



**MS thesis**  
**Business Administration**

**Strategy for a small/medium sized Nordic  
shipping line**

Ágúst Þór Ragnarsson

Advisor: Ingjaldur Hannibalsson  
School of Business



**HÁSKÓLI ÍSLANDS**

June 2013

# **Strategy for a small/medium sized Nordic shipping line**

Ágúst Þór Ragnarsson

Thesis for the degree of Master of Science in Business Administration

Advisor: Ingjaldur Hannibalsson

School of Business

The Faculty of Social Sciences

June 2013

Strategy for a small/medium sized Nordic shipping line.

Ritgerð þessi er 30 eininga lokaverkefni til MS prófs við  
Viðskiptafræðideild, Félagsvísindasvið Háskóla Íslands.

© 2013 Ágúst Þór Ragnarsson

Ritgerðina má ekki afrita nema með leyfi höfundar.

Prentun: Háskólafjölritun

Reykjavík, 2013

## **Prologue**

This thesis is a 30 ECTS credits final assignment for a Master's degree in business administration, which is a total of 90 ECTS credits.

I dearly thank my advisor, Ingjaldur Hannibalsson, Professor at the School of Business at University of Iceland, for his guidance and advisory during the course of this thesis.

## **Abstract**

The aim is to explore new market opportunities for small Nordic shipping operations. The dissertation begins by introducing how the shipping industry has developed from the start to latest trends on the market. The main characteristics of the market are outlined. It is a strategic advantage to recognize some of the market elements that differ, both for better and worse. The shipping network is discussed and how it reflects the carrier's strategic position. An explanation is offered in strategic terms as to why the small Nordic shipping line should focus on its expertise in cold chain logistics and expand into new markets. The cold chain transport is a value added and delicate service with many links that can affect the spoilage rate. Emerging economies and trade routes can be lucrative markets for small Nordic shipping lines, especially if they are involved in transport for agriculture, fish farming and other perishable food industries. In this research, the Latin America region is selected as a valuable option because it is one of the most lucrative markets for cold chain services. The focus is then set further, on Chile and Brazil, for economic and infrastructural reasons. Both economies offer good opportunities, but there are also important differences. The Brazil market is bigger with more product variations, whereas the transport system in Chile is more efficient. However, Chile is the first choice in a market expansion strategy, due to its efficient transport system and stable fish production.

## Contents

1	Introduction .....	11
2	Research method .....	16
3	The characteristics of the global container line industry .....	19
3.1	Keeping the balance in shipping line operation .....	19
3.2	Deciding optimum size of vessels .....	20
3.3	How the shipping industry arranges co-operation .....	23
3.4	Limited potential for cost savings .....	24
3.5	Strategy through liner service network design .....	26
3.5.1	The international logistics system as a platform .....	26
3.5.2	Global liner services .....	27
4	Logistics .....	36
4.1	Commodity chains .....	37
4.2	Integration .....	37
4.3	Freight transport and commodity chains .....	38
4.3.1	Intermodalism .....	38
4.3.2	Categorization of freight transport services .....	39
5	The reefer market .....	42
5.1	The cold chain network for food .....	42
5.2	The demand for cold chain logistics .....	43
5.3	The challenge of providing temperature controlled environments .....	44
5.4	The types of food .....	46
6	Strategy framework .....	51
6.1	Operational effectiveness and strategic positioning .....	52
6.2	The resource-based view .....	53

6.3	Strategy for a small Nordic shipping line .....	55
6.3.1	The choice of market expansion strategy .....	56
7	Developments on emerging trade routes .....	59
8	The cold chain between north and south regions.....	62
8.1	The Latin America region for cold chain logistics services .....	63
9	Results.....	68
9.1	Trade in the Chilean food market .....	68
9.1.1	The transport system in Chile .....	74
9.1.2	Chile SWOT analysis .....	76
9.2	Trade in the Brazilian food industry .....	78
9.2.1	The Transport system in Brazil .....	86
9.2.1	9.2.2 Brazil SWOT Analysis.....	89
10	Conclusion.....	92
	Bibliography .....	94

