NORGES HANDELSHØYSKOLE
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How do Norwegian shipping companies benefit from joining the Chinese maritime cluster?

A case study of a Norwegian shipping company's operations in China from a cluster perspective

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Master thesis in Strategic Management

NORGES HANDELSHØYSKOLE

Summary

Norwegian shipping occupies considerable market shares internationally and has achieved dominating positions within many segments. Thus, Norway appears as one of the leading maritime nations with one of the most complete maritime clusters in the world, a position that has been maintained since the beginning of the 1900's.

During the last three decades, China has experienced an extraordinary growth within some of the maritime industries as the Chinese market has opened up. Foreign investors, among them Norwegian shipping companies, are attracted by this growth and have recently carried out large-scaled investments in new and strategically located ports. This thesis explores one of them as a case company with the objective to find out how Norwegian shipping companies in general are able to benefit from joining the Chinese maritime cluster.

The thesis is based on the framework of Michael Porter's Competitive Advantage of Nations: the Diamond (1990). It explores by using this model whether the Chinese diamond generates cluster effects in terms of upgrading mechanisms and whether these in turn can lead to benefits that are achievable for Norwegian shipping companies operating there. The thesis extends Porter's theory by investigating whether companies from foreign nations can utilise cluster benefits in a *host* country.

The research strategy used is *single case study.* The analysis is carried out by collecting primary data from interviews with respondents both internal and external to the case company and then matching this with relevant secondary data. Findings from the analysis show that there as of today exists no complete Chinese maritime cluster and that Norwegian shipping companies thus are still unable to benefit from cluster effects in terms of upgrading mechanisms in China. Maritime China as of today consists mainly of shipbuilding and shipping companies and is too incomplete to be labelled a cluster. The findings however point towards the existence of a Chinese maritime cluster and upgrading mechanisms in a distant future.

Preface

The thesis is a part of our completion of a master degree in Strategic Management, a degree that involves courses that are to an increasing extent influenced by the subject of globalisation and integration of markets. Accordingly, we have during our years as master students at the Norwegian School of Economics and Business Administration (NHH) developed a certain interest for the study of entry strategies. This was initially the theoretical point of departure for this thesis. Studying in Bergen, in which the economic life is centred on, to great extent *shipping*, the choice of industry to study became obvious. Another reason for the choice of industry is the fact that it is probably the most international industry and thus a natural choice when studying entry strategies. During the reading of the literature, it became clear that it was more interesting to do the research from a cluster perspective and so the theoretical point of departure changed. It was eventually decided to study a case company with respect to the location attractiveness of where they have established businesses abroad. The case company has established central activities all over the world, however, it is their newly established terminals in China that are of special interest. What's more, the transition of China's economy is a subject that is constantly emerging in periodicals and academic literature as case study.

The thesis' development has involved an increased understanding of the theory used and much knowledge with respect to shipping as an industry, its position within a maritime context, interactions between Norwegian and foreign actors in a foreign milieu as well as China as a host country for maritime industries and its attractiveness as a competitive playground. The researchers have experienced that the concept of a 'Chinese maritime clusters' is still relatively new and unexplored. Hence, it has been difficult to gather data of good quality. However, the conclusions given throughout the analysis will hopefully give the reader a good picture of the phenomenon. It will be interesting to follow the further development of the maritime cluster in China.

We thank our advisor Joyce Falkenberg for counselling in connection with the thesis. Also, all respondents deserve much gratitude for availability and helpfulness. The case company has expressed a desire not to be mentioned by name and is therefore referred to as 'the case company' throughout the thesis.

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Introduction

The purpose of this thesis is to find out if and how Norwegian shipping companies in general, and the case company in particular, are able to benefit from being a part of the Chinese maritime cluster. As shipping is one of the decidedly most global industries involving exceptionally high stakes and thereby risk-loving actors, it is a particularly fascinating industry. This fascination is strengthened by the fact that Norway has established a unique competitiveness within maritime expertise across the whole maritime cluster. Regarding China, it has ever since the transition to market economy, to an increasing extent found itself in the world's searchlight. Investors are turned on by potential market shares from this colossal population and multinationals are eager to exploit the country's low factor costs. The Chinese economy is experiencing a tremendous growth and so it has become a case study also for academic purposes.

Contribution

Michael Porter in his theory ' The Competitive Advantage of Nations' states (1990) that a nation's industries are not evenly spread throughout the economy but connected in *clusters* consisting of industries linked through vertical or horizontal relationships. Porter claims with this study that firms are successful internationally because they draw upon advantages in their *home* based industry cluster, giving them an international competitive edge relative to their international competitors. This thesis takes Porter's theory a step further in investigating whether companies can gain the same advantages in participating in and utilizing cluster effects also in foreign countries. That is, whether foreign companies can benefit from a *host* country's cluster. There has, prior to this thesis, been relatively little research on this subject, at least not looking through the eyes of a Norwegian company. The existence of such advantages for foreign companies would extend Porter's theory of national advantage and international competitiveness.

The course of the thesis will gradually lead the reader toward the answers to the research problem. The theoretical and methodological foundation will be presented as a precursor to the analysis.

Research problem

By studying the activities of Norwegian shipping companies abroad, this thesis aims to determine how they take advantage of investing in maritime clusters in an emerging economy such as China. The case company has recently invested heavily in new terminals strategically located in Dalian and Jiangyin on the western shore of the country. The thesis will look at how this company in China manages to take advantage of the different factors that according to Porter's theory 'The Competitive Advantage of Nations' (1990) drive cluster processes. In other words, it attempts to find out what *factor conditions, demand conditions, supporting and related industries, firm strategy, structure and rivalry and government policies*[1] in China's maritime environments are favourable for Norwegian shipping companies in general and the case company in particular. It also investigates whether or not these factors in China are able to generate so-called upgrading mechanisms, which in turn can lead to cluster related benefits. This leads to the following research problem:

How do Norwegian shipping companies benefit from joining the Chinese maritime cluster? A case study of a Norwegian shipping company's operations in China from a cluster perspective

As the formulation consists of several concepts that might have diverse interpretations, it is necessary to clarify them in order to give a full understanding of the thesis' objective.

Benefit is a broad concept. It excludes in this context the pure economic meaning of the word, i.e. how much money a company generates from its operations. This thesis rests to a large extent upon Michael Porter's theories and findings. Porter uses a more strategic approach to the concept and 'benefit' can be explained in the terms of 'increased competitiveness'. In other words, increased competitiveness equals benefit gained.

Maritime clusters are in this thesis clustering of maritime industries within a limited geographical area, such as the area surrounding a seaport. The typical maritime cluster can include industries such as shipping, shipbuilding, repair and conversion, inland shipping, port related services, classification, R&D and education, equipment manufacturing and ship broking. The thesis is based upon Porter's definition of a cluster, i.e. an enclosure of

[1] 'Chance is ignored in this thesis'

necessary input factors, suppliers, related industries, customers, rivals and governmental institutions. Furthermore, it is assumed that the maritime clusters are not international; they are for the purpose of this thesis limited geographically. Hence, it is possible to refer to a Chinese maritime cluster ignoring the fact that the industries operating within a maritime milieu are also connected to industries on a global scale.

'Operations in China' refers to activities situated in China. In this thesis it is primarily the activities surrounding the case company's recently built terminals that will be studied.

Comments and assumptions[2]

The research complexity makes it necessary to make some comments and assumptions that are important to keep in mind when reading and evaluating the thesis.

- The thesis refers several times to the term Chinese maritime 'cluster' despite the fact that this might not be a correct term. A more adequate concept could have been milieu or sector. However, in order to avoid confusing the reader, the term 'cluster' is used throughout the thesis.

- It is possible to generalise to other Norwegian shipping companies based on information about one of them. Still, it is important to keep in mind that the case company both in Dalian and Jiangyin is a minor part (49%) of a joint venture. In other words it is possible that the conclusions drawn regarding the case company are not fully generalisable to other Norwegian shipping companies that establish Greenfield investments in this country: It is obviously easier to take advantage of the cluster conditions in a host country when combining forces with the host itself. However, this is one of the unavoidable characteristics of case studies so it has been ignored not to further complicate readings.

- The two names for Porter's theory: 'The Competitive Advantage of Nations' and 'The Diamond' are used interchangeably.

- The notion 'port clusters' does not equal maritime clusters: Whereas port clusters deal with all economic activities that are agglomerating in proximity to a port, maritime clusters include all maritime industries, but they are not necessarily localised in or nearby a port. For instance, shipping agencies do not necessarily need to be localised near the ocean, although it is advantageous.

- Whenever the thesis refers to the 'case company' in the analysis chapter, it is in fact referring to personal correspondence with the case company's Senior Vice President in Asia.

[2] In addition to the already mentioned when clarifying terms used in research question.

Configuration

As the case company is present in two different Chinese ports, much of the analysis is based on information about the two ports Dalian and Jianying. This has consequences for the structure of the analysis of the Diamond, which is configured as follows *when it has been adequate:*

- Analysis
  - The Diamond
    - Factor / determinant
      - China in general
        - Dalian
        - Jiangyin
          - Case company
          - Norwegian shipping companies

Model

The model structures the research process and illustrates the research procedure that has been carried out in order to answer the research problem. It has been necessary to gain insight in all the different areas of the theoretical framework to reach the thesis' purpose. That is, explaining the performance of Norwegian shipping companies operating in China as a function of the Chinese cluster's conditions and the company's ability to exploit these.

The dependent variable is the ability of Norwegian shipping companies to benefit from operating within the Chinese maritime cluster. This is in its turn dependent of the macro- and microeconomic conditions of cluster. The Chinese maritime sector has certain characteristics making it unique and attractive for foreign enterprises. To explore these, Porter's 'Competitive Advantage of Nations' (the Diamond) has been used as a theoretical foundation. These features of the cluster can lead to so-called upgrading mechanisms; pressures to innovate, complementarities and knowledge diffusion, which in turn can generate benefits for the companies operating within the cluster. If the upgrading mechanisms are weak or non-existing, the benefits may come directly from the Diamond.

Porter's framework asserts that companies and industries excel because they take advantage of factors in place in their home nation. This thesis extends this theory by investigating how companies and industries can draw benefits from participating in clusters abroad and thus utilise the same set of factors in a host country. The illustrated model is based on Benito's 'value creation in a cluster perspective[3]:

[3] See theory chapter - 'cluster theory' for further elaboration

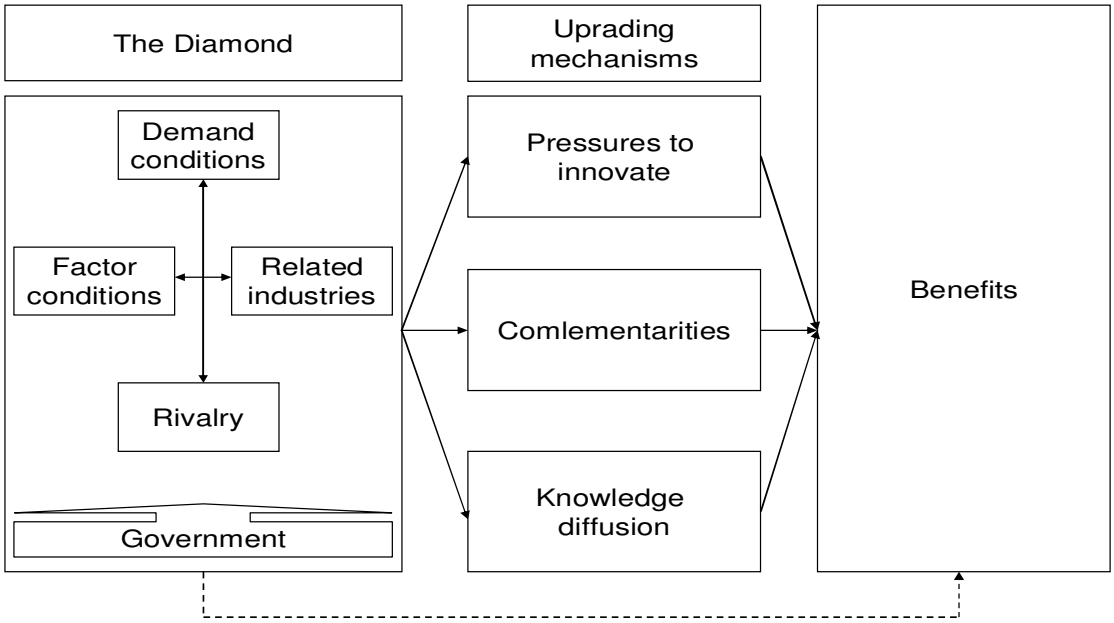

Figure 1: *The model structuring the thesis*

Theory

As the thesis follows a deductive approach, the theoretical framework has been drafted at the beginning of the research and slightly modified during the thesis' development. The theory is used as foundation for the analysis chapter.

Competitiveness

It is appropriate to elaborate on the concept of competitiveness as this thesis studies how the competitiveness of firms in a particular industry is influenced by the attractiveness of a given location. Nations can no longer assume that companies will stay and create value within their borders. Rather, they must compete in keeping and attracting firms. Consequently they must stand out as attractive hosts. As established by Jakobsen et al. (2003) in a research publication on maritime industries, 'companies have to be competitive in the international product markets and the country has to be attractive as a host for these companies'. Furthermore, Jakobsen et al. explains in their publication that there is an important relationship between *industry* competitiveness and *location* attractiveness that is also essential to this thesis. That is, a nation providing companies with something that may increase their competitive advantage is attractive. The location will then have a particular host advantage, which contributes to the companies' competitiveness. Industry competitiveness is then found by summarising the companies' competitiveness (Jakobsen et al. 2003).

International expansion

Firms are to an increasing extent splitting up their value chains and relocating value-adding activities in various locations. Consequently, the opportunities to exploit location-based advantages increase. Furthermore, the choice of location is important because the resources firms use in carrying out their value creating activities, may vary in quality and price between different locations. So, location decisions may be a source of competitive advantage (Jakobsen et al. 2003).

According to traditional trade theory, firms will localise according to a historically randomised distribution of inputs between regions and countries (Norman, 1993). The traditional form of cross-border business is international trade, that is, by importing or exporting goods between firms or people localised in different countries. This theory is by itself however not sufficient when studying multinational enterprises (MNEs). MNEs are according to Ietto-Gillies (2005) characterized by their engagements in foreign direct investment (FDI), explained by the same author as investments in which the firms establish affiliates abroad and acquire the ownership and control of their assets. Ietto-Gillies (2005) claims further that a controlling share in economic activity via FDI can be obtained by mergers or acquisitions of existing firms abroad or by setting up a completely new business unit. In addition to exports and FDI the most usual alternative means to penetrate new markets are as follows: franchising, licensing, partnerships such as alliances and joint ventures. These forms involve a certain degree of externalisation of activities, which means that external firms to a certain degree get involved in the business. Joint ventures are in some countries the only allowed form of establishment for foreign firms. The rational for this restriction is to facilitate the involvement and learning process of local businesses (Ietto-Gillies 2005). This used to be the situation also in China before their accession to the WTO. The case company has entered China via joint ventures with locals.

The Competitive Advantage of Nations: Porter's Diamond

Michael Porter's 'Competitive Advantage of Nations' (1990) re-examines the *nation* state. According to Porter the home nation takes on growing importance as the source of skills and technology that strengthens competitive advantage. Nations succeed in particular industries because their home environment is the most dynamic and the most challenging, stimulating firms to improve and extend their advantages over time (Porter 1990). Porter's Diamond can thus be regarded as an explanation of industrial dynamics and clusters, combining firms' location choices with the attractiveness of nations.

Porter goes against classical economists[4] with his theory in stating that national prosperity is *created,* not inherited: "companies gain advantage against the world's best competitors due to

[4] Mainly Smith and Ricardo. See more under "Factor Conditions".

pressure and challenge. They benefit from having strong domestic rivals, aggressive home-based suppliers, and demanding customers".

The determinants of the Diamond

To elucidate on the dynamics behind national strength in a particular industry, Porter developed the concept of the national diamond made up of four attributes[5] of a nation. These are 1) *factor conditions,* 2) *demand conditions,* 3) *related and supporting industries as well as* 4) *company strategy, structure and rivalry.* These determinants form individually and as a system the Diamond of national advantage: the playing field that each nation creates for its industries. Nations are most likely to succeed in industries where the national diamond[6] is the most favourable. The Diamond is also a mutually reinforcing system. The effect of one attribute depends on the condition of others, yet advantage in every attribute is not a requirement to achieve competitive advantage in an industry. Two additional variables influence the Diamond particularly and are necessary to complete the theory. These are *chance* and *government*. For the purpose of this research though, the variable 'chance' is regarded as irrelevant and will therefore not be elaborated on furthermore.

The essential unit of analysis for understanding national advantage is the industry. Nations succeed not in isolated industries, however, but in *clusters* of industries linked through vertical and horizontal interactions. A nation's economy includes a mix of clusters, whose structure and sources of competitive advantage reflecting the condition of the economy's and its growth. The determinants are presented consecutively and as a system in the following.

Factor conditions

Every nation possesses, upon which standard theory of trade rests, *factors of production.* These are basically the inputs needed to compete in an industry, such as labour, land, natural resources, capital and infrastructure. According to standard economic theory, a nation will export those goods making intensive use of the factors with which it is relatively well

[5] The terms attributes and determinants are used interchangeably
[6] Being referred to as a system

endowed. This doctrine, dating back to Smith and Ricardo is, according to Porter, incomplete. He claims instead that the role of factors is more complex. The factors most important to competitive advantage are *created*, not inherited, through processes that differ between nations and industries. Hence, the stock of factors at any particular time is less important than the rate at which they are created, upgraded, and specialised to particular industries.

Demand conditions

Three broad attributes of home demand are significant: *the composition*, *the size and pattern of growth* and *internationalization of home demand.* The significance of the latter two is contingent on the first. Also, the *quality* of home demand is more important than the *quantity* in determining competitive advantage. The three attributes are explained in the following.

1. *The composition of home demand* forms how firms perceive, understand and respond to buyer needs. Nations gain advantage if home buyers stress local firms to innovate faster. Pressures from buyers to improve products are earlier sensed in the home market where proximity and cultural similarity facilitate the communication. Hence, proximity to the right type of buyers is important. To reach national competitive advantage, there are three characteristics of the composition of home demand of particular importance:

   a. *Segment structure of demand*: the demand distribution for particular varieties.

   b. *Sophisticated and demanding buyers* pressure firms to meet high standards

   c. *Anticipatory buyer needs* gives an indicator of buyer needs that will spread

   Due to unavailability of information and time limit, we have in the analysis been chosen to focus on b), 'sophisticated and demanding buyers'.

