6\) Deadweight tonnage
designed to carry both gas and chemicals. With four gas tanks and 11 chemical tanks the three vessels has a capacity of carrying 3800cbm chemical and 5800cbm gas each. This makes the WG vessels flexible and increases the number of products on one keel. The ships do not have heating coil fitted, so they are not able to transport products such as vegetable oil or chemicals that needs heating. Nevertheless, this could be retrofitted at a later stage if the market for transportation of the mentioned oils or chemicals proves to be worth the cost of retrofitting.

Figure 2 - 3D picture of tank and pipe systems onboard the vessels
2.3. Academic concepts and frameworks

After reviewing main theories and frameworks, these are the theoretical frameworks we find most suitable to use in our analysis. In this section we will describe how they add value to the analysis of Norgas. For theory review, please see appendix 1.

2.3.1. External

PESTEL analysis

Through this analysis we will analyze the external environment in the three countries we choose to focus on. Issues identified in a PESTEL analysis will affect Norgas’ overall decision-making regarding countries, ports and markets to focus on. The findings will affect the recommendation of company strategy as opportunities, threats and trends are taken into consideration.

Porter’s five forces

We will be using the Porter’s five forces framework to analyze the industry’s attractiveness. The external environmental factors will be closely examined to see their impact on these forces. This is for the purpose of looking at how these factors affect the industry’s attractiveness. As a result of the interaction between the external environmental factors and the Porters five forces we get a better understanding of the nature of the industry’s environment. This enables us to later recommend how Norgas can respond accordingly.

Consumer purchase decision process

We will use this model to give an understanding of the steps Norgas’ customers go through to purchase their services. Moreover, we will provide key information about the contracts that are used.

Competitor analysis

The competitor analysis will be used to identify main players in the defined industry and to get an understanding of the competitor’s strengths and weaknesses compared to Norgas’. In addition, we will map the competitors to get a visual view of the competitive landscape.
Liability of foreignness

This is a framework used to identify liabilities of foreignness. We will be using this theory to determine differences between the environment in Norgas’ home country, Norway, and the host countries, Asia in general. By operating in a global industry where decentralized organization structures become more and more common, it is important that Norgas is aware of these challenges.

2.3.2. Internal

The VRIN-framework

The VRIN framework will be used to identify the capabilities and resources of Norgas performing as valuable, rare, costly to imitate and non-substitutable. The analysis will also be used to identify the capabilities and resources needed to succeed in this industry with the WG concept. Through this framework, we will be better able to understand the market (customer) and how our service can add value to their operations.

Value chain analysis

This analysis will be used to analyze the primary and support activities within Norgas, which adds value to their service of transportation. Through this analysis, activities that contribute to a competitive advantage and to shareholder value will be identified. Together with the VRIN framework, we will identify activities that can be improved to further its competitive advantage.

Industry value chain analysis

This analysis is carried out to explore the potentiality of business integration and to manage risks associated with partners (in the chain).

The ACE model

The ACE framework is added to our analysis to reflect upon Norgas’ attitudes, competence and embodiment throughout the organization. We will be using this theory to better understand the attitudes towards an international business. The framework will enable us to assess how
well Norgas could manage the liabilities of foreignness, understand the competitive limitations or weaknesses of Norgas when used with the Value Chain analysis, and thereby allow us to suggest ways to implement the strategies successfully.

2.3.3. Strategic

SWOT

The SWOT analysis is used as a tool to sum up the identified internal strength and weaknesses, and the external threats, opportunities and trends. As a result, grand strategies will be recommended with priorities attached to the formulated plan. Wherever appropriate, we compare against competitors to determine if a specific factor is a strength or weakness. Whenever possible, quantitative data will be used to help in our rating of the significance of a strength, weakness, opportunity or threat.

Porter’s generic strategies

Together with the Value Chain analysis, we can ascertain if the type of generic strategies are reflected in Norgas’ activities.

Focus strategy segmentation

The situation we analyze does not include an entrance into a new market with new customers and therefore we will not segment any market. We will use this theory to identify the segment Norgas currently operate in. The niche of their focused differentiated business strategy.

Marketing strategy

Marketing is not commonly used in the shipping industry. However, a marketing mix includes more than only promotion and we will use this theory to explain the current situation of Norgas related to the factors in the marketing mix. The marketing mix will be designed such that it is in line with the business strategy and overall objectives of Norgas.
Research Methodology
3. Research Methodology

Our research will be based on secondary data obtained through Norgas’ sources and databases we have access to. We will also do a primary study through in-depth interviews with people familiar with the industry, the market trends and technology. In addition, we will do a thorough external and internal analysis. With Norgas’ current situation and information obtained through the literature review, we have identified three research questions. Further, we will need to answer these through our research and analysis, in order to guide Norgas on the overall problem.

3.1. Primary and secondary data

Secondary data is data, which has already been primary research for another purpose and is now being reused. “The secondary data, are those which have already been collected by someone else and which have already gone through the statistical process”(Dr. CR Kothari, 2008). Secondary data is considered cheaper and faster to collect than primary data, but will of course need to be tested for validity and reliability.

Primary data is gathered for the sole purpose of a project. “The primary data are those which are collected afresh and for the first time, and this happen to be original in character”(Dr. CR Kothari, 2008). We separate between quantitative and qualitative primary data and the two types have both advantages and disadvantages. When gathering qualitative primary data it can be useful to conduct in-depth interviews. The advantages are that you get individual information, the interviewees are unaffected by peers or a focus group. On the other hand, the disadvantages are that this method often incurs higher costs and that the interviewer could affect the interviewee (Geir Gripsrud, 2010).

3.2. Research Objective

Based on Norgas’ opportunities and challenges in the petrochemical shipping market, together with Norgas’ Vice President of Marketing - Asia, Mr. J. Majumdar, we have developed the following problem definition for the thesis: “How can Norgas succeed with the commercialization of the WG fleet in the North-East Asian region?”
3.3. Research Limitations

In terms of scope, there is a fine balance between the width of the project and the depth of the project. In terms of the geographical area of research we got several pointers from Norgas. The new WG fleet needs to be relatively close to the shipyard in the beginning of their life span in case of any technical issues or reparations. In other words, the vessels should ideally not deviate too much from the Chinese shipyard. Huge demands of petrochemicals come from China because of the large amount of production facilities in the country and the WG fleet is most efficient on short distances. Therefore it will be natural to focus on the close region of China in terms of petrochemical suppliers to China. In co-operation with Norgas we found that the most suitable countries to focus our study on are China, Taiwan and South Korea.

Moreover, we need to limit the scope of petrochemical products. The products we will map the supply and demand of are Ethylene and Benzene, Toluene, Xylene and Styrene Monomer. In addition to ethylene gas, these are the chemicals we call BTX+S and these are the products we will be focusing a part of our study on. The WG vessels are capable of carrying a wide range of products. Keeping the thoroughness in mind we decided to focus on a few chemicals in addition to Norgas’ core business: Ethylene. After a meeting with the chemical experts at Norgas we decided to focus on BTX+S. The reasons were simple; these chemicals are considered “Easy Chemicals” because they have a relatively short and simple cleaning procedure. They are among the most common chemicals and the experts at Norgas knew that there was a substantial trade of these chemicals in the already chosen geographical area.

We had some challenges in retrieving and gathering sufficient numerical data and reports, which where in-depth about projections and forecasts. They were often supplied by information agencies and thus extremely expensive. In addition to the secondary data, we used in-depth interviews to get a basic understanding of the industry, market and the WG concept. We did not have the chance to conduct in-depth interviews outside of Singapore’s borders, but adequate data of high quality was gathered in Singapore, as the country is a huge hub for this industry.
3.4. Research Questions
On the basis of our purpose of study, our literature review and the problem definition we have identified three research questions. These will need to be answered in order to give recommendations upon future strategy. As a result of our literature Review, the research gaps and relating research questions can be identified. The more practical research questions are crafted to provide a close link with our research questions. In answering these research questions, we are then able to confidently provide a robust set of recommendations.

RQ1) How is the supply and demand for Ethylene and BTX+S in China, Taiwan and South Korea, leading to shipping demand?
RQ2) How do the resources and capabilities of Norgas match with those needed to successfully operate a combined fleet?
RQ3) Can the WG concept prove to be a competitive advantage and thus, profitable?

3.5. Design and Data Requirements
To answer our research questions we decided to adopt an exploratory approach. This approach allows us to get a better understanding of the industry and is the best option when having little or no prior knowledge or experience of the industry and market (Geir Gripsrud, 2010). Concerning our first research question it is necessary to do a thorough search for secondary sources of information. Concerning research question two and three the need is for a higher understanding and in-depth knowledge of the combined concept. Therefore we decided to do an adequate number of in-depth interviews with knowledgeable people in this industry. We did not use surveys because we were afraid not to be able to obtain sufficient information, which would not make our research reliable and valid. In addition, we felt the third research question needed a more face-to-face approach, a dialogue, to understand and perfectly interpret the answers. We also felt this was the most secure method for us not to be misunderstood in this complex industry.
3.6. Data Collection

We have used two methods to collect the data sets used in this study, secondary data and primarily data. Our process consists of conducting in-depth interviews with relevant people in the industry and to thoroughly search after reliable sources of secondary data on Internet, in books and in the internal databases of Norgas. Once we acquired adequate knowledge on the petrochemical shipping industry through secondary data, we moved on to focusing on interview objects and the collection of qualitative data. We use secondary data in answering research question one. We use primary data and our analysis to answer research question two and we use the primary data together with obtained knowledge to answer research question three. The discussion of data collected and the conclusion of the research questions will be in the chapter of findings.

3.6.1. Interview Process

We decided early that in-depth interviews were more suitable for our project than surveys. We did not experience major problems finding interviewees. We had some start-up trouble due to us being students in a foreign country without network and relations. However, after receiving guidance from helpful people we managed to get inside the network of Scandinavian expats in this industry in Singapore. This gave us substantial amounts of interview objects. Moreover, this method gave us information that made us perfectly able to answer the third research question. In addition, we received valuable input such as overall knowledge of the industry and basic understandings of issues, which made us more able to complete the whole project.

Two of the interviews were with two people at the same time. We experienced this as highly favorable to the outcome because the persons fulfilled each other when we could not contribute with knowledge. Often the interviewees discussed issues among them, which we gained a lot of knowledge from. The interviews was conducted by two of the group members and the process itself was done by using one as the interviewer and one as transcriber with computer and recorder as tools.
By the fifth interview and with a number of seven people we were, to some extent, getting the same information. This indicated that we had reached our saturation point and we ended the search for new candidates. Eisenhardt (1989) writes this about the closure of in-depth interview data gathering; “Two issues are important in reaching closure: when to stop adding cases, and when to stop iterating between theory and data. In the first, ideally, researchers should stop adding cases when theoretical saturation\(^7\) is reached (Kathleen M. Eisenhardt, 1989).

### 3.7. Evaluation of fieldwork and own method

As a team, which has produced a scientific paper and followed guidelines for research methodology we should be open and honest about what could have been done better in the research process. Even though we believe our method and fieldwork is as good as we possibly could make it, it has some areas of possible improvements. With more time, more resources and increased experience we believe these main criticisms could be dealt with.

<table>
<thead>
<tr>
<th>Primary data fieldwork and method:</th>
<th>Secondary data fieldwork and method:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Interviews only conducted in Singapore</td>
<td>• Reliance upon a few reports</td>
</tr>
<tr>
<td>• Predominance of Scandinavian interviewees</td>
<td>• As it is a volatile industry, forecasts seldom holds up</td>
</tr>
<tr>
<td>• Did not send the written interviews to approval from the interviewees</td>
<td></td>
</tr>
<tr>
<td>• Did not test the Interview guide in advance</td>
<td></td>
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</tbody>
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\(^7\) Theoretical saturation is simply the point at which incremental learning is minimal because there searchers are observing phenomena seen before, Glaser and Strauss, 1967.
4. Analysis
The objective of this chapter is to discuss external and internal factors affecting the shipping industry and the shipping companies. The external analysis will provide an overall broad understanding of the environment of the petrochemical shipping industry. The internal analysis is a more narrow scope where we look into Norgas.

4.1. External analysis
We have analyzed macroeconomic forces in the three countries of focus: China, Taiwan and South Korea. In the external analysis we will also determine the industry’s attractiveness and discuss cultural challenges of operating in a global industry like this. We have decided to focus on the factors that influence the shipping industry the most, and therefore the analysis will consist of a political, economic, environmental and legal overview.

4.1.1. External overview China
4.1.1.1. Political
China has been under single-party leadership for around 60 years. Unlike in democratic countries, the government in China has been able to decide and enforce new political actions without going through debate and negotiation. Partly due to this, China has witnessed high economic growth since the late 1980s. This single-party leadership is one of the main strengths of the political system, but also one of the threats. It has received criticism for suppressing the freedom of speech and also for strict censoring laws. Business Monitor writes; “Despite pressure from the international community, there is still no resolution in sight. In addition, China still lacks a federal structure, which would allow the state to accomplish its goals at a local level. The country still suffers from rampant corruption within the government” (Datamonitor, 2010).

The Communist Party of China, which has been governing China for the past 60 years, remains secure in its position as the country’s sole political party. The Chinese government has wanted to implement high growth policies since the mid 80s, and has thus consistently followed policies that are favorable to trade and conducive to a free-market environment. Business Monitor writes in their report that “In his 2006–2010 five-year plan, Hu Jintao formulated policies to
bridge the gap between rich and poor and encourage uniform and equitable growth” (Datamonitor, 2010). Moreover, China’s relationship with Taiwan remains as a concern in the political landscape. “The relationship between China and Taiwan has been in bad shape for a considerable period of time. Since 1949, there has been no consensus over the boundary dispute between the two countries. Although the US recognized the idea of “one China” in 1979, the dispute still remains unresolved” (Datamonitor, 2010). Taipei and Beijing have seemed to be less satisfied than ever with the situation they are in, since President Chen came to power in Taiwan during 2000. Threats from the president and his government to formally leave China have led to repeated warnings from China, both in verbal form and in military power. The issue has great resonance both domestically and internationally in determining China’s political image. Moreover the prospects of completing every aspect of the free trade agreement with ASEAN (association of South East Asian nations) could be of great importance for the region, and could further give force to China's economic growth.

4.1.1.2. Economic

Economic overview of China:

<table>
<thead>
<tr>
<th>Economic overview of China:</th>
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</tr>
</thead>
<tbody>
<tr>
<td>GDP growth</td>
<td>5.7 trillion USD 2010 est.</td>
</tr>
<tr>
<td>GDP growth in percent</td>
<td>10.3% 2010 est.</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>7400 USD, 2010 est.</td>
</tr>
<tr>
<td>GDP (Purchasing Power Parity)</td>
<td>9.87 trillion USD 2010 est.</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>4.3% 2009 est.</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>5.0% 2010 est.</td>
</tr>
<tr>
<td>Exports</td>
<td>1.5 trillion USD 2010 est.</td>
</tr>
<tr>
<td>Imports</td>
<td>1.3 trillion USD 2010 est.</td>
</tr>
<tr>
<td>Source: (CIA, 2011)</td>
<td></td>
</tr>
</tbody>
</table>

Table 6 - Economic overview China

China is the fastest-growing major economy in the world and is now starting to fulfill the country’s economic potential. In 2010 China became the world’s largest exporter (CIA, 2011), and experts discuss if China already has taken over the role as the biggest economy in the world (Michael Pettis, 2011). Factors that have contributed to the fast growth are an abundance of
resources, a favorable business climate and significant foreign investments. The economy has experienced a rapid growth in the private sector and has now gone from a typical planned-economy to a more market-oriented economy. The growth has lifted millions of people out of poverty, and China is now beginning to create its position in the global arena. But is the growth too much for the country’s own good? Along with the incredible growth, consequences have arisen. Corruption is a major stumbling block along with lax policy implementation, and as a consequence of the major growth, China may experience imbalances and inflation pressure (BMI,2009).

China’s official GDP for the year 2010 was USD 6,0 trillion (Michael Pettis,2011). The agricultural production has a steady growth and the industrial production went up with a substantial increase in economic efficiency of enterprises. Consumption enjoyed rapidly and steady growth and the most popular commodities maintained their high sale. Investments kept a fast growth with an improved investment structure. Urban and rural residents’ income increased and the total value of imports and exports had a fast growth (Ma Jiantang,2011). The current rate of expansion is becoming more unsustainable and Business Monitor predicts a fall in GDP growth to a level below 8 % by 2012. As mentioned the abnormal growth rate may cause big imbalances and a huge inflation pressure (CIA,2011).

The pressure on China to allow an increase in the value of the Renminbi will continue, however the currency is only expected to appreciate slowly against the US dollar in 2011-2015 (The Economist Intelligence Unit,2011). A sustainable growth in consumption is expected because the high levels of job creation and rising wages. The ongoing development and expansion of social services, meaning healthcare, education and pension plans, will support the growth in state spending. However, the country’s fiscal conservatism may act as a brake concerning the public expenditure growth. Massive overinvestment and a frothy housing market are the sources most likely to cause problems. The government proved strong capacity to overcome

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8 The Chinese currency
the financial crisis in 2008-09, but its ability to do so without escalating the problems mention above is less certain (The Economist Intelligence Unit, 2011).

4.1.1.3. Environmental

The sustainable economic growth in China has improved the daily lives of millions of people, but has at the same time given raise to ever-increasing environmental pollution. Major environmental problems such as air pollution, diminishing biodiversity, land degradation, soil erosion and water pollution leads to inefficient use of resources. Another crucial problem China faces is water shortages.

China is one of the world’s largest emitters of greenhouse gases, which consequently makes the air quality poor. The emission is likely to increase further, due to the high consumption of energy, which is projected to increase faster than China’s economic growth. The government has set ambitious goals to deal with the environmental challenges. The government will maintain a cooperative relationship with the Global Environmental Fund (GEF), which provides financial and technological support to help China protect its environment. Furthermore, China has established the State Environmental Protection Administration (SEPA) in cooperation with the World Bank Group that provides loans for environmental projects. SEPA also sets restrictions for industries with large consumptions of resources or a large amount of pollution.

China has accepted the UN Kyoto Protocol on limitations on greenhouse emission. The government has enforced 8 laws and 35 regulations on environmental protection. In addition, 14 laws are applied to the management of natural resources in order to improve the outlook of China’s environmental status. The Chinese president Hu Jintao unveiled China’s first national plan for climate changes during the recent G8 summit. China is committed to reduce energy consumption and increase usage of renewable power. The government is directing special attention towards biogas, nuclear, wind, hydropower and efficiency of coral plants in their environmental policy. Furthermore, China is concerned about the health of their people caused by pollution. However, the government has not set any higher restrictions on greenhouse gas emission growth than the restrictions announced in 2009. “Government’s efforts to set a
carbon intensity for the country’s next five-year plan (2011-15) are likely to speed up, increasingly opportunities for cleaner technologies and raising the possibility of pilot emissions-trading projects” (Datamonitor, 2010).

4.1.1.4. **Legal**

China operates under a civil law system that includes elements of common law. Two decades of different reforms, has resulted in a number of changes in the legal system’s institutions, laws and practices. The legal system today is a nationwide court system compromising 3,000 basic courts and over 200,000 judges. The courts are both local and national and with both general and special jurisdiction. In the reform of 1979, economic courts were established as part of China’s Supreme People’s court. The economic courts got jurisdiction over contract and commercial disputes between Chinese parties such as trade, maritime, intellectual property and insurance. In addition, they got jurisdiction over other business disputes involving foreign parties and various economic crimes such as theft, bribery and tax evasion.

There is also an administrative legal system, which adjudicates more minor criminal cases. China has many local norms and because of this, the overall legislation can be inadequate when laws are interpreted differently. The laws in China tend to be highly general and less specified then the OECD (organization for economic cooperation and development) countries. Although China has ratified the UN convention on the recognition and enforcement of foreign arbitrational awards, the courts usually resolve disputes trough mediation and informal conciliation. Overall, the Chinese judicial system is well organized and apart from some different courts occupying various levels, there are clear procedures of how to resolve different disputes on various issues. A future challenge is the enforcement of Intellectual property rights (IPR) directed towards foreign companies. This might be a problem because the Chinese government wants to secure domestic industries (ICIS, 2011).
### 4.1.1.5. SWOT – analysis China

<table>
<thead>
<tr>
<th>SWOT Analysis China</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengths:</strong></td>
<td><strong>Weaknesses:</strong></td>
</tr>
<tr>
<td>• Government’s focus on equitable growth</td>
<td>• Difficult relationship with Taiwan</td>
</tr>
<tr>
<td>• The growth continually lifts people out of poverty</td>
<td>• The massive growth may cause imbalances and inflation pressure</td>
</tr>
<tr>
<td>• The shift towards a market-oriented economy</td>
<td>• Corruption</td>
</tr>
<tr>
<td>• Rich biodiversity</td>
<td>• Conservatism is slowing the growth</td>
</tr>
<tr>
<td>• Environmental policies in progress</td>
<td>• High pollution levels</td>
</tr>
<tr>
<td>• Well organized legal system</td>
<td>• Water shortage and contamination</td>
</tr>
<tr>
<td><strong>Opportunities:</strong></td>
<td><strong>Threats:</strong></td>
</tr>
<tr>
<td>• Free trade agreement with ACEAN</td>
<td>• Rising corruption, inequality and poverty leading to social unrest</td>
</tr>
<tr>
<td>• The growth becomes broader with increase in domestic consumption</td>
<td>• The growth of China is not sustainable</td>
</tr>
<tr>
<td>• Government facilitates more FDIs</td>
<td>• The appreciation of the Yuan could lead to job losses in China’s export sector</td>
</tr>
<tr>
<td>• Development of renewable energy</td>
<td>• Balance between growth and environmental sustenance</td>
</tr>
<tr>
<td>• Lucrative investment deals</td>
<td>• Greenhouse gas emission and global warming</td>
</tr>
<tr>
<td></td>
<td>• Weak enforcement of IPR</td>
</tr>
</tbody>
</table>

Table 7 SWOT - analysis China
4.1.2. External overview Taiwan

4.1.2.1. Political

Taiwan has grown rapidly and progressed from being an autocratic country under the Nationalists, the Kuomintang (KMT) party in 1949, to a multi-party democracy. By 2000–2001, a process of change was discernible when the KMT lost control of the presidency and the legislature for the first time in Taiwan’s 50-year history. The former opposition, the liberal Democratic Progressive Party (DPP), won the presidency in 2000 and retained control through the 2003 election. However, the party lost to the KMT in the 2008 election (Datamonitor, 2010).

The issue of reunification with China has been and continues to be the predominant issue in domestic politics and international relations. With both the People’s Republic of China (the mainland) and the Republic of China (Taiwan) claiming to be the legitimate authority over Taiwanese land. Frequent tensions between the two are a common event and spreads uncertainty (Datamonitor, 2010). However, the election of Ma Ying-Jeou back in 2008 is expected to bring Taiwan and China closer together. Ma Ying-Jeou has been advocating improved relationship and ties with China, but has promised to the Taiwanese electorate that he will not enter into any negotiations over the country’s political sovereignty. Consequence, it is possible that US’ relations with Taiwan may weaken because of its improved ties with China.

The economic cooperation framework agreement (ECFA) between Taiwan and China, which was signed on June 24 2010, has upset the opposition DPP (Datamonitor, 2010). Even though the trade deal will most likely generate opportunities for economic development, DPP believes that it will increase Taiwan’s dependence on China and decrease the country’s sovereignty. However, the opposition does not hold enough seats to block the deal. The government of Taiwan has remained committed to liberalized economic and social policies. It has also continued with its investment friendly policies. “The asset management industry has been liberalized, with respect to investment in Chinese stocks, and the investment limit for Taiwanese firms in Chinese companies has been increased” (Datamonitor, 2010). Moreover, the social reform policies have been reoriented to balance economic growth and welfare measures. These reforms will further enhance the competitiveness of the Taiwanese economy. Taiwan’s
long-term political prospects are inseparable from its relations with China and while cross-Strait relations have changed in recent years, it is fair to believe that the status quo will largely reign. Therefore, while further economic integration is likely between the two countries, the chance meaningful political convergence is small. Nevertheless, Taiwan is unlikely to regain internationally recognized independence. Business Monitor Online believes that Taiwan will remain in a political no-man’s land – with this being the least bad path for political stability (BMI, 2011).

4.1.2.2. Economic

<table>
<thead>
<tr>
<th>Economic Overview of Taiwan:</th>
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</tr>
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<tbody>
<tr>
<td>GDP growth</td>
<td>427 billion USD 2010 est.</td>
</tr>
<tr>
<td>GDP in percent</td>
<td>8.3% 2010 est.</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>35 100 USD, 2010 est.</td>
</tr>
<tr>
<td>GDP (Purchasing Power Parity)</td>
<td>807 billion USD 2010 est.</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>5.2% 2010 est.</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>1.3% 2010 est.</td>
</tr>
<tr>
<td>Exports</td>
<td>278 billion USD 2010 est.</td>
</tr>
<tr>
<td>Imports</td>
<td>250 billion USD 2010 est.</td>
</tr>
</tbody>
</table>

Source: (CIA, 2011)

Table 8 - Economic overview Taiwan

In the past, Taiwan had an economy based on agriculture and rural life. In other words: the country had an agrarian economy, which was based on sugar and rice. “Taiwan has a dynamic capitalist economy with gradually decreasing government guidance of investment and foreign trade” (CIA, 2011).