## List of figures

Figure 1 Vessel size and capacity. Operational limitation applies to ships bigger than 8,000 TEU. Source: (Rodrigue, Comtois, & Brian, 2009).....	21
Figure 2: Zone differentiation of global ports. Shipping lines often limit their capacity to one zone. Source: (Degerlund, 2006).....	29
Figure 3: The horizontal axis reflects the coverage rate on port networks in the different sub-regions. On the vertical axis the bigger the average ship size, the more is the commitment of a shipping company to serving a specific region. Source: (Gadhia, et al, 2011).....	30
Figure 4: The proportions of world trade commodity groups. Bananas and meat have the largest share of the commodity trade. Source: (Drewry Shipping Consultants, 2010). ....	47
Figure 5: World's container port traffic. Here the port container traffic is measured by flow of containers from land to sea transport modes, and vice versa, in a twenty foot equivalent container which is a standard size of container. The data refer both to coastal and international shipping. Source: (World Bank, 2009). ....	60
Figure 6: The LPI international score map for 2012. Source: (The World Bank, 2012).....	66
Figure 7 : The LPI score for Chile compared to the Latin America & Caribbean region and Iceland: (The World Bank, 2012) .....	67
Figure 8: Chile's wine export. The map shows how Chile's wine is distributed to the world. Source: (Food and Agriculture Organization of the United Nations, 2012). ....	68
Figure 9: Detailed distribution net of grapes from Chile where North America and North Europe are largest and have extensive connections. Source: (Food and Agriculture Organization of the United Nations, 2012). ....	69
Figure 10: Export of apples from Chile, shown as a proportion of world export. Source: (Food and Agriculture Organization of the United Nations, 2012). ....	70
Figure 11: Largest proportional agricultural import. The green zone in this map shows the share of import of wheat to Chile. Source: (Food and Agriculture Organization of the United Nations, 2012).....	72
Figure 12: The map shows the distribution of aquaculture in the world (the data excludes aquatic plants). Source: (Food and Agriculture Organization of the United Nations, 2012). ....	73



Figure 13: Quality of port infrastructure. The figure shows Chile’s well-developed port system, as, for example, compared with Brazil’s average port infrastructure. Source: (The World Bank, 2012). .....	75
Figure 14: The total world production quantities of meat. Brazil is the third largest after China and USA in meat production. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	80
Figure 15: Brazil’s export of meat. Brazil exports 326,854 tonnes, worth 909,939 thousand US\$ and is exporting widely to the world. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	81
Figure 16: Import flow of fresh bovine meat to the United States of America. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	82
Figure 17: Chicken meat export from Brazil. A detailed world map of chicken meat export from Brazil shows a high proportion goes to Saudi Arabia. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	85
Figure 18: Brazil’s logistics system is the second best performer after Chile according to the LPI score for the Latin American and Caribbean region. Source: (The World Bank, 2012) .....	88

## List of tables

Table 1. Export of seafood in the South America region. Source: (Food and Agriculture Organization of the United Nations, 2012) .....	71
Table 2. The top 5 exporters. Chile comes second after Peru in exporting fish, with approximately 4300k tonnes of export. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	73
Table 3. Growth rate of top 15 fish aquaculture producers. The table shows countries which harvest 92.4 percent of total world production (the data excludes aquatic plants). Source: (Food and Agriculture Organization of the United Nations, 2010). .....	74
Table 4. The main import trading partners. Source: (International Monetary Fund, 2012) .....	76
Table 5. The main export trading partners. Source: (International Monetary Fund, 2012). .....	76
Table 6. The five largest meat exporting nations. Brazil comes second after the US. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	79
Table 7. The annual growth rate of export and import quantity by region. The steepest growth is from America. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	79
Table 8. The world's 5 largest export nations of fresh bovine meat. Brazil comes second with 926,083 thousand tonnes after Australia which exports 964,271 thousand tonnes. Source: (Food and Agriculture Organization of the United Nations, 2012) .....	81
Table 9. The five biggest importers of fresh bovine meat. The United States is the biggest import market, although Brazil has no access to this market. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	82
Table 10. The biggest importer of beef from Brazil. Russia is the biggest importer of beef from Brazil, but the table also shows that the majority of exports go to the developing countries. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	83
Table 11. Distribution of orange juice concentrate. A large proportion goes to rich EU countries like Belgium and Switzerland. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	84
Table 12. Top 23 countries that import chicken meat from Brazil and it is interesting to see the high export the value per ton to Japan. Source: (Food and Agriculture Organization of the United Nations, 2012). .....	86

Table 13. Shows Brazil's main import partners. Source: (International Monetary Fund, 2012). .....	86
Table 14. Shows Brazil's main export partners. Source: (International Monetary Fund, 2012). .....	87
Table 15. Efficiency of Brazil's transport system. There is some inefficiency in the Brazilian transport system which causes high cost to export and import. Source: (The World Bank, 2008). .....	90