2. *Demand size and pattern of growth.* Large home market *size* can lead to competitive advantage in industries where there are economies of scale or learning, by encouraging a nation's firms to invest aggressively in large-scale facilities, technology development and productivity improvements. Hence, size is advantageous if it promotes investment and reinvestment, or dynamism. It is a disadvantage if it provides enough opportunities for firms to ignore the need to pursue international sales. A rapid

rate of growth is able to direct a nation's firms to adopt new technologies faster without having to worry that they will make existing investments redundant.

3. *Internationalization of domestic demand* pulls a nation's products and services abroad. If the nation's buyers for a product or service are multinational companies, the nation's firms have an advantage as the domestic buyers are also foreign buyers.

Supporting and related industries

The presence of internationally competitive *supplier industries* in a nation creates advantages in downstream industries in several ways. The first is due to early, rapid and sometimes privileged access to the most efficient inputs. However, more significant than access to inputs is the advantage that home-based suppliers provide in terms of constant coordination. The most significant advantage of domestic suppliers might be the process of innovation and improvement. That is, firms are able to identify opportunities to apply new technologies through information, new ideas and innovations from suppliers. Through this process, the pace of innovation within the entire national industry is accelerated. Additionally, if suppliers are situated nearby the firms so that communication lines are shortened, all these benefits are improved. Proximity of managerial and technical workforce, together with cultural resemblance has a tendency to support a relatively open information flow. The presence in a nation of competitive industries that are *related* often leads to new competitive industries. Related industries are those in which firms can coordinate or share activities in the value chain when competing, or those involving complementary products (Porter 1990). Home-based competitiveness in these industries may speed the rate of innovation and upgrading through flow of information and technical interchange, analogous with the supportive industries.

Firm strategy, structure and rivalry

National conditions produce tendencies in how companies are created, organized and managed as well as how the nature of domestic rivalry will be. Porter claims that competitiveness in a particular industry is the outcome of a convergence of the management practices and organizational styles favoured in the country. Firm strategy and firm structure

are in this thesis however not as relevant as firm rivalry because of the latter's unique ability to generate innovation pressures.

The presence of strong local rivals is a final and powerful stimulus to the creation and persistence of competitive advantage. Domestic rivalry spurs dynamic improvement and creates pressure on companies to innovate and progress. Local rivals drive each other to lower costs, improve quality and service, *and* create new products and processes. One domestic rival's success proves to others that advancement is possible and often attracts new rivals to the industry. Geographic concentration magnifies further the power of domestic rivalry. Another benefit of domestic rivalry is the pressure it creates for constant upgrading the sources of competitive advantage. Companies are forced to move beyond the types of advantage that stems from simply being in a particular nation. As a result, their advantages become more sustainable. It is also vigorous domestic competition that toughens domestic firms to succeed in *global* markets: Having been hardened by fierce domestic competition, the stronger companies are well equipped to win abroad (Porter, 1990).

The role of government

Many see government as a vital influence on modern international competition. Government policy in some eastern nations is especially associated with the success of these nations' firms. Government's real role in national competitive advantage is in influencing the four determinants, as illustrated in figure 2 below. Although government has a vital influence on national competitive advantage, its role is *partial:* its policy will fail if it represents the only source of national competitive advantage. Successful policies work in those industries where the underlying determinants of national advantage are present and where government reinforces them. Government can accelerate or elevate the probability of gaining competitive advantage but does not have the power to create advantage all by itself (Porter 1990). There are some simple, basic principles that governments should embrace to play the proper supportive role for national competitiveness: encourage change, promote domestic rivalry, and stimulate innovation. Some of the policy approaches to guide nations seeking to gain competitive advantage include the following:

1. focus on specialised factor creation

2. enforce strict product, safety and environmental standards
3. sharply limit direct cooperation among rivals
4. deregulate competition
5. enforce strong domestic antitrust policies
6. reject managed trade

Porter does not in his theory distinguish between home and host government. It is important to keep in mind however that the role of government will differ when this determinant refers to a *host* government, and not a *home* government. For instance, the Chinese government will take on another role with respect to the Chinese shipping companies as opposed to the foreign shipping companies operating there.

The Diamond as a system

Each of the four attributes signifies a point on the Diamond of national advantage. The effect of one point often depends on the state of others. Weaknesses in any one of them will in general limit an industry's potential for progression. However, the points are also self-reinforcing: they comprise a system. It is due to the properties of the Diamond of constantly being in motion and restructuring itself that the national environment becomes even more favourable as a playing field in which to compete over time. The national industries must continually progress to reflect the shifting conditions and avoid a collapse. Thus, the national system is just as important as its individual parts (Porter 1990).

It is especially domestic rivalry and geographic industry concentration that have power to convert the Diamond into a system. Domestic rivalry as it promotes upgrading of the entire Diamond and geographic concentration by promoting and magnifying the relations within it.

The interactions among the determinants bring in new information, new skills, and new players into the competition, leading to more rapid innovation and competitive upgrading.

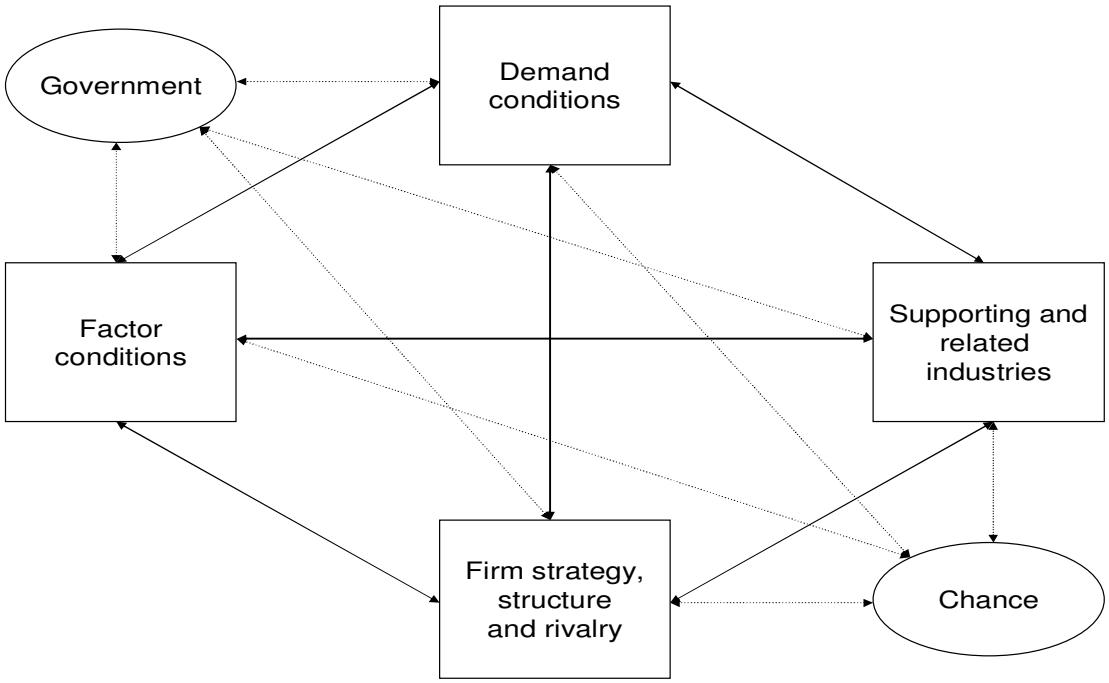

Figure 2: *The complete system of the Diamond (Source: Porter 1990)*

A consequence of the system is that a nation's industries are not spread evenly through the economy but are connected in *clusters* consisting of industries connected through vertical or horizontal relationships (Porter 1990).

It is important to distinguish between the concepts 'system' and 'cluster' with respect to the Diamond. The *system* is a property of the Diamond and this theory is useful when studying a nation's competitive advantages independently of the cluster concept. It is in *this* thesis, however, focused on this system's link to cluster and cluster effects: upgrading mechanisms. That is, 'cluster' is so much more than a system. This is further elaborated on in the cluster theory chapter.

Criticism of the Diamond

As the conclusions in the theory are based on a study of only ten industrialised nations, critics claim that they lack empirical support and that the case studies, i.e. the countries, used to justify them are rather selective. This is largely congruent with Yetton et al.'s conclusions

from 1992: 'Nor does the theory give insights into the dynamics by which diamonds can be developed in economies that are not already heavily industrialised'. The same researchers judge the theory as 'unable to offer insights for multi-domestic industries, lacking attention to the dynamics of creating successful firms and even diamonds' (Yetton 1992).

Cluster theory

Introduction

One of the fundamental features of international industry organization is that similar and related businesses cluster geographically and become increasingly interdependent. Concentrations of interdependent businesses that are linked through common or complementary inputs, innovations, processes, or products dominate markets in every industrialized nation (Rosenfeld, 1997).

Michael Porter is one of the leading researchers on the phenomena. He did not however invent the cluster-concept. In fact the theory goes back as long as Alfred Marshall's book of 1920, "Principles of Economics". Yet it was Porter who took the concept out of the academic periphery and brought it onto the political and business scene. He defines clusters as *geographic concentrations of interconnected companies and institutions in a particular field* (Porter, 1998:78). Clusters include a group of linked industries and other units that are important to competition. They comprise, among others, suppliers of specialised inputs and providers of specialised infrastructure. Moreover, clusters tend to expand downstream to channels and customers, to producers of complementary products and related industries. Finally, many clusters include governmental and other institutions. Hence, Porter's Diamond as presented above can be regarded as an explanation of cluster dynamics.

Factors driving cluster processes

Several theoretical perspectives have been applied in the study of clusters and the factors driving the cluster process have been a greatly debated subject in the literature. In general, businesses locate where it makes the greatest economic sense, either in terms of accessing the market for their product, the labour pool, or other required resources. The basic factors that

drive industry clustering are very similar to the factors that encourage urban or location agglomeration economies. There is consensus among researchers that firms *will* cluster as they receive some type of benefit from doing so. However, the factors generating those benefits are debated.

New Economic Geography was developed by theorists[7] in the 1990s with the objective to understand why some regions appear to attract a disproportionate share of economic activity. The approach covers an extensive variety of theories, including cluster theory, agglomeration economies, urban economies as well as regional economies. It stresses the interaction between producers and consumers collocating to exploit plant-level scale economies while minimizing trade costs.

Supporters of the New Economic Geography, Audretsch and Feldman (2003), drew attention to technological spillovers and human capital in their work on spatial innovation. They found that the mechanism in play is dynamic external economies: knowledge generates knowledge through proximity interactions.

Rosenfeld (1997) mentions the scale to achieve benefits of agglomeration economies as a big part of the reason why clusters prosper. Equally important is the flow of information, technological advances, innovations, skills, people, and capital into, out of, and within the cluster, or the 'current'. The current depends on norms and trust to encourage professional interaction and collaborative behaviour. Such mechanisms are the key to the most effective clusters. So, social network is just as significant as agglomeration economies in a cluster. Rosenfeld claims further that 'active channels' are as important as 'concentration', and without active channels even a critical mass of related firms is not a local production or social system and therefore does not operate as a cluster. It is the dynamics of a cluster, not the size or individual firm capabilities that are the key to synergy and thus its competitiveness (Rosenfeld 1997).

So, there are several key factors driving cluster processes. However, researchers differ on how these factors promote cluster growth. On the one hand, some academics claim that cluster development is promoted by *cooperation* among related firms encouraged by proximity. On

[7] Expansion of Krugman's framework (1991a)

the other hand, Porter acknowledges that clusters promote both cooperation and competition: Rivals compete intensely to win and retain customers. Without dynamic competition, a cluster will fail. Yet there is also cooperation, much of it vertical, involving companies in related industries and local institutions. Competition can coexist with cooperation because they occur on different dimensions and among different players (Porter 1998).

The systemic nature of the Diamond promotes the clustering of a nation's competitive industries. According to Porter, the reasons for clustering grow directly out of the determinants of national advantage: One competitive industry helps creating another in a mutually reinforcing process. Its presence in a nation helps develop competitive advantage in supplier industries. Competitive supplier industries provide technology, fuel transferable factor creation and may become new entrants. Once a cluster takes form during this process, the whole group of industries becomes mutually supporting: Benefits flow forward, backward and horizontally. Aggressive rivalry in one industry tends to spread to others in the cluster through the exercise of bargaining power, spin-offs and related diversification. Entry from other industries within the cluster stimulates improvement by stimulating R&D and by providing a way to initiate new strategies and skills. Information flows freely and innovations spread quickly through the operations of firms being in touch with several competitors simultaneously. Furthermore, interconnections inside the cluster lead to the awareness of new ways of competing. This way, the cluster grows to be a vehicle to sustain variety and overcome inertia and other factors blocking competitive advancement. The cluster scope promotes specialization and the prestige in attracting talent thereby becomes stronger. The result for the nation might be improved international reputation in the field. So, national competitive advantage is as much present at the cluster stage as in the nation's individual industries.

Effects of clusters

A large number of firms located in proximity to each other might increase the number and variety of available resources (Wijnolst et al. 2003). This proximity may also increase the degree of trust assumed to reduce agency costs in collaborations or alliances. Hence, the cluster increases the intended resource sharing between companies. These resources might be

shared unintentionally through spillovers of information and knowledge[8] flowing through the business relationships. These knowledge spillovers are according to Benito (2000) one of three self-reinforcing *upgrading mechanisms* that characterizes the microeconomic cluster processes along with the pressure to innovate and complementarities.

As established by Porter's Diamond (1990)[9], the *pressure to innovate* stems from frequent contact between suppliers and demanding customers in an industry. Porter suggests (1990) that a company should actively seek out pressure and challenge. Part of the task is to take advantage of the home nation in order to create the drive to innovate. The aim in seeking pressure and challenge is to create the conditions in which competitive advantage can be preserved: Short-term pressure leads to long-term sustainability. So, if a firm lacks the pressures for innovation, it must create them.

The second mechanism, *complementarities* 'is related to synergies between different types of goods, services and infrastructure, which have increasing returns to scale, are immobile and complement and reinforce each other in a system' (Jakobsen et al. 2003). Complementarities cause cluster effects as firms utilize common resources in their value creation. As cluster members are mutually dependent, good performance by one can boost the success of the others. The most obvious form of complementarities is when products complement one another in meeting customer needs. A different type is coordination of activities across companies aiming to optimise combined efficiency (Porter 1998).

Knowledge spillovers take place via face-to-face interaction and repeated contact. According to Feldman (1994a and 1994b), location boosts innovative activity as proximity improves the ability of firms to exchange ideas and be aware of important early knowledge which reduces the uncertainty of working in new fields. The mechanism of knowledge externalities leads to spatial clustering of innovation because it reduces the costs of scientific commercialization (Audretsch and Feldman 2003).

Complementarities and knowledge spillovers lower the transaction costs within the cluster. The transaction costs decrease because the players within the cluster share knowledge about

[8] Distinction between *knowledge* and *information:* Knowledge is accumulated skills including a *non-codifiable dimension.* Information is facts and can be transferred through ordinary communication without losing value.

each other businesses. For instance, companies within clusters usually have intimate knowledge of their suppliers' costs. Also, managers are able to measure costs and employees' performance up to other local companies (Porter 1998).

A clustering causes a certain profit. The 'cluster profit' is mainly a result of enhanced utilization of scale economies and might be deposited as higher factor wages, such as higher salaries or higher taxes within the cluster.

Complementarities and knowledge diffusion are important mainly due to their effect on innovation and international competitiveness (Wijnolst et al. 2003). As local suppliers and partners often get closely involved in the innovation process, a company within a cluster is able to source what it needs to implement innovations more rapidly. Hence, innovation is often regarded as the most important outcome of clusters and clusters can remain centres for innovation for decades (Porter, 1998). The formation of clusters provides competitive advantages through continual innovations for the firms operating within it. This is assumed to increase competitiveness both domestically and internationally. This discussion on upgrading mechanisms and value creation characterizing clusters is illustrated in figure 3. Not all variables under 'value creation' including in this model will be analysed in the analysis chapter. However, they are included in the figure in order to present completeness of the model.

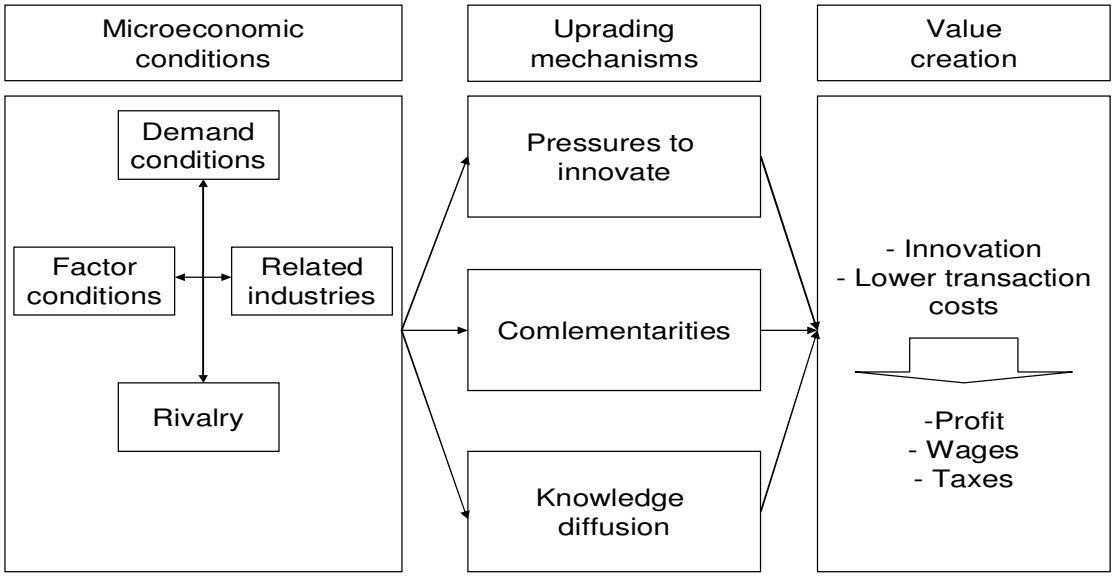

Figure 3: *Value creation in a cluster perspective (Source: Benito, 2000).*

Clusters and new business formation

Clusters are encouraging new business formation for a variety of reasons. Individuals working within a cluster can more easily observe an opening in the range of products or services already offered in a cluster around which they can build businesses. Furthermore, barriers to entry are relatively low. Necessary assets, skills, inputs, and staff are often available at the cluster location, waiting to be assembled into a new venture. These factors decrease the perceived risks of entry and exit. The formation of new businesses within a cluster is part of a positive feedback loop, as illustrate by the arrow in the figure above. What is more, an expanded cluster amplifies all the described benefits by increasing joint pool of resources, benefiting all the cluster's members. A growing cluster signals opportunity, and its success stories help attract the best talent. The net result is that companies in the cluster progress compared to rivals situated elsewhere (Porter 1998).

Policies and resistance

There is resistance towards policies aimed at support particular clusters. One of the major concerns is that economies will become overspecialised. Another is that large companies may

come to dominate an economy, which will weaken mutual reliance and reciprocity. A third is that clusters might hinder global outreach. Moreover, rural citizens worry that resources absorbed by clusters will fall disproportionately in urban areas and not meet rural needs.