Taiwan is one of the Asian Tigers together with Singapore, Hong Kong and South Korea. It is expected that a closer relationship with China will bring new opportunities, but that the domestic demand will continue to be the main driver of the economy and the GDP growth. In comparison to the other fellow Asian Tigers’ economies, which are expected a moderate
expansion; Business Monitor International (BMI) is expecting Taiwan to grow above trend from 2011 to 2020. They predict an average GDP growth of 4.8% during this period, and this is the highest among the Asian Tigers countries. Concerning the GDP per capita, Taiwan is expected to enjoy an average annual growth of 7.7% during 2011 to 2020 and this means outpacing even South Korea. BMI find the key driver of this growth performance to be investments as the island’s improved business- and investment environment will facilitate more foreign investments (CIA, 2011).

Taiwan’s export competitiveness is a foundational strength of the economy and a growth in the export will help to speed up the recovery of the economy after the crisis. However, the heavy dependence on exports makes the economy vulnerable to downturns in the world demand (Datamonitor, 2010) and (CIA, 2011). Although Taiwan is a favorable place to set up a business, corruption is like in China, a dampener and a problem. Taiwan is considered one of the countries with best business environment in Asia. However, the presence of corruption in the government’s legal bodies is high. On the Wall Street Journal’s Index of Economic Freedom in 2010, Taiwan scored only 57 in freedom from corruption, signalizing the presents of corruption (Datamonitor, 2010). Like China and any other country, Taiwan’s economy faces challenges. Taiwan’s diplomatic isolation, the rapidly aging population and the low birth rate are some major future challenges for Taiwan.

4.1.2.3. Environmental

Taiwan has experienced rapid industrialization, which has resulted in substantial environmental damage. Air pollution, water pollution, raw sewage, contamination of drinking water supplies, trade in endangered species and radioactive waste disposal are challenges they now face. The country has a high population in addition to a high motor vehicle density. Almost 70% of the rivers in Taiwan have been contaminated by garbage and only 46% of the garbage produced can be correctly deposited or recycled. Taiwan’s forest has been destroyed by human activities, an area estimated to be more than 35%. The coral cover in the coast areas has decreased by three quarters of the total in a ten-year period.
Taiwan has planned to build their fourth nuclear power plant, but they have not been able to control nuclear waste. This waste is dumped on peripheral islands, which has affected countries like North Korea. Taiwan is located close to China, which has led to some environmental problems, such as dust storms and air pollution emanating overseas. The country also suffers from the high water pollution. Taiwan has established the Environmental Protection Administration (EPA), which generate policies to reduce pollution and waste. The government has also adopted several strategies to achieve a sustainable environmental development, such as promoting the environmental awareness and environmental behavior to protect the atmosphere. The country has been able to improve the air quality to a normal level in many regions, due to environmental law enforcements. Water resources are protected by introduction of public information programs, education and law enforcement. The government has also implemented the National Biodiversity Action Plan to protect wildlife habitats and reserves.

The Legislative Yuan announced a long-term environmental protection, which states that environmental education will become mandatory for Taiwanese schools, businesses and organization from May 2010. The environmental impact assessment (EIA) has been set up to identify, predict and evaluate new projects. The energy research and development, and the new policies will help Taiwan reduce it’s greenhouse gas and CO2 emission and reach other environmental protection goals (Datamonitor, 2010).

4.1.2.4. Legal
The Taiwanese legal system has origins from the European and Japanese legal systems, though most commercial law systems are based on the US legal system. Taiwan is not a member of the New York Convention of 1958 of recognition and enforcement of foreign arbitrage awards. They are however, often involved in disputes regarding foreign parties, which are often enforced by Taiwanese courts on a reciprocal basis. The highest judicial organ is the Judicial Yuan, which is responsible for supervising the administration of the various levels of the courts.
Beneath this are the Supreme Court, the high courts, district courts, the administrative court and the Commission on the Disciplinary Sanctions of Public Functionaries. There is also Council of Grand Justices, which consist of the grand justices of the Judicial Yuan, which interprets the constitution.

Taiwan has one of the best environments for setting up businesses in Asia. The government provides considerable investment incentives for this purpose. Moreover, the government tries to be active in promoting policies, programs and legislation to encourage foreign investment in new technologies and facilitate free and fair competition. Competition policies in Taiwan will be regulated by the government in the future with the intention of securing equality and transparency in governmental contracts and deals. Although some restrictions still remain, the long-term outlook reviles a positive trend for the overall legal system. There will be a focus on enhancing FDIs and becoming one of the countries with lowest risk for business investment (Datamonitor, 2010) and (BMI, 2011).
4.1.2.5. **SWOT – analysis Taiwan**

<table>
<thead>
<tr>
<th><strong>SWOT Analysis Taiwan</strong></th>
<th><strong>Weaknesses:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengths:</strong></td>
<td>• DDP opposed the trade deal with China</td>
</tr>
<tr>
<td></td>
<td>• High dependence on exports = Vulnerable economy</td>
</tr>
<tr>
<td>• Business environment</td>
<td>• Corruption</td>
</tr>
<tr>
<td>• High level of FDIs</td>
<td>• High contamination of water</td>
</tr>
<tr>
<td>• Steady high growth in GDP</td>
<td>• Lack in recycle systems</td>
</tr>
<tr>
<td>• Strong policies for environmental improvements</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Opportunities:</strong></th>
<th><strong>Threats:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Closer relationship with China</td>
<td>• Local companies moving to mainland China</td>
</tr>
<tr>
<td>• Trade agreements with other regional partners are evolving in the near future</td>
<td>• Aging population</td>
</tr>
<tr>
<td>• Increasing FDI</td>
<td>• China’s industrial pollution</td>
</tr>
<tr>
<td>• Environmental education</td>
<td>• Too much governmental control</td>
</tr>
</tbody>
</table>

Table 9 SWOT - analysis Taiwan

4.1.3. **External overview South Korea**

4.1.3.1. **Political**

South Korea has a diverse and troublesome political past, known for frequent changes in government, little, if any, political freedom and several military coups. Data monitor states in the latest report that things have changed. “In 1986 the democratic process was streamlined and the president was vested with maximum power. Due to the centralization of authority, policy-making became straightforward. The president is the chairman of all the committees, who makes it easy to coordinate and run the whole system. The country also has strong political and economic support from the US” ([Datamonitor, 2010](#)).
Although South Korea has been a democracy for over two decades, the military continues to be relatively powerful and of importance for the governing party. There is a high degree of political violence in the country and the relationship with North Korea continues to be unstable and difficult. This is affecting South Korea both economically and politically. Despite frequent meetings and negotiations between the two countries, an agreement has not yet been reached. The military-staged coups in 1961 and 1980 did, and it continues to, influence political decisions and policies. More recently, the constant military threat posed by North Korea means that some military leaders still have considerable influence over the country’s political decisions. The unstable relation with North Korea has an impact on the military influence in South Korean politics, and this is not an ideal situation (Datamonitor, 2010). South Korea has fruitful and strong bonds with many western countries and is as mentioned a close allied to the US. There is however one relationship South Korea does not seem to be able to develop. South Korea has made consistent efforts towards reconciliation with North Korea. However, very aggressive and provocative military actions on behalf of North Korea and its attempt to build and acquire nuclear weapons are a cause for concern. More recent there has been a fair share of incidents between the two countries (Datamonitor, 2010). Despite a brief improvement in relations during the second half of 2009, North Korea remains a major military threat to South Korea.

In the more long term political landscape it is expected that South Korea is to see once again a new push for constitutional change over the coming years in order to address imbalances in the political system that lead to periodic instability. Business Monitor states in their report: “owing to the single term restriction on the presidency, most presidents typically become ”lame ducks” well before departing office, leaving the country in a state of drift” (BMI, 2011).
4.1.3.2. Economic Overview:

<table>
<thead>
<tr>
<th>Economic Overview:</th>
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</thead>
<tbody>
<tr>
<td>GDP growth</td>
<td>986.3 billion USD 2010 est.</td>
</tr>
<tr>
<td>GDP growth in percent</td>
<td>6.1% 2010 est.</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>30,200 USD 2010 est.</td>
</tr>
<tr>
<td>GDP (Purchasing Power Parity)</td>
<td>1.467 trillion USD 2010 est.</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>3.7 % 2010 est.</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>3% 2010 est.</td>
</tr>
<tr>
<td>Exports</td>
<td>466.3 billion USD 2010 est.</td>
</tr>
<tr>
<td>Imports</td>
<td>417.9 billion USD 2010 est.</td>
</tr>
</tbody>
</table>

Source: (CIA, 2011)

Table 10 - Economic overview South Korea

Only four decades ago South Korea’s GDP growth was at the same level as the poorest countries in Africa and Asia. Since the 1960s, the country has achieved an extreme and incredible growth. Today, South Korea is among the 20 largest economies in the world. What made this success possible was a “system of close government and business ties, including direct credit and import restrictions” (CIA, 2011). The government promoted import of technology and raw materials instead of consumer goods. In addition, they strongly encouraged investments and savings over consumption.

Similar to many other Asian economies, South Korea faces challenges in the future concerning a rapidly aging population and an inflexible labor market (CIA, 2011). Like Taiwan, South Korea faces difficulties regarding their overdependence on exports to drive economic growth. The country has had a heavy dependence on international trade and the merchandise exports counted for approximately 40% of the GDP in 2008 (The Economist Intelligence Unit, 2008). As of now, the service sector of the GDP has grown rapidly and is now contributing by more than 50% being the biggest sector in the country. The Korean stock market has had a rapid growth and the government aims for a stock market great enough to support the country’s economic growth.
development. In addition they encourage private owned companies to go public. As a result of the global slump in the economy, the demand both at home and abroad decreased, and because South Korea’s GDP consists of 60% exports, the country is quite dependent on an efficient recovery (Datamonitor, 2010).

South Korea’s central bank, the Bank of Korea (BOK), reports a 6.1% growth in GDP, the highest GDP growth in the last eight years. This facilitates low interest rates and high government expenditures, which will help the country fully recover from the global downturn (BMI, 2011). It is expected that the GDP growth decelerate from 6.1% (in 2010) to an average annual growth of 4.1% in 2011-2015. The Won⁹ is expected to strengthen during this period and the currency is expected to appreciate towards the US dollar. From 2011 to 2015, the domestic demand will increase steadily along with exports to strengthen external demand (The Economist Intelligence Unit, 2008).

4.1.3.3. Environmental

South Korea has experienced an exceptional economic growth, and consequentialy experienced side effects to the environment. Consequences such as highly increased energy consumptions and high pollution level. South Korea’s pollution problems are mainly derived from industries and automobiles, and about 80% of this pollution is produced in urban areas. The government commands efforts in changing the situation and various policies have been implemented to improve environment. The Ministry of environment (MOE) founded the Comprehensive Measures on the Provision of Clean Water to provide clean water and to protect the public health. Restrictions were also created to coordinate national waste management in order to reduce waste and have a greater utilization of waste resources. Many establishments have been set up to deal with environmental awareness. South Korea cooperates on global environmental issues and aims to introduce environmental policies together with partners in the region. The government promotes green development schemes such as introduction of natural gas buses in urban areas. Furthermore, they seek to increase the

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⁹ South Korea’s currency
country’s access to cleaner-burning natural gas and change its overdependence on petroleum. The emission in South Korea is a major problem not only within the country, but also for their surrounding countries such as Taiwan and Japan. In addition, South Korea is affected by industrial emissions from China. South Korea’s President Lee Myung-Bak announced that South Korea would reduce its carbon emissions with 50% by 2050, during the G8 in L’Aquila in July 2009. MOE’s environment management framework will help the country in direction of becoming more environmentally friendly (Datamonitor, 2010).

4.1.3.4. Legal
The South Korean legal system incorporates aspects of English and European civil law. South Korea has a “court organizational act”, which gives the courts general jurisdiction over administrative, civil, electoral, criminal and other major and minor cases. The court system compromises three levels, which consist of district courts. These levels include administrative courts and high courts. They have jurisdiction of rulings and judgments made in the district courts and the Supreme Court. This is the highest juridical and law organ. The Supreme Court has exclusive jurisdiction over the validity of the election of a president or that of a National Assembly member.

South Korea is one of the first countries in Asia, which has implemented a digital information system called CMS (Case management system). This system makes the juridical system more transparent to the general public and interested parties. This system is available in all courthouses in the major cities and is available for access at any times. There are also several decision management systems, property registration systems and public service systems available, which make information available and legal procedures easier. South Korea’s legal system has some weaknesses that have become a matter of concern in the country. One is the lack of juries. The government is now trying to increase participation from the public in the Courts and is making efforts to increase the willingness and awareness to the population. A future risk may be that well-qualified judges quit public job position, due to negative growth in wages and non-attractive incentives. In addition to this, the Law colleges in South Korea have a
low pass rate and very few students pass the exams. If this continues, the country will find it
difficult to recruit new qualified judges in the future (Datamonitor, 2010) and (BMI, 2011).
However, South Korea has a well-established legal system. One advantage is that the courts has
been modeled on the systems in Germany and the US and therefore foreign companies from
western countries have a higher level of understanding and are more open to solving disputes
locally.

4.1.3.5. **SWOT – analysis South Korea**

<table>
<thead>
<tr>
<th>SWOT Analysis South Korea</th>
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<tbody>
<tr>
<td><strong>Strengths:</strong></td>
<td><strong>Weaknesses:</strong></td>
</tr>
<tr>
<td>• Strong foreign relationships</td>
<td>• Aging population</td>
</tr>
<tr>
<td>• Rapid economical growth</td>
<td>• GDP growth is expected to depreciate</td>
</tr>
<tr>
<td>• Growth is service sector</td>
<td>• Limited natural resources</td>
</tr>
<tr>
<td>• Strong governmental intervention to protect the environment</td>
<td>• Absence of juries</td>
</tr>
<tr>
<td>• Legal decision management system</td>
<td></td>
</tr>
<tr>
<td><strong>Opportunities:</strong></td>
<td><strong>Threats:</strong></td>
</tr>
<tr>
<td>• Trade cooperation agreements in the region</td>
<td>• North Korea remains a major threat</td>
</tr>
<tr>
<td>• South Korea’s stock market is becoming strong</td>
<td>• Overdependence on exports</td>
</tr>
<tr>
<td>• High technology development</td>
<td>• Emission level</td>
</tr>
<tr>
<td>• Green strategies</td>
<td>• Judges quitting for private practise</td>
</tr>
<tr>
<td>• Initiatives to reduce emissions</td>
<td></td>
</tr>
<tr>
<td>• CMS development</td>
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Table 11 SWOT - analysis South Korea
4.1.4. The external environments effect on the petrochemical shipping industry

The discussion of macro forces will not add value if we do not discuss their affect on the shipping industry. The information is collected from the PESTEL (in our case PEEL) analysis. Shipping is a highly global industry and its prospects are closely tied to the level of economic activity in the world. A higher level of economic growth will lead to higher consumption and demand for products, which in turn will boost imports and exports. A growth would generally lead to higher demand for industrial raw materials, which is used to fabricate the consumption goods. This leads to a growth in the demand for shipping services of gas and chemicals. Frankly the demand for shipping services is closely correlated with the world’s economic growth. When that is said, there are several macro forces that affect the shipping industry. We have focused on the legal, political and environmental issues, in addition to the economic. The focus is still on China, South Korea and Taiwan.

Political forces

China is regarded as a country highly protective of the country’s production, consumption and trade. The political regulations, posed by the government, can possibly affect the trade in terms of shipping relationship between China and Taiwan. China is expanding the country’s fleet and wishes to do most of the domestic transport with ships sailing under a Chinese flag. Concerning South Korea, the problematic relationship with North Korea is a dampener on the country’s business environment and shipping in this area.

Economic forces

Shipping plays a central role in the global economy and the economy plays a central role in the shipping industry. China, which is one of the largest ship owning countries in the world also have one of the fastest growing economies. China’s petrochemical sector is now the country’s third largest industry and is of great importance to the economy. China has several thousand petrochemical production facilities under construction, which will contribute to an increase in production capacity over the next years. As GDP grow towards US$3000 per capita, the demand for gas and chemicals is expected to grow sharply and therefore, so will the need for shipping of
the products. The rapid globalization facilitates trade agreements and regional relationships, which affects trade patterns. South Korea will continue working on free-trade agreements with their major trading partners like China and The US. Taiwan is in many context’s regarded as part of China. This is because the Republic of China\textsuperscript{10} governs the island of Taiwan and this island makes up over 99\% of Taiwan’s territory. (Wikipedia,2011) The country aims to sign a trade agreement with China and is working on agreements with other countries as well. Overall, the economy of Taiwan is growing above the other Asian Tigers\textsuperscript{11} and along with growth in GDP follows a growth in income and then a demand for goods. Thereafter, the demand for products to fabricate the final products will increase, which means a higher demand for shipping services of gas and chemicals.

\textit{Environmental forces}

Some of the mega-projects planned in China may never see the light of day given current government concerns about environmental damage. The petrochemical industry in China initiates efforts to promote safer and more environmental friendly practices in the manufacturing, distribution and use of the products. Projects have to be approved by the Chinese government through an environmental impact assessment to secure environmental protection. Environmental awareness has been on the rise in Taiwan. This has led to restrictions on planned petrochemical sites in the country. The government plans to turn the country in to a “green silicon high-tech island” by promoting environmental-friendly industries. Therefore projects related to the petrochemical industry have experienced restrictions, delays and demonstrations. The increasing pressure for environmental friendly industries might make it difficult for this industry to grow in Taiwan, and therefore affects the pattern of shipping in the region. Similar to in China and Taiwan, projects in South Korea need to satisfy environmental regulations. New restrictions and regulations are introduced this year and will slow the growth potential to some degree. However, the challenges are common in this industry and the regulations must be faced anyhow.

\textsuperscript{10} Republic of China (commonly known as Taiwan) is the oldest republic survived in East Asia and governs the island of Taiwan.

\textsuperscript{11} The Asian Tigers consist of Singapore, Hong Kong, Taiwan and South Korea.
Legal forces

Regarding the legal forces affecting the petrochemical shipping industry, the major barriers are the regulations in China. The trend is that China facilitates to increase barriers to enter their economy while South Korea and Taiwan attempts to facilitate a more open economy. The two countries have a higher growth in GDP than China, which GDP growth is actually forecasted to decrease, and they are now in the face of facilitating foreign direct investments and trade, which will increase the demand for shipping services. Petrochemical laws of each country regulate which chemicals that are allowed and not allowed in different ports. They also regulate which chemicals it is allowed to import and export, and these limitations of course affect the shipping of petrochemicals.

The catastrophe in Japan

The macro environment constantly changes and the industry is constantly affected by different situations. As an example, the catastrophe that hit Japan in mid March 2011 will affect the petrochemical shipping industry in Asia both negative and positive. In the short-term, the ships that were sailing to Japan needed to be withdrawn and placed at other routes. Most of the ports are on the west side of Japan and therefore not affected by the tsunami, but because of radioactivity many shipments are rearranged and eliminated.

In the long run, Japan is going to need lots of gas and chemicals in order to fabricate products contributing to rebuilding the parts of the country that are destroyed. This will create a huge demand for petrochemicals and therefore a huge demand for petrochemical shipping. Japan will try to produce what they need to rebuild the country, but will probably need more than they have capacity of producing. Japan is the main trade partner of China and is a huge supplier of gas and chemicals to the country. In the close future, China will need to import products from other exporters in the area, as Japan will use what they produce themselves and probably import in addition. This might be Taiwan or Korea and the patterns therefore change as a consequence of a catastrophe like this.
4.1.5. Porter’s Five Forces

Norgas is operating in the petrochemical shipping industry. In this analysis we will focus on the industry where the WG fleet operates, which is the same as Norgas. The industry will therefore be defined as petrochemical shipping.

Threats of new entrants

Any firm will in theory be able to enter or exit a market if the entry barriers are free, but if the entry barriers increase the threat of new entrants is reduced. The shipping industry is characterized by very high cost requirements. Costs such as constructions or purchase of new ships together with operational cost of running the ships are large expenses. Since the cost requirements are defined as high, it is in theory difficult for new competitors to enter. When that is said, many shipping companies lease their ships in order to reduce financial risks. There are many large and dominant players in the shipping industry, which makes it complicated for new entrants without the right capabilities and relationships to capture market share. Due to the high cost requirements, a new player will in most cases be relatively small in comparison to the major players already operating in the market. The competition in the shipping industry is high due to large players with much power and large pools. Advanced technology is a vital factor in this industry, which affects the cost of entering.

Relationships are important in this industry. Network and relations give a rare access to right information, contracts, trends and recent relationships. This makes it even more difficult for new entrants. New companies will struggle to steal customers if the companies are providing the same service. If a competitor or a new entrant provides services that add value to the actual shipping services, a differentiated service, they might be able to steal customers. The switching cost in the industry is considered high due to the close relationships between partners. Close relationships reduce risk and can also reduce cost, because a broker will then not be needed. The shipping industry is regarded as a lucrative industry and profitable industries often attract new entrants. Overall we see a high demand for constant technology improvement, innovation and low-cost carriers. Companies that can offer innovative and cost efficient shipping solutions
will certainly have an advantage. However, the high costs required to enter this industry will overall result in a low threat of new entrants. Already established shipping companies that switch market or create joint ventures we review as a threat. Shipping companies can switch markets to different regions and in terms of cargo. Change of cargo will include cost requirements in terms of the need for new or re-building of vessels and different expertise.

On the basis of this we have identified the threat of new entrants to be **low to medium**. This is due to high cost requirements, the importance of relationships and the large players with much power. Large powerful players that may shift markets or create joint ventures pose the main threat. The macro factors that can affect this force are the political and legal aspect of the industry’s environment. A shift in a country’s political landscape might facilitate new laws and regulations affecting the industry’s entry barriers. A change in governmental positions might also affect the level of domestic subsidies and support and therefore increase the entry barriers and decrease the industry’s attractiveness. Furthermore, a change towards a more open economy with a higher level of foreign competition will decrease entry barriers and increase the threat of new entrants.

**Threats of substitute services**

The main substitutes in this industry are transportation by road (truck transport), railway and pipeline transportation. Some amounts of gas and chemicals are transported by road in tanker trucks. There are several types of trucks where some can be pressurized, some not, some can be insulated and some not. The amounts carried by tanker trucks are however extremely small compared to ships and the method is time consuming. The same goes for rail transport where the ability to carry larger cargoes is possible, but still, the amount is no were near the amounts possible to carry by sea. The rail transportation is used to satisfy domestic demand on shorter distances, and not globally. The largest substitute to shipping as petrochemical transport is pipes. Production units are often localized close to the petrochemical facilities. They are provided with the products through pipes and 95% of all ethylene gas produced in the world is transported through pipelines. The five remaining percentages is the imbalance in production
capacity between downstream and upstream, and this is transported by sea. We have concluded that pipelines are not a complete substitute for shipping, because the two transportation solutions are for different purposes.

From our point of view, none of the above-mentioned transportation methods are a threat to shipping. Barge transport\(^\text{12}\) is a substitute commonly used domestically on the major rivers in China, to move larger cargoes of petrochemicals. Barge transportation is also a short distance transport method, and concerning the smallest ships, this is from our point of view closest to a substitute. How big threat barge transport poses, depends on what ship size is operated and also in which area shipping is conducted. As a conclusion, the substitutes of shipping as a transportation method of gas and chemicals, poses a low threat. It simply costs too much to not transport by sea due to the time it takes and the small cargoes able to move. Barge transportation may pose a threat to firms operating small ships domestically and on rivers in countries where it is common to use barge transport. However, most shipping firms do not have these markets as main focus, and therefore this does not pose a big enough threat to increase the overall threat from low to any higher. In this industry this force is not highly affected by external factors, due to the lack of perfect substitutes.

**Bargaining power of customers**

In this industry, typical customers are large international petrochemical production units in different countries. These producers are often provided with the main supplies from a petrochemical unit close by. When the producer enjoys a higher demand than expected, it will need more petrochemicals. The producer will then use a shipping company to ship an amount of the needed product to the production plant, from another region that had an opposite imbalance.

\(^{12}\) Barge shipping is transportation by a flat bottom boat build mainly for river and canal transportation
In the petrochemical production industry there are both private owned and government owned companies. The larger producers tend to be partially or fully owned by the government. This might make the bargaining power of such a customer high because of large influence from government and large financial resources available. In addition, a big customer like mentioned above, will have a higher bargaining power because they can employ more ships and therefore reduce risk for ship owners. Depending on which strategy the company follows on contracts versus spot market, it is common to bind some shipments on a contract when the market is good. When the market is poor, it is common to do shorter contracts because of risk. Risk in terms of the market increasing in attractiveness. Depending on the availability of ships in the market, the bargaining power of customers fluctuates.

Concerning the gas segment, there are fewer operators and the relationships between the firms are close. In this segment we therefore regard the bargaining power as low to medium because of mutual dependence. In the chemical segment however, there are many suppliers, buyers and transporters. The relationships are not nearly as close as in the gas segment and the segment operates more on the spot than with long-term contracts. In this segment we perceive the bargaining power to be very high, because price is the main attribute that decides which deal to go for. It is common that the bargaining power of customers correlate with the competition in the industry. If the competition is intense, the bargaining power of customers tends to be high. Overall, the bargaining power of customers in the industry of petrochemical shipping is similar to many other industries. When the supply is high, the bargaining power is high, and when the demand is high, the power is low. In other words: if there are many vessels that can carry petrochemicals at the same time, the bargaining power of the customers becomes high and margins are pushed to a minimum. If there are few vessels, the bargaining power of the customers becomes lower; prices increases and so will the margins. We find the bargaining power of customers to be subject to huge variations. Currently we regard the power to be medium, but it will differ over time and between markets.
As mentioned, customers will have a higher bargaining power when there are many suppliers of the needed service. Factors affecting this balance are the economy and environmental restrictions. When the economy is growing the number of production facilities increase and the amount of customers will increase, leaving their bargaining power lower. However, a growth will also facilitate an increase in the amount of companies delivering this service, and therefore the balance will even out. Environmental restrictions will demand a higher awareness for environment from the production facilities, which might affect the establishment of new facilities.