# **1 Introduction**

The purpose of this dissertation is to describe the shipping industry and its competitive environment and to define a strategic goal for small container shipping companies. A strategy is provided for a small shipping firm. As is the case with many Nordic shipping lines, it is assumed that the firm has long history in the transportation of frozen products (particularly fish). The focus on a strategy for a small shipping line with experience in the logistics of frozen products is consistent with the Eimskip shipping line in terms of size and history. The reason for using Eimskip as a typical model company is that the author was asked to provide a market database for Eimskip. However, instead of creating a list of raw numbers of products and some general description of product flow the author wanted to provide a more focused strategic analysis. The goal of this research is to define suitable market expansion strategies for shipping markets to ensure the competitiveness of a small Nordic shipping line. By using its competitive expertise in the reefer market the shipping line should be able to gain a foothold in a new market territory. By expanding its market territory the shipping line is also lowering its exposure to certain economic and market risks.

It is important to introduce the world container industry before attempting a deeper analysis of some of its aspects. Chapter 3 comprises a description how the container market has evolved and what principles and conditions companies must face. The chapter describes differences in the global maritime industry as compared to other industries, including its function both in terms of terminal operators and shipping lines and the difficulty of controlling capacity with maximum utility in mind. The capacity problem of the industry is one of the reasons for the oligopoly situation and the emphasis on alliances, mergers and cooperation through shipping conferences. Container lines are classified by how truly global they are and only a few companies are global and most of them are calling at ports in the home region, having a somewhat unclear expansion strategy (Gadhia, Kotzab, & Prockl, 2011).

Chapter 4 describes the logistics process and how important an efficient commodity chain is for value creation in a firm where the core component is supply chain

management. Value creation in the firm occurs through the time and space arrangement of the products and the control of flow between supply, manufacturing, distribution and consumption in the logistics process. The freight transport service is categorized and the focus of the task is narrowed into cargo type and mode, with special reference to the cold chain service.

Chapter 5 provides a deeper understanding of cold chain reefer logistics, outlining the main challenges, the most common types of cold chain food products and how each of them is treated according to its temperature sensitivity and the increasing temperature control requirements of the shipments. This delicate added value service provides opportunities for shipping lines to offer a specialized function away from their home region and could supply them with foothold in a new market if done properly.

Chapter 6 comprises a general discussion about strategies for firms enlisted. A strategy is put forward for a small Nordic shipping line, based on Porter's theory and Resource based theory. A good strategy for container lines is to offer some diversity away from the oversaturated developed trade routes by developing their role on emerging trade routes, Wan Hai lines are named as an example of this approach in Chapter 7.

In chapter 8 a market expansion strategy for a small shipping company in cold chain logistics is defined as applicable in certain areas. The South America region offers sufficient trade routes and significant production of cold chain food products with opportunities of increasing trade between North and South hemisphere regions.

Chapter 9 focuses on the most efficient transport nation in the South America region and its transportation relationships with developed countries from the Northern regions. Chile and Brazil are large export nations in South America with relatively efficient transport networks compared to others in the region.

In the result chapter the Chile and Brazil transport system is covered and the export market for fresh food is analyzed and described by presenting a detailed world map and tables of the main fresh food products exported from the countries. The conclusion is that it is feasible to transport many cold logistics products from south to north. Chile is the best logistics performer in the region according to the LPI score and Brazil comes second (The World Bank, 2012). Like Brazil, Chile exports fresh fruit to the Nordic

hemisphere countries. Importantly, Chile also has a strong presence in the fish farming industry. Looking to the future, Brazil could be a very important player on the world market in the fresh food industry, especially if it develops its quality control of meat production to meet EU food safety regulations. The main conclusion from this research is that there is a promising current market expansion strategy for shipping lines specializing in cold logistics in Chile, with a longer term aim of gaining some share of cold logistics in the big Brazilian market.

Cargo transportation is a vital element of the international business environment. The amount of trade is growing steadily and products flow through a great variety of places and can have more than one destination. The economic powerhouse, China, has taken the lead in international transportation growth numbers. The world is getting smaller and the large trading distances are increasingly bridged through more sophisticated services on behalf of the logistics providers. The demand by Asia for more raw materials has increased and, in turn, this continent's export of manufactured products has increased dramatically, resulting in a more emphasis on long distance international transportation.

The demands are surging upwards, resulting in increasing freight volume and distance of cargo transported. Container cargo is not as old industry as many may have thought. The first vessel was built in 1968. In the early days, the competition was not as severe and the logistics companies were strongly aware of the advantages and cost savings of the containerization.

Container technology has made the industry capable of transporting large quantities with increased efficiency. The service has become more customized with either the option of fast service, or with more emphasis on cost. The world's distribution network is constantly growing; something which can only be accomplished with efficient up to date logistics where containers are the main tools in world business globalization (Rodrigue & Notteboom, 2009).