Hence, policy-makers have doubts about focusing on clusters, especially regarding overspecialization, isolation, dominance and the possible neglecting of rural districts. However, clustering and diversification are not conflicting. In fact, the most successful clusters generate new clusters by shifting their core competencies into new markets or products. Firms in successful clusters are able to maintain global connections but often in ways promoting the cluster. Companies and/or plants may dominate production and social systems but produce also opportunities for growth and diversification. Ultimately, rural areas can benefit by redefining clusters to include large areas.

Background information

This chapter is meant to provide the reader with purposeful background information regarding the thesis' context.

Maritime Clusters

Introduction

Even though it is the centre of many maritime environments, shipping is only one of many components of a larger maritime cluster consisting of many other mutually dependent industries. Each industry is made up by its possibly numerous components. Together these industries achieve synergetic effects in mutually supporting each other by providing innovation pressures, complementarities and knowledge diffusion that make the sum of the companies better off. They are interdependent and rely on each other to maximize value creation.

Different maritime clusters are made up by different industries and there are a number of different ways to define exactly what industries constitute a maritime cluster. Wijnolst, Jenssen and Sødal who wrote the book European Maritime Clusters distinguishes between 11 maritime industries while The European Commission and The Norwegian Ship Owners Association in their reports uses 16. This thesis however does not speak much of number of industries inherent in a cluster but of complete and incomplete clusters – complete clusters being the ones that generate cluster effects for its incumbents.

Shipping

The main determinant in most maritime clusters and the industry in which the thesis' case company operates is shipping. Shipping today carries out over 90% of the world trade and without shipping the import and export of goods on the scale necessary for the modern world would not be possible (www.marisec.org). It is one of the world's most global industries and is generally seen as a necessity for economic growth for exporting countries. Not only is shipping the preferred means of transportation, it continues to expand owing to increased efficiency, economic growth and economic liberalization. As of 2005 there were over 30.000

merchant ships of over 1000 gross tonnes operating the world's transportation needs (CIA – The 2005 World Factbook).

There are several ways of dividing the shipping industry into smaller segments. The most common is to use the transported cargo as a denominator. It is common to distinguish between the bulk shipping industry and the liner shipping industry. Bulk shipping provides transport for ship-loads of cargo on "one ship, one cargo" basis. Liner shipping on the other hand provides for smaller cargo parcels on "common carrier" basis. It is also common to distinguish whether the bulk cargo is dry or liquid (Stopford 1997).The case company operates within the liquid bulk segment.

Although slower than air transport, modern sea transport is a highly effective method of moving large quantities of non-perishable goods. Transport by water is significantly less costly than transport by air for trans-continental shipping. It is also more environmentally friendly. These benefits stem mostly from the ships freight capacity that exceeds those of air and land transport multiple times. Over a period of 50 years from 1945 and 1995 oil tankers became twenty times bigger and dry bulk vessels ten to fifteen times bigger. The shipping industry has also been very successful in exploiting technical developments so that prices have hardly increased. Due to unitization of the liner shipping business (containerization), the bulk shipping revolution and improved cargo handling, coal and oil cost little more to transport in the mid-1990s than in the late 1940s (Stopford 1997).

As stated in the preface the main task of the shipping industry is to transport cargo around the world. This however is a relatively narrow way of looking at shipping in economic terms. For the customer shipping is a service function and shipping companies provide a variety of services to meet the needs of the individual customers. The main determinants that can shift demand from one supplier to another in the shipping industry are price, speed, reliability and security. Each part of the business provides for a different combination of needs. Different commodities place different demands on the transport system and the shipping industry must offer tailored and specific solutions to keep track with customers' needs. Track record and reputation are also important factors distinguishing shipping companies (Stopford 1997).

In 2005 merchant ships transported about 7 billion tons of cargo consisting of many different types of commodities and covering everything from a 4 million barrel parcel of oil to a

cardboard box of Christmas gifts (UNCTAD). Viewing the trade as a whole, much of the tonnage of seaborne trade is associated with the energy and metal industries so the shipping industry is highly dependent upon developments within these industries.

World trade continues to grow and the recent decade has been prosperous for the shipping industry with an upswing in demand for its services. In fact the industry has experienced the longest sustained period of buoyant markets in living memory (www.marisec.org). The operation of merchant ships today generates an estimated annual income approaching US$500 billion in freight rates, representing about 5 percent of the total global economy (United Nations International Maritime Organisation).

Due to the second oil crisis in the 1970s and different taxation between nations, ship owners trying to reduce their costs to the minimum have left their national flags in order to make use of independent, international registers, often called flags of convenience, that offers the possibility to hire cheap third world crews and avoiding paying corporate and income taxes. This distinguishes the industry from most other international industries. Panama is today the largest ship register by far with 52 percent of the world fleet, while the largest ship owning country today is Greece with Japan, Germany, China, USA and Norway following (CIA – The 2008 World Factbook).

Ship building and marine equipment

The growth of the demand of shipping drives the demand for ships and the shipbuilding industry. There is a direct correlation between the shipbuilding demand and the demand for marine equipment and thus the future of the marine equipment industry relies on the ship building industry (Wijnolst et al. 2003). The ship building industry has since WWII moved from Western- and Central Europe to Japan, Korea and China. Together these three countries built 76, 9 percent of all finished ships in 2007 (www.skipsrevyen.no). It is then widely expected that also the European marine equipment industry will see a decline and later a shift in production to low cost countries in Asia once these countries are further developed and focus alters from shipping to its complementarities.

Ports

A port is a facility for receiving ships and transferring cargo. They grow in tonnage terms at least twice the rate of seaborne trade as cargoes have to be loaded and unloaded. There is currently a rapid expansion of Asian ports, a decline of Japanese ports and a status quo of European ports. At the same time there is a great potential for European ports as the hundreds of ports on the very long coastline of Europe become part of the rapidly expanding short sea shipping network. Short sea shipping is the only transport mode in Europe that can match the growth of road transport (Wijnolst et al. 2003). Asian ports, especially along the long coastal line of China, are popping up frequently.

Maritime services

The increase in world shipping has had and will continue to have an encouraging effect on the demand for maritime services. The challenge for each individual nation is therefore to obtain or maintain a share of these worldwide shipping activities and to facilitate the growth of its ports sector. Maritime services consist of amongst others ship broking, insurance, supply, class and underwriters.

The composition of each maritime cluster varies between nations in terms of size and comprehensibility. Some countries have clusters with few large sectors; other countries like Norway have medium size clusters with many sectors, while some have many, but small sectors. The important thing is still not how large the cluster is, but the degree of completeness and the possibilities of national and international enterprises to extract cluster effects out of being a part of the cluster.

Country determinants

In order to fully grasp and understand the similarities and differences between not only the Norwegian and Chinese maritime clusters, but also the position shipping constitutes within the two nations, it is of importance to know both the maritime history of the two nations, and the way shipping and their maritime clusters are organized as of today.

The Norwegian maritime cluster

The Norwegian shipping industry is a part of a dynamic maritime cluster distinguished by competing companies that operate all over the world. The common denominator for all the parties in the cluster is maritime skills and expertise. A particular feature is the very large number of companies having their markets in both shipping and oil & gas (and fisheries and also onshore industries) using their cross-over experience in research and development of new products and services (www.marinenorway.etp.no)**.**

The Norwegian maritime cluster includes many industries and is rather complex. The main participants in the cluster based on number of companies are as of 2005 (Wijnolst et al. 2003)

- Shipping companies (2501)
- Ship building and repairing (456)
- Ship broking (332)
- Shipping consultants (106)
- Shipping equipment and engines (65)
- Other shipping industries (306)
- Other shipping services (287)

While other nations mainly have their strength within one or two maritime areas, the Norwegian cluster is amongst the most comprehensive in the width of services, products and expertise. Still, although Norwegian researchers often state that the Norwegian maritime cluster is complete, there are maritime sectors within the cluster such as dredging, inland shipping and navy that are very small. The Norwegian maritime cluster as every other maritime cluster is dominated by the shipping sector and about 50 percent of the value creation in the maritime industry originates from its shipping companies. The rest of the cluster's value creation is almost evenly split between services, equipment and ship building (Wijnolst et al. 2003).

History

The Norwegian shipping industry was globalised around the beginning of the nineteenth century. Stimulated by aggressive ship brokers, the Norwegian shipping industry entered the oil transport segment and in the beginning of the 1930's the Norwegian tanker fleet amounted to a sixth of the total world fleet. The Norwegian fleet continued to grow quickly until World War II when almost half the fleet was lost (Samstag and Joshi 2007).

After the war came another period with comprehensive growth in the Norwegian maritime industry and Norwegian traders and shipping companies were pioneers within several segments of specialized shipping such as parcel tanking (Wijnolst et al. 2003). In 1973 the Arabic countries lay down their oil production leaving the oil tankers with nothing to do for the first time since the war in 1967 when the Suez Canal was closed and the demand for freight started growing continuously (Samstag and Joshi 2007). The long lasting international structural crisis hit Norwegian shipping very hard and sat the standards for a following period characterized by restructuring and turmoil. Aggressive competition from low cost countries put a great pressure on the Norwegian shipping companies to cut costs and the global shipping market was in the years after 1980 characterized by overcapacity. The Norwegian ship building industry was heavily reduced and many old notorious Norwegian shipping companies had to exit the industry while others started using flags of convenience (FOC) and replaced expensive Norwegian with cheaper foreign labour.

Norwegian shipping was in a terrible state in the 1980's and registering abroad under FOC became the solution for struggling Norwegian shipping companies. Meanwhile, maritime education was strengthened in this period making the Norwegian maritime top competence superior to others when things started turning around again (Samstag and Joshi 2007).

The Norwegian government initiated several public elucidations and in 1987 the Norwegian International Ship Register (NIS) was introduced to the shipping industry to correct the downward tendency the industry was facing. This new register allowed hiring foreign crew with wages agreed upon in their respective countries, making it more attractive to register ships in Norway. Together with the general alteration of the shipping policy in the end of the 1980's, the establishment of NIS led to competitive operating conditions and an increase of ships sailing under the Norwegian flag.

Another important feature that aided to the Norwegian shipping's recovery was the introduction of the tonnage tax reform of 1996. The Norwegian taxation was harmonized with that of other important maritime nations such as Greece and the Netherlands. Instead of paying income taxes, Norwegian shipping companies have since 1996 paid taxes based on their tonnage of their ships (Samstag and Joshi 2007). This reform was however reversed in 2007.

Norwegian shipping at present

As a result of Norwegian shipping companies' ability to adapt and adjust to changing market environments, Norway has managed to maintain its position as one of the world's leading maritime nations since the beginning of the 1900's. Despite having a population that only accounts for one thousand of the world's population our shipping fleet is the world's fifth largest. The growth rate and productivity of the maritime industry is higher than in any other business sector in Norway (www.marinenorway.etp.no)**.** An expressed objective for Norway is to preserve its position as a maritime superpower. This objective is based, among other things, on the vital importance of this industry to many coastal communities. The maritime environment employs as of 2005 over 75.000 people (Norwegian Shipowners' Association).

Foreign trade statistics for 2003 show that gross freight income from shipping reached NOK 72.5 billion, making shipping Norway's largest exporter of services (Norwegian Shipowners' Association).

Since mid-1970s Norway has been an oil exporting nation. One of the reasons of the successful Norwegian oil adventure is the fact that Norwegian shipping and other parts of the maritime cluster provided the administrative network and managerial skills needed to build an advanced offshore oil-related industry. As of 2005, the Norwegian mobile offshore fleet was the second largest in the world after the United States (Norwegian Shipowners' Association).

Although very important for Norwegian employment, the Norwegian shipping industry is foremost a global one. In fact over 90 percent of the Norwegian merchant fleet never call at a Norwegian port, and operate only between third countries (Norwegian Shipowners' Association).

In 2007 the Norwegian government reversed the 1996 tax reform and partly cancelled the current tonnage taxation system to adjust Norwegian shipping taxation to that of the EU (www.bwgas.com).

The merchant marine

The Norwegian merchant marine consists of 715 ships[10] in total. By type, bulk carrier 49, cargo 151, carrier 1, chemical tanker 146, combination ore/oil 12, container 5, liquefied gas 72, passenger/cargo 122, petroleum tanker 79, refrigerated cargo 12, roll on/roll off 16, specialized tanker 1, vehicle carrier 49. There are in addition to this 872 ships registered in other countries (CIA – The 2008 World Factbook).

The Chinese maritime cluster

China's economy during the last quarter century has changed from a centrally planned system blocked to international trade, to a more market-oriented economy that has a rapidly growing private sector and is a major player in the global economy. Reforms started in the late 1970s with the foundation of a diversified banking system, the development of stock markets, the rapid growth of the non-state sector, and the opening to foreign trade and investment. The restructuring of the economy and resulting efficiency gains have contributed to a more than tenfold increase in GDP since 1978. Measured on a purchasing power parity basis, China in 2007 stood as the second-largest economy in the world after the US (CIA – The 2008 World Factbook). Annual inflows of foreign direct investment in 2007 rose to $75 billion. Economic development has been more rapid in coastal provinces than in the interior, and approximately 200 million rural labourers have relocated to urban areas to find work (CIA - The 2008 World Factbook).

The Chinese maritime cluster is rapidly growing and completely taking over many functions previously performed by European and other Asian countries. The growth, especially in the shipping and ports sectors, has been nothing but remarkable the last decades.

The Chinese government has through their 5 year plans invested heavily in its cluster's different industries as it swiftly transforms from a part of a planned economy to an open market competitor. Heavy investments have been made especially in the shipping and ship

[10] 1000 GRT or over

building sectors by improving water transport infrastructure, constructing new ports and opening the shipping sector to the outside world (Mackey 2006). Major efforts have also been made to increase mechanization and containerization at major international ports.The Chinese are trying to establish themselves as the leading nation in the world in these two maritime segments. Other sectors of the maritime cluster are to a large degree being performed by international companies, especially when it comes to marine equipment. All in all, the Chinese maritime cluster has an international distinctive stamp and consists of a number of foreign players competing and cooperating together with the large Chinese, stately owned, conglomerates (Vatne 2008).

History

Historically, China has always been a great maritime nation. As far back as 2,000 years ago, the Chinese had supreme ships and sailing techniques compared with the rest of the world. However, when the Chinese Nationalist Party fled China after losing civil war in 1949 there was hardly any shipping industry left in the country. When the first Chinese shipping company was founded in 1961 there were no more than 20 ocean-going vessels serving in China's merchant shipping fleet. China had to rely heavily on foreign chartering for its import and exporting needs something that held up the country's transportation development for years. However, with the development of the national economy and as a result of years of goal-oriented political efforts, great progress has been made in respect of ocean transportation, especially since 1979 when the country began to carry out its new policy of opening up to the outside world (Huanning 1988).

Chinese shipping and maritime policy

Since the foundation of the Peoples Republic of China, the Chinese policy related to contemporary shipping has been concerned with the international shipping community. Prior to the 1980's, the international shipping policy adopted by the Chinese government was in the basis of state-owned and collectively-owned shipping enterprises, working within a planned economy and centrally unified, administrative controlled model and policy system (Sun and Zhang 2002). This was mostly due to the western trade embargo policy and influence from the USSR. In 1978 on the other hand a transition from a planned to a market economy began and China started to reform the state-owned shipping enterprises undertaking international maritime transport. Since then, regulations and restrictions regarding both Chinese shipping,

the Chinese maritime sector and the Chinese market in general has been eased and lifted letting foreign companies establish themselves in the country and bringing Chinese maritime enterprises to the international market. China became a member of WTO in 2001 making it a lot easier for foreign enterprises to establish themselves within the nation's borders. But still, the central government and, in particular, the Shanghai municipal government are major movers of the country's shipping industry (Mackey 2006).

Chinese shipping at present

The Chinese domestic shipping industry is mainly dominated by a number of large, stately owned shipping companies, with China Shipping Container Lines (CSCL) and China Ocean Shipping (Group) Company (COSCO) being the largest and most notable ones. The two enterprises are ranked respectively sixth and eight of the world's container liner operators in number of ships and have a joint capacity of 610.000 TEU containers. Being the largest one, COSCO also provide services in freight forwarding, ship building, ship repair, terminal operation, container manufacturing, trade, financing, real estate, and IT, employing more than 80.000 people (www.cscl.com.cn, www.cosco.com)

The merchant marine:

China's merchant marine consists of 1,775 ships[11] in total. By type: barge carrier 3, bulk carrier 415, cargo 689, carrier 3, chemical tanker 62, combination ore/oil 2, container 157, liquefied gas 35, passenger 8, passenger/cargo 84, petroleum tanker 250, refrigerated cargo 33, roll on/roll off 9, specialized tanker 8, vehicle carrier 17. There are in addition to these 1366 ships registered in other countries (CIA – The 2008 World Factbook).

Port clusters

China has a significant impact on international trade, the global economy and international shipping, port and logistics industries. The economic development of China has boosted the rapid growth of shipping ports and shipbuilding industry. Recognized as a shipping giant and an important shipbuilding power, China is one of the world leaders in terms of its total port capacity and volume of handling (www.shippingonline.cn).

[11] 1000 GRT or over

Three clusters of ports are about to take shape in China: Bohai Bay in the north, the Yangtze River Delta, and the Pearl River Delta. The aim is to improve trading capacity and make the Chinese coast home to some of the world's largest trading ports. China possesses the world's largest cargo throughput since 2004, and Shanghai is the world's largest port in handling tonnage. According to the Ministry of Communications, the total throughput of containers, measured in TEUs (twenty-foot equivalent units), will increase from 74.41 million in 2005 to 130 million in 2010. China already owns 10 of the world's 25 largest sea ports. Almost all of the major coastal ports are expanding with a focus on the transportation of containers and on raw materials such as crude oil. Shanghai will serve as the pillar of East China's port cluster while Dalian, Tianjin and Qingdao will form the three most important hubs around Bohai Bay (www.dl.gov.cn).

After the port expansion programme is complete, the Chinese mainland will have the capacity to handle an additional 80 million tons of crude oil in 2010 (Mackey 2006). Multinationals and the lowering of trade barriers have during the last two decades made coastal regions China’s economic powerhouses. Equipped with sufficient technology for environmental protection, coastal regions should be top choices for industrial and manufacturing bases due to their transportation links granting them with easy access to the world market (www.dl.gov.cn).

The case company

The case company is a leading company in the global market for transportation and storage of chemicals and other speciality bulk liquids. The company was founded 1916 and led the way in development of the parcel tanker trades in the middle of the 1950s and the tank storage business in the late 1960s. It owns and operates close to 100 parcel tankers in global and regional trade as well as a network of tank terminals. The operations are fully integrated, with dedicated functions for chartering, operation and ship management (The case company's annual report 2007).