**Bargaining power of suppliers**

Ship owners, which represent the supplier of capital in addition to equipment suppliers and ship builder firms, are the main suppliers in this industry. Ships are often sold to ship owner companies and leased back. The companies who buy the ships are regarded as a supplier of capital and carry the financial risks, while the shipping company who runs the ships carries the operational risks. The suppliers of necessary equipment such as technical support, maintenance, crewing and are a important suppliers in the shipping industry. We see that it is often a surplus of crew and there is also common to have backward integration, in other words the shipping companies own crew management departments. Shipbuilding companies have a high bargaining power when the market outlooks are good, due to the high demand for new ships. Accordingly they have a low bargaining power when they have few ongoing and future planned projects. The market is highly derived and will differ a lot. Therefore we regard the bargaining power of suppliers to be medium.

Similar to the bargaining power of customers, this force is also affected by the amount of suppliers compared to the amount of customers. Macro factors that might affect the number of suppliers in this industry are the economy: if there is need and room for more. And the political and legal factors: if the business environment changes the attractiveness of being a supplier will increases or decreases.
Intensity of rivalry in the industry

The factors analyzed above will affect the intensity of rivalry in the petrochemical shipping industry. As the shipping industry is highly correlated with the world’s economy it will grow when the economy increases. There is a constant economic growth in the world and therefore a growth in demand for shipping services. Competition among companies in the petrochemical shipping industry will follow market fluctuations. If there is a downturn in the industry, shipping companies aims to push profit margins and the rivalry to attain customers becomes high. When the market is in an upturn the rivalry becomes lower, due to the high demand for shipping services. The industry presents high exit barriers because of the resources, mostly financial and technical, needed to operate in the industry. Investments in ships, expertise, contracts and international offices are not something easily withdrawn. There are many companies operating in this industry, but many firms have a diverse service offer. Therefore the direct competition is not intense, but relative and different from company to company. If a company has a diverse service offer they may not perceive the competition as intense, because they have diversified their business. A company, which for example only operates ethylene tankers, might regard this industry as higher in rivalry intensity.

We have concluded that the intensity of rivalry in the petrochemical shipping industry is low to medium depending on the service offer of each company. The exit barriers are high and therefore many companies do not easily exit the industry. However, entry barriers are also high and therefore it is few competitors added to the competition. The industry has a high growth due to the world economic growth. If we take the current macro environment in to consideration, we will regard this industry as attractive. However, like every other industry, the macro environmental factors will constantly change the situation.
Figure 3 - Porters five forces

- Threat of substitute services: Low
- Threat of new entrants: Low to Medium
- Bargaining power of customers: Medium
- Bargaining power of suppliers: Medium
- Intensity of rivalry in the industry: Low to Medium
4.1.6. Competitor analysis

We have identified five companies from where Norgas experiences the fiercest competition. The analysis will not contain any financial data, because we did not locate financial information on all companies, and therefore, a comparison to Norgas will not be relevant.

- J. Lauritzen AS
- GasChem
- Eitzen
- Unigas
- Anthony Veder

J. Lauritzen AS

J. Lauritzen AS (JL) is 100% owned by The Lauritzen Foundation. JL was founded in 1884 and has been the “leading supplier of ocean transport solutions for 125 years” (J.Lauritzen, 2011). JL’s business divisions include Lauritzen Offshore, Lauritzen Bulkers (dry bulk), Lauritzen Kosan and Lauritzen Tankers. It is Kosan and Tankers that operates in the same market as Norgas where Kosan operates with transportation of petrochemical, energy and agriculture products and Tankers operates with transportation of oil products and chemicals. Kosan operates over 40 vessels and has a strong position in Europe, the Mediterranean. Their shipments consist of liquefied gas like LPG and LNG. Kosan opened an office in Shanghai in 2006 and are aiming to increase their share in the Far East market by serving the chemical and oil majors, particularly in China. Moreover, Kosan increased their presence in the Far East market when they received the first of six new gas carriers in November 2010 (J.Lauritzen, 2011). Lauritzen Tankers operates 13 vessels with four major chemicals tankers. Their major operation area is South-America and their shipments consist of various types of crude oils and chemicals. Tankers want to increase their presence in Europe and the Mediterranean, and have ordered 6 new vessels to be delivered within 2013. Both of these subsidiaries of Lauritzen are huge competitors concerning innovation, environmental awareness and technology. Lauritzen recently extended the fleet with a new ship among the industry’s most environmental friendly and technological advanced vessels.
**GasChem Services**

GasChem Services is a German shipping company based in Hamburg. GasChem Services was established in 1990 and manages the fleet from their offices in Hamburg. They provide transportation of olefins, chemical gases and LPG.

“GasChem is a leading fleet operator in the gas tanker market segment between 4.000 and 17.000 cbm capacity” (GasChem, 2011). GasChem has a fleet of 41 tankers and has a mutual pool with the Italian company GasMare, which consists of 33 ships that are suitable for carrying ethylene with a capacity of 255.000 cbm. During 2011 four new tankers will join the fleet. These are ethylene tankers with a capacity of 24.000 cbm. They operate worldwide with the main focus on Europe, the Atlantic and USA. They have currently no vessels with the same features as the WG fleet, but they are the leading company in terms of ethylene capacity (GasChem, 2011).

**Eitzen Group**

Eitzen Group has a strong position in the international shipping market and their wide range of shipping activities provides them with a strong force. Eitzen Group is one of Norgas’ biggest competitors with Eitzen Gas AS and Eitzen Chemical ASA operating the same market. “Eitzen Chemical ASA is one of the largest chemical transportation companies in the world, controlling more than 80 vessels with focus on the segment between 3,500 to 50,000 dwt” (Eitzen Group, 2011). The chemical division of the Eitzen group was established when Tschudi & Eitzen Holding AS acquired the Danish shipping company KIL Shipping A/S in the year 2001. Eitzen Chemical ASA transports organic chemicals, non-organic chemicals, clean and dirty petroleum products, lube oil and vegetable oils. Eitzen’s Chemical fleet consists of coated and stainless steel vessels from 3.500 to 48.000 dwt. They are mainly operating about 20 ships in two pools, from their offices in Denmark, USA, Spain and Singapore. Their future strategy is to strengthen their position as an industrial carrier of chemical products. In addition they are aiming towards a leading position in all the segments they involve in.
Eitzen Gas AS transports LPG and petrochemical gases, and offers logistic solutions globally. Eitzen Gas AS operates a fleet of 30 LPG and Ethylene carriers ranging in capacity from 1,600 to 17,000 cbm. Eitzen Gas AS has entered into an agreement with Solvang ASA to share commercial operation of ethylene carriers in their company ESE Eitzen, where Eitzen is contributing with eight carriers and Solvang with five bigger vessels.

**Unigas**

Unigas is a Dutch company and a member of the Unigas consortium founded in 1969. This pool consists of “Othello shipping company”, “The Schulte group” and “Sloman Neptun Schifffahrts-Aktiengesellschaft”. Unigas operates petrochemical and petroleum gas shipping worldwide. With a total of 29 vessels where 13 are specialized Ethylene tankers Unigas is operating a relatively large, modern and technologically advanced fleet. Unigas’ business plan includes long-term Contracts of Affreightment with some of the major international oil and chemical companies worldwide. They have offices in The Netherlands, Hong Kong and Houston, Texas. Unigas have been awarded for safety and quality on their ships and strives to meet the safety demands from the petrochemical industry at all time. They aim to expand internationally in the future to better fit the petrochemical segment. (Unigas, 2011)

**Anthony Veder Shipping**

Anthony Veder Shipping was established in 1937 and has its base in Rotterdam, which is Europe’s largest port. The firm is dedicated to the shipping of liquefied gas. They are operating in all aspects of gas transportation, including shipping of LPG, LNG, CO2 and petrochemicals. The main transportation is of l-butane, ammonia, ethylene, methane, butadiene, propylene, vinyl chloride and propane. The fleet consists of relatively modern gas carriers with most of them carrying ethylene. From Anthony Veder’s web site we can read that the fleet is of high quality and is constantly renewed in order to meet new regulations and customer preferences. Like most shipping
companies, the company has a strong relationship focus towards their customers. The fleet is trading for huge petrochemical and oil companies and consists of 15 vessels from 3.000 to 7.200 cbm. The company is strongly integrated and has every aspect of shipping management under “one roof”. Everything from a travel agency and crewing to technicians and chartering are all in the same company. We understand Anthony Veder is a huge company with over 40 years of experience in the industry of LPG shipping. “The ships have good cooling capacity and are highly flexible so they can easily change temperature grades”. In addition, the ethylene carriers of Anthony Veder are fast coolers and therefore suitable for shorter voyages.

Over 60 % of the business is petrochemical shipping and consist mainly of propylene and ethylene shipping. The company also ship butadiene. The shipments of propane and butane count for approximately 30% of the business. Anthony Veder built a tanker, which could ship a combination of LNG, petrochemicals and LPG and was the first company to create this kind of combined ship. This is however not the same concept as the WG fleet. Anthony Veder will focus on further developments of the ice class vessels in the future, and continue with a unique mix of LNG/LPG and ethylene shipments. (Anthony Veder, 2011)

Figure 9 - Key players in industry with fleet capacity
The figure above illustrates the forecasted development in cbm from 2011 to 2014. The diagram below shows the actual numbers. As showed Norgas has a substantial capacity compared to the competitors. Only ESE and GasChem have the same capacity.

![World Ethylene Fleet Development 2010-2013](image)

*Figure 10 - World Ethylene fleet development 2010-2013*

**Competitor map**

To get a better understanding of the competitor’s activities and their area of focus, we have created a competitor map where the competitor’s fleet sizes and activity area are identified. We have also included Norgas and the WG fleet. The x-axis shows the fleet size and the y-axis shows the main area of focus. The areas are divided into North East Asia, South East Asia, Europe and the US. We have chosen to exclude the Middle East due several companies currently have main operations there and we would not be able to differentiate the companies on the map. Information of fleet sizes is gathered from the companies’ web pages and the
geographical location of activities are based upon the vessels latest activities shown and their core business explained on their web page. The map will not be perfectly correct, due to every company being highly international and having operations globally. (Marine Traffic, 2011)

4.1.7. Cultural challenges

With five offices located in three different continents it is important to have an in-depth knowledge and understanding of cultural dimensions as it can affect the effectiveness of Norgas. The differences between the home and the host countries’ environment can create a liability of foreignness for Norgas. Norgas need to understand how to best deal with differences between home and host countries/markets. This will facilitate better cooperation between different departments and amongst employees. In Norgas’ case, cultural differences involve differences between the Western culture and the Eastern business culture, as Norgas is a Norwegian company operating in Asia. To be able to identify these cultural differences, we have used cultural theories and a concept called liability of foreignness, as well as information obtained through interviews with Mr. Bård Norberg from I.M. Skaugen and Mr. J. Majumdar.
from Norgas. In addition we have used what we experienced and learned at our excursion to the Wintergas ship: Norgas Pan (see appendix).

Norgas’ shipping services are no longer being operated from Norway. Like so many other shipping companies, operations are moved abroad to international markets. The differences between Norway and Asia can create a liability of foreignness for Norgas. Norgas employ local people for reasons such as lower labour cost and local knowledge. The mix of cultures in both the offices and on board the vessels represents challenges for Norgas. There are of course also opportunities evolving from a cultural diverse organization. Opportunities to learn from each other, to develop cultural understanding and cultural intelligence are examples of positive aspects. But more importantly cultural differences represent challenges, which international companies must deal with. The challenges mainly represent issues in terms of communication and information flow within the company.

Knowledge about culture diversity will help Norgas become more effective and overcome communication difficulties (Geert Hofstede, 2008). Hofstede describes values as the foundation of cultures, and culture as “the collective programming of the mind which distinguishes the members of one human group from another” (Geert Hofstede, 2008). Consequently, Norgas must be able to adapt to local values and norms of behaviour when operating in foreign countries. The liability of foreignness represents three environmental factors that can affect Norgas in Asia; the political landscape, the legal landscape and the social landscape. We will in this analysis focus on the challenges regarding Norgas’ social landscape as the external environmental factors are covered in the PESTEL analysis. Norgas will need to understand how to deal with differences regarding the cultural dimensions, social norms and social practices between Norway and Northeast Asia. Cultural dimensions will help us determine cultural differences between east and west, which Norgas faces. Communication is a vital part of business, but the way we communicate will vary over cultures. Language barriers are the first part that needs attention when a company is doing business in foreign countries. Different languages can make the communication challenging for both parts, although English is the
business language in most of the shipping industry, as well as in Asia where Norgas operate. Norgas has multicultural employees that can handle several languages, which is an advantage for the company. However, speaking a language does not mean you will overcome cross-cultural challenges regarding communication. We have discovered numerous of the areas where most westerners struggle when interacting with Asians, and vice versa.

The context of the communication will differ over cultures. The Westerners tend to have a directly approach and their partners in the East tend to have a low context communication style. People from Asian countries also have a natural way of communicating, while many western countries are expressive. This may cause misinterpretations and challenging situations in communication and information flow between Western and Eastern departments. Furthermore, cultures from the East tend to be more relationship focused, while cultures from the West are often more deal-focused. This means they will start talking business before they think of building relationships. This can be regarded as rude in Asia, where it is essential to build relationship and trust before discussing any deal. Another characteristic that separates the two cultures is the power distance. The power distance tends to be higher in Asia, meaning that employees expects and are comfortable with authority and hierarchical organization structures. We experienced the high power distance during our excursion to the Norgas Pan. It was quite clear that the Captain represents the top of the hierarchy and the employees expect the authority and the formal structure. Moreover, Western organizations tend to have a more flat and egalitarian organization structure, with a lower level of power distance. Western employees will need to observe and adapt to the power distance to retain harmony, which can be a challenge. It can also be challenging for Asians when Western companies like Norgas continue with flat organization structures while operating in their host counties.

Another difference is how business is carried out in the West compared to the East. Business done in Asia tends to be more formal than in the West, and international companies like Norgas will need to consider adapting to local norms and practices when operating in their host countries. Norgas can further overcome all of the mentioned challenges by understanding the
foundation of the differences, adapting to local norms and values, as well as making efforts to increase their knowledge about cultures and cross-cultural behaviour.

4.1.8. Purchase decision process
Norgas is a service provider, more specifically a transporter of petrochemicals. The need for their services appears when there is a deviation between the supply and demand for petrochemicals in countries. The need for either import or export occurs and therefore transportation services like Norgas’ are in demand. Transportation is used to transfer the petrochemicals from the place with high supplies to the place of demand, in this case by sea. Production units are large customers of petrochemical shipping, as petrochemicals are used in their production of a variety of products, such as plastics. Customers will go through a two stage information search; internal and external, to find services which can satisfy their need for transport. A customer will use experience and knowledge in addition to information gathered through colleges, public sources, brokers and reports in the search. The customer will find several companies able to fulfil their transportation need. As mentioned, the petrochemical shipping does not have any direct substitutes, so different methods of transport will not normally be evaluated. Therefore, it is the other shipping companies that constitute the main competition.

In the next stage, the customers will evaluate the objective attributes of the different services, such as price, speed, safety, size, delivery terms, relationship, service and reputation. These criteria form a consumer’s evoked set. Evoked set is “the group of brands that a consumer would consider acceptable from among all the brands in the product class of which he or she is aware of” (San Diego State University, 2011). It is vital that Norgas understand which attributes costumers evaluate and value to be among the customer’s evoked set. Further, the consumers take on the purchase decision, which include whom to buy from, when to buy or in some cases the customers decide not to buy. The decision depends on considerations such as terms of sale and past experience. If attributes such as price and technology are the most important to a customer, and Norgas scores the highest on these attributes among all the competitors, they are most likely to be chosen.
When the transportation of the petrochemicals is completed, the customers will compare the service delivered with their expectations and future experiences. Satisfaction or dissatisfaction affects the consumer’s value perception, the communication and if they are likely to repeat the purchase behaviour. The petrochemical shipping industry tends to be very relationship focused, so it is significant that Norgas contribute with positive post-purchase communications among consumers to build strong relationships. Steps in the consumer purchase decision can be skipped or minimized if Norgas succeed in creating strong relationships. Highly satisfied customers may only perceive one company as part of their evoked set and consequently no other companies will be evaluated. Norgas needs to be aware of these steps, to obtain customers, satisfy their needs and stay competitive through establishing and maintaining a set of loyal customers.

*Contracts*

Norgas operate with long contractual agreements and spot contracts. Costumers will go through the purchase decision process in both cases. Regarding the long contracts, consumers will go through this process before the agreement. In the spot market, customers will find the available services at a specific time and place, value their attributes and furthermore choose the service best matching their needs and preferences. The contracts govern the transportation of goods by ships. These contracts are made by bills of lading or by a charter party. A bill of landing is an acknowledgement issued by a carrier. The bill of landing specifies the goods on board, from where it will be transported and the final destination. The bill of landing serves several purposes: It is an evidence of a valid contract, it is used as a receipt and as a legal document of transfer. A charter party is a lease contract between the ship-owner and their charterer ([Investopedia,2011](#)) and ([BusinessDictionary,2011](#)).
A spot contract is used when someone wants to lease cargo space for a single voyage or to transport a specified cargo from A to B. The freight price for a spot-operation is often higher than a contractual agreement, due to the short-term nature of the contract and the relative smaller lot sizes. The length of the initial agreement decides how many and who, that has to be involved in the actual agreement process. If the proposal is longer than 6 months, the board of directors will get involved and make the decision to pursue or not. This will then be a Long Contractual Agreements and there are two main types of these contracts, which Norgas uses: a time charter and a Contract of Affreightment (COA).

A time-charter is a licensing contract between Norgas and a charterer, where the charterer leases the vessel for a specific time period and for one or more voyages. Norgas maintains rights of possession and control, while the charterer decides upon cargos and directions. The charterer pays for all the operational costs involved like fuel and port costs together with a daily rent to Norgas. A Contract of Affreightment is a contract to rent all or part of the cargo space on series of voyages. When a charterer contracts for only a part of the cargo space, the governing contract is called a space charter. Under a voyage charter, it is customary for the master or the agent to issue a bill of lading to the shipper, who is usually the charterer. However, the voyage charter remains the governing contract. For Norgas, these types of contracts are being created with large customers, usually on a yearly basis.
4.2. Internal analysis
We have analyzed internal factors within Norgas and identified factors that create value in the company. Further we have determined Norgas’ resources and capabilities to create sustainable competitive advantages and the activities, which can and should be improved.

4.2.1. VRIN-Analysis
In this analysis we will look into what resources and capabilities of Norgas that are fulfilling the characteristics of the VRIN analysis. Then we will identify which resources and capabilities that are needed to succeed with the combined concept.

Managing the financial resources (Competitive parity)
Norgas is a fairly small company and their financial resources are limited. But since Norgas is a wholly owned subsidiary of the bigger Norwegian marine transportation company, I.M Skaugen, it has solid financial support, which provides security. From the annual report of 2011 we note that the financial situation of IM. Skaugen, and thereby Norgas, is clearly affected by the financial crisis, but as the CEO states “The aftermath of the financial crisis has started to ease” (I.M. Skaugen SE, 2010) and the outlook for 2011 is optimistic.

The capability of managing the financial resources of Norgas is clearly valuable; they have spent money on new-building programs, which enables them to be competitive in terms of technology and fleet. Moreover, the financial resources has given Norgas the stability needed in troubled times, such as the financial crisis. On the other hand, the financial resources cannot be argued to be very rare in this industry. Managing financial capabilities are neither costly to imitate nor a non-substitutable capability and therefore we have concluded that this capability is a competitive parity for Norgas.

WG fleet (Competitive disadvantage)
The WG fleet is unique and the first of its kind. The flexibility of the WG ships enables Norgas to choose between Ethylene and BTX+S as commercial circumstances dictates, as a sort of hedging. This resource is as of now, not valuable for Norgas as it does not provide profits to the company. However, it facilitates the exploitation of opportunities in the Intra-Asia trade if the
markets picks up. Although the implementation and performance of WG has been slower than expected, it is still expected that this fleet have potential to cater some segments very efficiently. These special types of combined carriers are rare. As stated introductorily, the WG fleet is unique. The WG fleet is not costly to imitate, at least not because of historical reasons, ambiguous causes of capability or of some kind of social complexity. But however, the WG fleet is relatively costly to imitate in financial terms. All shipbuilding requires great amounts of funds and investments. But for the purpose, and based on the definition of Costly-to-imitate from the VRIN framework, the WG fleet is not costly to imitate. The characteristics of the WG fleet make it non-substitutable. There is no strategic equivalent to the advantages of the combined carrier. All in all this makes the WG ships currently a competitive disadvantage, which could potentially move to a competitive advantage over time and by internal development.

**SHE&Q (Temporary competitive advantage)**

Norgas does a whole lot when it comes to systematic efforts to enhance and insure safety, health, environment and quality (SHE&Q) both at sea and on land, and in every part of their organization. To get sound results in SHE&Q, the company has worked very hard to get systems in place for internal reports on data about this subject, and also the company’s proficiency in analyzing and benchmarking. Getting data from the fleet is something that Norgas has worked with for quite some time and they have managed to get sufficient solutions in place. The STAR IPS information system facilitates the reporting from sea to land. In addition to this, IM-Skaugen has in cooperation with a partner, established a training ground for the crew. The University is where they get certifications and training to be able to handle the products, which Norgas carries. Norgas does well compare to their competitors on many levels in terms of SHE&Q. This is clearly a capability that is valuable for Norgas. The fewer the incidents and the more safe the ships, personnel and equipment are, the more money do Norgas save. As SHE&Q director of Norgas Ragnar Rud mentions in an informal interview: Norgas is amongst the best when it comes to the systematic work with gathering data and other elements on SHE&Q. Hence, we find this capability to be rare. Furthermore, this capability is from our point of view not especially costly to imitate and is the resources and reasons behind this capability is not costly.
to implement or acquire. But this capability has no strategic equivalent, hence it is non-substitutable and therefore we conclude with stating that Norgas’ SHE&Q capability is currently a temporary competitive advantage. This could be transformed in to a sustainable competitive advantage if Norgas can make such progress that it would be a capability costly to imitate.

Technology and Innovation capabilities (Sustainable competitive advantage)

Norgas and the mother company IM Skaugen have always been driven by technology and innovation. One example is the technology, which is applied to cool down the liquids to keep the cargoes in liquefied condition. “We see that due to the low heat ingress the vessels can sail without the cargo plant running for long periods of time without getting anywhere close to the maximum pressure (MARVS). Furthermore, the consequence of the efficient cooling is that we can wait until just a couple of days prior to discharge before start-up the reliquefaction plant and cool down of cargo to the desired temperature” (I.M. Skaugen SE, 2010).

Furthermore the report states: “during a typical ethylene export voyage from the GCC (Gulf Cooperation Council) region to South East Asia, the cargo reliquefaction plant can remain shut-down most of the voyage. This gives considerable reduced running hours on the system and consequently reduces both fuel consumption, lubrication oil consumption and spare part consumption” (I.M. Skaugen SE, 2010). “The estimated saving for such a voyage is about 2 ton fuel, which means 63 ton less CO\textsubscript{2} emissions, 1,3 ton less NOx emissions and 1,8 ton less SOx emissions – all in just one voyage!” (I.M. Skaugen SE, 2010). This would of course result in savings in terms of dollars and cents. “A cost saving of about USD 10,000 just on direct fuel cost for the same voyage. In addition, there will be considerable savings over time on lubrication oil and spare parts” (I.M. Skaugen SE, 2010).

All this contributes to the fact that Norgas has the most modern and advanced fleet in the industry. There is no doubt that the capability to innovate and utilize new technology is

\[13\] a solution to liquefy the boil-off gas and return the LNG back to the cargo tanks
valuable for Norgas, as it is for every other company in this industry. The technology leads to
cost effective voyages and improved productivity. This technology is also rather rare, as it is not
many of the competitors that have this level of innovation and technology. It is very costly to
imitate, because of the spirit of innovation that pervades the organization, which is built
through many years of development. Last but not least, Norgas’ ability to innovate and utilize
technology has no strategic equivalent. Therefore, we believe that Innovation and technology
usage is a sustainable competitive advantage for IM Skaugen and for Norgas.

Resources and capabilities needed to succeed with the combined concept

To succeed operating a fleet of vessels with the combined concept technology it is necessary
with “double expertise”. To successfully utilize and operate the WG fleet it is important and
highly necessary to have resources and capabilities within both the gas and the chemical
segment. So what are the resources and capabilities needed to succeed with a combined
vessel? We have identified the resources needed to be:

- Financial resources
- Adequate research prior
- Technological expertise
- Innovation
- Access to information
- Education of crew
- Adequate number of offices abroad
- Correct location of offices
- Quality of crew in terms of service,
  loyalty and trust
- Licensing and certification of crew
- Administration (Operation and
  commercial department)
- Network
- Relationships
- Reputation

Financial resources are important because the needed financial investments in this industry are
high due to the costs such as ships, offices abroad, crew, equipment, support and licensing. We
believe it will be favorable to have access to a research study done prior to the project in order
to regulate the operation after what the market looked like, what the customers wanted and
what the basic opportunity was. It is highly important to have access to information in terms of
how the market changes, where cargoes are moving and the imbalances of gas and chemicals.
In addition, it is important to get information of the development of new production facilities, crackers and new regulations and rules. If the information is not adequate a firm may lose out on opportunities for shipments and may make costly and inefficient decisions.