Globalization is a process of eliminating trade barriers and liberating markets. The market tendency has been in the direction of fully or partly privatizing the ports. Public intervention is more based on efficiency and liberalization and setting the ground rules for fair competition to thrive. Governments have an obligation to offer their citizens a

degree of public safety by sufficient access to certain goods and services in a monopoly environment (Notteboom & Winkelmans, 2001).

The reason for international freight modes is the distance between cargo destinations, often covering more than 3,000 km. The largest share of the global logistics trade is by maritime cargo shipments, or around 90%. The container share of the maritime trade is about 12 % which is by no means large, but does, however, involve more than a half of the world's trade value and is growing steadily. There is also a constant need for transporting new categories of products in the ever changing business environment (e.g. neo bulks). International logistical activities provide the fiscal evidence of globalization where containerization is a very important factor in the chain.

The maritime logistics system has to reflect global trade demand. The industry has developed major gateways which provide networks to the major production and consumption regions. Major hubs provide connections and transshipments for maritime shipping to circulate effectively in the regions (Rodrigue J. P., 2009).

Atlantic Ocean freight is where the development of containerization began. The evolution of the world's trade environment has largely changed and the largest share of terminal activities now occurs in the dynamic area of East Asia. In the period between 1980 and 2004, container traffic in Asia surged from 25 per cent to 46 per cent in 2004. In 2009 the world largest share of container traffic occurred in China which has nine ports in the top list of container traffic with a 22.9 per cent share (UNCTAD secretariat, 2011).

The world tendency has been towards increased globalization, with fewer barriers and more liberating agreements between trading nations. New markets are increasingly becoming involved in world trade, resulting in increasingly complicated international supply chains, where logistics are constantly responding to increased customer quality demands and more focused market segmentation, leading to more difficulty in handling quality versus cost based services. There are increased differences between logistics companies in how they operate and how much logistics service they offer. Increasing demand for door to door logistics in almost every area of the world has encouraged many service providers to offer an efficient global service network. Many companies

have shifted from being solely transportation-based integrated warehouse and distribution services into operations. The demand for more integration has engendered a new operational form based on non-asset related services, called fourth party logistics (Marasco, 2008).

The transport supply has increased and competition has never been more intense with increased numbers of innovative players providing new solutions in ever changing market conditions. This places pressure on cost related factors and pulls some of the old traditional companies into an age of new solutions to tackle increased demand for quality-service. The recent literature has been focusing on changes in the value chain where the interaction of ports and shipping operations has come under scrutiny.

Some have categorized the role of seaports as a certain element in providing value added service in a logistics chain (Robinson, 2002). Others are discussing the changing role of port authorities in new, restructured logistics environment (Notteboom and Winkelmanns, 2001b; Heaver et al. 2000). Structural changes in terminal operations are also discussed in the logistics literature (Martin & Thomas, 2001).



## 2 Research method

The research question is: “What are the opportunities for a small/medium sized Nordic shipping line company in the international market?”

Unfortunately, Eimskip did not provide access to data of importance for this research. Therefore, it is assumed that the typical Nordic shipping line is similar to Eimskip and has some history in cold chain logistics services. Before searching for market opportunities, it is necessary to provide certain insights into the market and how it differs from other markets. Secondary data is used in this thesis to support the discussion of aspects of the shipping market, such as logistics, strategy and framework, and to provide necessary information about market conditions. Databases are also used in the research (particularly the FAO database) to provide necessary facts on selected countries’ import and export trades.

Nevertheless, the task of this research is to find new market opportunities based on the competitive advantages of a Nordic shipping line. It is important to recognize which market norms the company must face. This research provides arguments for a niche approach in the operation of moderate size shipping line in a mature and somewhat stagnant industry environment. It is maintained that going against industry norms could be a necessary approach to avoid the self-destructive modes of the market.

After the introducing international transport market forces and how the logistic environment works, the discussion becomes more focused on cold chain logistics with emphasis on emerging trade routes/markets, those two being important elements of competitive strategy that a Nordic shipping line can build on. A strategy frame for a small/medium sized Nordic shipping line is suggested, based on the relevant company’s competitive advantage in specialized or niche market fields. The strategy frame is based on Porter’s theory of competitive advantages (Porter M. E., 1985). The resource based view is also discussed to provide another perspective on competitive advantages on which useful tools are based, as for example the VRIN model (Barney J. , 1991).