Strategy and operations

The case company's strategy is 'to continue developing their position as a leading logistic service provider with customers worldwide'. They are aiming at maintaining this position through efficient and safe operation of deep-sea and regional parcel tankers and tank terminals (The case company's annual report 2007).

The case company aims at being a leading, preferred and profitable global actor in the market for transport and storage of chemicals, acids, oils and special products. To achieve this, the company will offer services that are efficient and reliable and the transport shall be precise and without accidents in transit. Additionally, they will fulfil the latest environmental requirements. They are operating within both global and regional tank transport offering loading, unloading and storing of the customers' products in tank terminals (The case company's annual report 2007).

The company had per 2007 92 parcel tankers, of which 77 ships are operating on the global transport market. The more than 20 offices are localised in 13 countries, making possible a local marketing and attendance for their customers. The rest of the ships are used in regional transport, which is currently experiencing a rapid growth as the customers require that products are delivered on a relatively short notice (The case company's homepage).

The terminals

The case company has invested in tank terminals as an expansion of their transport services. The investments in tank terminals were beneficial as they enabled to better control a larger part of the value chain, optimise the utilisation of the fleet and thereby provide a better offer for their customers. The terminal operations yield synergies with the transportation activities and improve quality and efficiency throughout the transportation chain. The case company has direct investments in wholly owned tank terminals in Rotterdam and Houston as well as in partially owned terminals in Singapore, Korea, and China. Altogether, the network currently offers about 930 tanks in 15 ports around the world, making them one of the world leaders in combined shipping- and storage services (The case company's homepage).

A large part of the expansion strategy is to spread their terminal activities along their main shipping lanes. They focus also on strategic ports in newly industrialized countries in order to improve the development of chemical markets. Other than being profitable investments, the tank terminals play an important operational role in their cargo-consolidation programme to reduce the time the ships spend in port (The case company's homepage).

The demand for combined services from shipping companies has steadily increased because of the industry's ongoing pursuit to improve supply chain efficiency. The case company's combination of shipping and tank terminals gives them the ability to meet this demand and offer complete logistical packages to their customer (The case company's homepage).

The case company in China

Asia represents a growth area for the case company, with significant new chemical production expected to come on stream in the near future. According to their annual report of 2007, they 'are looking towards increasing activities within China'.

In addition to the terminals in Dalian and Jiangyin, the company has an office in Shanghai from where it is currently managing one (soon to be two) ship. It should also be mentioned that they have a 12, 5 % stake in Ningbo (The case company's website). However, their share of this terminal is considered to be too small to be of interest for the purpose of this thesis. Thus, the focus is on the two new industrial zones Dalian and Jiangyin because this is where

the main tank terminal activities are localised. These are currently more important than the shipping activities for the case company's operations in China.

Dalian

Port of Dalian is located at the central point of West Pacific, centre of the arising Northeast Asian economic circle, the entrance for this region to the Pacific and the rest of the world. During its development, Dalian Industrial Zone has always focused on the goal of developing and industrializing high technologies. The zone has established close relations with more than 20 countries and regions around the world. Inside the zone, there are about 1,700 enterprises, of which 380 involve foreign elements (www.dl.gov.cn).

Having broad space and deep water and being free of ice and mud the year around, makes the port the most convenient seaport for the transhipment of cargoes between Far East, South Asia, North America and Europe. It operates nearly 80 specialized modern berths for containers, crude oil, product oils, grains, coal, bulk minerals, chemical products and passenger/cargo roll/roll transportation. Dalian Port Corporation Limited has established trading and shipping ties with more than 300 ports in 160 countries and regions of the world. With 68 international and domestic container shipping routes, it is China's second largest container port, the largest and fastest growing port for sea-rail through transportation and one of the world ports handling more than 100 million tons of cargoes each year. Moreover, Port of Dalian is the transhipment hub of oil products for Northeast Asia and the most advanced base for bulk, liquefied chemicals in Asia (www.dl.gov.cn).

Dalian has, as the model city of internationalised software industry and the finance centre in northern China, become an important outsourcing centre for multinational enterprises which has given the city an edge for technology and scientific innovation and development (www.dl.gov.cn).

Dalian Maritime University (DMU) has a highly qualified faculty team of young specialists and professors well equipped in profound theoretical knowledge and capable of extensive research in the fields of marine traffic engineering, maritime information engineering, artificial intelligence application onboard vessels, ship power systems and energy-saving technology, marine engine repairing, communication and information systems, marine

environmental protection, and maritime law. Numerous discoveries made by the research teams at DMU have contributed to the development of China's maritime technology (www.dl.gov.cn).

The terminals in Dalian

The company operating the terminals in Dalian is a joint venture between the case company and Dalian Port (DPA) Company Ltd. The terminals are located in the Caofeidian Industrial Zone east of the Dalian Bay, 10 kilometres from Dalian Development Zone. One of the world's largest hubs for oil products and liquid chemicals in North-East Asia is situated here. The terminal is designed and built using the most advanced technology available, providing the industry with a safe and efficient alternative for storage and transhipment of liquid products (the case company's homepage).

Jiangyin

With a total area of 988 km2 and a population of 1.17 million, Jiangyin is the first port city along the Yangtze River, approximately 150 km west of Shanghai and 12 hours by ship from the river entrance. The city is situated on what is referred to as "The Golden Coastline" a 35 km long coastline which is neither freezing nor silting. (www.english.eastday.com).

As the land was traditionally cultivated for farming, agricultural income still accounts for the major portion of the city's economy. Yet, rapid economic expansion and industrialization over the past decades has turned the city to a wealthy municipality and the industrial income is becoming increasingly important. The industrial sectors have gained enormous investments from national and international enterprisers that have brought the city a new economic capacity. Still, although business opportunities prosper in the Jiangyin area, no higher education institutions are yet present (www.jiangsu.net/city).

With a designed area of 188 square kilometers, Jiangyin New Harbor City lies in the west of Jiangyin and is built to take advantage of Jiangyin port. Jiangyin New Harbor City aims to establish a modern city with a dynamic and sustainable competitiveness that combines the functions of port industry, storage and logistics with a central business district, sightseeing &

tourism (www.repanda.com). The local government wants to establish six industries in the area with the petrochemical industry being one of them (www.jiangsu.net/city).

As it is well situated on the west coast of the Taiwan Straits, Jiangyin Port is gearing up to build itself into the shipping hub for the region and beyond. Jiangyin Port is a deep-water port positioned on the Yangtze River. Being a deep-water port it can accommodate a fully loaded Panamax ship, excluding only ULCC sized ships and it has attracted a large sum of capital. An advanced operational system and a widespread distribution network make the port capable of catering to international shipping services. It has so far established waterway trade relations with more than 40 countries and regions. The port consists of a utilized land area of 1,300 hectares and 1,565 m waterfront terminals. So far 23 berths of 10,000 tonnages are under construction (www.jiangsu.net/city). The port's container business has been enjoying a fast growth since its international container terminal was put into use in 2003. Annual throughput of the port reached 288,000 twenty-foot equivalent units (TEUs) in 2007, rising 47 percent over 2006. Because Maersk began shifting its container business to Jiangyin in February, the port's annual container throughput this year is expected to exceed 600,000 TEUs (www.simic.net.cn).

Waterway trade across the Pacific Ocean has always been important for Jiangyin. The major partners of trade include Japan, Korea and Southeast Asia. Of recent time, several large Scandinavian maritime enterprises have established themselves in the Jiangyin area, such as Maersk, Wilhelmsen and Kongsberg Maritime (www.jiangsu.net/city).

The terminals in Jiangyin

The terminals in Jiangyin are situated in Jiangyin Economic Development Zone, New Harbour City. The terminal handles many different types of petrochemicals from ships, barges and trucks. The terminals have a distinct long pier reaching out of the terminal area capable of serving seven ships at a time. This is an advantage in an area where long queues are frequent when loading and unloading ships. There are also several pipelines built into the terminal allowing liquid chemicals to be pumped in or out of the special tanks in the terminal area, shortening the time ships spend at the port. The terminals in Jiangyin provide terminal services to high environmental industry standards. These terminals are also a joint venture: between the case company and Garson Group, Shanghai, China (www.jiangsu.net/city).

Figure 4: *Map illustrating the localisation of Dalian and Jiangyin*

Methodology

The purpose of this chapter is to present a framework of how the study has been conducted as well as to give an explanation for the choice of method used to explore the research problem.

As will be further explained in the following, an adequate method for this thesis is a qualitative approach through the deductive technique of theoretical categorising of the data.

Research design

The research design is the general plan of how to go about solving the research problem. It forms the thesis in high degree and is thereby regarded as the very structure of the research. The most common classification of research design is three folded and arranged into exploratory, descriptive and explanatory research. As this thesis seeks to explore a phenomenon within a certain setting it is explorative.

Research strategy

Saunders et al (2007:592) defines case study as 'a research strategy that involves the empirical investigation of a particular contemporary phenomenon within its real-life context, using multiple sources of evidence'. This thesis studies a specific firm in its real-life setting abroad by gathering data from both interviews and literature from multiple sources. It takes a qualitative approach and there are many variables. A natural research strategy is therefore a *case study*. Furthermore, it is a *single* case study because it investigates only one organisation. The main advantage to this and the reason for choosing this strategy is the possibility to go more in-depth than what is possible when investigating multiple cases, a strategy that demands more time and resources. By focusing on only one company it is easier to achieve a thorough understanding of the dynamics operating within the industry and the determinants that in the end answer the research question. What's more, a case study strategy provides a useful way of exploring existing theory and even to challenge it, as argued by Saunders et al. (2007).[12] This case study follows a structured approach where a theory and a model are presented in the beginning of the thesis and guide the data collection and analysis. Finally, in order to answer how Norwegian shipping companies in general may benefit from entering the

Chinese cluster, it is an adequate strategy to investigate how one of these companies may have benefited from doing so. In other words, it is the most adequate strategy to employ to answer the complex research problem.

Research tactics

Research tactics refer to the processes of data collection and data analysis (Saunders et al. 2007).

Data collection

In order to elaborate on the different variables in the thesis as presented in the model, it has been necessary to gather data from multiple sources, both primary and secondary data.

Primary data have been collected through six *semi-structured* interviews: a schedule of important subjects that needed to be covered was used but standardised questionnaires were not undertaken during the collection process. Instead, an interview guide consisting of categories divided into elements and appurtenant questions was formed[13]. Because the respondents differed in terms of knowledge and background, the interviews had to be tailored to each respondent.[14] The respondents are presented chronologically according to when they were interviewed in table 1. The number of six was necessary and sufficient: It was necessary to cover enough subjects and secure a certain reliability of the data and sufficient as it was eventually realised that enough data were collected and a pattern from this could be observed.

[13] See table 3
[14] See appendix 2-7 for the various interviews.

Name	Position	Company	Relevant knowledge
Eirik Vatne	Professor	NHH[15]	Cluster theory, business networks, innovation systems, China
Erik Jakobsen	Associate professor and Managing Partner	BI and MENON Business Economics	Maritime clusters Cluster theory Upgrading mechanisms
Per Ivar Gjærum	Associate Professor and earlier Board Member of the case company[16]	NHH[17] and the case company	The Chinese maritime cluster The case company Shipping economics
Ari Marjamaa	Principle consultant	Det Norske Veritas Maritime Solutions	The Chinese maritime cluster Upgrading mechanisms Cluster development
NN in the case company	Senior Vice President, Asia	Case company	The Asian shipping fleet The Chinese maritime cluster The case company
Siri S. Pettersen	Professor	NHH[18]	Cluster theory The Chinese maritime cluster FDI Shipping economics

Table 1: *Respondents and their knowledge*

The interviews were carried out as late as in May and June. The reason for this was that it was essential to gain as much knowledge as possible about the Chinese maritime milieu on beforehand to be adequately prepared for the interviews. Before the actual accomplishment of the interviews, the respondents were given, by e-mail, an explanation of the study, its purpose as well as a copy of the actual questions in order for them to be prepared.

Data were gathered both by tape recording and note taking. The relevant data were then extracted by transcription afterwards. This way, the amount of necessary data gained through interviews was maximised. The respondents that did not find themselves in Norway during the time of the thesis' development had to be interviewed via phone and e-mails. This concerns the respondent within the case company in Singapore and Ari Marjamaa in London.

[15] Department of Economics
[16] Gjærum was a board member when the case company started to invest in terminals in China
[17] Department of Finance and Management Science
[18] Department of Economics

Secondary data have been used through the whole thesis and gathered by means of the following sources:

- Books and reports at the library at the Norwegian School of Economics and Business Administration (NHH)
- Electronic journal databases to which one has access as students at NHH
- Books and reports mailed from various other Norwegian university libraries
- Brochures mailed from the case company's headquarter
- The Internet: various articles, resourceful sites and web pages
- Annual reports from the case company and the Norwegian Shipowners' Association

The research question requires a thorough understanding foremost about the Chinese maritime cluster, but also about shipping in general and the theoretical aspect of cluster formation. The model structures the data collection process. For the theory part, secondary data (mostly books) were used to gather valuable insight and information on the chosen theories. To analyse and answer the research question however, specific and up to date information was needed and provided by primary data sources.

The necessary data sources differ for each variable in the model. The various data sources that was needed for the different variables are summarised in table 2

Variable	Primary data	Secondary data
The Diamond applied to the case	Interviews: Eirik Vatne Erik Jakobsen Per Ivar Gjærum NN in the case company	Internet sources Books Journals Annual reports from 2007[19] Other Reports
Upgrading mechanisms	Interviews: Erik Jakobsen Siri S. Pettersen Ari Marjamaa NN in the case company	
Value creation / ability to benefit	Interviews: Per Ivar Gjærum Siri S. Pettersen NN in the case company	

Table 2: *Data sources for the different variables in the model*

[19] Those of the case company and The Norwegian Shipowners' Association

The interviews were shaped by categories based on the theoretical basis. This method helped formulating questions for the study's very purpose.

Category	Elements		
The Diamond applied to the case	Factor conditions		
	Demand conditions		
	Composition: demanding buyers	Size pattern	Internationalisation of buyers
	Supporting and related industries		
	Firm strategy, structure and rivalry		
	Government		
Upgrading Mechanisms	Pressures to innovate		
	Complementaries		
	Knowledge Diffusion		
Value Creation	Benefits		

Table 3: *Categories and elements structuring the interviews*

Data analysis

After each interview, the data were transcribed by listening to the tape recording and using notes taken. They were transcribed according to the different categories as represented in table 3. This way, it is relatively easy to compare the various respondents' answers. When there was a question that was answered differently from two different respondents, this information was verified with secondary sources and/or additional respondents' answers. When the interviews no longer provided additional information, it was decided to stop collecting more primary data.

During the process of the analysis, it became clear realised that additional data were needed in order to 'fill holes'. Respondents with relevant knowledge within the area that represented a 'lack' in the analysis were then contacted. For instance, one of the respondents who had earlier worked with an already interviewed respondent was, at the request of the latter, contacted relatively late in the process to fill holes regarding upgrading mechanisms. Thus, the snowball method was partially used as a method to choose interview respondents. In fact, several of the interview respondents suggested interviewing certain colleagues or others with

relevant knowledge about subjects they had little or no knowledge about. This is why the process of data collection and analysis for this thesis has followed the course of a spiral:

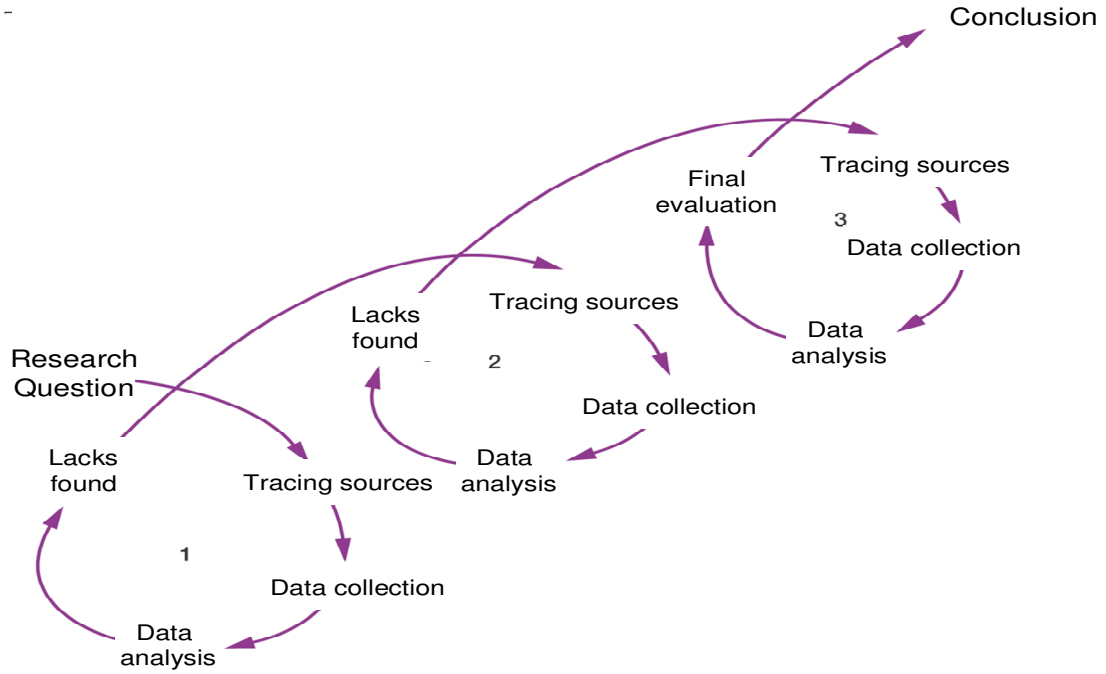

Figure 5: *The process of data collection and analysis. (Source[20]: Saunders et al. 2007)*

Development of conclusions

The development of conclusions has been an ongoing process throughout the analysis. They are however not presented in the thesis until the conclusion chapter. The main conclusion, or answer to the research question, is based on sub-conclusions drawn from the analysis. All conclusions are backed by primary data, secondary data as well as knowledge and experience gained through the process.

Credibility

As this thesis aims to study a phenomenon on the other side of the planet, there have been some geographic issues concerning the process of gathering much of the primary data. One of the interviews had to be conducted by phone, which was harder to transcribe and could more

[20] The figure is changed from how it appears in the book to fit the process of this very thesis.

easily lead to misunderstandings than a face-to-face interview would have. One interview was also done by e-mail. This eliminated also the opportunity for immediate follow-up questions.

Reliability

There may be four *threats to reliability* (Saunders et al., 2007:149) of which three are relevant for the process of this thesis.