Regarding crew, it is important to have loyal and trustworthy people with suitable attitudes and education of high quality in the organization. It is a necessity that the crew has the correct licenses in order to work with both gas and chemicals. The rest of the organization has to have a broad understanding of the concept and be in the possession of adequate knowledge to operate and commercialize the combined vessels. In the shipping industry the competition is on software and not hardware. There is close to almost no room for differentiation and the marketing is at a minimum level. The industry demands a high focus on relationships, networks and reputation. In order to succeed with a combined vessel fleet it is necessary to have this in addition to all the above mention resources. To have offices in the market and at the correct geographical places is important. This is not something especially important to succeed with a combined vessel, but is more of a necessity like the licenses and certifications. Offices should be located where the markets are growing and the demand for shipping services is high.

From the resources needed we have identified four necessary capabilities a firm must be in possession of to succeed with operating a combined fleet:

- Financial
- Technological
- Human Resource management
- Customer relationship management

The financial capability includes adequate financials and capital support to invest enough in technology, commercialization, research and human resources to succeed with a combined fleet. Included in the technological capability are the ability to innovate and the access to expertise in both the gas and the chemical segment regarding technical aspects. Human resource management (HRM) includes the education of crew in terms of the firm’s vision, mission and goals, and licensing and certification. In addition, HRM includes the management
and the operation and commercialization department of the firm. Regarding customer relation
management (CRM) it is as mentioned extremely important to have a large network, close
relationships and a proper history in terms of reputation to succeed. In addition, location is
important when managing customers in an industry where relationships are highly valued.

4.2.2. Industry Value Chain and Norgas’ value chain
It is important to have a deep understanding of how Norgas either provides additional value to
customers through their activities, or how Norgas executes the activities to reduce cost and
thereby provide value. Moreover, it is vital to know the general value system surrounding
Norgas. The value chain analysis was first developed with industrial companies in mind, and it is
far easier to do this analysis on firms operating with products compared to companies like
Norgas, which provides services. Nevertheless, we believe it is crucial to know in which
activities the firm is creating value or is reducing cost compared to its competitors. In this value
chain analysis we have chosen to focus on some selected activities where we believe Norgas is
either superior or inferior to its competitors, in other words, we have chosen to omit the
activities, which are viewed as equivalent.

Primary activities
Operations are the actual shipping service itself. Norgas is known for their efficiency and
quality, and is also investing heavily on improving their SHE&Q program. Moreover, a highly
skilled and experienced crew carries out the operations. Being owners of the training facilities,
Norgas can more easily monitor and evaluate the performance and proficiency of their crew.
The marketing and sales of Norgas’ services evolves from contact with previous clients and
current clients. Unlike many other ship owners, Norgas rely on both incoming sales: waiting on
customers to contact them, and outgoing sales. Outgoing sales are conducted through
contacting customers and discuss the developments in the market or their current situation.
Through conversations and relationship building, strong ties are created and sales are hopefully
likely to follow. It seems like Norgas posses a substantial amount of social capital and we view
this as value adding.
The after sales services in this industry, is divided between hardware (vessels) and software (Employees). Hardware is mostly the same in every company, and there is not really much one can do to be different or superior. Due to this, firms are competing on software. Most of the after sale service is done through relationship management. Norgas manages their contacts and relationships very carefully: they share information with each other and build trust. Norgas has allocated resources to a new CRM system, which could potentially lead to a better after sales service. However, this system is not in use yet. This will be discussed more thoroughly in our recommendation section.

**Support activities**

Regarding Human resource management, IM Skaugen owns a training center in Wuhan, China. The Wuhan University provides key training for future and present crewmembers. This university gives the crew a possibility to earn certificates needed as crew when the ship is carrying petrochemicals and gas. In terms of developing executives and managers, IM Skaugen is involved in the Maritime Trainee program in Norway, which intends to give recently graduated students an opportunity to learn and practice their skills in Maritime companies. We believe that HR management is something, which could potentially be one of the activities where Norgas could improve to make this activity superior compared to their competitors.

Concerning the firm infrastructure, the Norgas Vessel System (NSV) gives office employees and coordinators information of the ships’ total contribution per day and also information regarding bunker cost and remaining bunker. The system reports on discrepancies automatically and provides reports to the master or coordinator. This system is developed especially for Norgas, but has also been sold to other companies in the past years. Nevertheless, we believe that because this system was made especially for Norgas, it should suit Norgas best and therefore create greater value for Norgas, and furthermore their customers.

The technological development in the petrochemical shipping industry in general and in Norgas specifically is focused and invested heavily in. IM Skaugen employs Business developers, which
continuously work with innovation and development of the company’s hardware and thereby their service quality. We strongly believe that the activities that are being carried out in this part of the value chain are superior for Norgas.

Procurement is the activities completed to purchase inputs that are fully consumed during the manufacture of products including fixed assets. Norgas has a new IT system from SiSmarine, which has made the cost and time spent on procure to decrease. The procurement for Norgas is providing the ships and the hardware that makes the operations possible. Norgas enjoys value added from the integrated shipbuilding through Skaugen Marine Construction (SMC). SMC has developed an unconventional set-up for new-building projects. The concept is based on shipbuilding by subcontracting, meaning management of qualified subcontractors to build customized and specialized ships more cost effectively compared with the “standard” method of designing, ordering and taking delivering of ships from established shipyards. Thus, their slogan – SMC – Ships More Competitive.

4.2.2.1. Industry value chain

To better be able to analyze Norgas, it is imperative to think through where Norgas actually fits in, in the industry’s value system. Norgas’ Value chain is part of a larger system that includes the value chains of upstream suppliers and downstream channels and customers. To understand where Norgas fits in, we need to explain the petrochemical cycle.

Crude oil has to be altered before it can be used for anything. This happens in an oil refinery. A refinery takes the raw material (crude oil) and transforms it into petrol and several other useful products. A typical large refinery costs billions of dollars to build and millions more to run and upgrade. It runs around the clock, 365 days a year, employs hundreds of people and occupies as much land as several hundred football fields. Petrochemicals are chemicals made from petroleum and natural gas. When transporting gas, you liquefy it first. Liquids occupy several hundred times less space than gases and make transportation feasible. Liquefied petroleum gas carriers are one of the most specialized tankers trading the high seas. These vessels, like the Norgas vessels, have very specific cargo handling and cargo containment systems.
For most of Norgas’ customers, the shipping service becomes inbound logistics, because the petrochemical company receives the Ethylene or BTX+S chemicals for further processing and refining. On the other hand a Norgas service becomes outbound logistics for a company, which is selling the Ethylene or BTX+S chemicals. This might be the same company and the transportation is just for transporting between downstream plants and upstream plants.

4.2.3. ACE-model

In an international business it is important that the management and the employees possess a “right” set of attitudes towards export. These attitudes strongly affect the activities and the decisions made by the company. The important attitudes we have analyzed are market orientation and attitudes towards other cultures. The construction of the WG fleet was initiated as a due course to a potential untapped demand in the petrochemical industry: the ability of shipping both gases and chemicals all at the same time and keel. Having successfully designed and launched such a fleet, Norgas is today in the possession of something rare.

Globalization makes the world flatter and more similar. However, cultural differences still plays a big role and represents challenges for any international company. Norgas is in possession of important cultural knowledge, which they have gained through doing business in the Middle-East region, the larger Asian region and in the US. Norgas has also managed to successfully established and run new offices in China during recent years. Culture should however always be an area of focus, even though the company is regarded as highly international. Through formal and informal talks with employees at Norgas, we have understood that the Norwegians are perceived to be more direct, while the Asians tend to be more indirect and less expressive. Like in many other companies operating a Western company in Asia, these are common challenges that might cause problems such as slow information flow and communication across departments. In our external analysis we identified the liabilities of foreignness. We discovered that communicational differences between the home and the host countries could create a liability of foreignness for Norgas. To successfully approach this challenge Norgas will need to understand how to deal with the differences between home and host countries/markets and
the attitudes towards this is therefore important. Currently there is no cultural education, the employees learn through working together. But to hinder cultural differences potentially to cause problems, it might be favourable to conduct some cultural education within the company. This should facilitate better cooperation between different departments and employees, and should also benefit the organizational structure of Norgas as a whole.

According to Solberg (Carl Arthur Solberg, 2009), successful exporters tend to “follow the textbook” to a much higher extend than unsuccessful exporters. Hence, putting more emphasis on creating new, and more appropriate international strategies when entering new foreign markets is of great importance. Regarding Norgas’ ability to operate internationally in terms of the mentioned attitude issues, it seems that Norgas has benefitted from their previous experience when entering new and foreign markets. This is particularly in terms of gas transportation, which they are considered as one of the market leaders in their main market. Norgas has throughout its period as a leading integrated shipping company, placed a lot of emphasis on innovation and technology. This has made it possible for Norgas to create and construct vessels that possess unique features compared to similar offerings in the new market. The features of the WG fleet are more advanced than those of regular ethylene gas carriers. However, even though the company is considered to be one of the leading gas shipping companies in their main market, they still lack valuable experience and knowledge regarding the transportation of chemicals. The company is aware of this and is emphasizing improvements. In order for Norgas and the WG fleet to succeed, this issue must definitely be improved.

Even though the general level of management and employees in a business possess the “right” attitudes and competence, this will not benefit the international business as a whole unless the whole organization has the right focus towards export. This especially applies to the top management, but is also important throughout every level of the organization. Therefore, Norgas must ensure that their organizational structure is streamlined, so that the international strategy is embodied in the organization and successfully implemented. With a decentralized
structure like Norgas’, the embodiment and streamline may be difficult and might cause challenges. Therefore, we believe awareness is key. Norgas currently controls this issue to a certain degree by stationing many of the employees in certain positions at their offices in Houston, Bahrain, Singapore and China. But as mentioned, other measures could and might be favorable to implement.

**4.3. SWOT analysis**

Through the internal analysis and the primary research we have identified the internal strengths and weaknesses of Norgas. Furthermore, the external factors, the opportunities and threats, were identified in our external analysis and through our secondary research. The sum up is showed in the table below.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Advanced technology and young fleet</td>
<td>• Lack of knowledge and experience (chemical market)</td>
</tr>
<tr>
<td>• Knowledge and experience (gas market)</td>
<td>• Lack of solid relationships (chemical market)</td>
</tr>
<tr>
<td>• Strategic relations (gas market)</td>
<td>• Weak brand name (chemical market)</td>
</tr>
<tr>
<td>• Strong brand name (gas market)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Growing market</td>
<td>• Slow SPOT market in chemicals</td>
</tr>
<tr>
<td>• New trade agreements</td>
<td>• North East Asian low cost carriers</td>
</tr>
<tr>
<td>• Developments in shipping innovation</td>
<td>• Environmental restrictions</td>
</tr>
<tr>
<td></td>
<td>• Crude oil prices</td>
</tr>
</tbody>
</table>

**Figure 11 - SWOT - Norgas**

Similar to other shipping companies, Norgas depends on new and advanced technology, to be able to meet the increasing demand for shipping services and for high-tech vessels, equipment
and quality. Norgas’ fleet is regarded as young and the average age is only eight years. Due to this and their technological and innovative abilities, the fleet possesses advanced technology, which is a competitive advantage.

<table>
<thead>
<tr>
<th>Company</th>
<th>Number of vessels</th>
<th>Average building year</th>
<th>Average age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norgas</td>
<td>21</td>
<td>2003</td>
<td>8</td>
</tr>
<tr>
<td>Eitzen Chemical and ESE</td>
<td>98</td>
<td>2003</td>
<td>8</td>
</tr>
<tr>
<td>A. Veder</td>
<td>16</td>
<td>2000</td>
<td>11</td>
</tr>
<tr>
<td>GasChem</td>
<td>46</td>
<td>2001</td>
<td>10</td>
</tr>
<tr>
<td>Unigas</td>
<td>28</td>
<td>1997</td>
<td>14</td>
</tr>
<tr>
<td>J. Lauritzen Kosan</td>
<td>42</td>
<td>2001</td>
<td>10</td>
</tr>
</tbody>
</table>

Figure 12 – Average fleet age

Norgas has developed an extensive network during their 29 years in this field, and many valuable strategic partnerships have evolved. The partnership with SABIC is one example and these relations are highly valuable in this industry and has strengthen Norgas’ name. Norgas has been able to create competitive advantages, which has given rise to sustainable incomes.

Norgas has established a good position in global transportation of gases, but experience a lack of knowledge in the chemical markets. The WG fleet’s purpose is to carry both gases and chemicals, which means Norgas will have to acquire essential knowledge as they want to succeed with their operations in the chemicals market as well. Norgas will need to develop strategic relationships in this market as the rivalry among competitors is defined as higher than the gas market. Norgas is currently associated with gas transportation and will consequently need to create a strong brand name in the chemical market, as in their existing gas market.

The economic growth in the Asian region, and in particular China’s growth, is resulting in an immense growth in the demand for plastic and end products of Ethylene and BTX+S. This will, as mentioned, impact the demand for petrochemical shipping services. Moreover, the possibility of new trade agreements between countries will serves as an opportunity for Norgas. The trade between two countries will rise dramatically if import taxes or other trade barriers are removed in the event of new trade agreement. Lastly we believe the constant
developments in petrochemical shipping innovation serves as a great opportunity for Norgas. The possibility to leverage on the technical developments enabling the ships to function more efficiently, thus saving costs is something that Norgas will be sure to explore in the coming years. The business developers are determined to find new and improved solutions for issues like insulation and reliquiefying.

We consider the spot market in chemicals to be a threat, because of the small lot sizes that are in the market along with the price, which actually hinders the margins of freight to be fairly profitable. This forces the shipping companies to look for more contracted agreements and therefore forces them out of the spot market. The North East Asian low cost carriers pose a substantial threat to Norgas’ operations. The low cost carriers rarely emphasize safety and environmental issues as much as the Western ship owners and the extra cost that the latter occur, affects the margin.

Also, environmental focus and the fact that ships do pollute the environment with SOx and NOx emissions could potentially lead to restrictions or policies (International Maritime Organization, 2000). Lastly, we strongly believe that the increasing oil prices and thus, bunker prices, can pose a threat to Norgas and all other shipping companies. The market rate does not respond to the bunker changes in the adequate manner and leaves the margins thinner and thinner.

4.3.1. Weighted SWOT

We will be using a weighted SWOT as a tool to convert qualitative elements of Norgas’ strengths, weaknesses, opportunities and threats over to quantitative, comparable numbers. As an explanation: the total score consists of the different elements we have identified under each of the four aspects of SWOT, multiplied with the relative importance of the element, and then added up to find an overall score for Norgas. The relative importance of the different elements is determined through looking at the key success factors of the industry and the purpose of the Wintergas fleet.
The radar diagram illustrates that when we quantify the SWOT elements and displaying them in a diagram, the square with the most covered area is the quadrant of Weaknesses and Opportunities. This means that Norgas must take some corrective measures in order to succeed with the WG fleet. In terms of strategy, the proposed should contain elements of a turnaround strategy\textsuperscript{14}. We will in our recommendation chapter present some measures that could, if implemented properly, lead to the transformation of the weaknesses into strengths.

\textsuperscript{14} We define “turnaround” as a rapid change of corporate strategy that is needed to deal with issues such as falling profitability, lower return on investment or loss of market share. These issues result from sudden changes in demands from the external marketplace, be it competitors, suppliers or customers. (http://www.western-consultants.co.uk/expertise/12/)
In other words, based on Norgas’ SWOT, we believe they should aim to transform their weaknesses into strengths to be able to take advantage of the identified opportunities. This in turn could lead to a reduction of the threats that Norgas is facing.
5. Findings
In this chapter we will present the findings from our research conducted to answer the research questions. Information to answer RQ1 is gathered through secondary data search, while the information to answer RQ2 and RQ3 is collected through our primary data research and obtained through interviews.

5.1. RQ 1
“What is the supply and demand for ethylene and BTX+S in China, Taiwan and South Korea, leading to shipping demand?” To answer this research question we have used secondary data, reports and databases.

5.1.1. China
Market overview
The petrochemical market in China has grown rapidly over the last decade and has become the country’s third largest industry behind machinery and textiles. China is the world’s leading synthetic fibers producer, ranking fourth in terms of synthetic rubber and third in ethylene production worldwide. China’s government plans to expand the industry even more due to the enormous growth in domestic demand of petrochemicals, and several projects of new petrochemical production facilities are under construction. This will increase the total production capacity, and is expected to make China the world’s second largest producer of petrochemical products after the United States of America. China has been successful in obtaining a considerable scale in the developments of their five-year plans. These five-year plans are made to secure that the production capacity match the current and forecasted supply and demand, and are also one of the main reasons for the rapid petrochemical growth in China. The five-year plans form the strategic development and planning process for the entire industry, and decides which efforts that will take place in the next years (Stephen J. Orava, 2011) and (ICIS, 2011).

Production
The petrochemical industry in China is as mentioned growing rapidly, but is also faces several challenges. This rapid growth has resulted in imbalances in the petrochemical sector’s industrial
structure, particularly relating to the supply of raw material. This can eventually lead to a reduced incentive to increase production in an economy that is already unable to meet its domestic demand from the local market. The Chinese government is therefore trying to stabilize production, and advance the competitiveness at a global level by implementing measures to optimize the industrial structure of the petrochemical industry. The government is also promoting foreign direct investment in the industry and tries to regulate the economic sector in the petrochemical industry (ICIS, 2011).

Supply
The ports that we have chosen to focus on in China are Shanghai and Ningbo (middle-east coast), Tianjin and Fushun (north-east coast), and Guangdong, Fujian and Tsingtao (south-east coast). This is done in order to display the spread in capacity in the production of petrochemicals in China (Asia Tradehub, 2011).

Ethylene: China is the world’s second largest Ethylene producer with a capacity of 16,260mn tpa (2010). This capacity is expected to increase to 25.700mn tpa by 2015.

<table>
<thead>
<tr>
<th>Total Capacity:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Guangdong:</td>
<td>1.000.000tpa</td>
</tr>
<tr>
<td>Shanghai:</td>
<td>1.000.000tpa</td>
</tr>
<tr>
<td>Nanjing:</td>
<td>150.000tpa</td>
</tr>
<tr>
<td>Jinshan</td>
<td>1.300.000tpa</td>
</tr>
<tr>
<td>Other:</td>
<td>12.810.000tpa</td>
</tr>
<tr>
<td>= Total Capacity:</td>
<td>16.260.000tpa</td>
</tr>
</tbody>
</table>

Adapted from: (ICIS, 2011)
Table 12 - Ethylene capacity China

Benzene: China has over 50 production facilities of pure Benzene. The Benzene capacity was 7.46mn tpa in 2009, while the demand consisted of 4.5mtpa.
Table 13 - Benzene capacity China

<table>
<thead>
<tr>
<th>Total Capacity:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shanghai:</td>
<td>260.000tpa</td>
</tr>
<tr>
<td>Jinshan:</td>
<td>260.000tpa</td>
</tr>
<tr>
<td>Xinjiang:</td>
<td>240.000tpa</td>
</tr>
<tr>
<td>Other:</td>
<td>6.700.000tpa</td>
</tr>
<tr>
<td>= Total Capacity:</td>
<td>7.460.000tpa</td>
</tr>
</tbody>
</table>

Adapted from: [AllBusiness, 2011]

Toluene: China’s total capacity of Toluene was 6m tpa in 2009, while demand consisted of 4.23mn tpa.

Table 14 - Toluene capacity China

<table>
<thead>
<tr>
<th>Total Capacity:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Other:</td>
<td>6.000.000tpa</td>
</tr>
<tr>
<td>= Total Capacity:</td>
<td>6.000.000tpa</td>
</tr>
</tbody>
</table>

Adapted from: [AllBusiness, 2011, ICIS, 2011]

Xylene: Unfortunately we were unable to retrieve information concerning the total capacity of Xylene in China. However, we were able to identify several projects in China initiated to increase the capacity of Xylene. These are: Sinopec Shanghai (600.000tpa), Petro China (1.000.000tpa), and Tenglong Aromatic Hydrocarbon Company (800.000tpa).

Styrene Monomer: By 2006, Chinese Styrene Monomer (SM) demand exceeded domestic production by 200%, despite large-scale expansions in capacity. The deficit was made up by imports from Japan (37%), South Korea (32%), Saudi Arabia (8%), the US (8%) and Singapore (6%). China’s total capacity of SM was 2mn. tpa in 2009.
Future petrochemical demand will be led by the transport, automotive and construction sectors, while agricultural development would increase sales of chemical fertilizers, pesticide and plastic sheeting. During China’s 11th five-year plan (2006-2011) the focus has been the Ethylene feedstock prices because of the massive demand for petrochemicals in the Chinese textile market. The 12th five-year plan on the other hand (2011-2016) indicates that the major focus will be on the agriculture industry by producing value-added goods that include fertilizers, pesticides, paints and dyes etc. The plan is also reported to call for more Olefin projects and the production of Ethylene with more diversified input materials.

As a due course to the extreme Chinese petrochemical demand, China is so far not able to cover all of this demand, and is therefore still reliant upon the import of petrochemicals. According to BMI’s recent report, China’s annual Poly Ethylene demand is expected to grow by 8-9% in 2010 and 2011. Still, considering the new five years plan which includes new capacity, the imports of Polyethylene is expected to be reduced by up to 14% from the 7.4mn tons imported in 2009.

Upcoming Projects
South Korea Energy Corporation (SK Energy) confirmed in 2008 that they would participate in a Joint Venture with Sinopec on a cracker and derivate complex at Wuhan. SK Energy will have a 35% stake. The complex will cost US$960mn, with the overall cost of the cracker and derivatives complex estimated at about US$2.2bn. Construction on the cracker began in late 2007 and is expected to start production in 2011. In January 2010, Lummus Technology was awarded a contract by PetroChina’s partner “Jilin Petrochemical” for the license of an Ethylbenzene and Styrene Monomer production facility at Jilin. The facility will have capacity for 320,000tpa.
Styrene and use proprietary technologies provided by Lummus in cooperation with UOP. The plant is expected to start productions in 2011 (ICIS, 2011).

5.1.2. Taiwan

Market Overview
The petrochemical industry in Taiwan is large, although China is the major player in this region. Taiwan has experienced revived domestic consumption of petrochemical, and to be able to meet this demand, Taiwan is in the process of increasing its petrochemical capacity and take advantage of export opportunities. As of today, Taiwan is the 9th largest producer of Ethylene worldwide. Taiwan’s economic development is relying on the petrochemical industry in the country. The country has established a structured economy, with advanced infrastructure and relatively low long-term risks. This strengthens Taiwan position when competing with large markets like China. Taiwan has a well-developed supply chain with marketing channels worldwide, which makes the country a significant participant in global markets. ChiMei, Nan Ya Plastics, the Formosa Plastics Corporation (FPC), Dahin and Lee Chang Yung Chemical are examples of leading companies in Taiwan that are becoming visible on the global arena. The nation does not face any problems locating buyers for their petrochemical products, as they are very competitive. Nevertheless, Taiwan’s dependency of the Chinese market is vital. Local producers of petrochemicals are advised to diversify their markets for being able to minimize risks of overdependence on export to the Chinese market (BMI, 2011).

Production Supply
Taiwan’s production of Ethylene and BTX + S is produced mainly in two locations, Lin Yuan and Mailiao. Lin Yuan is located southeast in Taiwan, while Mailiao is located in the middle of the country’s east coast.

Ethylene: Taiwan is the 9th largest producer of Ethylene in the world with a total capacity of 4.105.000tpa in 2010. The future outlook for Ethylene production in Taiwan is expected to be 6.145.000tpa in 2015. The total production per anno roots from the following facilities:
**Ethylene capacity Taiwan**

<table>
<thead>
<tr>
<th>Total Capacity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lin Yuan:</td>
</tr>
<tr>
<td>1.170.000tpa</td>
</tr>
<tr>
<td>Mailiao:</td>
</tr>
<tr>
<td>2.935.000tpa</td>
</tr>
<tr>
<td>= Total Capacity:</td>
</tr>
<tr>
<td>4.105.000tpa</td>
</tr>
</tbody>
</table>

Adapted from: [BMI, 2011]

**Benzene**: Taiwan is a large producer of Benzene with a production capacity of 1.370.000tpa in 2010. The capacity is expected to increase to 2.110.000tpa in 2015. The total production per annum roots from the following facilities:

<table>
<thead>
<tr>
<th>Total Capacity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lin Yuan:</td>
</tr>
<tr>
<td>210.000tpa</td>
</tr>
<tr>
<td>Mailiao:</td>
</tr>
<tr>
<td>1.160.000tpa</td>
</tr>
<tr>
<td>= Total Capacity:</td>
</tr>
<tr>
<td>1.370.000tpa</td>
</tr>
</tbody>
</table>

Adapted from: [BMI, 2011]

**Toluene**: Taiwan’s total production capacity of Toluene was 995.000tpa in 2010. The total production per annum roots from the following facilities:

<table>
<thead>
<tr>
<th>Total Capacity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lin Yuan:</td>
</tr>
<tr>
<td>445.000tpa</td>
</tr>
<tr>
<td>Mailiao:</td>
</tr>
<tr>
<td>510.000tpa</td>
</tr>
<tr>
<td>= Total Capacity:</td>
</tr>
<tr>
<td>995.000tpa</td>
</tr>
</tbody>
</table>

Adapted from: [BMI, 2011]

**Xylene**: Taiwan’s production capacity of Xylene was 2.430.000tpa in 2010, and the production is expected to grow to 3.300.000tpa in 2015. The total production per annum roots from the following facilities:

<table>
<thead>
<tr>
<th>Total Capacity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lin Yuan:</td>
</tr>
<tr>
<td>800.000tpa</td>
</tr>
<tr>
<td>Mailiao:</td>
</tr>
<tr>
<td>1.630.000tpa</td>
</tr>
<tr>
<td>= Total Capacity:</td>
</tr>
<tr>
<td>2.430.000tpa</td>
</tr>
</tbody>
</table>

Adapted from: [BMI, 2011]

**Styrene Monomer**: Taiwan’s production capacity of Styrene Monomer was 1.120.000tpa in 2010, and is expected to grow to 1.930.000tpa in 2015. The total production per annum roots from the following facility:
Production Demand

Taiwan provides both domestic and world markets. Due to Taiwan’s small size, the country’s economy is highly dependent on trade and external demand conditions. Taiwan exports more than 40% of their petrochemical production, where the majority of these petrochemicals are exported to China. The Chinese market is growing rapidly with increased demand for petrochemicals, but still, Taiwan’s petrochemical industry will be highly affected by increased crude oil prices and a fast increase in global petrochemical capacities. However, the Economic Cooperation Framework Agreement\(^\text{15}\) (ECFA) is likely to be launch in 2011. The program has a three year plan, by the first year tariffs will be reduced from 15% to 10%, reduced to 5% in year two and create a tariff-free entry to the Chinese market in year three. Moreover, domestic and regional demand is expected to grow over time, and will require substantial capacity of either domestically produced or imported Olefins like Ethylene (BMI, 2011).