It is assumed that Nordic shipping lines have a good and valuable knowledge of cold chain logistics which provides them with value added service knowledge and a

competitive edge. Some conditions are outlined for selecting the right market region. The relevant questions are: Is the region productive in the fresh food market? Is the region a developing economy with emerging trade routes? Is the competition severe or moderate? What is the capacity of terminals in the region and what is the infrastructure like?

The first steps in finding suitable markets for a small shipping line specialising in cold chain logistics is to look at emerging economies with large-scale production of fresh food which have demand base for cold logistics transport service. When the decision has been made on which market to focus, the next step is to collect relevant information on the market. The method is to gather evidence from various databases which contain facts about export and import transport volumes and the value of national product. This data search is based on the shipping line's expertise in transporting cold chain products.

The data is gathered mainly from the Food and Agriculture Organization of the United Nations (FAO). The FAO database provides statistical information on food and food-related issues on a worldwide scale and offers the tools used in this assessment. As part of the FAO database, the detailed statistics food transport direction map yields vivid information on countries' food trade routes on a world-wide scale. The database provides required information both on price and quantity. From this data, the estimate of the market potential is based on the history of food trade between the analyzed nations and the rest of the world. Other databases are also used; for example evidence is sourced from the International Monetary Fund on trade directions and from the World Economic Forum on competitiveness and national infrastructure. The infrastructure must be sophisticated enough for the company to be able to deliver a seamless service. The shipping company must ensure that no breakage of the cold chain occurs. If the infrastructure is below required standard, the risk of damage increases which, in turn, affects the promised quality of the service.

The report, *Connecting to compete 2012; trade logistics in the global economy*, compiled by the World Bank offers a useful perspective of national competitiveness on a worldwide basis. In the report, the LPI score is used to reflect different countries' logistics effectiveness and this yields the necessary information to determine which

countries are regional leaders in logistics and have satisfactory logistics systems. The LPI score reflects the quality of infrastructure, the performance of core service, the friendliness of trade clearance procedures, and the time, cost, and reliability of import and export supply chains (Arvis, Mustra, Ojala, Shepherd, & Saslavsky, 2012).

A SWOT analysis of the markets is performed which provides another view on their economic condition. A SWOT analysis is a structured planning method tool which estimates the strengths and weaknesses of an enterprise, as well as market opportunities and threats. The analysis is a management tool to identify important internal and external factors that are crucial to enable the company to make successful market decisions. Strengths are all the qualities and capabilities which help the enterprise to accomplish its mission. Weaknesses are the other side of the coin, that is, flaws which prevent the enterprise from reaching its full potential and accomplishing its mission. Opportunities are the environmental conditions which can help the operation to fulfil its mission. The shipping line can benefit from market conditions which enable it to execute strategies and obtain more profit from its operation. Threats are external conditions that can damage the shipping line's reliability and profitability. These are generally uncontrollable and can jeopardize a firm's stability. The SWOT analysis makes it easier to determine the firm's strategic position on markets. The final choice is between two markets, each of which is a favourable option as a starting point. In the concluding chapter, the choice is made, based on gathered information and the assessment process.

### **3 The characteristics of the global container line industry**

During the infancy of containerization, shipping lines were strong profitable corporations with little risk of financial trouble. The industry was relatively homogeneous with similar services, limited capacity and conferences where the companies consulted the freight rate for trade routes resulting in conference tariff agreements. This method of managing the industry lasted until the 1980s when the shipping line Evergreen started to operate without heeding conference agreements (Notteboom T. E., 2004).

In this decade many container operators are facing financial difficulties and the industry as a whole is performing worse than other industries. One explanation for this situation lies in capital intensive investments in a risky market with no guaranteed revenues. The option is to own the fleet with cost advantages or lease the assets and lower the risk in a difficult market. Therefore, it can be hard to find the right balance in a new or unstable market, although this, however, will eventually emerge in the long-term perspective (Brooks, 2000).

#### **3.1 Keeping the balance in shipping line operation**

Economic bursts and booms will always affect freight rates. The high, fixed industry cost exerts pressure towards filling the vessels in order to maintain the long-term plan. Eventually overcapacity will result in lower freight rates with a lower margin for every shipping line on the market. Even though more cost effective assets are used, the tendency in the past few decades has been lower return on investment. The market is difficult and the trade volume has to match capacity. Controlling capacity will always be troublesome until the market evolves into an oligopoly situation which enables players to control capacity in step with demand (Clark, 1997). One example is in the years of 1999-2000 when a high percentage of capacity was utilized with an inevitable decline in 2001. This boom and bust story is best described by large rate increases made by shipping lines until these reach the peak of demand and have to be reversed to maintain trade levels (Notteboom T. E., 2004).