1) *Participant error*. It is undecided whether or not the respondents answered the questions with 100 % certainty or if they were speculating to some of them. Hence, there is a certain risk that some questions have been answered in speculative manner.
2) *Subject or participant bias*. The different interviewees possess different positions within different organisations and have different knowledge. Regarding secondary data, the researchers got the impression when searching for data for the ports of Dalian and Jiangyin, that some Chinese web pages are biased. The language used in these pages gives the impression that the editors of the boast about the locations to attract foreign investors. For instance, Chinese and Korean web pages give contradictory information on certain areas.
3) *Observer bias*. While working on a research project such as this one, the researchers run the risk of becoming supporters of a certain conclusion. When realising that the conclusion may differ from what is initially expected, one runs the risk of 'ignoring' this and govern the conclusion towards an expected and/or more accepted conclusion. However, being aware of this from the start has helped the researchers stay as neutral as possible without posing leading questions in the interviews.

Validity

Validity is concerned with whether the findings are really about what they appear to be about (Saunders et al., 2007:150). Fischer (2007) mentions in his book about research methods four different threats to validity: construct or measurement validity, internal validity, external validity and ecological validity. Only validity issues relevant to this thesis are considered.

Internal Validity

Internal validity is concerned with whether the evidence presented justifies the claims of cause and effect that are being proposed in the thesis. Internal validity regards this thesis especially in the linkages between the different variables in the model. To avoid such validity problems, data material have been gathered for the purpose of being analysed as well as to support the thesis' linkages between the Diamond analysis, upgrading mechanisms and benefits.

External validity

External validity questions whether the generalisations or interpretations that a researcher has proved in a particular context apply equally well to other populations or other contexts, to which extent the findings may be equally applicable to other research settings, such as other organisations. It is of particular concern for a single case study as this one and refers to whether one really can generalise from such a study. Case studies inevitably lack representativeness. It cannot be claimed that what was discovered in one case is typical of all cases. In many occasions the power of the case study lies in its capacity to grant insights and significance for the reader, something that to a large degree appeals to this thesis.

Access to the organisation

The ability to get hold of data depends on access to appropriate sources. The first level of access is *physical access,* which can be hard for various reasons. As experienced during the development of this thesis is that organisations or individuals may not be ready to engage in additional, voluntary activities due to time and resources required (Saunders et al. 2007). The request for access to obtain data was considered by different people in different divisions within the organisation of the case company. Furthermore, access is often seen as a continuing process. This is particularly true for this research as the people from whom the researchers needed to collect data were not the ones that granted access. This resulted in unanticipated time spent on getting in touch with the proper people, postponing interviews as well as an increased uncertainty associated with the data collection, as to when the people possessing the relevant knowledge would be reached.

Analysis

The analysis has two levels. First of all, it gives a diagnosis of the phenomenon – Norwegian shipping companies represented by one of them - within its real-life context – activities within the Chinese maritime cluster - based on collected data. The theory as presented in the theory chapter has been applied to the case. The main part contains an analysis of the factors within the Chinese diamond with respect to shipping. The aim is to find out whether they are creating upgrading mechanisms and through this, or by themselves, may lead to benefits for Norwegian shipping companies operating in China. Second, it is an analysis of the data gathered, mostly through the interviews. This way, it is also a documentation of findings from the data collection process.

China's location attractiveness

Even thought the case company has not by definition entered China through FDI, the following text is presented in order to give an understanding of China's location attractiveness for foreign investors, which also includes investors seeking to join forces with locals, such as the case company. Additionally, it serves as an introduction to the Diamond applied to the case because the Diamond is in fact also an analysis of location attractiveness. Finally, it gives an explanation to why local governments such as Dalian and Jiangyin are actually taking the initiatives to encourage blooming of industries in their respective industrial zones.

China ranks number one as the world's preferred FDI destination (Henley 2004). The country started to actively seek FDI in 1982. Back then, the government was still sceptical to foreign investors. A system of incentives for bureaucrats and foreign investors has since then been established through, among other initiatives, a process of encouragement of economic delegation towards provincial governments and in 2003 the country was hosting 63 billion dollar in inward FDI (see below figure) making FDI one of the major drivers behind the Chinese trade expansion.

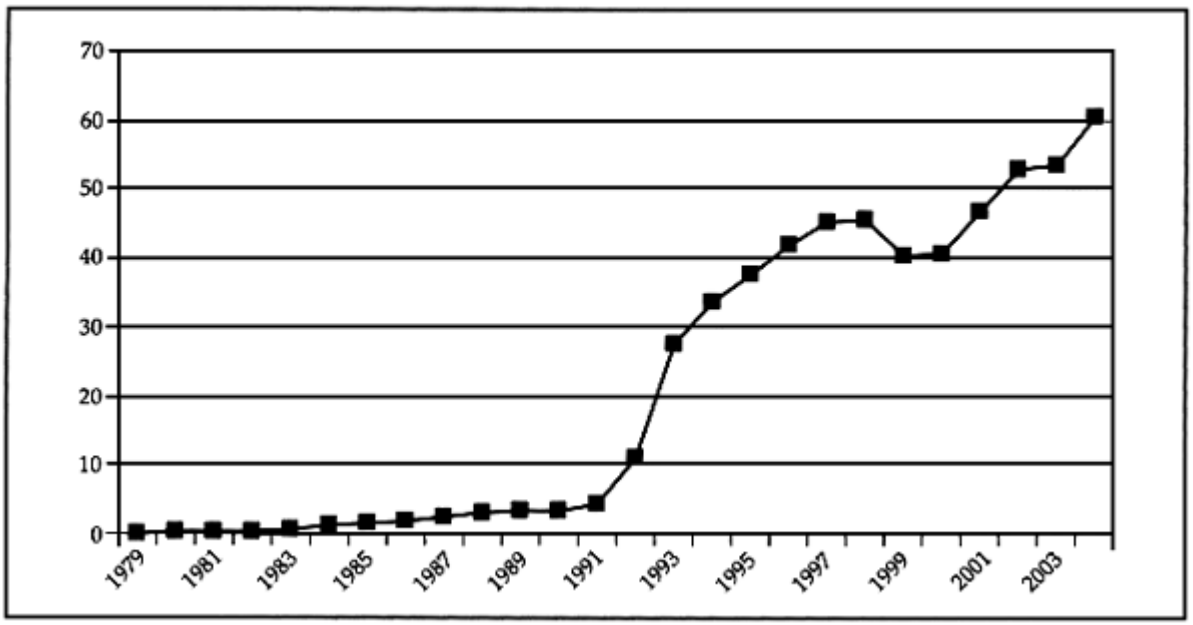

Figure 6: *Inward FDI in China (US$ billion), 1979 – 2004. (Source: www.fao.org)*

Local governments in China are encouraged by the central government to expand the penetration of inward FDI at provincial and city level and across certain sectors. In fact, city authorities are pressured to generate annual FDI statistics showing an expansion of inward FDI (Henley 2004).

The geographical distribution of FDI in China is tilted towards the coastal provinces. The central government is taking initiatives to channel investment to infrastructure in support of inward FDI encouragement in these regions: the provincial government has increasingly been granted authority to set up special investment zones across the country to attract FDI (Henley 2004). In these areas, it is mainly the interaction of domestic and foreign investment that produces growth-promoting effects. FDI favours growth in provinces that are relatively economically strong and endowed with superior infrastructure (Henley 2004).

There are various reasons for why foreign investors are attracted to China. The most obvious is the extremely low labour costs. Also, the enormity of the market is self-explanatory with a population of 1.3 billion. Moreover, the Chinese buying power is expected to increase sharply due to low inflation rates and a strong GDP growth. Recently, Chinese laws concerning FDI have been significantly relaxed. Therefore, the attitude to FDI in China has been altered ever since the accession into the WTO. For instance, foreign investors are now permitted to form companies that are 100 % owned by foreign capital (www.worldwide-tax.com).

The Diamond applied to the case

Factor conditions

The source of country attractiveness for maritime companies lies in the availability of relevant resources in the host countries. If the quality of the resources needed is high and the prices sufficiently low, companies will find the country attractive (Jakobsen et al. 2003).

Statistics indicate that China has excellent basic and generalized factors that are important for an efficient shipping industry: its 14500 kilometre long coastal line, several long rivers qualified for water transportation, many excellent and newly constructed deep-water berths and an enormous access to both labour and land. But, as Porter argues, the key factors of production are created, not inherited. The factors presented as follows are all *created* except for some natural infrastructure conditions and natural resources, which are of inferior importance compared to the created factors (labour, material costs and created infrastructure).

Labour

China has an enormous access to cheap labour combined with large-scale production facilities and are starting to develop relatively advanced competence. Most labour intensive onshore activities related to shipping are dominated by cheap Chinese labour. However, the Chinese wage level is much more differentiated than its Norwegian counterpart with huge differences between the people at the entry-level and senior managers. The wage level for Chinese in executive positions is for instance close to, and can be even higher than the Norwegian (Interview with Erik Jakobsen).

Gjærum asserts that the relatively low costs of Chinese labour were not the reason why the case company decided to establish business within the Chinese maritime cluster. However, the workforce at the case company is, except for certain key executive positions, Chinese at competitive Chinese salaries. Thus, that the case company is able to exploit relative differences in wage levels that the host country is offering.

To support competitive advantage however, the factor must be specialised to the industry's particular needs (Porter 1990). Eirik Vatne points out that Norwegian and other foreign

companies localised in China are popular due to the relatively higher salaries they offer (although still low compared to the salaries in other countries) and superior safety level. Thus, Norwegian companies including the case company manage to attract specialised labour.

According to the case company, it is important to have top expertise involved when starting up a new project and these are normally expatriates. However, more and more competence and responsibilities will be transferred to the local management as they with time are expected to achieve appropriate levels of experience and knowledge. For instance, Gjærum points out that long-term training for the most responsible positions at the case company is needed due to the complex handling with respect to safety and emission considerations at the terminals. In fact, the company is already skilled in this field due to experience gained at the terminals in Houston, where the safety and environmental standards are amongst the highest in the world. They are currently training Chinese workers to occupy these positions in China, which is a time-consuming task (Interview with Per I. Gjærum). This means that an increasing amount of locals will probably occupy responsible positions within the organisation. It is reason to believe that this is also true for other Norwegian shipping companies, especially those that are niche-oriented. It is in this context important to keep in mind that specialised labour is more expensive and will thus not represent a competitive advantage in cost efficiencies to the same extent as the cheaper non-specialised labour (Interview with Erik Jakobsen).

Material costs

According to the case company, material costs are normally regulated by international prices. If there is any need for specialty equipment, such has to be imported at a higher cost than what you may find in the local market. Still, operating in the chemical transportation industry, unique materials, parts and the handling of various types of chemicals require specialized equipment and materials for certain products.

Infrastructure

Inland transportation is an important and complementary industry with respect to shipping and the transport infrastructure influences the efficiency of shipping goods. Transportation is a major factor in China's national economy and the Chinese government is currently in the midst of a highly necessary, massive upgrade of its transportation infrastructure. Despite China’s long coastline and huge land mass, its transport infrastructure was for a long time regarded as relatively weak and transporting goods has suffered much due to an inefficient

road network much due to heavy traffic, poor roads and low quality trucking services. In accordance to this, domestic province border difficulties, an inadequate railroad system and highly inefficient seaports made transportation of goods expensive and difficult to handle (www.chinaeconomicreview.com). Until recently, China's economy was able to continue its growth despite inadequacies in the country's infrastructure development. This is no longer possible however, much due to the immense pressure the economic growth has put on the long disregarded transportation network. The Chinese government has realised that it in order to keep progressing, an efficient system must be in place to move goods and people across the 9.326 billion square kilometres of land (www.globalsecurity.org).

Between 2001 and the end of 2005 more money was spent on roads, railways and other fixed assets than the previous 50 years. According to the state media, investment will see double-digit growth every year for the rest of the decade. Between 2006 and 2010, $200 billion is expected to be invested in railways alone, four times more than in the previous five years (www.economist.com). Huang Min, the Ministry of Railways' chief economist, says that by 2020 the railway system's freight-handling capacity should be greater than demand. At present it can handle only 40% (www.economist.com).

China has a large inland waterway network which links the whole country both from east west and north south, also linking many of its major cities. Moreover China's geography and the location of its population are exceptionally favourable to inland water transport. Many rivers carry large volumes of bulk cargo that are hauled from rural to urban areas for processing and to ease the pressure of demand for new roads and improved railways, the government has recently increased investment in waterways to deepen navigation channels and upgrade navigational aids, in order to allow larger ships to sail upstream (www.worldbank.org).

Maritime port infrastructure tends to be inefficient[21], though it is catching up under a major program of investment in berths, handling equipments and storage and a streamlining of procedures. Huge investments are being made in this sector and foreign enterprises are contributing in the development of new and efficient Chinese ports and terminals. There is a huge expansion of seaport capacity and efforts being made in increasing seaport efficiency (www.worldbank.org). This has been a part of the case company's China strategy, as they in

[21] Clearance times vary from three days to a month, mostly cause by documentation, customs and tax procedures

both ports have built sophisticated and high-technological terminals equipped to meet the most recent safety standards. By doing this they achieve a combination of (1) increased market share by strategically localised hubs to serve the constantly growing north-eastern market and (2) social responsibility and maximised protection of the environments surrounding their operations. This is analogous to Porter's claim, that *inadequate* infrastructure makes it possible for companies to contribute in building up or improving it, and thereby generate new markets. It is in this regard important to distinguish between improvement of inadequate technical port infrastructure, which the case company is contributing in developing and the *transportation* infrastructure, which in the two ports is already adequate.[22]

All in all, China's infrastructure is improving continuously, but there are still obstacles making transportation and exchange of goods inefficient. According to Huang Min China logistic costs currently account for 18% of GDP in China compared with 10% in America. This number is however expected to decrease once the huge investments that have been made become operative and visible.

Dalian has superior natural conditions with broad space and deep waters free for ice and mud. The construction of new railways linking together major cities in northeast china is supporting the development of Dalian as one of China's major harbours. Dalian is since 2007 connected to Yantai on the other side of the Bo Hai bay by a train ferry, making land transport to Shanghai less time consuming and more efficient (People's Daily Online 2007).

Jiangyin has transportation net on the river, sea, lake and land. There are 23 berths of approximately 10,000 tonnages being built over a utilised land area of 1,300 hectares and 1,565 meter waterfront terminals. Key projects in the new port area comprise unsheltered area of public berths, storage facilities, warehouse logistics and transit transportation (www.repanda.com). In addition to its excellent waterway access, Jiangyin has built up a strong traffic network with several expressways and a suspended bridge is providing access to more than six cities nearby making it easy accessible for land transport and a crucial transportation hub in the region (www.english.eastday.com).

[22] See below

Natural resources

China's natural resources consist of coal, iron ore, petroleum, natural gas, mercury, tin, tungsten, antimony, manganese, molybdenum, vanadium, magnetite, aluminium, lead, zinc and uranium. The country also possesses the world's largest hydropower potential (CIA – The 2008 World Factbook).

Steel, with higher qualities in terms of costs, endurance and material, has for long replaced wood in the construction of ships. China is the world's largest producer of steel by a rapidly growing margin. By the end of 2000, this margin was roughly 20-30 million tons per year. However, being state-owned, Chinese steel producers are extremely inefficient: the steel productivity per employee is approximately 37 tons per year, as opposed to almost 400 tons per year in developed nations (www.chinabusinessreview.com). Still, China's abundant access to steel lowers the cost of production and hence the price of ship contracting.

Ability to benefit

The case company's training of locals and their participation in developing infrastructure are examples of Norwegian shipping companies' ability to actually draw benefits from Chinese factor conditions. What's more, Chinese workers are even more motivated to get employed in foreign shipping companies due to the relatively higher salaries and standards. Norwegian shipping companies' ability to benefit from this factor is additionally confirmed by a statement made by the case company itself: 'everybody operating in the Chinese market has access to the same input factors'.

Demand conditions

Demand size

As stated in the theory, large home market size can lead to a competitive advantage in industries where there are economies of scale or learning, by encouraging firms to invest aggressively in large-scale facilities, technology development and productivity improvements. This is precisely what is currently happening in China: given the great possibilities for economies of scale and learning within the shipping industries as well as in supporting maritime industries, the government is through SOEs investing in large-scale facilities,

technology development and productivity improvements. This assertion is supported by two of the interviews: both Vatne and Jakobsen speak about China's large-scale projects within the maritime cluster, especially within shipyards.

With a predicted growth in exports of 10, 5% in 2008, making it the fifth year in a row with a double-digit growth expansion and being the world's largest exporter to the USA, China relies heavily on international shipping to support its economic growth (www.chinadaily.com). In accordance to this, the International Energy Agency expects China's imports of oil to triple by 2030. Chinese demand for raw materials of all sorts is growing so fast that bankers have invented a new word: super cycle. Over the past few years, there has been a marked shift from light manufacturing to heavy industry. Consequently, ships are lining up to load cargoes destined for China (The Economist 2008).

Gjærum explains one of the case company's motives for moving into China by the demand for energy: By observing the rapid growth of Chinese production and consequent demand for raw materials, they reasoned that there would also be a high demand for energy. Where there is a high demand for energy, there will be a high demand for chemical products and a subsequent need to transport these.

Demanding buyers

Customers of shipping services are becoming more demanding, requiring combined services, more rapid deliveries and thus shorter lead times than before. This is especially true within the Chinese maritime clusters as many of the Chinese customers for shipping companies are SOEs requiring high standards (Interview with Eirik Vatne). Many of the case company's customers are large multinational chemical producers that are tough negotiators (Interview with Per I. Gjærum). Gjærum speculates about whether Chinese customers might be demanding in nature due to their predisposition to be sceptical towards foreigners.

According to the case company, the degree to which Chinese customers are demanding depends on the speciality of the products that shall be handled. The main determinant is the price offered, not so much safety as in many other countries with an established maritime cluster. The international customers are according to the case company more focused on safety and quality than the local customers due to their international standards. However, as many international customers have joint ventures with Chinese companies, the requirements

for safety seems to be closer to the Chinese requirements. The case company however believes that the Chinese customers over time will become more focused on quality and safety as they are influenced by the foreign enterprises and by global shipping standards.

Internationalisation of demand

The case company's customers are both local and international. According to Vatne, many of the customers are also operating on an international scale. A great part of them are MNEs localised in China that are exploiting the relatively cheap labour to produce more efficiently than elsewhere. They produce to export, and not to serve the domestic market. So, these producers need someone to ship their products overseas.

The petrochemical industry is international with both production and consumption in all regions. Consequently, many of the petrochemical companies have become global in their market approach. Most of these companies are focusing on China where they meet the largest growth in demand for their chemical products. The petrochemical industry is constantly demanding logistics service providers that are capable of offering different types of storage *and* transportation, such as the case company.

Ability to benefit

The fact that China is actually relying on international shipping to support its growth means that they must arrange for foreign shipping companies to benefit from the rapidly growing demand for both shipping services and raw materials. The case company considers the rapidly expanding market and the increasing demand as one of the main factors to enter China. They also benefit from the many international incumbents and exports.

Many foreign companies are organised as joint ventures with locals allowing them to better gain access to the different market segments and the market potential.