### Table 20 - Styrene capacity Taiwan

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailiao</td>
<td>1.120.000tpa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>= Total Capacity:</td>
<td>2.430.000tpa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adapted from: [BMI, 2011]

### Table 21 - Demand for Ethylene Taiwan

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene</td>
<td>Production</td>
<td>3,665,950</td>
<td>3,622,636</td>
<td>3,851,877</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td>423,360</td>
<td>342,306</td>
<td>296,296</td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td>8,987</td>
<td>14,330</td>
<td>143,676</td>
</tr>
<tr>
<td></td>
<td>Demand</td>
<td>4,080,323</td>
<td>3,950,612</td>
<td>4,004,497</td>
</tr>
</tbody>
</table>

Adapted From: [APIC, 2011]

### Table 22 - Demand for Benzene Taiwan

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>Production</td>
<td>1,605,683</td>
<td>1,550,229</td>
<td>1,557,693</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td>678,285</td>
<td>427,613</td>
<td>672,382</td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td>na</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td></td>
<td>Demand</td>
<td>2,283,968</td>
<td>1,977,842</td>
<td>2,230,005</td>
</tr>
</tbody>
</table>

Adapted from: [APIC, 2011]

\(^{15}\) An intellectual property protection between China and Taiwan with the purpose of reducing tariffs on featured products.
**Demand = Production + Import – Export**

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Toluene</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td>35,825</td>
<td>15,562</td>
<td>39,025</td>
<td>151%</td>
</tr>
<tr>
<td>Import</td>
<td>340,782</td>
<td>264,629</td>
<td>143,620</td>
<td>-45.7%</td>
</tr>
<tr>
<td>Export</td>
<td>11,717</td>
<td>9,967</td>
<td>17,443</td>
<td>75%</td>
</tr>
<tr>
<td>Demand</td>
<td>364,890</td>
<td>270,214</td>
<td>165,202</td>
<td>-28.9%</td>
</tr>
</tbody>
</table>

Adapted from: (APIC, 2011)

Table 23 - Demand for Toluene Taiwan

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Xylene</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td>2,368,172</td>
<td>2,463,990</td>
<td>2,460,628</td>
<td>-0.14%</td>
</tr>
<tr>
<td>Import</td>
<td>1,366,745</td>
<td>1,131,851</td>
<td>1,388,878</td>
<td>22.7%</td>
</tr>
<tr>
<td>Export</td>
<td>352,809</td>
<td>818,289</td>
<td>694,967</td>
<td>-15.1%</td>
</tr>
<tr>
<td>Demand</td>
<td>3,821,108</td>
<td>2,777,552</td>
<td>3,154,539</td>
<td>13.6%</td>
</tr>
</tbody>
</table>

Adapted from: (APIC, 2011)

Table 24 - Demand for Xylene Taiwan

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Styrene Monomer</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td>1,824,424</td>
<td>1,679,391</td>
<td>1,906,015</td>
<td>13%</td>
</tr>
<tr>
<td>Import</td>
<td>560,405</td>
<td>429,778</td>
<td>402,901</td>
<td>-6%</td>
</tr>
<tr>
<td>Export</td>
<td>391,961</td>
<td>574,998</td>
<td>531,583</td>
<td>-8%</td>
</tr>
<tr>
<td>Demand</td>
<td>1,992,868</td>
<td>1,534,171</td>
<td>1,777,333</td>
<td>16%</td>
</tr>
</tbody>
</table>

Adapted from: (APIC, 2011)

Table 25 - Demand for Styrene Monomer Taiwan

**Upcoming Projects**

Kuokuang Petrochemical Technology Company is a joint venture govern by the Communist Party of China. The company plans to reallocate its petrochemical project from Yunlin to Tacheng of Changhua country, but the project has been stopped, since 2003. Nevertheless, Kuokuang Petrochemical Technology has encouraged the Taiwanese government to prioritize the project so it can be inaugurated, if not it will be cancelled altogether. However, if the government approves the project, the plan is to construct a refinery and Naphtha crackers in two stages. The first stage is planned to be finish by the end 2015, and involves the construction of a 150,000b/d refinery and cracker with a capacity for 1.2mn tpa Ethylene and downstream plants. This project is likely to double the size of its capacity by 2025.
Formosa Plastic has initiated a project, which includes the construction of three Ethylene plants, and the newest of Naphtha cracker. This will increase capacity by 456,000tpa from 1.2mn tpa of Ethylene, and will expand Formosa’s total Ethylene capacity to 3.39mn tpa. Taiwan will over the medium-term concentrate the petrochemical expansion to the Chinese petroleum Corporation, CPC’s at their Lin Yaun complex. This co-operation will assure a raise in ethylene capacity of 52%, up to 6.15 mn tpa (APIC,2011) (BMI,2011).

5.1.3. South Korea

Market Overview

South Korea is the 5th largest producer of Ethylene in the world, and is also considered to have the 5th largest petrochemical industry globally. This is largely due to a high economic growth in the nation, which has evolved during the last 30 years. The attractiveness of the petrochemical industry in South Korea has throughout its development been supported by increased investment coming from the private sector, as well as the geographical strategic location of South Korea as a supply base for North East Asia. Due to its significant and still growing size, the petrochemical industry has emerged as a major constituent of the South Korean export basket. According to Business Monitor International petrochemical report from 2011 q1, South Korea ranks as the second best investment area concerning the petrochemical business environment in the Asia Pacific region. This is mainly because of the standards of governance in South Korea, which has opened up more to foreign investment since the Asian financial crisis, the quality of the infrastructure compared to other Asian countries, and the highly educated workforce in South Korea (BMI,2010).

Production supply

The petrochemical production facilities in South Korea are located at Ulsan and Onsan, which are located on the East coast of South Korea, Daesan and Incheon, which are located on the West coast of South Korea close to the capital Seoul, and Yeochun and Yosu, which are located on the Southern coast of South Korea (BMI,2010).
Ethylene: As mentioned above, South Korea is the 5th largest producer of Ethylene in the world with a total capacity of 7490.000tpa in 2010. This capacity is expected to remain, and is also forecasted to grow slowly to a capacity of 8080.000tpa by the end of 2015. The total production per anno roots from the following facilities:

<table>
<thead>
<tr>
<th>Total Capacity:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulsan</td>
<td>880.000tpa</td>
</tr>
<tr>
<td>Onsan:</td>
<td>470.000tpa</td>
</tr>
<tr>
<td>Daesan:</td>
<td>2680.000tpa</td>
</tr>
<tr>
<td>Yeochun</td>
<td>1810.100tpa</td>
</tr>
<tr>
<td>Yosu:</td>
<td>470.000tpa</td>
</tr>
</tbody>
</table>

= Total Capacity: Total Capacity: 7490.000tpa

Adapted from: [BMI, 2010]

Table 26 - Ethylene capacity South Korea

Benzene: South Korea is also a large producer of Benzene with a total capacity of 4055.000tpa in 2010. This capacity is expected to remain stable for the foreseeable future. The total production per anno roots from the following facilities:

<table>
<thead>
<tr>
<th>Total Capacity:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulsan:</td>
<td>495.000tpa</td>
</tr>
<tr>
<td>Onsan:</td>
<td>275.000tpa</td>
</tr>
<tr>
<td>Daesan:</td>
<td>1440.000tpa</td>
</tr>
<tr>
<td>Incheon:</td>
<td>100.000tpa</td>
</tr>
<tr>
<td>Yeochun</td>
<td>430.000tpa</td>
</tr>
<tr>
<td>Yosu:</td>
<td>1175.000tpa</td>
</tr>
<tr>
<td>Kwangyang:</td>
<td>140.000tpa</td>
</tr>
</tbody>
</table>

= Total Capacity: Total Capacity: 4055.000tpa

Adapted from: [BMI, 2010]

Table 27 - Benzene capacity South Korea

Toluene: South Korea’s total capacity of Toluene was 2375.000tpa in 2010. This capacity is expected to remain stable for the foreseeable future. The total production per anno roots from the following facilities:
<table>
<thead>
<tr>
<th>Total Capacity:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Daesan:</td>
<td>100,000tpa</td>
</tr>
<tr>
<td>Yeochun:</td>
<td>80,000tpa</td>
</tr>
<tr>
<td>Ulsan:</td>
<td>870,000tpa</td>
</tr>
<tr>
<td>Yosu:</td>
<td>1,045,000tpa</td>
</tr>
<tr>
<td>Kwangyang:</td>
<td>30,000tpa</td>
</tr>
<tr>
<td>Inchon:</td>
<td>250,000tpa</td>
</tr>
<tr>
<td>= Total Capacity:</td>
<td>2,375,000tpa</td>
</tr>
</tbody>
</table>

Adapted from: [BMI, 2010]

Table 28 - Toluene capacity South Korea

**Xylene**: South Korea is an important producer of Xylene with a recorded total capacity of 4,825,000tpa in 2010. Due to a strong demand from China’s polyethylene terephthalate (PET) industry, this South Korean Ethylene production is expected to experience a massive rise in capacity with a forecasted growth of an incredible 70% by 2015. This part of the petrochemical industry is expected to become an even more important constituent to the South Korean export basket than before. The total production per anno roots from the following facilities:

<table>
<thead>
<tr>
<th>Total Capacity:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulsan:</td>
<td>1,965,000tpa</td>
</tr>
<tr>
<td>Onsan:</td>
<td>860,000tpa</td>
</tr>
<tr>
<td>Daesan:</td>
<td>600,000tpa</td>
</tr>
<tr>
<td>Yosu:</td>
<td>1,400,000tpa</td>
</tr>
<tr>
<td>= Total Capacity:</td>
<td>4,825,000tpa</td>
</tr>
</tbody>
</table>

Adapted from: [BMI, 2010]

Table 29 - Xylene capacity South Korea

**Styrene Monomer**: South Korea’s total capacity of Styrene Monomer was 3,280,000tpa in 2010. This capacity is expected to remain stable for the foreseeable future. Unfortunately we were not able to retrieve any information concerning the locations of this production. [BMI, 2010].

**Production demand**

Due to a strong import demand in petrochemicals coming from Mainland China, South Korea generally export their petrochemical products apart from their own consumption. South Korean petrochemical producers are highly reliant on this Chinese demand because it contributes to
most of their exports. Since this strong demand is forecasted to continue in the near future, the South Korean petrochemical growth is also likely to be stimulated by Chinese demand.

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene</td>
<td>Production</td>
<td>6,827,000</td>
<td>7,071,000</td>
<td>7,380,000</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td>110,000</td>
<td>115,000</td>
<td>160,000</td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td>721,000</td>
<td>762,000</td>
<td>659,000</td>
</tr>
<tr>
<td></td>
<td>Demand</td>
<td>6,216,000</td>
<td>6,424,000</td>
<td>6,881,000</td>
</tr>
</tbody>
</table>

Adapted From: (APIC, 2011)
Table 30 - Demand for Ethylene South Korea

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>Production</td>
<td>4,221,000</td>
<td>4,107,000</td>
<td>4,174,000</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td>317,000</td>
<td>260,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td>1,194,000</td>
<td>1,258,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Demand</td>
<td>3,344,000</td>
<td>3,109,000</td>
<td></td>
</tr>
</tbody>
</table>

Adapted From: (APIC, 2011)
Table 31 - Demand for Benzene South Korea

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>Production</td>
<td>1,748,000</td>
<td>1,534,000</td>
<td>1,818,000</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td>217,000</td>
<td>223,000</td>
<td>203,000</td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td>761,000</td>
<td>615,000</td>
<td>902,000</td>
</tr>
<tr>
<td></td>
<td>Demand</td>
<td>1,204,000</td>
<td>1,142,000</td>
<td>1,119,000</td>
</tr>
</tbody>
</table>

Adapted From: (APIC, 2011)
Table 32 - Demand for Toluene South Korea

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylene</td>
<td>Production</td>
<td>4,338,000</td>
<td>4,127,000</td>
<td>4,103,000</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td>734,000</td>
<td>1,035,000</td>
<td>1,130,000</td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td>1,272,000</td>
<td>1,130,000</td>
<td>1,154,000</td>
</tr>
<tr>
<td></td>
<td>Demand</td>
<td>3,800,000</td>
<td>4,032,000</td>
<td>4,079,000</td>
</tr>
</tbody>
</table>

Adapted from: (APIC, 2011)
Table 33 - Demand for Xylene South Korea
Demand = Production + Import - Export

<table>
<thead>
<tr>
<th>Product</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>2,923,000</td>
<td>2,749,000</td>
<td>2,767,000</td>
<td>1%</td>
</tr>
<tr>
<td>Import</td>
<td>616,000</td>
<td>518,000</td>
<td>759,000</td>
<td>47%</td>
</tr>
<tr>
<td>Export</td>
<td>1,211,000</td>
<td>1,251,000</td>
<td>1,305,000</td>
<td>4%</td>
</tr>
<tr>
<td>Demand</td>
<td>2,328,000</td>
<td>2,016,000</td>
<td>2,221,000</td>
<td>10%</td>
</tr>
</tbody>
</table>

Adapted from: (APIC, 2011)

Table 34 - Demand for Styrene South Korea

Upcoming Projects

“South Korea’s petrochemical companies are expected to expand production capacity by nearly a quarter in the near future to sustain the demand growth in China” (BMI, 2010). As mentioned, this expansion is in particular in context to the production of Xylene, which is expected to experience a massive increase in capacity of incredible 70% by 2015. HC Petrochem’s Xylene plant at Daesan has launched a project that includes the increase in capacity of 800,000tpa Xylenes. The project is scheduled to be finished in 2013. Samsung Total Petrochemicals expanded their aromatics capacity at their Daesan complex in 2009. This expansion included the increase in capacity of 270,000tpa Xylenes and 90,000tpa Benzene. Honam Petrochemical, one of the largest producers of Olefins in South Korea, is planning to expand their capacity in Ethylene at its Yosu complex. This project has already started, and includes the spending of 456.2 mn USD. On the completion of this project, Honam’s Ethylene capacity will rise to 2,000,000 tpa (BMI, 2010).

5.1.4. Summary RQ 1

During recent years the global petrochemical industry has experienced a change in demand of petrochemicals. As a due course to this, the target of investments are now mainly concentrated in the Middle East and Asia. This new trend is mainly because of the strong demand of petrochemicals coming from China and the forecasted increase in capacity of petrochemical production in the Asian region.
In China, the Ethylene capacity is expected to grow by 60% by 2015, and the Polymer capacity is expected to grow by 25% by 2015. These extreme measures is due to the strong growth in domestic demand of petrochemicals, and will also make China the world’s second largest producer of petrochemical products after USA. In Taiwan, measures are taken to cover the growth in domestic demand, as well as the foreign demand coming from Mainland China. These measures include increase in Ethylene capacity close to 50% by 2015, as well as a significant increase in capacity of Benzene, Xylene and Styrene Monomer. In South Korea, the petrochemical industry has emerged as a major constituent of the South Korean export basket, and consists of 20-25% of the nation’s total GDP level. Due to the strong petrochemical demand coming from Mainland China, South Korea also generally export their petrochemical products apart from their own consumption. In order to approach this strong foreign demand, South Korea is planning to increase their production capacity of Ethylene and Xylene.

By looking at the current and future trends in the Asian petrochemical industry, the situation looks favorable for the WG fleet. The increase in capacity contributes to an increase in the current trade flow between China, Taiwan and South Korea, as well as a stronger focus on Ethylene and BTX+S. We therefore forecast opportunities in the future for Norgas’ services.
5.2. RQ 2

“How do the resources and capabilities of Norgas match with those needed to successfully operate a combined fleet?” To answer this research question we must identify what resources and capabilities Norgas are in possession of. Further we compare these to the capabilities needed, identified in the VRIN analysis. Consequently, we answer this research question based on the internal analysis and especially the VRIN analysis.

The financial capability is highly present in Norgas. This is due the support in the mother company I.M. Skaugen. The research done prior to the WG project may not have been sufficient enough. Possible solutions to challenges in terms of the different cost structure should have been identified. In addition, challenges if the market would change (like it has done) should have been identified with possible solutions. We believe innovation may have slightly overruled the actual market projections and the possibility of success. The capability to develop and implement technology is one important capability we identified in the VRIN analysis. This capability is present in the company and Norgas holds a high level of expertise in both the gas and chemical segment in terms of technology. We believe that a project like the WG concept and the innovative mindset behind it proves the ability of innovation in the company. In terms of fulfilling this capability I.M Skaugen supports Norgas on the innovation and technological expertise. Therefore, the ability to fulfill these two capabilities is high in Norgas.

Regarding the capability of HRM, Norgas is able to control the education of crew due to the integrated university of I.M. Skaugen. In addition, it is invested heavily in SHE&Q and this provides quality and security to the crew. As mentioned, licensing and certifications is a necessity. Concerning information, the company is lacking adequate information on the chemical segment in terms of changes in the market, competitor’s actions, trends, cargoes moving, production, consumption etc. The access to information on the Ethylene segment is adequate due to most of the fleet shipping Ethylene. But the access to this kind of information on the chemical segment is limited.
The ability to operate with an effective management and administration department is the capability also known as HRM. Regarding WG we believe Norgas have to some extend down prioritized the project after it has proved to be more difficult to commercialize than expected. In order turn this around, the priority must be lifted to an adequate level and key positions towards chemical expertise must be employed.

CRM is adequate in the Ethylene market because, as mentioned, the majority of the fleet operates in this segment. Network, relationships and reputation are maintained and the access to vital information is present. In the chemical segment however, the network and relations are limited and this is something that should be prioritized in order to succeed with the WG concept. It is quite natural that Norgas do not have this expertise in this segment because they have their core business in the gas segment. However, their favorable location of offices makes it possible to build and maintain relationships. So how do the resources and capabilities of Norgas match with the resources and capabilities needed to succeed with combined vessels?

<table>
<thead>
<tr>
<th>Match:</th>
<th>Mismatch:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>HRM (chemical segment)</td>
</tr>
<tr>
<td>Technological</td>
<td>CRM (chemical segment)</td>
</tr>
<tr>
<td>HRM (ethylene)</td>
<td></td>
</tr>
<tr>
<td>CRM (ethylene)</td>
<td></td>
</tr>
</tbody>
</table>

As displayed, the capabilities of Norgas do not perfectly match with those needed to succeed. However, these are hinders which can be dealt with and with corrective actions Norgas should be able to increase the possibility to succeed with the concept. From our point of view it should be carried out a thorough research on the chemical market in the near future to identify current opportunities and situations. Norgas lack adequate information on this segment, but this should be possible to obtain more systematically to a relatively low cost. Information is usually bought and the only thing keeping them from having this kind of information is the lack of emphasize on the chemical market.
The commercialization of the WG vessels has been more demanding than expected, but this takes time and more importantly: it is a difficult concept to get customers to believe in. However, the most likely reason is that the chemical market is weak and prices are down, and because of this it is difficult to compete with a new and more costly fleet. This might be the hardest part to turn into a capability because it requires time. The customer relations in the chemical segment are fewer due to the lack of presence in this segment. This however can be turned into a resource by increasing their presence and prioritizing the segment more. From our point of view it is not difficult to change the mismatch of capabilities into an almost perfect match. The issues are however if Norgas should prioritize this project over other operations, and if this concept is possible to succeed with even if the needed capabilities match with Norgas’.
5.3. RQ 3

“Can the WG concept prove to be a competitive advantage and thus, profitable?” To answer this research question we have conducted in-depth interviews and had informal talks with people in the Norgas office.

5.3.1. Findings from Norgas Carriers AS

Mr. Majumdar is an experienced man and has been working in companies related to the shipping industry for over 25 years. Being an Indian he started his career in the Shipping Corporation of India and has worked in several companies, but since 1998, with the exception of a brief stretch at another company in 2008, he has worked in Norgas. Mr. Majumdar has been our contact person at Norgas.

<table>
<thead>
<tr>
<th>Key takeaways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry is event driven and ever changing</td>
</tr>
<tr>
<td>“The most informed wins”</td>
</tr>
<tr>
<td>Lack of solid network in the chemical market</td>
</tr>
</tbody>
</table>

Our key takeaways from this interview are that the industry is extremely event driven, meaning that single cracker shutdowns or malfunctions could change the entire trade flow or outlook. This implies that the company with the most information and the most connections will have an advantage over its competitors, because they hold the newest info, and could act upon it. Moreover, Mr. Majumdar has expressed his concerns about the chemical aspect, and over the lack of the same kind of network they have in the Ethylene market. Basically we find that the markets are very difficult to predict. Nevertheless the general outlook is favorable, and the fundamentals are positive. Whenever there is surplus or deficit somewhere, Norgas is in demand. Moreover we found that Norgas’ biggest competitors are the actual crackers itself. A new cracker could more effectively

Some Norwegian told me a joke once, “God must be a ship owner, because he has scattered the natural resources and demand for them all around the world, and covered the distance in water”
eliminate the imbalances than ship owners can. In other words: Norgas’ customers and their plans are the biggest competitors. To be well informed is the biggest advantage. For instance in 2004 the “garlic war” (Korea refused to accept a shipment of Chinese garlic, saying it wasn’t good enough) made China embargo Korea, and Korea had suddenly a lot of gas and chemical surplus needed shipping elsewhere. More of a current event is the earthquake and tsunami in Japan. Although it did not hit the part of Japan where the major parts of the industry are, Japan has reduced its impact on the industry. Also, Mr. Majumdar informs us that in terms of security, Norgas as ship owners have the right to say no if they think the radioactivity level is too high and the safety of their vessel and crew is at risk. The charterer would be responsible for alternative solutions. Mr. Majumdar identified mostly challenges relating to finding the right trade route and partner, and thus the importance of a solid network in the chemical market.

5.3.2. Findings from Eitzen Solvang Ethylene

Andreas Rahbek is Danish, and has been in the shipping industry since 2007. He has now a position as chartering assistant in Singapore. Mr. Rahbek is currently working for Eitzen Solvang Ethylene, which is a joint venture between Eitzen Gas AS and Solvang ASA. The company is active in transportation of petrochemical and LPG gases globally. They have a diverse fleet and offer a wide range of services with a main focus on ethylene. Mr. Rahbek is currently working with Ethylene, but has previously done a study on combined vessels. He is not an expert on the technical aspect of vessels, but “when working on the commercial side it is important to have an understanding of the technology”.

<table>
<thead>
<tr>
<th>Key takeaways</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The daily expenses of a combined ship are about 15% more than a normal vessel</td>
</tr>
<tr>
<td>• The market looked quite different when they decided upon this</td>
</tr>
</tbody>
</table>

The key takeaways from this interview are that Mr. Rahbek does not believe in the combined concept in the current situation and believes the main problem with combined vessels is the economy. The daily expenses of such a vessel are approximately 15% higher than a “normal” vessel, with costs of cleaning, cooling and crewing as the main costs.
From his point of view the market looked quite different when this project was started compared to what it looks like now. In addition he thinks Norgas had a couple of planned projects with the vessels that has failed, making the utilization and commercialization of three new ships even more difficult. As a person working with Ethylene trade he is positive to this market and do not have a lot of information concerning the chemical markets. However, he mentions an interesting point. If the combined vessels are to succeed he believes it is necessary to have a good chemical spot market. This is not the situation right now and he does not see any trends pointing towards a market like this either. He believes it may be developed a spot market within fifteen years, but then the ships will be old. He says that “the carrying of chemicals is not really happening right now and it is currently a difficult situation”.

He believes that there might not be a need for combined cargo shipping right now. Currently the gas markets are good and new crackers are being established. When the rates in the gas market are good, it is not necessary to do combine. He states that this might be what they are experiencing as well, because Norgas are only carrying gas with the combined vessels.

Mr. Rahbek says that an ethylene tanker can carry chemicals as well, but that they are not really thinking about it in the current situation. But if the market turns bad again it is a possibility to start thinking about other cargoes. He tells us that they went as far as to considering carrying orange juice when the market collapsed in the financial crisis.

Mr. Rahbek says he think the idea of combined ships is very good, but that it might not be a need for this concept of carrying two cargoes right now. He does not think the ships will prove to be a competitive advantage and he doesn’t think the chemical market will overshoot the gas market in the close future.
5.3.3. Findings from GEMOIL Pte Ltd

Ms. Wong Yoke May and Ms. Claudia Koh is currently working at GEMOIL Pte Ltd, which is a trading company specializing in international trade of petrochemicals and petrochemical equipment. Ms. Wong and Ms. Koh have a short history of employment in this industry and are currently working as a trader (Wong) and with business development (Claudia). Before working in GEMOIL, Ms. Wong worked as a petrochemical broker and Ms. Koh worked with bunker.