The challenge accompanying stable container liner services is the high fixed cost that shipping lines are facing. Shipping networks can be large and expensive which forces the shipping line to maximize the utilization of capacity. This enforced position places pressure on the market. To handle the problem, many container services have long term agreements with shippers. However, the drawback for the carrier is that contracts can be risky. When a carrier is offering to handle perishable products and simultaneously dealing with overcapacity the market situation is forced. The carrier has to sell the slot at a marginal price and accept operational losses (Notteboom T. E., 2004).

Carriers can neither influence nor change the size of the market. Price at marginal cost cannot even affect demand when the market size is limited. However, the carriers' tendency in the short run will be reducing prices without a sufficient increase in demand for container freight. The difficulty lies in the small proportion of freight revenue of the total value of most container shipping. The core problem for liner profitability is inflexible demand curves. Shipping lines are often too reliant on the market in their effort of utilize capacity. Lack of the shipping line's central control over pricing leads to inefficient pricing and treating the sailing cost as fixed. The business environment is therefore concentrated on cost, whereas it is highly tempting for the sales agent to accept prices below the optimum price range (Notteboom T. E., 2004).









### **3.2 Deciding optimum size of vessels**

The industry's concentration on cost efficiency is reflected in a tendency to invest in large vessels where the aim is to reduce cost per TEU<sup>1</sup> of capacity. Figure 1 describes different vessel size and capacity from 1956 to 2006; the latest development, however, is even larger vessels with up to 18,000 TEU capacities. According to Drewry Shipping Consultants, the cost savings of vessels transporting 12,000 TEU on the Europe Far East route is around 11 per cent versus an 8,000 TEU vessel and the difference becomes even more striking if compared with 4,000 TEU where it is estimated at around 23 per cent. This comprises calculated potential cost differences. However, if port productivity

---

<sup>1</sup> The twenty-foot equivalent unit is a concept based on volume of a 20 foot or 6.1 meters long intermodal container and is the usual description of the capacity of container ships.

is taken into account the best performers are 8,000 TEU vessels and for transatlantic routes the optimum vessel size is around 6,000 TEU (Drewry Shipping Consultants, 2001).

		Length	Draft	TEU
First (1956-1970)	 Converted Cargo Vessel	135 m	< 9 m < 30 ft	500
	 Converted Tanker	200 m	< 30 ft	800
Second (1970-1980)	 Cellular Containership	215 m	10 m 33 ft	1,000 – 2,500
Third (1980-1988)	 Panamax Class	250 m	11-12 m 36-40 ft	3,000
	 Panamax Class	290 m	11-12 m 36-40 ft	4,000
Fourth (1988-2000)	 Post Panamax	275 – 305 m	11-13 m 36-43 ft	4,000 – 5,000
Fifth (2000-2005)	 Post Panamax Plus	335 m	13-14 m 43-46 ft	5,000 – 8,000
Sixth (2006-)	 New Panamax	397 m	15.5 m 50 ft	11,000 – 14,500

**Figure 1 Vessel size and capacity. Operational limitation applies to ships bigger than 8,000 TEU.**

Source: (Rodrigue, Comtois, & Brian, 2009).

Many limiting factors exist for growing ship size. This is influenced by market demands like service frequency, demands of cargo supply by large volume customers and, importantly, the limitations of port facilities for handling large vessels, not to mention the equipment required for storage in the ports. Even with a policy of improving access for large ships, it would take time and the right economic conditions to do so. It is problematic, furthermore, how to design and construct ships of the largest sizes. Besides, some trade routes involve passing through canals which restrict ship sizes.

In addition, there are limitations of ship design and construction technology, as well as channel restrictions in canals on selected trade routes. Many models of optimal ship size have been suggested by economists. One of the most comprehensive models was made by Jansson and Shneerson (1982). It provided a definition of long run optimal ship size. The ship capacity is split into two components: the hauling capacity (the ship size

times its speed) and the handling capacity (cargo loaded or unloaded per time unit) (Christiansen, Kjetil, Bjorn, & David, 2007).