The current demand conditions in China do not lead to upgrading mechanisms as of today. It is possible however, that the customers will become more demanding and thus lead to higher pressures to innovate in the future. Then, foreign companies will benefit from a change of focus from costs towards quality and safety. Hence, this factor leads to benefits for Norwegian shipping companies *directly* and not through the upgrading mechanisms.

Supporting and related industries

Shipping companies should localise their operations in proximity to their most important suppliers (Panayides 2001).

As mentioned by Jakobsen, classification companies, equipment manufacturers, and shipping agents are industries that are primarily provided by foreign enterprises in the Chinese maritime cluster. He further states that the Chinese cluster is relatively incomplete but hat the country excels in certain activities, such as shipbuilding. There is also reason to believe that the port related services are adequately developed and efficient. This is also true for R&D and education. Furthermore, the ship building industry is developing rapidly (Interview with Erik Jakobsen).

The supporting and related industries that are identified as most vital – and present - for shipping companies operating in China are shipbuilding and repair yards, inland transportation, port related services, classification companies, shipping agents, R&D and education as well as equipment manufacturers.[23] This cluster is illustrated in figure 7 where the links to the industries that are still not fully developed and thus contributing to the incompleteness of the Chinese maritime cluster are thinner than the bold links to the industries that are present and relatively well developed within the Chinese maritime cluster. Below the figure follows an analysis of these industries in China.

[23] Most *scraping* is found to take place within countries with even cheaper labour such as India (Jakobsen 2008).

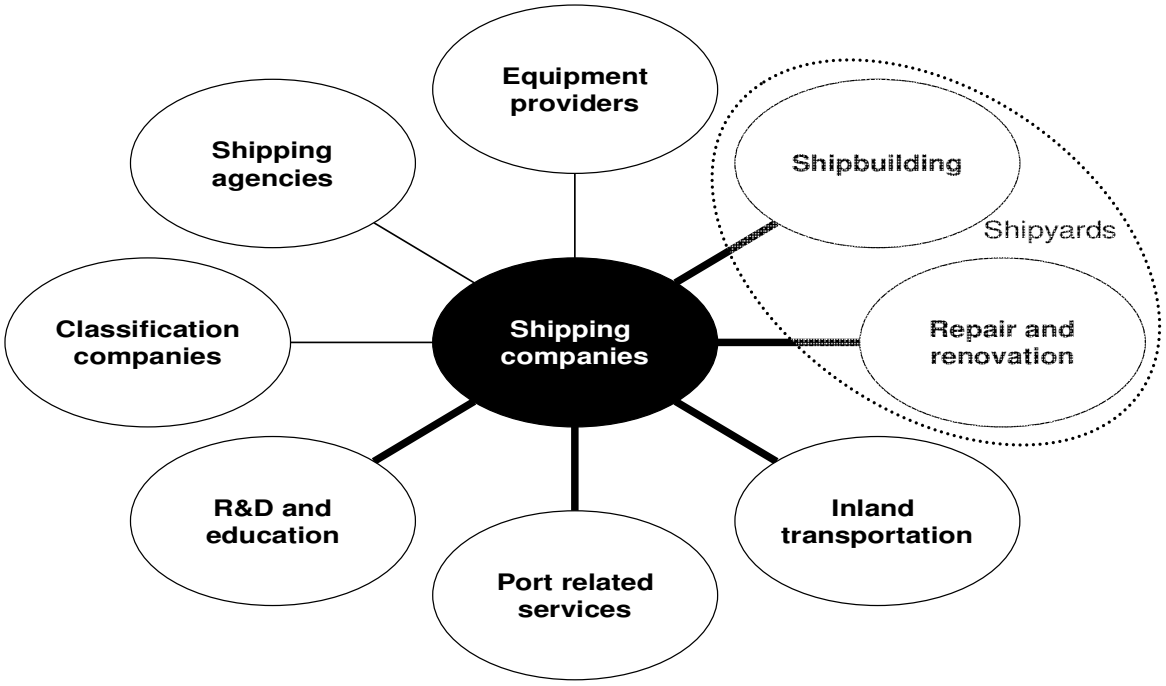

Figure 7: *Supporting and related industries within the Chinese maritime cluster*

Shipyards: Shipbuilding, repair and renovation

North-West European countries once formed the core of shipbuilding design and production, but since the mid-1980's the structure of the global shipbuilding industry has changed considerably. European manufacturers now operate mostly in niche segments while the main shipbuilding has moved to Asia. As of 2007, Korea accounted for 32, 1%, Japan for 25, 6% and China for 19, 2% of the total global shipbuilding production (www.skipsrevyen.no).

Vatne predicts that China's shipbuilding industry will gradually evolve from being a low cost competitor to a high quality differentiator. The Chinese shipbuilding industry is currently doing initiatives to upgrade its ships from conventional crude oil tankers and bulk carriers into high value-added vessels, such as high-speed containerships, liquefied natural gas carriers and very large crude oil carriers. Such high value and sophisticated vessels has traditionally been the domain of South Korean and Japanese shipbuilding companies. There is consensus among the respondents that the quality of Chinese technically advanced ships is still uncertain.

International ship production is now moving from the world's former shipbuilding centre, Korea, to Chinese shipyards and in terms of shipbuilding orders Chinese companies have already exceeded South Korea and Japan (www.chinadaily.com). According to a British

report, China shipbuilders had orders for 14 million CGT Compensated Gross Tons (CGT - ship's capacity measure) in January 2008, accounting for 50 percent of the world's total (www.chinadaily.com). China's largest shipbuilder, the China State Shipbuilding Corporation (CSSC), is currently building the world's largest shipyard, (Jakobsen et al. 2003), and according to DNV, Morgan Stanley and several other analysts, China is expected to exceed Korea as the world's leading shipbuilding country by 2015 (www.dnv.com).

China has become a major player in the shipbuilding industry owing primarily to inexpensive labour, scale efficiencies, rapid economic growth fuelling the demand for vessels as well as government subsidies. Equally important is the global boom in shipping: 80 % of the output of China's shipyards is exported (www.terradaily.com). Chinese shipyards are known to be large and impressive, and almost all of the large ones are state-owned enterprises (SOEs).

So, China's maritime strength is within shipbuilding. According to Jakobsen, China excels in this industry by matching large scale capital intensive industry production with labour intensive production. Due to an immense trade surplus, China can apply large amounts in capital investments, pair this with their relatively low wages in labour intensive production and thus gain a competitive advantage in large scale shipbuilding (Jakbosen 2008).

An attractive characteristic of the Chinese society is that it is highly organised, able to mobilise large amounts of people rather quickly and is thereby well suited for production. More specific, it is possible to build a huge plant and position a large number of workers there that will be organised very rapidly. This is why heavy industrial efforts such as ship building are booming in China (Interview with Erik Jakobsen).

The Chinese shipbuilding industry is dominated by two large state-owned enterprises, which jointly account for almost two thirds of the Chinese output. Apart from this, the industry has of recent time experienced a fragmentation: the remaining part of the output is produced by a large number of small shipyards run by local governments or private joint ventures, also including foreign firms. There were in March 2008 approximately 3,000 smaller shipyards spread around China's coastline, a number that is almost the tenfold of what it was just a decade ago. Chinese shipyards have managed to build up a good reputation as professional enterprises on a global scale (www.terradaily.com).

Pettersen lays out the logic behind why the Chinese focus on shipbuilding: China has an abundant access to relatively cheap labour, and with shipbuilding being the most labour intensive industry within a maritime cluster it is natural for the Chinese to focus on this segment. According to Pettersen the shipbuilding industry follows labour cost. This is the reason why it shifted from Japan to Korea in the early eighties and this is why it is now transferring again from Korea to China.

Dalian is a very important shipbuilding base, showing great potential in developing port-related industries. Dalian Shipbuilding Industry Co. runs the eight largest shipyards in the world and has clients across the globe (www.terradaily.com).

The case company has together with its Chinese joint venture partner signed agreements with several Chinese shipyards to build seven plus optional four chemical tankers for delivery in 2008-2012. These ships will replace smaller vessels that are currently operating in their regional trades in Asia and Europe (the case company's annual report 2007).

The case company further states that the costs of building ships are as of now lower in China. However, given the internationality of the industry, there is a risk of diminishing benefits if companies start to require foreign equipment, which is far more costly. Quality at all yards may not be at par with other international shipyards so it is imperative with highly competent on-site inspection crews. The case company reports that it has recently been able to secure earlier delivery at Chinese shipyards than in international yards.

As repair and renovation take place within shipyards, it is regarded to play an equal role within the Chinese maritime cluster as the shipbuilding industry. The case company states that it has good experience with conversion work. However, it is necessary to be 'on-site' and 'hands-on' in order to follow up.

It is obviously possible to contract with Chinese low-cost shipyards without being actually present in China. Marjamaa also mentions this needlessness of being localised in proximity

with shipyards. There is however a good explanation for why it will be beneficial for Norwegian shipping companies to localise in proximity to them hereafter. That is, as mentioned, Chinese shipbuilding is shifting its focus from low costs to quality and high technological standards. Thus, for Norwegian shipping companies, such as the case company, that use sophisticated vessels of high standards, it is vital to be able to easily supervise the completion of the ships on an ongoing basis.

Inland transportation

This is analogous with what has been presented regarding the Chinese infrastructure: the railways are currently being improved to support the development of the four major harbours in northeast China, among them Dalian port (Interview with Eirik Vatne).

Port related services

Port related services are according to Jakobsen assumed to be well developed and efficient in China. According to UK Trade and Investment (UKTI), China has undertaken a major 10 year strategy which aims to increase port construction in China. More concrete, the Chinese are making improvements in the overall layout of ports in China, older ports are modernized, they are made more commercially attractive to potential investors and the scale of construction of new projects is enlarged. The following five years the Chinese ministry of communication plans to improve the layout of existing ports; speed up construction of sea-ports; modernise the Yangtze Golden Waterway construction; and strengthen the supporting system for water transport (www.gov.cn). More than 600 new deepwater berths and 340 new river berths will also be built (www.uktradeinvest.gov.uk). The fact that the local governments in both Dalian and Jiangyin aspire to transform the ports into regional shipping centres and thus fuelling the ports with investments in industries related to the ports supports this assumption. Besides, Dalian serves as one of the most important hubs around Bohai Bay.[24] The case company however reports no special benefits from operating in Chinese ports in comparison to ports in other geographical locations.

[24] See 'Port clusters'

R&D and education

Research, development and education with respect to, shipping and other maritime activities are growing. The government is investing huge amounts in education and research, especially in technology and engineering as it is currently trying to transform the national ship building towards a more high quality production of advanced technology (Interview with Eirik Vatne).

The Chinese shipping and maritime universities have solid international reputations offering tailored education for students that aspire to work within the maritime cluster. Some of the Shanghai-based universities are cooperating with Norwegian universities and business schools. An example is the close cooperation between the Norwegian School of Management (BI) and the Fudan University. Many Chinese students go to Norway to learn about Norwegian/western management styles and relations in order to make a career in a Norwegian shipping company established in China (Interview with Erik Jakobsen). It is also reason to believe that the talents graduating from shipping and maritime universities find positions within the maritime sector relatively attractive.

Furthermore, there has been established an education programme and close cooperation between China Shipping Group and the Norwegian Shipowners' Association. The association considers China to be an interesting supplier of competent seamen and is continually working on satisfying solutions with respect to employment conditions on Norwegian ships. Moreover, the Norwegian Shipping Association and representatives for the Chinese government did in September 2006 sign an agreement to cooperate on the education of Chinese seamen for the Norwegian fleet. It is stated in the agreement that education of Chinese seamen constitutes an important part of the economic contact between the two countries (The Norwegian Shipowners' Association's Annual Report 2007).

Dalian Maritime University (DMU) is one of the largest maritime universities in China and an excellent centre of maritime education and training (www.iame2008.org). The university has educated and trained nearly 50,000 advanced professionals and technical authorities of which many are now playing important roles in maritime and maritime-related industries in the country. Hence, DMU is an important player in the clustering of maritime activities in Dalian.

Classification companies

Classification companies in China are, according to both Vatne and Jakobsen, to great extent foreign companies such as Det Norske Veritas in Shanghai. So, classification companies are barely present within the Chinese maritime cluster but not to the same extent as in Norway. This scarcity is one of the reasons why the Chinese maritime cluster is not as complete as the Norwegian. The case company reports that it has only a very limited use of local classification societies.

Shipping agencies

Despite isolated incidents, the industry of shipping agencies is one of the weakest in the Chinese maritime cluster. The relatively few shipping agencies present in China are foreign-owned, either placed in Shanghai or Hong Kong and the brokers are often operating from Singapore.

Equipment providers

Providers of ship equipment have traditionally been foreign companies investing in China (Interview with Erik Jakobsen). Norwegian equipment providers, such as Jotun (ship painting) and Kongsberg Maritime (high-technology systems) are to an increasing extent establishing busiensses in China.[25]

In the new industrial area of *Jiangyin,* six industries are being pursued. The following list is presented to demonstrate an example of how supporting and related industries[26] are, on the initiative of the local governments, localising in proximity to each other. (www.redpanda.com.au):

1) *Petrochemical.* Some large-scale liquid chemical tank terminals and storage equipments have been built in the petrochemical industry park
2) *Automobile.*
3) *Precision machinery manufacturing* emphasises heavy machinery, ship-based machinery and environmental machinery.
4) *New materials*

[25] See appendix 1
[26] 1), 3), 4) and 5) are to various extents related or supporting with respect to shipping

5) *Industry equipment* is the key industry of Jiangyin.
6) *Biopharmaceutical*

Industries that are linked together are closely localised in both Dalian and Jiangyin. In fact, the two industrial areas have been constructed on the government's initiative to exploit linkages between the different industries operating there. They are supposed to function as industrial areas, or clustering of economic activities. The intention is to create a sustained industrial milieu attractive enough to attract foreign investors.

Ability to benefit

Although China's shipbuilding industry is internationally competitive and some of the other industries are well represented and growing, the inadequacies in the Chinese maritime cluster still make it hard for foreign shipping companies to gain benefits from this factor as it does not yet lead to upgrading mechanisms. It is mostly this lack of related and supporting industries that makes it incorrect to, for the time being, talk of a Chinese maritime cluster.

It is however, important to be localised in proximity to shipbuilders for niche-oriented shipping companies that depend on the ability to supervise the completion of ships. So, it will be able to benefit greatly from being localised in China when the Chinese shipbuilding industry becomes more quality focused.

Firm strategy, structure and rivalry

Foreign shipping companies have realized that managing in China requires different models and strategies than those pursued elsewhere, even in other emerging markets.

Strategy style

Chinese companies cultivate a long-term perspective, especially with regards to investments in brand names and technological capacities to compete effectively against Western companies in mature markets. Their networks, experience and insider information provide them with an edge when operating at home.

Structure: state-owned enterprises

A significant part of Chinese domestic production of goods and services still takes place in SOEs which still dominate China's key industries (Owen et al. 2006). Almost all the top domestic corporations in China are state-owned and depend on ongoing subsidies to survive. The dilemma is that their role as key employers and providers of necessary goods and services to the economy makes it economically and politically infeasible to shut them down (www.sjsu.edu). Today, Chinese firms remain, if not state-owned, then at least under active influence of the state (Owen et al. 2006).

As a consequence of the Chinese WTO membership in 2001, the country is now required to strictly abide international rules on multilateral principles such as Most Favored Nations treatment, transparency of trade and so on. Foreign investors are allowed to establish companies for the purpose of operating a fleet under Chinese flag and as of today, all shipping companies of a certain size are in some way represented in the Chinese market, and the majority of them are situated in Shanghai. (Strandenes, 2008)

Rivalry

The Chinese shipping industry is according to the case company fragmented, consisting of many different international enterprises together with the large Chinese SOEs. Marjamaa considers the Chinese shipping market at present to be relatively chaotic and complicated and he expects a shakeout as soon as the economy slows down.

Due to the strong relationship between the government and industries dominated by SOEs, the large key corporations will have an advantage in any potential conflicts with foreign partners. Thus, domestic competitors enjoy a wide variety of benefits and enterprises often enjoy explicit government support. So when foreign investors and domestic producers crash in the market, Chinese enterprises are able to exploit their tight relationships with the government to negotiate deals to their advantage and to the disadvantage of their foreign counterparts (www.chinabusinessreview.com).

The profitability of individual shipping companies traditionally relies on efficient operations. Large companies have advantages in fleet size and port access, while companies of a smaller size can compete effectively by chartering services out of smaller (shallower) ports and transporting unusual cargo. The Chinese market however differs from the rest of the global industry with its rigid focus on price.

The case company claims that it is hard to compete with local Chinese shipping companies because they operate at a different quality, safety, standard and cost level. Their hope is that authorities and the petrochemical industry become more demanding in enforcing safety and quality requirements, something that would strongly favour the foreign enterprises.

Ability to benefit

This factor is the one from which it is probably the most difficult for Norwegian shipping companies to benefit. Even though it is getting easier to establish business on Chinese soil, it is still not easy to compete against domestic companies on it due to inequalities with respect to government support and standard levels. Also, the rivalry does not currently lead to innovation pressures or other upgrading mechanisms, which according to Porter is this factor's main contribution as a source to increased competitiveness.

Government

The role of government is given relatively heavy emphasis in this thesis due to the strong influence of Chinese government with respect to the Chinese competitive milieu and hence the nation's attractiveness as a playing field for foreign investors and furthermore their ability to benefit from participating in the country.

The government is investing largely in ports to improve handling capacity, allowing them to keep up with the rising demand for ship construction (www.dl.gov.cn). It also offers strong support for the shipbuilding industry by investing large amounts of money into new shipyards (www.terradaily.com).

As an example, the Chinese government is supporting key enterprises in the steel industry because of their role as important employers and producers of steel. Government investments have been heavy throughout the decade, but the allocation has been more widespread than

intended. The domination of SOEs within the steel industry makes it extremely inefficient. Being supported and protected by the government allows them to waste and abuse resources as well as maintaining redundant employees. What's more, China's antidumping actions against foreign competitors enable Chinese steel enterprises to force their end-user industries to accept higher costs and lower standards. Consequently, none of the steel producers are currently fit to compete internationally. However, Chinese trade authorities will not be able to protect the steel industry to such an extent in the long run. The reason is that many of the industries hurt by the steel industry's high prices are among China's most competitive companies. It makes little sense for China's authorities to weaken other industries' international competitive advantage to protect the steel industry.

Focus on specialised factor creation

Despite the recently surging presence of capitalism, the Chinese government still uses 5-years plans through which it plans development of certain industries. The government has earlier been investing heavily in shipping and the industry is still getting much attention being one of the areas of concentration. The Chinese government faces a challenge in transferring labour forces from the inefficient agriculture to effective industry sectors.