<table>
<thead>
<tr>
<th>Key takeaways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical markets are currently poor</td>
</tr>
<tr>
<td>Macro factors have potentially huge implications on this industry</td>
</tr>
<tr>
<td>The trend is that chemicals are moving to China to be fabricated into products and then shipped to Europe or America</td>
</tr>
<tr>
<td>The concept does not make economic sense, but it might be a good way of diversification</td>
</tr>
<tr>
<td>Eventually everything is about price</td>
</tr>
</tbody>
</table>

The key takeaways from this interview are that the concept of a combined vessel may be a good way to secure a diversification, but may not be a good solution in terms of cost. From this interview we received two important and interesting facts. Firstly, that China has discovered a problem by using Styrene Monomer in their construction work and has now taken actions towards importing this. Second, we learned that the quality of chemicals differs between countries and that some of Taiwan’s supplied chemicals are considered as lower quality than others. Therefore producers may not want to use chemicals from Taiwan in their fabrication of products. These are factors affecting the whole trade and the trade between the three countries we are focusing on. Ms. Koh believes that different regulations and rules in different ports may pose a threat because the vessels need different certificates and licenses than other ships. In addition, the cleaning costs of a combined vessel and the larger scope of education of crew are problems to be considered when asking: if this makes financially sense? They do not find customer problems threatening. They do not think customers will rely less on a combined ship than a chemical-only

In this industry the price is the main thing and it basically always boils down to this.

- Ms. Wong Yoke May
tanker. Everything is based on price and it always boils down to which price you are able to offer. This is what the customers consider. Especially in troubled times like this

### 5.3.4. Findings from Odfjell Asia

Johan Halle is educated in the field of macro economy and is a Norwegian who currently works at Odfjell in Singapore and has been working at the company since 1997. With his 14 years in shipping, many in Asia, his input has been invaluable for us in this process. Odfjell is a leading company in the global market for transportation and storage of bulk liquid chemicals, acids, edible oils and other special products. Originally set up in 1916, the Company pioneered the development of the chemical tanker trades in the middle/late 1950s and the tank storage business in the late 1960s. Odfjell owns and operates chemical tankers in global and regional trades as well as a network of tank terminals.

**Key takeaways**

- Negative outlook for BTX+S in North East Asia
- Difficulties with excessive red tape and restrictions in China
- Fierce competition and not sufficient price
- Customers trust in a combined vessel

The key takeaways from this interview are that Mr. Halle was not very optimistic about the outlook for the BTX+S chemicals in the intra Asia trade, especially with the fierce competition from cheaper Korean ships in the trade routes we have focused on.

However, he spoke warmly about the more general opportunities in this part of the world: it is the fastest growing area in the world. It seems that as long as the forecasts for national GDP growth are optimistic so is the outlook for the shipping demand. Especially in China where the resources allocated to construction and infrastructure development is skyrocketing. When discussing the more general challenges it seems to be difficult for the Western ship owners because of the relatively higher price. This is often because these ship owners incur higher costs on safety and environmental protecting equipment, and these costs needs to be transferred to

There is definitely a surplus of ships in the triangle Korea, Taiwan and China. It is a difficult market

- Johan Halle
the customer. Also we understand from our meeting with Mr. Halle that the triangle we propose to Norgas is a difficult market. It’s a market with several ships and suppliers and it could be proven difficult to attract new customers. Moreover, he is not sure that the customers view Norgas as a typical chemical shipping company. This could prove to be an obstacle for Norgas when trying to gain market share in the chemical market.

Lastly Mr. Halle points out one major issue. Restrictions from the Chinese government stating that only ships under Chinese flag will be able to serve the domestic trade. This would not have been a major issue if it had not been for the fact that Chinese governments consider Taiwan as domestic. The only exception to this rule occurs if you obtain a license, which one will need for every single shipment, and this could take up to 7 days to arrange.
5.3.5. Findings from Lorentzen & Stemoco Shipbrokers

Rolv Stokkmo and Esben Ringen are two Norwegians working in Singapore at Lorentzen & Stemoco shipbrokers. Lorentzen & Stemoco shipbrokers provide ship broking and consulting services. The company has offices in Oslo, London, Vancouver, New York, Singapore, Beijing and Shanghai. Lorentzen & Stemoco service clients within gas, dry bulk and product tanker chartering in addition to contracting, offshore projects and traditional sale and purchase (Lorstem, 2011). Rolv has been in the shipping industry since 1972 and has worked in Norgas and Unigas among other companies. He has been working as fleet chief in Shanghai and with trading in Hong Kong. Now he is Vice president and head of gas department in Asia Pacific at Lorentzen & Stemoco. Esben has previously worked on a joint venture in Singapore from 1997 to 2007 and is now back as Director of the sale and purchase department at Lorentzen & Stemoco. Esben has been in the industry since 1995.

Key takeaways

- The idea is good, but the concept is difficult
- The gas and chemical market is correlating, so hedging is not actually possible
- The costs of these ships do not make them capable to compete on price
- It may be a solution to trade domestically in China, but they will need a license

The key takeaways from this interview are that this concept is perceived as very difficult to commercialize and to actually operate. The problems occurring with this concept is making it difficult to exploit the whole concept and when a combined vessel ends up carrying only Ethylene with only parts of the ship, it is basically not good enough for anything. Rolv and Esben talks about the correlation between the world’s economy and the shipping industry. In addition they perceive the two markets, gas and chemicals, to correlate rather perfectly and therefore they do not see any possibility to hedge risk with these combined vessels. From Rolv’s point of view, a man with a long experience in this industry, he feels it was not done adequate research on the concept before the vessels
were built. He believes the idea of rebuilding “two to three\textsuperscript{16}” has proven to be a poor idea and thinks that they might have been better off by building “two to two” and end up with two big Ethylene carriers. But that is what the market wants right now and may not be what the market needed then. Esben identifies the main problem to be cost. The cleaning, crewing, cooling and port costs will be higher than on a “normal” ship and from the men’s personal point of views a combined ship is not able to compete against the other ships carrying the easy chemicals. It is several “crazy cheap” Korean tankers with extremely low costs and the price competition is not something a combined ship will be able to handle. Other chemicals might have been a better idea, because it is able to command a higher price, but then again this is not something possible to do now. Rolv and Esben would have made the decision to rebuild the ships into fully Ethylene carriers if they had a fleet of combined ships right now. An ethylene tanker can also carry chemicals and it can take a full load of Ethylene when the chemical market is poor, which the combined ships are not able to do. However, after talking about the problems with this concept they agree with each other that it is a good idea and an interesting concept, however it is hard to do practically. They discussed solutions as to do trade domestically in China, but it demands a license. Esben believes it is only five licenses available and that Norgas do not have any of them, so this is of course an administrative issue needing to be solved first. There is a lot of trade between Korea and China, but as mentioned the competition on price will probably be to hard for the combined vessels to handle.

Rolv addresses another possibility in trading between China and Taiwan since there are a lot of small cargoes moving there. In addition, if it is possible to identify a small trade pattern of possible combined cargoes, the combined vessels will probably be alone there. They do not

\begin{quote}
\textit{It is a lot of trading from Korea to China, but it may be too many cheap vessels to compete against.}

- Mr. Esben Ringen
\end{quote}

\footnote{\textsuperscript{16} Norgas rebuilt two large gas tankers into the three WG ships, saving money and environment}
think the concept will be copied until it proves to be extremely profitable, which is not very likely in the current situation.

5.3.6. Summary RQ 3

Overall the WG concept is not a source of competitive advantage as of now. In addition the interviewees has pointed out several obstacles that needs to be sorted out before the commercialization process could be considered a success. However, with some internal changes at Norgas, favorable changes in the external environment and more specifically an increase in the chemical prices, the WG concept can become valuable. If Norgas manages this, the concept will be Valuable, Rare, Costly to imitate and Non-substitutable, making the fleet a source of sustainable competitive advantage for Norgas.
6. Strategy formulation

We will in this chapter suggest a strategy based on our findings and the analysis. In this section we present specific goals, both operative and strategic. In addition, the business strategy and niche segment is determined and a marketing strategy to follow this strategy is suggested.

6.1. Finding Recap

As a recap of our findings, these are the main takeaways from our research:

**RQ 1:**
- China is a huge producer of petrochemicals, but is still in need for big amounts of import because of the huge and increasing demand.
- Taiwan and South Korea are important petrochemical producers.
- Taiwan and South Korea use less than they produce and are therefore exporting.
- Taiwan and South Korea are to a large extent dependent on China to import their products.
- Overall the petrochemical industry is growing, due to the growing demand, especially in China.

**RQ 2:**
- Norgas’ capabilities do not perfectly match with those needed to succeed with a combined fleet.
- Corrective actions may be implemented at a relatively low cost.
- The main concern is whether or not to put emphasis on this project over other operations, and if a correct set capabilities will make this concept profitable.

**RQ 3:**
- China has implemented protectionist policies to shelter their domestic shipping industry.
- Different countries deliver petrochemicals with different quality.
- China has identified problems by using Styrene Monomer in construction work.
• Korea is operating easy and cheap vessels between Korea and China, which is almost impossible to compete against due to their extremely low costs.
• The interview objects identified challenges with this concept to be higher costs related to cleaning, crewing, bunker and ports, in addition to customer trust.
• The cost of this concept makes it difficult to compete on price.
• Challenges like a current tough market and a slow spot market forces the WG vessels into a non-profitable trade of only Ethylene.
• Loyalty and relationships are very important in this industry.
• The strong focus on costs and prices makes this an intense industry.
• If the WG fleet does not prove to be profitable even if Norgas adapt the needed capabilities, some alternatives might be to only carry Ethylene, expand to heavier chemicals, change market or carry acid.

6.2. Strategic Problem Definition
We have identified a strategic problem definition, which we will answer with our purposed strategy and recommendations for Norgas. The strategic problem is as follows: “How can Norgas Carriers AS use their strengths to mitigate weaknesses and threats which are preventing them from taking full advantage of the opportunities?”
6.3. Goals

After identifying the main challenges Norgas faces, we have crafted a set of goals Norgas should strive to fulfil to achieve to overall challenges. The goals presented are based on the “SMART” model, which means they are specific, measurable, attainable, realistic and time-based. Furthermore we have divided the goals into operative and strategic goals. Operative goals have a short-term time period of 1-2 years, while strategic goals are long-term goals on a 3-5 year basis. The operative goals will be more specific and easier to measure than the strategic goals, which have a more long-term focus (ProjectSmart, 2011).

6.3.1. Operative Goals

1) Employ commercial staff with chemical expertise and an extensive network.
2) Contact three customers with the objective to present a contract offer, the concept and the ability of the WG vessels, within two months.
3) Establish two time charter contracts with partners in the chemical market, within six months.
4) Implement and fully make use of a CRM system, within one year.
5) Earn a profit of USD 360.000-375.000 per calendar month, within one year.

6.3.2. Strategic Goals

1) Establish network, a good reputation and close relations with partners in the chemical market, within two years.
2) Conduct a customer survey and take corrective actions, within three years.
3) Utilize the WG fleet as the core concept and idea, within three and a half years.
4) Establish the WG fleet as a profitable part of Norgas’ fleet. More specific: accomplishing revenues of USD 450.000-475.000 per calendar month within four years.
6.4. Critical Success Factors

For Norgas to reach the above-mentioned goals, some internalities and externalities need to be present. The critical success factors are therefore:

- Maintain contracts and relationships in the Ethylene market
- Management’s approval to put emphasis on the process towards a full commercializing of the WG fleet.
- Build relationships and trust in the chemical market
- Increase information access and expertise in the chemical market
- Access to an adequate and thorough research study on current situations
- Constantly strive to deliver quality and to develop innovative solutions

6.5. Strategic Analysis

On the basis of the set of goals we will suggest a strategy in which Norgas can successfully reach the goals. First, we will focus on Porter’s generic strategies. This will enable us to determine the overall company strategy of Norgas. Second, our focus will be on the segment and the marketing strategy. The marketing strategy is a toll that will ensure that the overall service proposition of Norgas is correctly carried out to most successfully reach goals and objectives.

6.5.1. Porters Generic Strategies

Norgas, with the WG fleet, is less able to compete on costs because the concept is more expensive to operate than only gas or only chemical carriers. The WG concept is unique and flexible and in theory it should be possible to command a price premium for this differentiated service, which in theory is their competitive advantage. However, in real life it proves to be difficult, it is currently not a competitive advantage and Norgas is currently not earning above-average returns on the vessels. Norgas has a focused scope. First of all, the petrochemical shipping industry is a niche in the overall shipping industry. Second, the WG fleet carries gas and chemicals, which is a scope of the petrochemicals industry as well.
Norgas has a typical **focused differentiation strategy** where the focus is on a narrow segment with the intention to serve customers with a special service, which the overall industry’s suppliers are not able to deliver with equal quality. In theory this is the best solution of business strategy for Norgas, but once again we find it difficult to implement and make perfect use of opportunities in the current situation. Due to a complex technology, higher costs and a relatively new concept it is difficult to exploit and use the strategy perfectly. However, from our point of view, this is the strategy still best fitted to achieve future goals and handle the overall challenges with the WG fleet.

Companies with a focused differentiated strategy must be able to create and deliver differentiated services to a competitive cost. Norgas are in possession of a differentiated service, but the costs of delivering this service are not characterized as highly competitive. Activities required to create value to customers by using this strategy are a company-wide emphasis on the importance of producing high quality and investments in technology. These are activities present in Norgas. As mentioned previously, Norgas has expertise and adequate access to information in the Ethylene market, but lacks the same expertise in the chemical market. Due to this, some of the activities are “missing” in Norgas’ value chain on the chemical part, such as a strong capability in research. One activity, which is not currently present in Norgas’ organization, is a highly developed information system to better understand customers’ purchase preferences. This is something we will discuss more in our recommendations. ([Hoskins and Hitt Ireland,2009](#)).

Success with this strategy is achieved when the firm is able to constantly improve and upgrade technology and use innovation. This is highly present in Norgas. The theory explains that through this strategy, firms “produce non-standardized products”. In our case it is a service Norgas delivers and it is to some degree standard. However, a service can be differentiated in other ways including customer service, innovation and technology leadership, which are examples of important capabilities identified and discussed in our research chapter. “Customers tend to be loyal purchasers of products differentiated in ways that are meaningful
to them” (Hoskins and Hitt Ireland, 2009). If Norgas is able to identify a customer perfectly fitted to their flexible service or a trade route with cargoes most efficiently traded by a WG ship, this will of course be the best solution and it may make the WG ships not just an advantage, but also a sustainable advantage. The issue is however, if it is a current need for this differentiated service or if the industry’s suppliers of only Ethylene shipping and only chemical shipping fulfill the customer needs.

6.5.1.1. Focused strategy segmentation

As mentioned in the previous section, Norgas has a focused scope with the WG fleet. Norgas’ focus is therefore to serve the needs of their special targeted customers with a special service, in which the overall industry’s suppliers are not able to deliver an equal quality. Norgas normally identify new and potential customers by looking at current and future trends in their scope of the petrochemical market. This includes current capacities of petrochemicals within Norgas’ operational area, the current trade flows of petrochemicals, and future petrochemical projects, which will increase the supply of petrochemicals. All of these variables can potentially lead to future demand for Norgas’ services. Norgas’ niche and narrow segment in the petrochemical shipping industry is, with the WG fleet, to target both large Ethylene and chemical production units in North East Asia. Customers of Norgas (brokers and production units) are:

- Samsung Total Petrochemicals
- LG Chem
- Petrochina
- KEYUAN Petrochemicals
- Chempetrol
- Sumitomo
- Mitsubishi
- Taiwan SM Corporation
- SK Group
- Sinopec
- Apex
- Integra
- Vinmar
- Centrotrade
- Honam Petrochemical Corporation
- LG International
- Formosa Plastics
- Alba
- Jinshan Trading
- Marubeni
- Mitsui
6.5.2. Marketing strategy

The commonly used marketing mix consist of four P’s, however Norgas provides a service and therefore we believe it would be more suitable to make use of the extended marketing mix, consisting of the additional three P’s shown below (Marketing91,2011).

![Service marketing mix](image)

**Figure 14 - Service marketing mix**

*Product*

The product in Norgas’ marketing mix is the shipping services itself. In other words: the carriage of cargo by sea. Their operations are of high standards, both in terms of safety and efficiency. The fleet, which is used to provide the service, is relatively young and modern in terms of technical solutions. They differ from competitors with the use of new technology such as insulation solutions and reliquefaction. Moreover, Norgas operates the WG vessels, which have unique features and can carry both gas and chemicals. To differentiate, Norgas needs to deliver their service impeccable every time and provide after sale services that contributes to establishing new and fruitful relationships.

*Pricing*

Pricing in the petrochemical shipping industry is a wholesale operation with individually negotiated prices. In terms of pricing Norgas can only affect the price to some extent. They need their margins and so does the charterer. However, if there is a bigger supply (of ships) then demand, the market price on the spot market will decrease. The market price influences all the players in the industry. The market price impacts the spot prices Norgas can get for their services and also the time charter price and COA price. Norgas should strive to offer competitive prices and follow the market prices closely.
Promotions

The majority of the promotion is conducted as relationship building with charterers and brokers, presentations at conferences and participation in exhibitions. At the events Norgas uses more traditional marketing. Printed material with the purpose of showing a future charterer what Norgas can offer, their key features and track record. The key customers Norgas wants to attract are not many in quantity and therefore relationships are extremely important. “Wining and dining” is not an uncommon term used by the companies. For every new customer Norgas gets they send a representative to build relationship and trust with the customer. Norgas needs to be systematic in their approach and establish systems to better manage their relations. In order to achieve a better utilization of the WG fleet Norgas the promotion strategy will be to maintain relationships in the Ethylene market and more importantly establish relationships in the chemical market.

Placement

The service takes place at whatever geographical location the charterer needs transport. For Ethylene and BTX+S and the WG fleet, the main placement will be in relatively close proximity to the shipyard. Since they are newly built Norgas wants them close in case of any technical issues. We advise Norgas to continue with their efforts in some chosen geographical areas, where their services are most in demand keeping the limitations of the shipyard distance in mind.

People

As mentioned by Mr. Majumdar, Norgas compete on software not hardware. Ships are becoming more and more similar and the way to differentiate your service is through the quality of employees. Norgas is aware of this and training standards are high. We believe that the company should work on attracting talents in both operations and on the commercial side. The employees would need the right skills and knowledge to be able to build solid networks, maintain them and add value to the customer. In addition we advise Norgas to put more emphasize on the chemical market and employ people in key positions enabling Norgas to obtain valuable information on this market.
Process

In the process of delivering the service the commercial employees are often working with customers, quoting prices and terms of the agreement. These issues are often discussed by telephone or e-mails, thus mistakes and errors can have unfortunate consequences. This calls for strict procedures and policies. It is important to make these policies and procedures thorough, but also as easy as possible. From our point of view Norgas conducts a thorough education on these procedures and Norgas should aim to continue with the efforts. The open landscape office solution facilitates efficient and favorable integration of young and new employees.

Physical evidence

It is important that Norgas’ ships looks safe and well maintained. This will send signals to the customers and the competitors. If a ship has been neglected over a period of time and is not well maintained, the news will spread fast in this close-knitted industry. This could potentially result in loss of contracts and revenues. Moreover, the company office locations are of importance because of the desire to have close proximity to clients, suppliers and the general industry. From what we know, the ships are well maintained and Norgas has offices in the hubs of shipping and are close to their operations.

![Norgas Marketing Mix Diagram](image)

Figure 15 - Norgas marketing mix
7. Recommendations

After presenting our suggested strategy we will recommend some future actions for Norgas to successfully implement the strategy and achieve goals. These recommendations aim to improve the exploiting of the market opportunities with the WG fleet, which is the main objective for this project. We have divided the recommendations in to three sections: suggestions of trade routes, develop human resource management and implement a customer relationship management system.

7.1. Suggested trade Routes and Financial Calculations

We have identified a trend in the North East Asian petrochemical industry, where trade routes generally are targeted towards China. Due to the strong demand for petrochemicals coming from Mainland China, the country is supported by the export from Taiwan and South Korea. As a result of these trends, we have suggest two sets of trade routes in which the WG fleet might successfully establish a presence. Since the petrochemical industry is considered highly cyclical, these two routes will only be explained on a general level, meaning that the cargo and structure of the route can differ from time to time (see appendix for trade map).

![Figure 16 - Trade route 1 Taiwan-China-Taiwan](image-url)
In trade route one the shipping of Ethylene and BTX+S will be concentrated between Taiwan and China. Our suggested voyage pattern as displayed above: Kaohsiung (Taiwan) → Mailiao (Taiwan) → Shanghai (China) → Nanjing (China) → Mailao (Taiwan), will ensure a time- and cost effective trade pattern for the WG fleet when considering the geographical location of these ports. If the WG vessels are able to maintain an overall cruising speed of 13.5 knots, the total duration of the route is estimated to take 11.85 days. The total direct operating cost is estimated to be 158,654USD, and includes the cost of FO (fuel oil), MGO (marine gas oil), and ports dues. This cost is covered by the charterer hire.

If we assume a TC/day (time charter per day) of 12,000USD, the route will generate revenues of 142,241USD. This is still only achievable if the price of Ethylene and BTX+S holds an average of 67USD per ton (Ethylene) and 29USD per ton (chemical). A TC/day of 12,000USD will ensure Norgas’ short-term goal of a TCY PCM (total charter yield per calendar month) of 360,000USD.

In the second trade route the shipping of Ethylene and BTX+S will be concentrated between South Korea and China. Our suggested voyage pattern as displayed above:

### Trade route 2, South-Korea-China-South-Korea

<table>
<thead>
<tr>
<th>Cargo/tons</th>
<th>Load/Disch Cost</th>
<th>Ulsan</th>
<th>Yeosu</th>
<th>Shanghai</th>
<th>Nanjing</th>
<th>Ulsan</th>
<th>Total days</th>
<th>MT FO</th>
<th>MT MGO</th>
<th>FO $</th>
<th>MGO $</th>
<th>Total Port cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
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<td>Load</td>
<td>Disch</td>
<td>Load</td>
<td>Disch</td>
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<td>192</td>
<td>669</td>
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<table>
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<th>Voyage Pattern</th>
<th>Ulsan</th>
<th>Yeosu</th>
<th>Shanghai</th>
<th>Nanjing</th>
<th>Ulsan</th>
<th>Total</th>
<th>MT FO</th>
<th>MT MGO</th>
<th>FO $</th>
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<td>51,000</td>
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If we assume TC/td 12,000
TCM PCM 360,000
Total Direct Operating Cost 157,705
Charter Hire 141,574
Total Cost of shipment 299,349
Cargo Quantity 6,150
Arrive Cost to Charter 48,7 $/Ton

Figure 17 - Trade route 2 South Korea-China-South Korea
Ulsan (South Korea) → Yosu (South Korea) → Shanghai (China) → Nanjing (China) → Ulsan (South Korea), will also ensure a time- and cost effective trade pattern for the WG fleet when considering the geographical location of these ports. If the WG vessels are able to maintain an overall cruising speed of 13.5 knots, the total duration of the route is estimated to take 11.80 days. The total direct operating cost is estimated to be 157,765USD, and includes the cost of FO (fuel oil), MGO (marine gas oil), and ports dues. This cost is covered by the charterer hire. If we assume a TC/day of 12,000USD, the route will generate revenues of 141,574USD for Norgas. This is still only achievable if the price of Ethylene and chemical holds an average of 67USD per ton (Ethylene) and 29USD per ton (chemical). A TC/day of 12,000USD will also ensure Norgas’ short-term goal of a TCY PCM (total charter yield per calendar month) of 360,000USD.

7.2. Human Resource Management

Our main recommendations in HRM are to:

- Employ
- Educate
- Integrate

Norgas will need to identify a unique combination of resources and capabilities to become more competitive in this market. The petrochemical shipping industry is represented by quite homogeneous hardware, which means companies will need to differentiate their services on software. Norgas will need to bundle their shipping services together with intangible resources, like excellent human resources and human resource management. Intangible resources are difficult for a competitor to imitate, because it often represents distinctive patterns of routines, which has been integrated over time. Human resources can be defined as “knowledge, trust, managerial capabilities and organizational routines”, while “human resource management is the function within an organization that focuses on recruitment of, management of, and providing direction for the people who work in the organization” (About.com, 2011).

Norgas needs to continue their focus on developing a good HRM system to proceed with the WG project and turn it into a possible future competitive advantage. It has been said that “the
success of a corporation lies more in its intellectual systems capabilities than in its physical assets” (Hoskins and Hitt Ireland, 2009), which means it is more important to have a competent workforce that can carry out this project, rather than the ships it selves.

Recruiting competent and motivated employees ensure a solid foundation of how the quality is perceived from customers. It is beneficial to recruit a competent workforce with the right set of personality characteristics to carry out their responsibilities in every level of the organization. As mentioned in the ACE analysis, the embodiment of these values is crucial. Norgas faces some communication and information flow challenges due to their decentralized business structure and culture diversity. This can be improved with increased knowledge about cross-cultural behaviour. Challenges regarding decentralized business structures and culture diversity are challenges difficult to fully overcome for every player in this industry.

Due to Norgas’ lack of information in the chemical market, the company should emphasize on hiring new competent employees in key positions to improve this, and to educate the parts of the organization dealing with the WG vessels. They should be qualified after skills, knowledge and experiences in the chemical market. If Norgas succeed in recruiting competent employees, they can share their individual knowledge within the organization. Information shared between two people often creates and influence to additional knowledge, which will contribute to performance improvements for Norgas. It will also be beneficial for Norgas to hire people with local knowledge in China, Taiwan and South Korea, for a better understanding of cultural aspects and to establish a broad network. Norgas should offer their employees regularly training and set weekly goals, as this tends to be a motivational factor. There are many ways to implement incentive systems, but it is necessary to focus on incentives that trigger intrinsic motivation in comparison to extrinsic motivation. To sum up, Norgas needs to develop their human resources management further by recruiting people with knowledge and experience in the chemical sector and place them in key positions dealing with the commercialization of the WG fleet.
Norgas should also provide regular training and education, and create incentives that motivate the employees to improve their knowledge of the chemical market, in addition to cultural dimensions.