The market environment for shipping lines is not benefiting from the emphasis on large vessels. The risk is high for the shipping line of not being able to reap the estimated benefits; on the contrary side, overall fixed cost rises when the shipping line tries to offer a competitive network that fulfils the needs of the market. To serve global requirements, the big players have to offer at least 12 vessels catering for the Europe - Far East – US West routes, 8 ships for the Europe- Far East route and 5 on the trans-Atlantic route. It takes time and large investments from players who possess sufficient financial muscle to upgrade vessels to maximum size. Now the biggest vessel type has a capacity for over 10,000 TEU. However, it is unlikely that in the future this vessel size will be the optimum size for the market. The reason lies in the flexibility that shipping lines need to have. The market demands quality service; that is high frequencies and low transit time. The operator has to choose between quality for the customer or cost savings made by increased volume. A size of 6,000 TEU is the optimum vessel size in sense of maximum volume without trading off the flexibility required to serve a number of potential ports or maintain direct access to specific regional ports (Notteboom T. E., 2004).

Large container ships can be deployed efficiently on the major trade lanes, provided they are full and the recent scale enlargement in vessel size has reduced slot costs in container trade, but carriers have not reaped the full benefits of economies of scale (Lim S. M., 1998). Poorer slot utilization and the need to go out and buy more cargo at lower rates can have a profound impact on carriers' revenues and lead to lower profitability. The reason why many shipping lines fail to utilize their capacity in their new large vessels is the unpredictability of business cycles. Business contracts cannot neutralize the risk. As is the case in many industries, competition leaves the industry in a difficult environment with lower profits on average. For some players, large vessels could suit their service and give them a competitive edge. However, the market is then left with a cost disadvantage. Even the early mover on the market will face difficulties. Maximizing vessel size, therefore is not the right answer, and this applies both to an individual shipping company and to the industry in general (Graham, 1998).

### **3.3 How the shipping industry arranges co-operation**

The shipping industry is known for its co-operation and conference agreements. Shipping lines can share their vessels, through negotiated slot chartering agreements. There is also a long a history of strategic alliance, mergers or acquisitions in the industry. There are a number of reasons why shipping lines seek mergers and acquisitions. One is economy of scale in order to increase the market share which could bring the company a wider service network and therefore increase its market power by gaining access to critical markets. Gaining access to technological advantages and quality staff is also a factor. The shipping market is today an oligopolistic, with which the 20 largest carriers controlling the majority of the market. In 1980 the top 20 shipping lines controlled 26 per cent the world slot capacity. Since then, this ratio has risen to 41.6 per cent in 1992 and to about 53 per cent in 2003 (Notteboom T. E., 2004).

Mergers are not always easy undertakings and this also applies in the carrier industry. Even though the shipping industry is one of the first globalized industries, cultural differences invariably create problems and the synergies are not always as expected. The environment is, however, relatively advantageous for acquisitions compared to other industries. Barriers to entry are high and in some cases it is difficult to develop a new customer base. An acquisition could lower the risk inherent in entering a new venture. When the cost of operating alone is higher than cooperation, the latter option should always be considered. Cooperation could provide economies of scale by combining operational cost or through contracts that enhance transactions. It could also lower the risk of operating a heavily invested vessel fleet (Ryoo & Thanopoulou, 1999; Slack et al, 2002).

Cooperation in the carrier industry is a means to obtain easier access to other market territories or enjoy lower cost for services, for example by sharing terminal slots. Lowering risk and cost is an efficient way to control the company in an unstable environment.

Others have pointed out that although alliances seem to be the answer to an unstable market, this has not always been the case in reality. Forming an alliance is a complicated process, especially when the competition is so fierce that it can affect trust between the companies involved. The market has also been more in a phase of mergers



and acquisitions rather than partnering in alliances. Many shipping lines fail to differentiate from competitors in the market, which, in turn, reduces the chance of alliances with others. Another issue is the absence of partnering in marketing and selling ships; for some reason, this aspect is not generally included in alliance agreements (Graham, 1998; Midoro and Pitto, 2000).

### **3.4 Limited potential for cost savings**

The pressure to find potential cost savings in the transport industry lies more in the landside logistics while the potential at sea (enlarging vessels, mergers/acquisitions and strategic alliances) is getting smaller. Alliances and economic restructuring of shipping methods have lowered the ship system cost and such measures have reached their limits. The inland transport cost, however, is the most significant factor in the door to door logistics process and can range from half the cost to 80 per cent. Others have accounted for a 42 per cent share of the overall cost which could reach 50 per cent if empty containers on the backhaul are taken into account (Hastings, 1997).

The big difference between landside and ocean logistics is overcapacity which is a limiting factor on the price level in ocean freight. The inland freight handles flexible price levels with greater ease. In today's market situation, the shippers are taking the global coverage of logistics for granted. The demand pull by shippers is the force on which carriers base the integration of their logistics service, frequency and reliability (Slack, Comtois, & Sletmo, 1996).