Ship building is a relatively advanced industry. The ship building industry in China finds itself in a transition between cheap mass production to specialisation. There is a clear strategic idea behind the investment in the maritime cluster, which is the government's aim to build up China as a world leading maritime superpower (Interview with Eirik Vatne).

The Chinese government's planning in infrastructure is also characterised by long-term strategies. The government defines goals and arranges for investments in infrastructure that will achieve them (Interview with Erik Jakobsen).

Safety standards

One of the specific policy approaches that according to Porter (1990) guide nations seeking to gain competitive advantage is to enforce strict safety and environmental standards.[27] The

[27] Porter, M.E. 1990, 'The Competitive Advantage of Nations', Harvard Business Review

security work for the ships and the port facilities is very heavy. The 2002 Amendments to the SOLAS Convention as well as the ISPS Code adopted by the International Maritime Organization asked for precautions to be taken by the Contracting Parities (China being one of them) to prevent maritime terrorist activities. The Amendments to the SOLAS Convention involve all ports open to international trade. As a large shipping and port country, China has actively participated in the formulation of these Amendments and is thereby obliged to actively fulfil its obligations. A port security system has for that reason been established. This has strengthened the port management, which is under the responsibility of the local governments in the port cities. Active fulfilment is necessary to protect China's trade, shipping and port interest against terrorism and thereby maintain their international reputation. The Chinese government has introduced instructions and organised personnel training for port and ship security and is constantly working to achieve a higher level of security (Zhang Shouguo Department of Water Transport 2008).

As for environmental principles, the Chinese government has increased fines for pollution, reduced subsidies on fuels and scraped tax breaks for heavy industry (The Economist 2008).

Limit direct cooperation

Administrative monopolies represent a greater threat to China's growing market economy than private monopolies. There are administrative monopolies in China in primarily three areas. First, in the industries where governmental departments have been changed into industrial associations, anticompetitive practices by members are permitted. The main members in the industrial associations are still SOEs exposed to government control and the managements are usually former government representatives. Since 1990, along with the increasing market competition, many industrial associations implemented 'self-disciplinary' prices, which in reality functioned as price cartels. This situation was aggravated when the government in 1998 officially legitimated this practice. What's more, local governments create and maintain barriers to competition from other regions.

Market economy – competition

The industries regarded as vital to national security and economic development are still heavily controlled by the government and thereby dominated by SOEs. There is a national consensus that the state-dominated industries should be exposed to increased competition. However, the government is the owner of the major players and is simultaneously supposed to function as a regulator, thereby occupying a dual role regarded as harmful to the development of China's market economy. Separate regulatory agencies have therefore been established as a step towards a separation of the two roles (Owen et al. 2006).

As a contrast, the competition between the millions of small and medium sized companies is in general regarded to be too severe. Chinese policy-makers have blamed these companies for engaging in 'suicidal' competition. Consequently, the government has undertaken measures in order to forbid some forms of competition regarded as damaging to the national economy.

Antitrust policies

China's antitrust law from 1993 is rather ambiguous and simplistic compared to the antitrust laws and competition policy guidelines in countries with a broader experience with antitrust.

The policy-makers' attitudes towards competition are two-folded. On the one hand, they have realised the problems created by administrative monopolies. On the other hand, many of them have doubts regarding the necessity of antitrust laws and there are furious debates about whether China really needs an antitrust law for its millions of small and medium sized enterprises, both state-owned and private (Owen et al. 2006).

Theoretically, if a legal system is able to provide a predictable set of contract enforcement solutions, more contracts will be entered into than otherwise. This increases output, social welfare and thereby economic growth. Concerning the area of antitrust, entry by firms seeking to compete with an SOE will be more likely than otherwise if the entrants expect the competition agency to protect them effectively from potential predatory reactions from the

SOE. In other words, predictability reduces the discretionary power of the government (Owen et al. 2006).

Due to lack of confidence in the law, Chinese and foreign firms will find it very difficult to rely on the antitrust law or the actions of the Chinese courts as a basis for predicting the antitrust risks that might result from different business practices. Therefore, the principal indicator by which antitrust law (or indeed any law) affects economic behaviour is absent in the Chinese competitive environments. Unless the bureaucracy that enforces the antitrust law actively pursues a policy of reliable enforcement founded on sources of predictability, the law will have little significance, an outcome that would represent a major loss for the economic welfare in China (Owen et al. 2006).

Rejecting managed trade

China has been undertaking significant trade liberalization since the early 1990s in order to accede to the World Trade Organisation (WTO). It has taken major steps to revise and update a large number of laws, and to restructure the trade policy regime to conform to international standards. The level of market access for foreign services suppliers has been considerably increased. In spite of these achievements, China still faces various challenges to improve transparency in policy-making. Further measures to liberalise the service sector include relaxed ownership (Ben 2007).

Ability to benefit

The analysis of the Chinese government's role as a host government with respect to shipping gives a wide variety of findings. Thus, Norwegian shipping companies' ability to benefit from this factor is not crystal clear. The findings indicate that the government's focus on specialised factor creation through investments in education and infrastructure, its maintenance of high safety and environmental standards, increased market access for foreign investors as well as its initiatives to attract FDI[28] makes it attractive to enter. On the other hand, the government's incapability to limit direct cooperation, its dual role that is harming the market economy and the lack of confidence in antitrust policies might deter some foreign investors from entering. Given the fact however, that the case company's entry strategy is

[28] See 'China's location attractiveness'

joint ventures with locals, the three latter are not considered to be discouraging for the case company.

All in all, this factor is considered to be a source of benefit because the focus in attracting FDI makes the governments realise the imperative in removing elements that are currently *deterring* it. Thus, the elements that according to the reasoning above make it possible for Norwegian shipping companies to benefit, weigh more than the ones that may deter them from entering. Besides, the possibility to join forces with locals makes the discouraging elements avoidable.

The Diamond as a system

The Diamond's factors comprise a system. It is this systematic nature of the model that is of particular interest for this thesis: in fact, it is according to Porter a consequence of this characteristic that industries are connected in clusters instead of being evenly distributed in the economy. Also, it is Porter's recognition that it is the interactions among the determinants that bring in new information, skills and players into the competition, *leading to more rapid innovation and competitive upgrading* that validates the link between the Diamond and the upgrading mechanisms in the thesis' model. Thus, it is crucial for the case to also apply the Diamond *as a system.*

Chinese competitive labour costs and relatively cheap material costs explain to great extent the expanding labour-intensive shipbuilding industry in China. The low-priced input factors also attract new entrants, which in theory should increase the *fierceness of rivalry* along with a fragmentation of the industry. However, the *demand conditions* in China may dampen the *factor conditions'* effect on *firm rivalry*. That is, in China, this factor is primarily characterised by growth and a large size. So, the rivalry will not necessarily be as brutal as expected if the market is 'big enough for everyone'. The growing demand for shipping services to and from China is also influencing the *factor conditions* directly. In fact, it stimulates specialised factor creation with respect to shipping and an improvement of the infrastructure to arrange for the conditions favouring shipping and other maritime activities. It is often the *government*, local and central, that takes initiative to improve such infrastructure and invest in specialised factor creation, such as maritime education. For instance, it is the

local governments in Dalian and Jiangyin that are currently making efforts to propitiously boost concentration of economic activity there. The central Chinese government is pursuing shipyards, the main *supporting industry* in this case. The government may also influence the *firm rivalry* in a particular way: the fact that it is still playing a protective role with respect to the domestic industries might result in unfair competition between Chinese and foreign companies. *Firm rivalry* is theoretically the factor that is the most able to convert the Diamond into a system. According to Porter (1990), fierce rivalry within a country strengthens the firms when expanding abroad and also pressures them to become innovative. The nature of the rivalry in this case has been somewhat difficult to describe due to lack of sufficient data. Also, the demand is large and growing. So, there is reason to believe that the rivalry is not so fierce. It is, however, unfair because of the government's role as explained and because the domestic shipping companies are operating with lower standards. The issue of standards is, in turn, something that *demand conditions* has the potential to revolutionize: challenging customers might have the power to demand high standards.

This reasoning has certainly not captured the whole complexity of the various links that can be attributed to the interplay between the different factors in the Chinese diamond. It illustrates, however, the systemic nature of it.

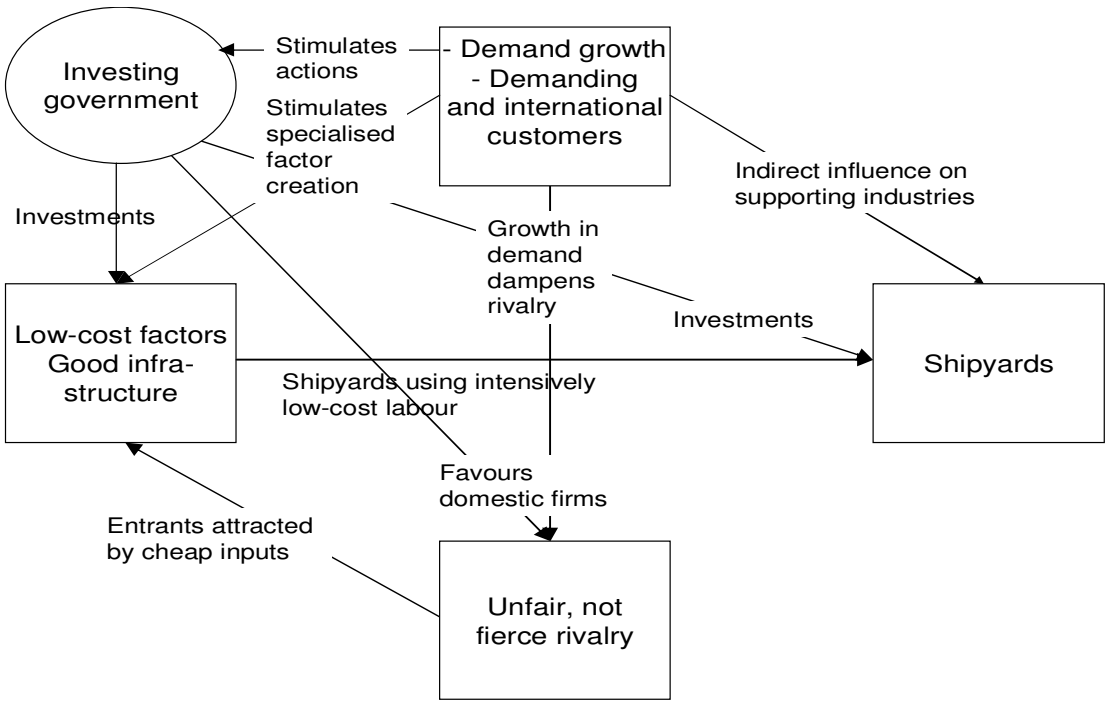

Figure 8: *The self-enforcing Chinese diamond*

Upgrading mechanisms

There is a difference between localising within a dynamic knowledge intensive milieu with a considerable degree of knowledge diffusion, communication, innovation pressure and complementarities and establishing a business unit within an emerging economy with the purpose of exploiting differences in price and availability of vital resources, which has traditionally been the motive of foreign investors entering China. They are to a large extent rather encouraged by cheap labour than by upgrading mechanisms (Interview with Erik Jakobsen).

Pressures to innovate

The case company reports that operating in the Chinese maritime cluster does currently not create a pressure to innovate as the cost pressure still dominates and the companies operate under different standards.[29] According to Porter, fierce rivalry spurs companies to become creative and creates thus a pressure to innovate. In China, the demand is currently growing so

[29] See under 'rivalry'

fast that even though the shipping industry is considered to be fragmented (by the case company), this will not result in the kind of brutal rivalry that creates innovation pressures because the demand is steadily increasing allowing non-efficient enterprises to operate.

However, there is reason to believe that this trend will turn in the future: Marjamaa predicts that pressure to innovate might be the most interesting upgrading mechanism because of the rapid market growth and development; new players with different ideas are mushrooming. In fact, companies investing in china might be forced to think and act differently, something that might stimulate them to become more creative (Interview with Ari Marjamaa). Marjamaa also states that a shakeout phase sooner or later will emerge in the Chinese market and that we will see some consolidation as the industry matures.

Complementarities

Several of the respondents assert that the complementarities are 'already there' in China: related industries utilising the same resources are operating in proximity to each other. Still there are many missing, making the Chinese cluster incomplete. The rigid focus on price is also hindering the related industries present in the maritime sector as they are not advanced enough to utilize synergies with foreign enterprises. This does not regard the different joint ventures that have been established by entrants and local companies, but there are problems in attaining complementarities from local incumbents as their technology and knowledge is often inferior to that of the entrants.

Knowledge diffusion

The case company reports that it is not gaining new insights through knowledge diffusion in China: There is currently relatively little knowledge diffusion to draw benefits from within the Chinese maritime cluster for Norwegian companies. In fact, it is the Chinese companies that are gaining knowledge benefits from inward FDI. Both Pettersen and Marjamaa confirm that Norwegian (and other foreign) companies in China are the ones contributing with knowledge diffusion *to* the Chinese actors, not the other way around. For instance, the case company is currently training locals to take over more sophisticated and responsible positions within the

company. Another example is the Norwegian educational institute BI that is educating Chinese students in China (Interview with Siri S. Pettersen).

One reason for the lack of knowledge diffusion, which several of the respondents mention, is the rigid Chinese focus on the price element in competition. The Chinese and the foreign companies are currently not craving the same competence. The Chinese focus on low costs, while foreign companies such as the case company are still waiting for the Chinese to move their focus more towards quality and safety.

However, the Chinese government is now taking initiatives to transition its maritime industries from a low cost focused and labour intensive to a more technically sophisticated one. Thus, in a distant future, when Chinese shipping has become more technically advanced and the focus is also on quality and safety, one might observe more knowledge diffusion also *from* the Chinese companies.

Pettersen supports this view and says that the current one way diffusion trend is likely to turn in a distant future as Chinese companies will become more competent (Interview with Siri S. Pettersen). This competence will also be a result of the knowledge that is now flowing from inward FDI.

Competitive advantages and specialisation

”Attracting the Winners” (Jakobsen et al.2003) distinguishes between localisation factors promoting geographic specialisation and factors promoting development of complete maritime clusters. One of the authors, Erik Jakobsen, indicates that if there is a certain interaction between the various regions and also a difference in competence between them, they will most probably develop different comparative advantages, which will strengthen through interaction. He believes that this will also take place in the maritime regions in china. It will partially be due to an exploitation of comparative advantages. ‘The point of cluster mechanisms is that comparative advantages are strengthened by exploiting them: one improves within areas in which one already does well’ (Interview with Erik Jakobsen). So, it is reason to believe that some areas will excel in ship building and others will specialise in other areas.

Furthermore, a consolidation will, according to Jakobsen, probably take place by acquisition of small and medium sized Chinese companies with improvement potential. Here, one will observe groups of large shipyards localised within the same area. This is not only a result of cluster mechanisms but also from the conscious strategy carried out by the Chinese government (Interview with Erik Jakobsen).

Norwegian shipping companies in China

During the collection of primary data, interesting findings regarding Norwegian participation in China with respect to motives to enter as well as their contribution to the milieu and the development of a potential future cluster were discovered. This information will give the reader an understanding about how Norwegian shipping companies believe they will be able to benefit from participating. In other words, *motivation* to enter a country must be based on a confidence that there are *benefits* to achieve from doing so. Also, the description of how they contribute gives an indication regarding how they will be able to benefit from being there in the future.

Motives to enter China

According to Gjærum, when considering the China entry at board meetings in the case company, cluster effects were not considered. Rather, he explains the reason to enter China to be partly caused by strong market growth and partly due to the need to build high entry barriers. To be more specific, the petrochemical tanker industry is one with relatively high entry and exit barriers. In order to enter the market; it is necessary to invest heavily in a fleet of sufficient size to be able to operate on a rational level. In order to build and maintain high entry barriers in this industry, one must be present and operate world-wide. If not, the customers with a need to transport goods to and/or from China would switch to other transporters (Interview with Per I. Gjærum).

Jakobsen speaks of the potential of small Chinese companies as acquisition targets for Norwegian companies entering China. By acquiring an already established but for instance poorly run enterprise, Norwegian companies can develop the business unit into a larger and more competitive firm within the cluster. This contributes to further cluster development (Interview with Erik Jakobsen). The case company followed this entry strategy by joining

forces with local firms. According to Gjærum, they had no choice but to enter a joint venture because it was vital to be on board with the local port government and secure local business as well as contributing with knowledge of the local culture.

Marjamaa, on the other side, does not see a clear rationale for shipping companies to enter China apart from its size and market growth. He explains that one of the main criteria evaluated by shipping companies when deciding where and whether to invest, is tax incentives. As China has not focused in tax relief to attract foreign companies, 'one does not invest in China to benefit from tax incentives; rather, one invests in Singapore or Dubai' (Interview with Ari Marjamaa). He states that everyone is aware of the need to, in some way or another, have a presence in China. There are for 'pure' shipping companies however yet no large enough incentives to move enough people in order to boost cluster development. According to him, this would be more of interest for companies in the marine equipment sector. However, the case company is logistics-focused and occupying a relatively large part of the value chain compared to 'pure' shipping companies by offering both storage and transport of chemicals. So, for their part, it makes more sense to have a stronger footing there (Interview with Ari Marjamaa). Cf. incidentally what Gjærum says about building entry barriers above.

Contribution to the maritime milieu

Over 120 Norwegian companies are operating in China (Vedde-Fjærestad 2008). With China being one of the world's largest and fastest growing economies, they will probably continue to invest there in the future. A large part of the Norwegian companies present in China is from maritime industries, mainly ship equipment providers and shipping companies.[30] Norwegian maritime industries have been relatively successful in establishing relations to Chinese companies, institutions and the Chinese government. In fact, Norwegian companies are participating in making the maritime cluster in China more complete: Norwegian shipping banks such as DnB NOR and the classification company Det Norske Veritas are examples of this development. In other words, partly due to the very Norwegian investments in China, more and more pieces of the maritime puzzle may be falling into place. In accordance to this Norwegian companies contribute with spreading knowledge and best practices to the Chinese maritime industries through their joint ventures with Chinese enterprises.

[30] See appendix 1

Conclusion

Challenging the Diamond

Porter's 'Competitive Advantage of Nations' was published in 1990; 18 years before the completion of this thesis and 11 years before China entered WTO. It is the product of a study of a pattern of competitive success in ten leading developed nations. China, which was at the time of study barely considered an emerging economy, was not included. Porter declared back then that firms succeed because they draw upon advantages in their *home* country. After experiencing a tremendous growth in FDIs since the publication of his model, it is about time to test its applicability to analyse the same factors in *host* countries.