**7.3. Customer Relationship Management**

Our main recommendation concerning CRM is:

- Implement CRM system

Our next recommendation is that Norgas should implement and maintain a Customer Relationship Management (CRM) system. A CRM system is defined as a “process to compile information that increases understanding of how to manage an organization’s relationships with its customers and as a business strategy that uses information technology to provide an enterprise with a comprehensive, reliable and integrated view of its customer base so that all processes and customer interactions help maintain and expand mutually beneficial relationships” (S. Durvasula, Lysonski, S. and Mehta, 2004).

Today, the shipping industry is highly competitive. The hardware product itself does not have significant advantages. Ship owner pools and similar technology make their hardware service irrelevant. Besides prices, vessels should have a special edge over their competitors in order to increase their competitiveness. We believe that there is a need for more customer focus, or rather a more traditional customer focus in the industry. Relationship management is as mentioned previously, of great importance to Norgas. To better manage and maintain these important strategic relationships with the customers we believe it is vital that Norgas implements a CRM system and that the system is embedded across all the functions in Norgas. This system is software that is online and also integrated with Norgas’ own server system. The main features of such a system are that it systematically sorts and catalogues data of the customers. The 80/20\(^{17}\) rule applies to several B2B companies, and this just adds to the fact that the individual relationships with some of the customers are important. The customers will have individual virtual areas in the system where previous contracts, news feed from the customer’s webpage, useful information and procedures regarding contracts are kept. This will

\(^{17}\) 20% of their customers accounts for 80% of their income.
enable new employees to faster get up to speed on the different relationships and also help share the knowledge throughout the organization. This could lead to more people within the organization benefiting from the knowledge and relations, which only some key people at Norgas currently have. In addition to sort and store the data on relationships, the system could be used to measure consumer satisfaction. Norgas do not have any customer satisfaction records, because the individual sales person keeps all interaction information records. One way to evaluate satisfaction is by asking the customer directly through interviews and questionnaires. This could be done more easily if the customers are catalogued in a database such as a CRM system. In general, most of the shipping companies rely on their sales team to keep track of customer satisfaction. Customer satisfaction data is not recorded within any system as per now.

This system will compliment the already in place systems such as the purchasing system and the Information and planning systems from SISmarine. These are systems to get information from the vessels and enabling the land-based departments plan better. The implementation of a CRM system will support Norgas’ mission to “Create shareholder value through our emphasis on achieving cost and service leadership; consistently improving customer service and focusing on operational efficiency and thereby growing the profitability of our business” (I.M.Skaugen SE,2011).
8. Conclusion
In this chapter we will discuss the implementation issues of the recommended actions. We have identified issues regarding the routes, which will be followed by suggested alternative routes and cargoes. We have also identified issues concerning the implementation of the HRM- and CRM measures. We will further display an implementation plan and thereafter identify areas for further research.

8.1. Implementation

8.1.1. Routes
As identified in the interviews conducted there are several issues of shipping in the North East Asia region. After suggesting the most favorable route on foundation of the mapping of Ethylene and BTX+S we need to take these issues into consideration. Are the routes that we have suggested feasible and possibly profitable? Some of the issues are not affecting the trade sufficiently, and we have therefore chosen to not focus on them. We have identified two issues that could affect the possibility of profitable routes with the WG ships. The issues are the low cost carriers trading between Korea and China and the recent regulations of domestic trade in China. The WG fleet is far from as competitive able as the Korean ships trading between Korea and China. The vessels have extremely low costs as a result of highly standardized services and lower safety. This results in lower prices than most firms in this industry are able to compete against. By standard services we mean that these vessels trade petrochemicals from South Korea to China on an almost routine schedule.

The second issue is the highly protective regulations in China concerning domestic trade. In the recent years China has operated with licenses available for some foreign firms to ship domestically. Now these licenses are removed and authorities wish to do all domestic trade with ships sailing under Chinese flag. Foreign firms will need to apply for every individual domestic shipment and get approval. In addition to this, Taiwan is considered Mainland China, forcing two countries out of our chosen three under strict regulated trade. Due to this, many Korean ships have switched from trading Taiwan-China to trading Korea-China, making the issue first explained an even bigger issue. The application process is of course time consuming,
but it might not make the route unprofitable. Within our area of focus in this project, we believe the trade route between Taiwan and China will be the best solution and recommend Norgas to look further into this solution. However, we believe other alternatives need to be considered.

**8.1.2. Alternative routes**

In order for the WG fleet to be operated profitable Norgas might need to look beyond the three countries of our focus. We recommend a closer look at Thailand, Malaysia and Japan. These countries are major players in the petrochemical industry and are expected to increase production capacity, import and export of several different petrochemicals in the future. The largest petrochemical port in Thailand is Map ta Phut, and during our research we identified a large amount of tankers both loaded and discharged chemical cargoes here. Thailand is a major producer of Propylene and Ethylene and has started exporting Xylene and MTBE (Methyl-Tert-Butyle-Ether) to China and Korea. The location is perfect for short voyages between many countries for the WG vessels.

Malaysia’s petrochemical industry is growing and is supported by a well-established oil and gas sector. The most important petrochemicals are Ethylene and Propylene with a production capacity of 1mill tpa in 2009. The government is planning to develop Bintulu, Gurun and Tanjung Pelepas as important areas of petrochemicals and will increase the production line to involve more chemical products. The industry in Malaysia is expected to grow 7 % in the next five years. Japan is China’s main partner in the petrochemical industry and is according to the latest report from BMI the country with the largest petrochemical industry in Asia. In addition, it is expected to continue to increase. The most important locations are Kitakyushu, Yokohama and Kobe. Japan is a major producer of Ethylene and Styrene Monomer and has traded BTX + S with China for several years, and it is believed that the exports from Japan to China will continue to increase in the near future (BMI, 2011). As mentioned, the catastrophe might create high demands for petrochemicals when rebuilding the destroyed parts of the country.
8.1.3. Alternative cargoes
The chemical market is an unstable market and involves many operators with larger vessels and huge tank capacity. If the challenges with the WG fleet is more difficult to overcome than to simply put emphasize on chemical market knowledge, Norgas might need to look for alternative cargoes to carry. One alternative is to only ship gases like Propylene and Ethylene. Propylene is the second most important petrochemical in the industry after Ethylene, and is the raw material used in many different industries like plastics, textiles and agriculture. The demand for Propylene is high, and in 2009 the production capacity was 6mill tpa in South Korea and 3mill tpa in Taiwan. Norgas is already well established in the gas market, so no extra knowledge or network is needed.

There are over 80,000 different chemicals used widely in the commercial market today. Therefore one solution for Norgas will be to expand the chemical scope and look into carrying heavier chemicals\(^\text{18}\). The WG vessels can carry 23 different chemicals widely used in China, Taiwan and South Korea. The freight price is higher for the heavier chemicals, and this might make the WG fleet profitable. We recommend MTBE (Methyl-tert-Butyle-Ether) and acetic Acids. MTBE is used a gasoline additive and is used as an oxygenate to raise the octane number of different gasoline types. The demand for import and export of MTBE is set to increase in Asia in the near future (ICIS,2011). Acetic acid is a weak organic acid, which absorbs water easily. Acetic acid is used in the production of Polyethylene Terephthalate (PET) that is mainly used in soft drink bottles, cellulose acetate, photographic film and wood glue, as well as synthetic fibers and fabrics. The global demand for Acetic acid is 7mill tpa per year, and it is mostly traded in Asia from China to Taiwan, Korea, Thailand and Philippines (ICIS,2011).

8.2. Human resource management (HRM)
Regarding the implementation of the HRM strategy we have identified some issues. To find skilled and experienced people are among the most difficult tasks HRM managers have. The process is challenging due to difficulties related to people’s real expertise, skills and motivation. An HRM manager has to be selective and exceptionally aware of the different personalities

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\(^{18}\) Heavier chemicals are more complex to carry and have e.g. higher cleaning requirements
when hiring new people, as the workforce is highly important for the company’s performance. New employees should bring value to the company and fit in to the work environment Norgas’ has created. If not, dissatisfaction, integration issues and communication problems are likely to arise.

Skilled and knowledgeable people are in high demand and are very valuable for a company, especially in service industries and in industries that requires high technical knowledge. Norgas can find people with experience within the same industry, for example among their competitor’s employees. These employees are complicated to “steal” due to their high value and importance to their organization. Talented people in all industries represent a significant advantage for their company, and organizations tend to do what they can to keep these, often by a number of incentives. Consequently, Norgas might face issues in their search for new employees.

To hire new people will represent costs for a company. It is often time consuming and it will increase the labour costs, if no one else has to leave the company. However, resources allocated to new employees, should not be a problem for Norgas concerning the financial, it is rather a problem of finding the right people.

8.3. Customer relationship management (CRM)
There are some important issues Norgas need to be aware of when implementing a CRM system. A system like this can easily lose its meaning if the planning process is weak. Initiatives can easily fail when efforts and costs to choose good enough software are limited, and the supplier does not understand the large scope of the project. If Norgas are uncertain of whom the key groups that will use the system will be and make the scope to large, the quality of the system will fall and the integration process could potentially be weak. The system should reflect the strategy of Norgas, and offer quality, not quantity to the user. The information provided in the system shall lead to satisfactory experiences for the customers of Norgas, and furthermore, add extra value.
Norgas should choose a system that is easy to use and offer applications that are user-friendly and customized to their needs. Norgas must provide training and have an appropriate amount of service employees that knows the system, available at all time in the beginning. In addition, Norgas must be aware of people resistance to change. It is therefore important that every employee knows the importance of this system and what extra value it will add to Norgas’ operations, in the long run contributing to profits to the company. People will need to change working habits and routines to some extent. But by educating the staff in this system, which contributes to more satisfied customers, we believe the implementation can run smoothly.
### 8.4. Implementation plan

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<tr>
<th>Time</th>
<th>Immediate future</th>
<th>Operative goals period I</th>
<th>Operative goals period II</th>
<th>Strategic goals period</th>
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<tr>
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<td>0-2 months</td>
<td>2-4 months</td>
<td>4-8 months</td>
<td>12-18 months</td>
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<td>Trade route</td>
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<td>- Approach potential customers</td>
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<td>- Time Charter</td>
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<td>CRM</td>
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<td>- Implement CRM system</td>
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<td>- CRM training for commercial employees</td>
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<td>- Evaluate and take corrective measures</td>
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<tr>
<td>HRM</td>
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<tr>
<td>- Hire commercial staff with chemical expertise</td>
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<td>- Train commercial employees</td>
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### 8.5. Managerial implications

The managerial and organizational implications for the first recommendation, the trade route, will be minimal. The ships could potentially start going the proposed route immediately as long as there is a COA or time charter contract established.

The managerial implications of our HRM and CRM recommendations are going to affect the managers focus and decisions profoundly. First and foremost, our recommendations require some investments in the proposed CRM systems and also allocation of more resources in HRM. Moreover, the way the commercial staff handle their relationships will also be changing. A CRM
system requires the staff to work more systematically with recording key information and storing it into the database. In terms of HRM, the proposed recommendation will impact the number of employees in the commercial department in Singapore.

8.6. Areas for further research
We have limited this research to only three countries and five cargos, this implies that there is a wide array of opportunities for further research if shifting or broaden the scope, both in terms of countries and cargos. Also future research should emphasize doing more in the area of competitive dynamics. In addition further research on understanding customer needs will help to customize service offering to maximize value creation for all.

8.7. Final words
Although the Wintergas concept has proven to be difficult to commercialize we believe the measures mentioned previously are improvements that could be done internally at Norgas. With these measures, Norgas could make significant progress towards a profitable Wintergas fleet, making the profits less dependent on market prices and reaching a state of “smooth sailing”.
9. Bibliography

9.1. Books


9.2. Articles


9.3. Online databases


The Economist Intelligence Unit 2008. Country Profile South-Korea. The Economist Intelligence Unit.

9.4. Web pages


10. Appendix

10.1. Appendix 1 Theory review

10.1.1. External

**PESTEL**

The PESTEL framework is used to identify factors in the macro-environment that affects the decision-making in an organization. New laws, trade barriers, economic growth, environmental restrictions and demographic change are examples of typical macro-environmental variables. The analysis consists of five different factors: political, economic, social, technological, environmental and legal factors, which all together influence the external macro environment within a specific geographical area.

**Porter’s five forces**

Porter’s five forces is an industry environment analysis, where the purpose is to analyze five different forces to determine the industry’s attractiveness and its profit potential. A high threat of new entrants will threaten the market share of established company’s market share. The entry barriers of an industry will furthermore also affect the threat of new entrants. High entry barriers, such as economics of scale and high start up costs, can be an advantage for already established companies, and make the industry less attractive for new competitors. Furthermore, low entry barriers are a disadvantage because it will be easier for new competitors to enter. Threat of substitute products can threaten companies if the switching costs to the products are low and customers perceive the substitutes as more or less equal or better. Low switching costs generally represent a high threat. The following force in the model is the bargaining power of buyers and suppliers. How much power these two groups have will always differ and affect the profitability in the industry. The last force in the model analyzes the intensity of rivalry among competitors. Firms within an industry are mutually dependent, and they are affected by each other’s actions. If the intensity of rivalry among competing companies is high, companies often tend to differentiate their product or services from competitors in order to stand out (Hoskins and Hitt Ireland, 2009).
**Consumer purchase decision process**

Consumer purchase decision explains the decision making process which customers undertake before, during and after the purchase of a product or service. Customers go through a cognitive process of selecting a course of actions. The consumer purchase decision process suggests that a consumer go through a five-stage decision-making process in any purchase: problem recognition, information search, evaluation of alternatives, purchase decision and lastly post purchase behaviour (San Diego State University, 2011).

![Diagram of consumer purchase decision process]

**Competitor analysis**

A competitor analysis is part of the corporate strategy and is part of the final external analysis done by firms, the analysis of the competitive environment. Competitor analysis is a commonly used tool to identify the company’s opportunities and threats, and the competitor’s strengths and weaknesses. Information collected about competitors will help the firm develop an “anticipated response profile” for each competitor. The goal of this analysis is to understand the players in the industry and more efficiently is able to understand, interpret and predict competitor’s actions (Hoskins and Hitt Ireland, 2009).

**Liabilities of foreignness**

The concept of liabilities of foreignness is explaining the costs of doing business aboard and the firm’s capabilities in overcoming or limiting the liability of foreigners. The differences between the home and the host country’s environment create a liability of foreignness for the firm. To succeed, a firm need to understand how to deal with differences that exist between home and host countries/markets.
Cultural dimensions determine the pattern of cross-cultural business behavior and describe differences and similarities between cultures. Commonly used cultural theories are the dimensions produced by Gesteland, Hofstede and Hall. The dimensions we use are the context of communication, natural/expressive, relationship focused/deal focused, power distance and formal/informal (Hoskins and Hitt Ireland, 2009).

Source: Clive Choo, Strategic management professor and Supervisor
**SWOT**

A SWOT analysis is used as a strategic planning method and includes four factors; strengths, weaknesses, opportunities and threats. Strengths and weaknesses include internal factors, while opportunities and threats cover the external elements. Strengths are the basis for creating competitive advantages, while weaknesses can be defined as the absence of certain strengths within a company. Opportunities can be adopted into future advantages, while threats create difficulties for a company. “The goal is to match the company’s strength to attractive opportunities in the environment, while eliminating or overcoming the weaknesses and minimizing the threats” (Philip Kotler & Gary Armstrong, 2010).

**10.1.2. Internal Value Chain**

The value chain is a tool used by companies to better understand where they create value and where they can improve. Companies only earn above-average returns when the value created is bigger than the costs incurred to create that value. A firm’s value chain consists of primary activities, which are the actual creation of the product or service, its physical sale and distribution and after sale service. The value chain also includes support activities, which are activities providing the necessary assistance for the primary activities to take place. The primary activities are identified as inbound logistics, operations, outbound logistics, marketing and sales and service. The support activities are identified as procurement,
technological development, human resource management and the firms’ infrastructure. The value chain explains the product or service’s route from raw material to the final customer. The idea of the value chain is to help companies identify stages within the production of products or services where increased use of resources would increase the produced value more than the costs of doing so. It also intends to help the firm locate stages in the process where effort is lagging (Hoskins and Hitt Ireland, 2009).

**Industry Value Chain**

“A firm’s value chain is embedded in a larger stream of activities that I term the value system (or Industry value chain). Suppliers have value chains (upstream value) that create and deliver the purchased inputs used in a firm’s chain”. (Michael E. Porter, 2008) The industry value chain is a set of separate firm’s value chains and how they link up with each other within the industry that the main product/service of one firm can be the procurement part of another and so on.

**VRIN**

The VRIN framework consists of four criteria of sustainable competitive advantage. Check the textbook and see how it is described. It is a test where one runs capabilities and resources, through to conclude if they are valuable, rare, costly to imitate and non-substitutable. “The four specific criteria of sustainable competitive advantage that firms can use to determine those capabilities that are core competencies.” (Hoskins and Hitt Ireland, 2009) A valuable capability is a capability that allows the firm to exploit opportunities or neutralize threats in the external environment. If the capability is something that few, if any, competitors possess the capability is regarded as rare. “The key question to answer when evaluating this criterion is: How many rival firms possess these valuable capabilities? Capabilities possessed by many rivals are unlikely to be sources of competitive advantages to any of them.” (Hoskins and Hitt Ireland, 2009) Capabilities that are costly to develop for the rivals are capabilities satisfying the criterion of “costly to imitate”. Not only costly in financial terms, but also costly in terms of the time it takes to develop such a capability, which can be due to some unique historical conditions. “Non-substitutable capabilities are capabilities that do not have strategic
equivalents” (Hoskins and Hitt Ireland, 2009). If there are other capabilities that can perform with the same strategic impact the criterion of non-substitutable is not fulfilled. The table below reviews how to judge the outcome of this core competency test.

<table>
<thead>
<tr>
<th>VRIN Analysis</th>
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<tr>
<td><strong>Is the Resource or capability valuable?</strong></td>
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<td>No</td>
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<tr>
<td>Yes</td>
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<tr>
<td>Yes</td>
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<td>Yes</td>
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**ACE**

According to Solberg there are three sets of characteristics, which together describe how successful an international business is. These are; the attitudes of the management towards export and a proper balanced set of competence in export and the embodiment of this. In order for an international business to succeed, these characteristics must be implemented and used in a sufficient way. One can use this framework to analyze if there is any correlation between the culture and the performance of the international business (Carl Arthur Solberg, 2009).
10.1.3. Strategic

Porter’s generic strategies

When selecting business-level strategy it is five alternatives explained in the Porter’s generic strategies. Cost leadership is characterized by an overall main focus on keeping costs lower than industry average or benchmark costs through all activities to give a cost advantage over competitors. Differentiation is a strategy where all activities in the value chain are completed with main intention to differentiate the company’s product or service from its competitors.

When applying a focused strategy the company has an integrated set of actions intended to produce goods or services that serve the needs of a particular competitive segment. In other words, the firm tailors the value chain activities to a specific competitive segment. When following an integrated strategy the firm pursues value chain activities, which allows the firm to simultaneously operate with low costs and differentiation. Several firms execute this strategy to meet the increasing expectations of low cost products with differentiated features.

“Each of these business level strategies helps a company to establish and exploit a particular competitive advantage within their particular competitive scope” (Hoskins and Hitt Ireland, 2009). Michael Porter has argued that a company's strengths either fall into cost advantage: being able to have lower costs than competitors, or differentiation: being able to create value for the consumer by being different. By applying these strengths in either a broad or a narrow scope, a company will perform the value-chain’s primary and support activities to create unique value.

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<table>
<thead>
<tr>
<th>Cost leadership</th>
<th>Differentiation</th>
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<tr>
<td>Focused cost leadership</td>
<td>Focused differentiation</td>
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<tr>
<td>Integrated cost leadership/Differentiation</td>
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(Hoskins and Hitt Ireland, 2009)
Segmentation

Market segmentation is a method used to divide large homogenous market into smaller segments that have similar needs, wants or demand characteristics. By understanding the needs of the customer one will understand the decision process. Through segmentation target segments, which best suits the product or service is determined. A segment should be measurable, durable, accessible, sustainable and responsive to the specific marketing mix. Among numerous of segmentation variables the most commonly used in business market segmentation are geographic segmentation, customer type and buyer behavior to identify the different customers.

Marketing Strategy

The marketing mix is a marketing framework, which outlines the tools a company can use to set their marketing strategy to life. There are initially four P’s; The product (or service) that the business offers to its customers, the price of the product or service, the place of the product or service, and the promotion to target customers and persuade them to buy. These 4 factors are brought together in a “mix” because each ingredient affects the other, and the mix must overall be suitable to the target customer (Philip Kotler & Gary Armstrong, 2010).
10.2. Appendix 2 Interviews

10.2.1. Interview with Norgas Carriers AS, Marketing

What is your name?
Jyotirmay Majumdar

What nationality are you?
Indian

Where do you currently work?
Norgas

What do you currently work with?
Commercial aspects of the whole Norgas fleet

What is your background in shipping?
I started early in 1985 in Shipping Corporation in India. I was in a new department then, my basic job was more contracting and not really a shipping company. I worked for there for 5 years. Then because I felt I needed some experience in the financial field I moved to an Indian finance company. I have also worked with Petrochemical shipping in Reliance. In 1996 I left to work in Vernon shipping company. After that I started working with dry bulk in Dubai, where I did mostly Grain trading. I got an offer from Norgas in 1997. There was a bit of back and forth negotiation. I wanted to go to Norgas, but I was tied up in Dubai. I stayed in Dubai and got incentives to stay there. So I joined Norgas in 1998. It took a little bit time to move to ship owner side mentally and getting in the game, but I managed the “change of hats” After a long time I went back to Vernon again, this was in 2008, after some time they asked me to transfer back to Bombay again. I did not want that at the time. In 2010 I got the chance to go back to Norgas again.

How long have you been in this industry (line of work)?
Since 1985, 26 years now.

What in particular do you find appealing and interesting with the shipping industry in general?
I like the pace and the fact that shipping makes the world trade run smoothly.
Have you heard of the WG fleet?
Yes

Are you familiar with the technical aspects of a combined vessel?
Yes

How do you view the opportunities/challenges in the Inter-Asia gas and chemical shipping market?
What happens in gas is difficult to predict. But nevertheless the general outlook is favorable. Somebody from Norway told me a joke once, “God must be a ship owner, because he has scattered the natural resources and demand for them all around the world, and covered the distance in water”. Wherever there is surplus or deficit somewhere, we are in demand. But this market is an ever-changing market. Our biggest competitors are the crackers itself. A new cracker could more sufficiently and efficiently take away the imbalances than ship owners can, so basically the customers and clients we have and their plans are our biggest competitors. To be well informed is the biggest advantage. For instance in 2004 the” garlic war” (Korea refused to accept a shipment of Chinese garlic, saying it wasn’t good enough) made China embargo Korea and they had suddenly a lot of surplus needed shipping other places.

How do you see the future price development in the petrochemical market?
The general development should be favorable.

What is the implication of the Catastrophe in Japan for Norgas?
In Ethylene it has not seemed to have a major impact. The earthquake and tsunami did not hit the part of Japan where the major parts of the industry is. Japan has reduced its impact on the industry however, but anyway we do not do much of our Business in Japan. Korea- Japan will be the trade route. But in terms of security, we as Ship owners have the right to say no if they think the radioactivity is too high. Then the charterer would be responsible for alternative solutions.
Do you foresee any problems connected to the combined chemical and gas shipping? If so what?

Could be some ports were they do not allow it, but not for the majority. There could also be some next cargo difficulties. Meaning that for the chemicals we need to be sure that we can carry a specific chemical after another.

We do not have the same network of contacts in the chemical market, we basically do not know as much about it. But because of the internal rotation systems in the Japanese trading companies, some of the people we have spoken to about ethylene, suddenly is working with chemicals the week after.

We could be facing some customer problems, because they want specially focused ships, only chemical ship not combined.

**Do you think the cost structure will differ? If so how?**

Yes, we know that the cost structure will differ on these ships because they use more fuel than others. Also we need crew that is certified to handle both gas and chemicals.

**Do you think combined vessels will prove to be a competitive advantage? If so, how sustainable could this be?**

We believe that these ships can become profitable, but we do not know if it can become a competitive advantage. That’s why your group is assigned. To help us answer this question.
10.2.2. Interview with Norgas Carriers AS, Business development

Tell us the story about the WG fleet?
The ships were originally made because of two main reasons; First of all we saw that we wanted to cater a growing market in the Inter Asia trade and also river trade, basically up the Yangtze River. Furthermore, because of the scrapping of two of our old boats we had 6 relatively new stainless steel tanks which we wanted to use, and we wanted to build some smaller and cheaper ships. We wanted three ships out of two. So it was a combination of catering a “blue ocean” and the thought of recycling.

What makes them unique and special?
They are shorter and wider then our average ships. This is mainly because we wanted them to be more suitedable to some of the terminals in China and Yangtze. In addition to this there is no heating coil. This makes for instance the carriage of vegetable oil impossible. But this can be retrofitted at a later stage if the market for these kinds of oils proves to be worth it. The biggest advantage is of course the ability to carry both chemicals and gas. In our case Ethylene gas and chemicals (such as Benzene, Toluene, Xylenes, and Styrene Monomer). This makes the ships flexible and increases the number of products within one keel.

How did the market look back when the WG fleet was initiated?
I am pretty sure the amount of chemicals that move around is much more than before and also with an increase in lot size. This did not happen overnight though. Also we saw that some of the Easy-Chemicals were in the same locations (terminals) as the ethylene gas.

What kind of Chemicals was initially intended to be carried in WG?
The original idea was to carry so called Easy-Chemicals (This includes our BTX+S). This is chemicals that require relatively easy cleaning routines.

Does the Earthquake and Tsunami disaster in Japan affect Norgas´activites?
Not directly. From what I have heard the affected ports are mostly in the north east side of Japan and the damage inflicted on them will not affect our shipping routes. But more indirectly the disaster will affect us. First of all I think we could be affected positively, by the fact that a big part of the country needs to be rebuilt, and with that there comes a demand for plastic
products, and of course with that there comes the demand for our shipping services of gas and chemicals that are essential in the making of plastic.

**More in general, how has the development and growth of Norgas been in the last two decades?**

Well, the 1990s where a bit difficult, but when we reached 2000 there was a lot of optimism. We decided to renew our fleet and the building prices at that time were relatively cheap. Later on we grew along with everybody else in the mid 2000s but were of course hit by the crisis in 2008-2009. You know it takes some time before that type of crisis hits our industry due which is characterized by a sort of lag and derived demand.

**Tell us a bit about Innovation and technology efforts at Norgas?**

We have done several things in relation to innovation and technology. In the coming years I think most people in this business is going to focus on making our carriers more efficient. For instance we have developed better insulation for our tanks which causes the heating ingress to decrease. Furthermore, our improved recondensation systems are more efficient and better. When we carry gas, some of the gas will get condensed and these systems will turn the condense into gas again.

**Where do you think Norgas has competitive advantages?**

As we have discussed we are good at innovation and technology, which again reduces our costs and reduces emissions.

**In terms of SHE&Q, what is important?**

Norgas and IM Skaugen is of course affected and regulated by international law and regulations. WG is more affected and regulated because the chemicals being carried are more in number and therefore more regulated. In addition to this, crew must be certified on more chemicals than compared to regular ships, because WG carries several products.

**What is the company’s development plans?**

I can reveal some new plans, but not all. We are planning to get four new ships. Big Multigas ships who can carry almost 12,000. These are somewhat copy/paste from the previous ships and will be carrying ethylene. You must understand that it is not just about getting bigger and bigger, but more efficient and more volume effective.
**Norgas has a fairly young fleet, is this industry average?**
Yes, I would guess the average age is about 10 years which is a lot lesser than we had in the end of 1990.

**Do you own the WG ships?**
No, actually they are owned by Tee Kay in Canada. We designed them, built them, sold them to TK and we are now leasing them back.

**Are there any difficulties in this industry and particularly in getting new customers?**
Yes, there are some difficulties in getting the customers to understand the value of the flexibility delivered by the WG solution. Also some customers could be difficult to get because there are relationship between people and a whole lot of trust. The switching costs in this industry is high and it is not easy to “steal” customers if you do not have a significantly better service. We have also experienced some problems with getting the customers to realize the environment-argument for choosing to carry more products under one keel, which you actually can do with the WG ships. It is difficult when you cannot convince them with arguments that can directly show profitability. As I said, we are struggling with commercializing WG.

**Combined ships as competitive advantage?**
I am afraid it is not an advantage at the moment. We have succeeded in the technical aspects, but not in the commercial aspects of WG.

We must develop and be better at teaching the customer about WG and about the advantages. I do not see that anyone at this stage will try to copy our WG features. They have not to this point been a commercial success and I think they must be a huge success before anyone takes the time, commits the resources and takes the risk to copy them.

**In practice do you experience any cultural differences within this multinational organization?**
Well, of course. People are different and are from different cultures. Shipping is no longer being run in Norway; more and more of the main operations are being moved abroad. Suddenly just a few executives are still in Norway and this makes an efficient flow of information difficult. Sometimes the perception the Norwegians have is that our colleagues in Singapore and China are not that direct as we are, and that could potentially cause problems. But at Norgas we work to make this diversity an advantage rather then something challenging.
10.2.3. Interview with Eitzen Solvang Ethylene

What is your name?
Andreas Rahbek

What nationality are you?
Danish

Where do you currently work?
Eitzen Solvang Ethylene

What do you currently work with?
Chartering assistant

What is your background in shipping?
I have worked in the industry since 2007 and have only worked at Eitzen. Previously I completed a business education and have attended a few courses in terms of seminars like technical education. I do not have much education in this industry, but it is more learning by doing in this industry than actual educational degrees and the companies often want to educate the new employees themselves.

How long have you been in this industry (line of work)?
Since 2007.

What in particular do you find appealing and interesting with the shipping industry in general?
For me it is very much about the genuine “hands-on” approach in this industry. I like the fact that it is basically learning by doing. For me I was kind of thrown into it and was given a lot of responsibility from day one. I find this industry very exciting and I love the fact that it is so international. The thought of helping the world’s trade is very satisfying. Shipping is really the binding factor to keep the world together and to be able to contribute to that is inspiring.

Are you familiar with the technical aspects of a combined vessel?
To some extent - I am not doing the technical stuff in the company I am doing the commercial part. However I went on a week seminar at a navigation school in my first period as employee and this is actually compulsory. So I learned the technical basics there and of course when doing the operations you need to be familiar with these things.
Have you heard of the WG fleet?
Yes I am. I actually did a study on these ships back in the days and have brought some information for you.

How do you view the opportunities/challenges in the Inter-Asia gas and chemical shipping market?
Well we do not really handle chemicals that much and the market for petrochemicals is not that good. I mean we have the capacity to do it, but we don’t do it. We are not carrying any of the BTX+S chemicals. Last year we did look at it, but the market was so bad and this was when everything collapsed. Then we actually went so far as to considering carrying orange juice. We have the scope to that as well, but now it is much better.

How do you see the future price development in the petrochemical market?
The problem is basically the economy with the combined vessels. I am not into this, because as I said, it has been quite a few years since we carried chemicals. But by economy problems I mean especially that the daily expenses of combined ships are about 50% more than other ships.

Do you foresee any problems connected to the combined chemical and gas shipping? If so what?
I do not know how the market looked like when they started the project of these boats, but I am quite sure it is not what it looks like right now. Now the ethylene market is peaking, so there is actually no point of doing combined right now. However, the expensive thing in the building of such ships is to include the ethylene part, and that is already done, so the idea is good. However, from my point of view the ships should carry ethylene and there is no need to include LNG. Actually, I do not think they are too happy about these ships right now.

Another problem is that there is no spot market for LNG and I think one of the project Norgas had planned failed. I know A.Veder has a project to run with their combined vessels. Honestly I it was a waste of money and maybe in twenty or fifteen years it can work. Then their vessels will be quite old, but I think this is the scope to develop a spot market in LNG. The carriage of chemicals is not really happening right now.
I do not think it will be a problem with customers. Even though they are not specializing, but combining there should not be any problems. The customers have all reasons to trust the operator of combined ships because they are required to provide licenses and certificates to prove them able and secure. If they have a decent history, it should not be a problem.

**Do you think the cost structure will differ? If so how?**

When operating these kind of ships obviously the cost of cleaning will be higher and also the cooling. In addition you have the different licenses required and therefore certificating and training of crew is a bigger cost. Concerning port problems I do not think it will be a huge problem. Some may require extra education and certificates of the crew, but it is not that much.

**Do you think combined vessels will prove to be a competitive advantage? If so, how sustainable could this be?**

No, not at all. I don’t think even operators and then mostly Norgas thinks so any more. It is a quite common concept, but the LNG has no spot market so I don’t see any market for carrying two cargoes now. Regarding hedging I don’t really know, but I don’t see hedging as a big opportunity here. If you can get good rates in the gas market it is no point of trying to hedge. Chemical market will not over shoot the gas market any ways. There is no signs of that happening and the market is kind of “shit”, but that is just my point of view.

I don’t see us starting to carry chemicals either. More crackers are coming up so the ethylene niche market is good and there will be a need for vessels. I would never have built these ships and I have no faith in this concept right now.

**What is the implication of the Catastrophe in Japan?**

Nothing. I mean, it is tight in the market. They produce less so there will more production from other places. It is not bad for the industry. It is of course it’s a disaster for the country and my condolence goes out to the people of Japan. We do not do that much with Japan anyways so we didn’t really get affected in any way. We have two main contracts with Middle East and Indonesia and therefore it is years since we “called” Japan.
How is the relationship focus in your industry?

There is no marketing in this industry. We attend conventions and here we meet our customers. We do some presentations and basically it is a lot of “social marketing” because there is really nothing to market except from our people. We cannot say that we transport differently, because that is impossible. A ship is a ship and if it can carry ethylene then it is similar to all ships that can carry ethylene. If a company markets a lot it is mostly because they are hiring people. The awareness you get from customers is not necessary because they and the brokers already know you. So it is quite cheap
10.2.4. Interview with GEMOIL Pte Ltd

What are your names?
Wong Yoke May and Claudia Koh.

What nationalities?
Singaporeans

Where do you currently work?
GEMOIL

What do you currently work with?
I (Wong) am a trader and I (Claudia) work in business development.

What is your background in shipping?
Well, we have a relatively short history in this industry, before GEMOIL I worked one year as a petrochemical broker (Wong). And I (Claudia) have only worked at GEMOIL for a few months, but before that I have been doing bunker for two years.

How long have you been in this industry (line of work)?
I (Wong) have been in the industry for 4 years and I (Claudia) have worked in shipping for a little over two years.

What in particular do you find appealing and interesting with the shipping industry in general?
Personally I find the constant changes very interesting (Claudia). Yes, and the diverse environment in terms of different actors in the same industry like for example brokers, ship owners, chemical experts and production units (Wong).

Are you familiar with the technical aspects of a combined vessel?
No, actually the actual shipping service is not our area of expertise so we do not have a wide understanding of the actual ships that are used (Wong).

Have you heard of the WG fleet?
No, but now that you have told us, we understand the basic aspects of a combined ship (Claudia).
How do you view the opportunities/challenges in the Inter-Asia gas and chemical shipping market?

Well, the gas market we know little about, but regarding the chemical market, it is quite poor right now. Any increase will be positive concerning the current poor level of the market`s prices and profits (Wong). And to tell you the situation in China, the current the supply of petrochemicals is very low (Claudia). In addition, China uses a lot of styrene in their construction work, but recently they have detected a problem with this and have now stopped all the import of styrene monomer. This will of course pose as a challenge for those shipping styrene to China.

How do you see the future price development in the petrochemical market?

The thing is that in this market we experience a huge derived demand. The demand for petrochemicals is derived from the demand for toys, Tupperware and other products fabricated with for example plastic. Therefore a forecast should be done by someone knowing a whole lot more of these industries than we do (Wong).

An interesting issue is the different quality of the same product from different countries. For example, Taiwan is producing Styrene Monomer regarded as a lower quality than for example Korea or Japan. So this chemical is used in the production of plastic and is therefore affecting the demand for styrene from Taiwan because Western producers of toys, which use Styrene in their fabrication in China, will not want China to buy the Styrene for Taiwan (Claudia). So you see the implications of different issues can affect many actors in this industry and this is just one example of the derived demand and the forces affecting the price development (Wong).

The trend however, concerning this kind of fabrication, is that the flow is to China, especially to south China from Korea and Japan and the products are fabricated there and then shipped to Europe or America (Wong).

Do you foresee any problems connected to the combined chemical and gas shipping? If so what?

As mentioned, we are no experts at the technical aspect of the ships used in our industry, but we can give you some thoughts on this (Claudia)
You have to look into the different ports to identify if there are different regulations and rules. For example, a vessel like this will need several insurances and licenses (Claudia).

Regarding customer problems I do not believe they will regard a combined ship as less capable to carry chemicals than a fully specialized chemical tanker. From my point of view, the customers only concern for price and if you have the most favorable price, you will get the shipment assigned to you (Wong). In this industry the price is the main thing and it basically always boils down to this (Wong).

**Do you think the cost structure will differ? If so how?**

Because the ships of this concept usually are quite small, the vessels freight expenses will be higher (Claudia). Concerning the cleaning this will possibly be a huge expense and the vessel might use a lot of fuel to carry less than maximum. I would want to ask if this makes economic sense. (Wong)

**Do you think combined vessels will prove to be a competitive advantage? If so, how sustainable could this be?**

The only thing I see as an advantage is that it reveals a good diversification because the gas market might do well when the chemical market is not (Claudia). So, it will be a less risk of losing money compared to doing specialization (Wong). However this must be considered in context with the problems of this kind of vessel and therefore I would conclude that it will probably not prove to be an advantage in the future and therefore neither prove to be a profitable concept (Wong).

**What is the implication of the Catastrophe in Japan?**

In the short term the catastrophe had a huge impact on the market and the industry of chemical shipping (Claudia). However, many shipments out of Japan has not been stopped, it is only the container ships that have been stopped because of uncertainty of radiation (Wong). The current situation is that process came down, but is now stabilizing again. In the long run I do not believe it will be positive effects on the shipping industry of chemicals because I believe Japan will supply themselves until everything is ok (Wong).
10.2.5. Interview with Odfjell Asia

What is your name?
Johan Halle

What nationality are you?
Norwegian

Where do you currently work?
Odfjell

What do you currently work with?
Chartering manager, I work on the commercial side and I am responsible for the Asia Pacific fleet.

What is your background in shipping?
I have worked at Odfjell since 1997 and my field of education is social economy/macro economics.

How long have you been in this industry (line of work)?
In total I have been 14 years in shipping.

What in particular do you find appealing and interesting with the shipping industry in general?
Well, it is a bit difficult to say. But basically there are new things happening every day. You get to be involved in building companies and fleets from point zero. The pace in the industry is extremely quick and it is very exciting. I have lived in Japan, Singapore and Houston and I like the possibility I have to travel.

Are you familiar with the technical aspects of a combined vessel?
I am familiar with the concept and its technical aspects.

Have you heard of the WG fleet?
Yes, I have heard about it.

How do you view the opportunities/challenges in the Inter-Asia gas and chemical shipping market?
The opportunities are extraordinary. It is the area in the world growing the fastest. The growth in demand for shipping services like we provide will usually be two times the growth in GDP. So
if timed right it could be an incredible journey ahead. There is an enormous growth in building and infrastructure development in China, and this needs gas and chemicals. The more obvious challenges for the Norwegian ship owners is that we are often more expensive. The Chinese owners on the other hand are not that concerned with safety, health and environmental issues. And this is something which Norwegian ship owners spend a lot of money on, and those cost needs to be transferred over to the customer somehow.

**How do you see the future price development in the petrochemical market?**

Well, there were assumptions and forecasts showing that this year would be a good year. But the oil price is greatly affecting us and when bunker prices is spiking, there is really not much we can do. The event in the Arabic world has affected the oil price and therefore our costs. The market could not cope with the increase in bunker cost. Revenues are in some not following the extraordinary costs.

**What is the implication of the Catastrophe in Japan for Odfjell?**

First of all I want to express my great sorrow and send my thoughts to the Japanese people. But if we are to analyze the market’s reaction to something like this, it would probably be short term negative outlook, because the ships which were sailing in Japan needs to be withdrawn and placed at other routes. On the other hand, the long term outlook would probably be more positive. The country would need the products we ship in the rebuilding of the country.

**Do you foresee any problems connected to the combined chemical and gas shipping? If so what?**

In a market with several ships and suppliers it could be proven difficult to attract new customers. Moreover, I am not sure that the customers view Norgas as a typical chemical shipping company. This could prove to an obstacle for Norgas when trying to gain market share in the chemical market.

With regards to Port issues, I would guess that as long as the ships have a relatively normal layout there will be no problems at all.
When it comes to restrictions and legal issues one issue is key. China is almost impossible to deal with due to the excessive red tape. The domestic trade in China (and this includes Taiwan) is something you must apply to get license for at that could take a great amount of time.

Do you think the cost structure will differ? If so how?
Yes, probably but all in all it is the price they could get for the chemicals that would prove if this is plausible or not.

Do you think combined vessels will prove to be a competitive advantage? If so, how sustainable could this be?
No, if we have had these vessels I think we would have tried to focus them on the chemical market. There is definitely a surplus of ships in the triangle Korea, Taiwan and China. It is a difficult market. But the gas market and the chemical markets are not directly linked and correlated, so the vessels could be used as a sort of hedging. Also there could be some mileage in vegetable oils if they get heating coil retrofitted.
10.2.6. Interview with Singapore at Lorentzen & Stemoco shipbrokers

What are your names?
Rolv Stokkmo and Esben Ringen.

What nationalities?
Norwegians

Where do you currently work?
We both work at Lorentzen and Stemoco shipbrokers

What do you currently work with?
I (Rolv) am Vice president and head of the gas department in Asia Pacific.
I (Esben) am Director for the sales and purchase department.

What is your background in shipping?
I (Rolv) have worked in Norgas previously, in Unigas as fleet chief in Shanghai and with trading in Hong Kong.
I (Esben) have studied master degree in economy and administration at BI Norwegian School of Management. I have previously worked with a chemical joint venture in Singapore from 1997 to 2007. Now I am back in Singapore to take care of the sales and purchase department in Lorentzen Stemoco.

How long have you been in this industry (line of work)?
I (Rolv) have been in the industry since 1972. And I (Esben) have been in the industry 1995.

What in particular do you find appealing and interesting with the shipping industry in general?
I (Rolv) was always planning an education at sea and after this it was natural to follow the line and start working with shipping from land. I (Esben) have always been interested in shipping and therefore I studied shipping after my education from BI NSM.

Are you familiar with the technical aspects of a combined vessel?
Yes, we are, we know about the ships and we are pretty familiar with the technology (Rolv). The concept is actually quite old (Esben).
Have you heard of the WG fleet?
Yes, as you may know I worked at Norgas in the early years. I still have contact with the people there and I always meet up with Bård when he is down here in Singapore (Rolv).

How do you view the opportunities/challenges in the Inter-Asia gas and chemical shipping market?
The thing about this kind of shipping is that it correlates perfectly with macroeconomic forces (Rolv). If the economy goes up, the need for shipping of gas and chemicals will also increase (Rolv). If there is an economic growth in some countries, there will be an increasing need for gas and chemicals to fabricate products, and therefore a need to ship these gas and chemicals to the country (Esben). Yes, so therefore, to succeed in shipping you are dependent on following the macro trends (Rolv).
Right now, the market is growing, no doubt about that because of the Middle East and their production (Esben).

How do you see the future price development in the petrochemical market?
The market is growing. In Saudi Arabia expansion is focus and they are increasing ethylene capacity (Esben). You see, the price is only depending on where the imbalances are, but the trade is increasing because of the Middle East (Rolv).

Do you foresee any problems connected to the combined chemical and gas shipping? If so what?
The idea is good, but the concept is difficult (Rolv).
First of all, I think they bought the equipment by themselves. They wanted to do so much by themselves and kind of lost the economy of scale because of that. If a shipyard bought the equipment, it would be to a much better price (Rolv).
Concerning the three countries you are focusing on (China, Taiwan and South Korea) it will be a problem that there is so many simple and cheap Korean ships that easily can move the chemicals you are analyzing (Rolv). From my point of view, they should have tried to do this with other chemicals, but at the same time, that will demand more cleaning cost and therefore be more expensive, so it will not work (Esben). The point is that it may not be the best solution to do these chemicals because many ships could do it to a lower cost (Rolv).
The flexibility of the ships is not being fully exploited because the meaning could be to carry gas when chemical markets are bad and the other way around, but these markets are correlating perfectly and cannot be compensated by each other (Rolv).

Another problem is a higher port cost (Esben). You pay port cost for each ship and if the ship is not even full, the cost will be higher per ton than the other ships so you will be less able to compete on price (Esben). The ship will also burn more in context to what it actually carries. And the ship with these costs is competing against ships that are full and which need a lower price of the transport because it carries more to the same costs (Esben).

If we were to operate these ships we would first of all never have build these vessels (Rolv). But if we had them, we would probably rebuild them so that all the tanks could carry ethylene, since right now they can never carry a full load because the integrated tanks cannot take ethylene (Esben). To sail half empty is of course not good. Now they only carry ethylene a part of the boat and if they rebuilt they could at least do full boat (Rolv).

If you cannot make money on the combination, which was the main idea, then it is very difficult to make money on these ships at all (Rolv). Now it is kind of either or and right now they are not perfectly good for anything (Rolv).

The recycling part of building these ships was clever, but from our point of view and from how the market looks now, they probably should have rebuilt the two ships into two ethylene tankers at 6000m3 or something (Rolv). Then they could also carry chemicals, but instead of three combined ships that right now is useless for the concept, this idea would have been better (Rolv). The idea is very good, but to do it practically is more difficult (Esben).

**Do you think the cost structure will differ? If so how?**

The costs are mainly cleaning and crewing (Esben). Cleaning will be a major cost because it is ok to go from gas to chemicals, but to go from chemical to gas will need many days of cleaning. Crewing is a main cost because the crew will need licenses for both gas and chemicals (Esben). In addition, chemicals pay a low price on short distances and the flexibility looses its value because of that too (Rolv).
Do you think combined vessels will prove to be a competitive advantage? If so, how sustainable could this be?

I do not think they did enough studies in advance, they kind of just jumped into it without knowing if this could work, and now it shows that it don’t work (Rolv). Now you are doing the analysis, after the ships has been built (Rolv).

If they or you succeed in identifying a small trade that is suitable for the concept, then they can do it all alone. I don’t think anyone will try to copy (Rolv).

It is a lot of trading from Korea to China, but it is also a lot of cheap vessels to compete against (Esben).

It may also be possible that the vessels can trade between China and Taiwan if one find two or three products that are moving around there (Rolv).

Concerning the problems with the flexibility and the gas and chemical markets moving similar, it may be possible to transport acid. This product is always needed and is not correlated with the economic growth like the gas and chemical demand (Esben).

Maybe it can go domestic travels in China with combination cargos (Rolv)? But I do not think they have the licenses to do that, or I know they don’t have, so they will first need to get one (Esben). For some years ago five licenses very delivered, and Norgas do not have any of these. It is basically no demand for too many carriers domestically either (Esben).

What is the implication of the Catastrophe in Japan?

As mentioned the shipping industry is closely related to the world economy. When one country needs to rebuild it will of course be a huge demand for gas, chemicals and other construction products. And because of this, it will be a demand for shipping services of these products. We just have to wait and see how much Japan will produce and how much they need.
### 10.3. Appendix 3 Political overview

#### 10.3.1. Political overview – China

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Adapted from: [BMI, 2011](#)
### 10.3.2. Political overview – Taiwan

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| **Last Election**           | Parliamentary - January 11 2008  
Presidential - March 22 2008 |
| **Composition Of Current Government** | Kuomintang (KMT) |
| **Key Figures**             | Vice President – Vincent Siew; Secretary-General – Lin Join-sane; Minister of Finance – Lee Sush-der; Minister of Foreign Affairs – Timothy Yang; Minister of Defence – Kao Hua-Chu; Minister of Economic Affairs – Shih Yen-Shiang; Head of Mainland Affairs Council – Lai Shin-Yuan  
Central Bank of the Republic of China Governor: Perng Fai-Nan |
| **Main Political Parties (number of seats in parliament)** | Kuomintang Party (71 seats): Pro-Beijing and business-friendly.  
Democratic Progressive Party (27 seats): Pro-independence, liberal and environmentalist  
People First Party (8 seats): Conservative. |
| **Next Election**           | Parliamentary January 2012  
Presidential March 2012 |
| **Ongoing Disputes**        | Dispute with Japan and China over the Diaoyutai islands and with China, Malaysia, the Philippines and Vietnam over Spratly islands. Dispute with Vietnam over Parcels Islands. |
| **Key Relations/Treaties**  | Strong alliance with the US (treated as if Major Non-NATO Ally) |
| **Adapted from:**           | [BMI, 2011](#) |
### 10.3.3. Political overview – South Korea

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10.4. Appendix 4 Excursion at Norgas Pan

April 15 we were invited to visit the Norgas Pan, which is the first ship that was constructed of the Wintergas fleet. This was arrange for us so to obtain a better understanding of the ship many functions, how it is being run and of course how it looks like. We were very happy to get the change to see the ship in real life, as we have used much time studying and analyzing the fleet and its market, as it is the main part of our diploma project. Captain Ajay Singh was our mentor of the day. He did a brilliant job in showing us the many aspects of the ship and we had a great learning lesson.

The visit started with greeting the Captain of Norgas Pan; Sytnikov Voldoymyr. The first thing we learned was that safety on board is always the first priority, so we changed into working jumpsuits, safety shoes, helmets and gloves. Now we were suitable to view the whole ship safety. It is important to take precautions before when being near explosive gases and chemicals. The ship is loaded with safety equipment in every part; everything from VHF, lifeboats, lifejackets and more specific safety equipments that ensure loading, temperature and leaks is taken in control. It is also placed emergency stops everywhere that stops the engine if needed. We were shown where gases and chemicals are loaded, and inside the control rooms where instruments can tell us everything from how much is loaded, which temperature they hold etc. We were also shown how the crew lives and after hours of viewing we enjoyed a great lunch with the crew.

We have made a competitor analysis in the external analysis of our thesis, which made us able to spot Norgas’ competitors close up while we were on board. We spotted Lauritzen Kosan, Eitzen, Gaschem, Odfjell and Stolt Nielsen, which were all anchored in the same area as Norgas Pan. This made us realize how though the competition in this market is, because of the wide scope of available fleet in the same area.

We all agreed that this was an interesting and learning experience, which gave us another perspective of the ships. Captain Ajay and Captain Sytnikov answered all our questions properly, which helped us understand more of the operational factors of the ship. They also helped us with numbers needed to measure costs of transportation used in research questions.

This excursion was really inspiring and was a real motivational factor for the project and our aim to learn more about the shipping industry.