The findings from the analysis indicate that Norwegian shipping companies entering China are able to achieve benefits from almost all of the factors in the Diamond. One of the main reasons for this is most likely that the Chinese government is now taking initiatives to attract foreign FDI. In order for a country to attract FDI, it must arrange for the foreign companies so that they are able to benefit from the same sources of competitive advantage as the domestic ones. Singapore is mentioned (Interview with Siri S. Pettersen) as the success story where this strategy has worked. Marjamaa shares this opinion, stating that Singapore has always been aware of the possibility to gain valuable knowledge by making the country attractive to invest heavily in by the means of FDI. In every way, he explains, the Singapore maritime cluster is built on knowledge extracted from foreign companies: the cluster is imported. According to Marjamaa it is possible to construct a cluster by attracting FDI and foreign companies can utilize cluster effects in the same way as those of the host country.

In other words, the Diamond is just as appropriate to employ when evaluating whether the factors in a *host* country might be sources to benefits for also foreign companies as it is when evaluating the same industries' *home* country's factors. Cf. the case company's confirmations on this.

Concluding remarks from analysis of the Diamond

From analysing the factor conditions, it is found that exploiting the relatively cheap Chinese labour is a vital source to competitive advantage for firms operating in China. As this resource

is readily available also for foreign firms, Norwegian shipping companies can exploit it and it is thus a source to competitive advantage also for them and not only Chinese enterprises. The cheap labour is listed by most of the interview respondents as an important source of benefit for Norwegian companies operating within the Chinese maritime cluster. Moreover, specialised labour is attracted to Norwegian shipping companies.

The case company entered China primarily due to market growth. It is the growth and size element of the demand conditions that Norwegian shipping companies benefit most obviously from when investing there. Also, the fact that there are mighty and demanding SOEs and MNEs among the chemical producers is advantageous because they will demand high standards for their suppliers. This will in its turn dampen the unfairness of the rivalry with Chinese shipping companies operating with low standards.

The growing shipbuilding industry may seem like a crystal clear benefit for shipping companies entering China. However, one might contract with a Chinese shipyard from an office in Rotterdam or Houston and achieve virtually the same benefits in terms of low costs. It is however risk reducing to actually be in proximity to the shipbuilders in order to supervise the working processes. This is especially important for companies within the chemical tanker segment because they buy very sophisticated vessels. As the case company itself has pronounced it: 'It is necessary to be on-site and hands-on to follow up'.

The Chinese shipping industry is still fragmented and relatively unstructured. Being fragmented the industry should experience fierce competition but this is moderated by the high and increasing demand that China is experiencing at present. In accordance to this the large Chinese SOE's dominate parts of the market, especially the low cost segment. These do not fully compete with each other, which makes the competition unnatural.

The Chinese government has realised the advantages of opening up for FDI, are taking numerous initiatives to attract it and is therefore welcoming foreign investors. Also, it is investing huge amounts of capital in shipping and shipbuilding and arranging for specialised factor creation by investing in maritime universities and taking initiatives to transform the shipbuilding industry from being cost focused to quality focused. It might however be necessary to join forces with locals in order to be on terms with the *local* governments.

The existence of a Chinese maritime cluster

Almost all respondents question the existence of a Chinese maritime cluster. It is apparently too early to label the Chinese maritime milieu a cluster. When asked to compare the Chinese cluster to the Norwegian one, or clusters elsewhere, some of the respondents consider China to be light years behind maritime nations such as Norway and Singapore with respect to completeness and sophistication.

The abundant access to labour, the improvement in access to more specialised labour and the specialisation in infrastructure that is expected, all point towards potential cluster effects being attainable. The great demand, although temporarily limiting competition, is also contributing to this. The Chinese cluster however is far from being complete or allowing for any cluster effects to be reached. Maritime China as of today consists mainly of shipbuilding and shipping companies, while other maritime industries either are not present or of such poor quality that they are not contributing to the creation of any upgrading mechanisms, at least not in the near future. These are so far provided from Singapore, Hong Kong, Dubai or other clusters that are more complete than the Chinese that as of today stands out as incomplete.

The Chinese government is spending a lot of money and efforts to make their maritime industries advance. However, even though the shipyards become more sophisticated, this will not necessarily result in a more complete maritime cluster. Marjamaa predicts that one will observe sectors with cluster tendencies instead of a complete Chinese maritime cluster. Thus, it might just be that China will focus more on a development of and specialisation within the shipyard industry instead of a completion of the whole cluster. Finally, it takes a certain critical mass and diversity to be labelled a ‘cluster’ (Interview with Ari Marjamaa). Jakobsen partly shares this understanding and predicts that there might be areas along the Chinese coastal line specializing in different sectors of the maritime cluster and exchanging goods. Pettersen does neither believe in a single Chinese cluster, but expects regional clusters to emerge in the future as China is able to gather more knowledge from its joint ventures, build up competence from its education campaigns and move its focus from costs to quality.

Upgrading mechanisms

Given the cluster's incompleteness, the upgrading mechanisms are currently not characterising the maritime milieu in China. There are virtually no pressures to innovate and the knowledge is diffused one-way; from foreign companies to teachable Chinese. However, with a prospective completion of the Chinese maritime cluster, the upgrading mechanisms will come into play in the future: knowledge will be diffused in all direction within the cluster, complementarities will surge and the pressure to innovate will grow (Interview with Erik Jakobsen).

Ability to benefit

The findings from the analysis that Norwegian shipping companies are able to benefit from the factors in the Diamond are confirmed by the case company's own assertions as well as logical conclusions: the Chinese government is arranging for foreign companies to enter the country and establish business or join forces with local companies. Singapore is mentioned as an evidence of this reasoning.

To conclude, three evident sources to benefits that are attainable for Norwegian shipping companies have been identified. They are identified based on the analysis of the Diamond applied to the case and the subsequent concluding remarks on these factors. As there are no upgrading mechanisms into play yet, there are no benefits related to synergy and cluster effects to be gained from investing in China. Consequently, the benefits must stem directly from the Diamond's factors.

1. Exploitation of relatively cheap and specialised labour (factor conditions)
2. Market growth (demand conditions)
3. Resourceful government investing in maritime industries and arranging for FDI (government)

The findings from the Norwegian shipping companies' contribution in developing a Chinese maritime cluster as well as the prospects for the Chinese maritime cluster given by several respondents indicate that there is a potential to gain benefits in terms of upgrading mechanisms - in a distant future.

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- Personal correspondence with the case company's Senior Vice President, Asia
- The case company's annual report 2007
- The case company's website

Appendices

Appendix 1: Norwegian companies in China

This list is a selection of the Norwegian companies operating in China and a brief explanation of their operation field.[31] It illustrates that China is an attractive location for Norwegian companies, especially for those operating within the maritime milieu.

Company name	**Type of operations**
17 group of Norway	Equipment supplier to the Chinese shipping industry
Aalesundfish A/S China	Exporter of seafood
Aasly Marine	
Aker Kværner	Provider of engineering and construction services and technology products
Alpha Boat Manufacturing	Boat design and manufacturing
Alu Rehab	Wheelchair manufacturer
Barwil Unitor (Wilhelmsen) Ships Service	Maritime services network
Beta Moss Shipping	*Shipping*
BI	Education
Borregaard Industries	Supplier of wood-based chemicals
Daiyoo Electronics	High performance magnet manufacturer
Det Norske Veritas	Safeguarding (life, environment, property)
DnB NOR Bank	Banking
EDF Induction	Induction heating product manufacturer
Ekornes	Furniture manufacturer
Elkem International Warehousing & Trade	Metal and material producer
Astrup Fearnleys	*Shipping*
Goltens	*Provider of repair, maintenance, overhaul services and engineering components for shipping and offshore marine installations*
Grieg Billabong, PRC	*Ship-owner, shipbroker, logistic services,*

[31] Shanghai and the surrounding provinces: Jiangsu, Zhejiang, Anhui, Fujian, and Jiangxi

	maritime information systems, investment consulting, windmills and fish farming
GHIR China Ltd/Grenland Group Asia	Engineering, procurement and construction
Høegh Auto Lines Ltd.	*Shipping, real estate and financial advisory*
I.M. Skaugen	*Shipping*
ITP Box & Bag Co. Ltd.	Provider of sourcing services
Jotun and Jotun Coating	*Painting systems (for ships)*
Kongsberg Automotive	Engineering, design, fluid assemblies, manufacture, industrial driver products etc.
Kongsberg Maritime China	*High-technology systems to offshore oil and gas, merchant marine, defence and aerospace*
Lærdal Medical	Lifesaving products for education and clinics
Lortenzen & Stemoco AS	*Ship broking and consulting*
Malthe Winje	Electro technical products, automation, real estate, traffic control systems
Metallkraft	Silicon and silicon carbon slurry
MultiPlus Solutions	ERP systems and consultancy services
Norautron	Electronic manufacturer
Nordic Industrial Park	Delivers business solutions to help small and medium-sized companies enter China
Norsk Hydro, Hydro Aluminium	Aluminium and aluminium products
Norwegian Deck Machinery	Solid winches
Norwex	Cleaning without chemicals
Odfjell	*Shipping and storage of chemicals*
OTRUM Trading	Interactive TV technology
Pan Fish	Seafood
Rikett	Quarts floor covering
Rolls-Royce Marine	Aerospace, energy, marine and defence
SAS Airline	Airline company
Scana Skarpe nord	*Hydraulic actuators and valve remote control systems for ships and offshore installations*
Scana Volda	*Reduction gears , propellers and remote control systems for a global maritime market*

Sevan Marine	Floating units for offshore applications
Skipskonsulent	*Ship design*
Sotra Anchor & Chain	*Maritime and offshore-related products*
Star Shipping	*Shipping*
Stolt-Nielsen Transportation	*Shipping*
Tandberg	Video systems
TQM Center	Lederutvikling
TradeWinds	*Reporting of shipping companies.*
TTS Marine	Ships and shipyard equipments
Tubus Carrier Systems	Bending and repairing of tubes
ULSTEIN	*Ship design and ship building*
Uniteam International	Shelter systems
Ultra Jet	Bath tubs
Unitor Marine Systems	*Technical services, marine products, logistics and ships agency*
Wallenius Wilhelmsen Logistics	Outbound vehicle logistics services
Wikborg Rein	Forretningsadvokater
Yessamin	Health products
Zhang Jia Gang Unistar Mobile Shelter System Co., Ltd.	Containers.

Appendix 2: Interview with Eirik Vatne

The following questions were asked during the interview with Eirik Vatne in his office at NHH 13.05.2008.

Questions based on the Diamond

Factor conditions

- How are the prices on input factors in China impacting competitiveness of the firms that are operating there (firms in general and shipping companies in particular)
    - Labour costs
    - Material costs
    - Capital costs
- How would you describe the access to input factors?
- To what extent are the input factors specialised?
    - Specialised labour
    - Unique materials / parts

Demand conditions

- Is the Chinese maritime cluster, in your opinion, characterised by demanding customers?
- Are they international?

Supportive and related industries

- How are the supportive and related industries, with respect to shipping companies in China, influencing the competitiveness? Examples of supportive and related industries are:
    - Ship building
    - Repairment / conversion of ships
    - Scrapping
    - Inland transportation
    - Port related services
    - Classification companies

- Shipping agents
- R&D and education
- Equipment providers

Firm strategy, structure and rivalry

- Is the Chinese shipping industry able to attract many of the talents from the universities?
- How would you characterise the rivalry between shipping companies established in China?
- To what extent is the industry fragmented?

Government

- How, in your opinion, is the government promoting specialised input factors that the shipping industry might benefit from?

Questions related to clusters

- How do you perceive the characteristics of the Chinese maritime cluster as compared to the Norwegian one?
- What has it meant for Norwegian shipping companies to enter the maritime cluster in China?

Appendix 3: Interview with Erik Jakobsen

The following questions were asked during the interview with Erik Jakobsen in his Oslo office 27.05.2008.

Questions based on the Diamond

Factor conditions

- How do the prices of Chinese input factors influence the competitiveness of Norwegian shipping companies?
    - Labour costs in China
    - Material costs in China
    - Capital costs in China
- How does the infrastructure influence their competitiveness?
- Can you characterise the access to input factors and what has this meant to the competitiveness of shipping companies operating within the cluster?
- To what extent are the input factors specialised? How does the government arrange for specialisation of input factors?
    - Specialised labour
    - Unique materials / parts

Demand conditions

- Is the Chinese maritime cluster characterised by demanding customers? (for instance, do they demand high standards and short lead times?)
    - If yes, how does this influence their competitiveness and innovation capability?
- Are the customers operating globally?
    - If yes, how does this influence the competitiveness?

Supporting and related industries

- How do supporting and related industries in China influence the competitiveness of Norwegian shipping companies? Examples of supporting and related industries within maritime clusters:
    - Shipbuilding
    - Repair and conversion

- Scrapping
- Inland shipping
- Port related services
- Classification societies
- R&D and education
- Equipment manufacturing
- Shipping agencies

Firm strategy, structure and rivalry

- Are shipping companies operating within the Chinese maritime cluster able to attract many of the Chinese talents (from the universities)?
- How are Norwegian shipping companies upholding in the competition against Chinese shipping companies
  - SOEs
  - Private owned
- Can you say anything regarding the rivalry between shipping companies operating within the Chinese maritime cluster?

Questions related to clusters and upgrading mechanisms

- How do you characterise the Chinese maritime cluster as compared to the Norwegian?
  - Degree of completeness (what is included in the Norwegian but still missing in the Chinese and possibly reversed)
- What do Chinese companies add to the cluster and what do foreign companies add?
  - How are N*orwegian* shipping companies contributing in the development of the Chinese maritime cluster?
    - To what extent – compared to other countries, and compared to Norwegian participation in other maritime clusters elsewhere.
- How do Chinese shipping companies draw value out of being part of the Chinese maritime cluster?
  - Foreign shipping companies
  - Norwegian shipping companies – why have they invested there?

- How is the Chinese maritime cluster strengthened by having foreign companies investing there?

Appendix 4: Interview with Per Ivar Gjærum

The following questions were asked during the interview with Per Ivar Gjærum in his office at NHH 04.06.2008.

Questions based on the Diamond

- What was the main reason behind the case company's decision to invest in China?
- How do the necessary input prices in China influence the case company's competitiveness?
    - Labour costs
    - Material costs
    - Capital costs
- Who are your customers and how would you characterise these?
    - Demanding / sophisticated?
    - International?
- How would you characterise the rivalry with other shipping companies that are established within the Chinese maritime cluster?

Questions related to the upgrading mechanisms and the cluster effects

- What has it meant for the case company to invest and establish activities within the maritime cluster in China?
    - What advantages have you had with respect to this?
- Does competing within the Chinese maritime cluster create a pressure to be innovative?
- Does the case company acquire new knowledge/learning by being positioned within the Chinese maritime cluster?

Appendix 5: Interview with Ari Marjamaa

The following questions were asked during the interview with Ari Marjamaa via phone from London 05.06.2008.

Questions related to the Chinese maritime cluster

- How developed is the Chinese Maritime Cluster?
    - Compared to the Norwegian one
    - Compared to other maritime clusters elsewhere in the world
- What do Chinese companies add to the cluster and what do foreign companies add?
- How do you think the Chinese maritime cluster will develop in the future?
- What benefits can Norwegian shipping companies gain by being a part of the Chinese maritime cluster?
    - Knowledge diffusion
    - Complementarities
    - Pressure to innovate
- What are the main reasons for Norwegian shipping companies to invest in China?
- Can Norwegian shipping companies exploit the same benefits from the Chinese maritime cluster as Chinese companies?
- Do you think there are benefits originating from the Chinese cluster that Norwegian shipping companies do not exploit? Which - and for what reasons?
- Why are several Norwegian shipping companies entering China through joint ventures with Chinese enterprises?
- How does shipping in China differ from shipping in Norway?

Appendix 6: Interview with Senior Vice President, Asia of the case company

The following interview was sent to the case company's Singapore office. The response was received 06.06.08.

Questions related to entry

- What was the main reason for investing in China?
- Why did you choose to invest in China via a joint venture?

Questions based on the Diamond

Factor conditions

- How do the input prices influence your competitiveness in China?
    - Labour costs
    - Material costs
    - Capital costs
- How does the infrastructure influence your competitiveness?
- What has (certain, good) access to input factors meant for your competitiveness?
- To what extent are the input factors you need specialised?
    - Specialised labour
    - Unique materials / parts

Demand conditions

- Who are your customers?
- Is the Chinese maritime cluster characterised by demanding customers?
    - If yes, how does this influence your competitiveness and innovativeness?
- Are your customers international?
    - If yes, how does this influence your competitiveness?

Supporting and related industries

- How do supporting and related industries in China influence the competitiveness of Norwegian shipping companies? Examples of supporting and related industries within maritime clusters:

- Shipbuilding
- Repair and conversion
- Scrapping
- Inland shipping
- Port related services
- Classification societies
- R&D and education
- Equipment manufacturing
- Shipping agencies

Firm strategy, structure and rivalry

- How are you upholding in the competition against Chinese shipping companies?
- Is the industry fragmented or consolidated?

Questions related to clusters and upgrading mechanisms

- How would you characterise the Chinese maritime cluster as compared to the Norwegian one?
- What has it meant for you to invest and establish activities within the maritime cluster in China?

Innovation

- Does competing within the Chinese maritime cluster create a pressure to be innovative?
- Has innovative solutions implemented in China also been transferred to your operations elsewhere?

Knowledge externalities

- Have you acquired new knowledge by operating in the Chinese maritime cluster?
- Has this meant anything for how you operate and/or compete in the rest of the world
- Are you experiencing knowledge externalities in China?

Appendix 7: Interview with Siri Strandenes Pettersen

The following questions were asked during the interview with Siri Strandenes Pettersen in her office at NHH 06.06.08.

Questions related to the Chinese maritime cluster

- How developed is the Chinese maritime cluster?
    - Compared to the Norwegian one
    - Compared to other maritime clusters
- What do Chinese companies add to the cluster and what do foreign companies add?
- How do you think the Chinese maritime cluster will develop in the future?
- What benefits can Norwegian shipping companies gain by being a part of the Chinese maritime cluster? with respect to:
    - Knowledge diffusion
    - Complementarities
    - Pressure to innovate
- How do you think this will change in the future if the cluster becomes more complete?
- Can Norwegian companies benefit from the same benefits as the Chinese companies?
- Do you think there are benefits of being a part of the Chinese maritime clusters that Norwegian shipping companies are currently not seizing?
- What might be the main reasons that several Norwegian shipping companies choose to enter china through a joint venture with a Chinese company?
- How is shipping in China different from
    - Shipping in Norway?
    - Shipping in other parts of the world?

Questions inspired by Pettersens' research on 'causes and effects of FDI by the Norwegian maritime industry'

- Why do Norwegian companies invest in China?
- What is the effect of such investments on the Chinese shipping industry and china in general?

Questions regarding firm strategy, structure and rivalry

- How would you characterize the Chinese shipping industry?
    - Consolidated / fragmented?
    - Hard competition, low margins?
    - Many newcomers?
- How do you think the rivalry will be characterised in the future?
- Do foreign shipping companies possess superior technology and/or knowledge in comparison to the Chinese shipping companies?
- Who are the 'winners' in this industry today?