Customers' demands are often more complex than merely requiring transportation from one point to another. New approaches and methods, like just in time inventory management puts more emphasis on precise, reliable and integrated logistics practices. The management service for the customer is generally implemented through an independent subsidiary which generally uses the transport service of the mother company but also has the option of using other shipping lines (Heaver, Meersman, Moglia, & Van de Voorde, 2000).

Shipping methods can differ in their service quality. A shift has occurred in the global demand for service practice from door to port or port to port into door to door services. This tendency has grown with internationalization and the demand for low complexity in international business. One shipping line which is known for its integrated logistics is

Maersk shipping line. They offer well integrated door to door services. Maersk Logistics handles logistics packages by managing terminal operations through an APM terminal network where they form a direct relationship with shippers and gain the freight forwarder share of the business. The more traditional shipping business has left the inland operation to other inland service players. Others go further and offer service agencies or distribution centers. For some reason, shipping lines generally avoid investments in inland service operations. Rather, the norm has been forming long term relationships with inland service operations (Graham, 1998; and Heaver, 2002).

There can be a number of reasons why shipping lines avoid investing in landside operations. One is that inland logistics demand intensive management and the needs for outsourcing some aspects of the service are much higher than in marine logistics. However, customer requirements and behaviour usually demand more inland service from the shipping lines. Here, the problem for shipping lines lies in the heavy focus on cost saving methods in their operations as a result of which they are unable to fully meet customer demand. Opportunities for late bookings can result in increased cost when the cargo is not handled in the most cost effective manner. It is also difficult to handle equipment imbalances when servicing varying volumes of cargo. Delays in ports and inland service add uncertainty and make forecasting difficult. In response to changed demand, however, shipping lines have modernized their service bases to handle value added services (Evangelista & Morvillo, 2000).

The challenges carriers confront can be complicated and they use IT solutions to solve their tasks in inland logistics and manage container flows. To improve equipment utilization the shipping lines have outsourced or offered master leases (Skjoett-Larsen, 2000). This is often arranged through liner conferences. Carriers and shippers are part of the same integrated service chain and have to take into account each other's interest; the New World Alliance is a case in point. Through inter-carrier cooperation shipping lines can share knowledge and build additional bargaining power.

The demand for increased integration of logistics systems has encouraged the shipping lines to seek into the inland market. In Europe, shipping lines have shown increased interest in carrier haulage, although few shipping lines have demonstrated success in the carrier haulage business. But there are important opportunities for

reducing intermediary cost by integrating some inland logistics in the operation. The inland logistics operation, however, only affords limited scope for raising prices because of the threat of substitution where sea transport could be another option for shippers. In many cases, the highly competitive environment places the carrier in a forced position in the price contention with the customer. By achieving the right management practice for mastering the difficulty of integrative work the shipping company could gain a competitive edge, due to its sustainable differentiation from the general market (Notteboom T. E., 2004).

### **3.5 Strategy through liner service network design**

#### **3.5.1 The international logistics system as a platform**

Liner shipping networks have changed due to cargo availability, motivating carriers and alliances to reshape their networks and introduce new types of door to door and platform services for trade lanes like the main east-west-line. Some international trade routes have grown faster than others, such as the EU - Far East –US West coast which serve as international platforms. When shipping lines use hub ports as platforms between two trades, this is often referred to as “pendulum service”. These routes are mostly served by Post Panamax vessels. The Post Panamax has been the usual size of ship for pendulum service since the Panama Canal is not accessible to this type of vessel. The usual process is to allocate ships into a single route, which may vary to ensure reliability, the right frequency and sufficient level of service. The East-West shipping routes have been in a development phase, offering new cargo load centres resulting in increased efficiency. Traffic flow is the lifeline of such load centres and is maintained by different ports on the routes. The hub and spoke system of ports works very efficiently for a large ship sailing around the beltway of the world on the east/west pattern. The transshipment hubs on the east/west routes are the call destinations where containers are shifted to a multi-note feeder subsystem, which serves as global net for north/south, diagonal and regional routes (Notteboom T. E., 2004).

The focus of the liner network service is increasingly on shippers’ needs and the demand for a better service has resulted in a change in direction from narrow carrier-specific operational factors. This move towards a more customer-oriented service and less cost-driven exercise as an optimal network design offers certain flexibility for the

smaller shipping lines. Having the biggest ships which are often employed in high speed operations between reduced numbers of ports is the optimum service of a pure line network operation. However, the most efficient way of operation has not yet occurred in practice because it is not always coherent with customer needs. Carriers are increasingly facing tradeoffs when meeting customer demand while keeping cost down (Zohil & Prijon, 1999; Lirn, Thanopoulou, Beynon, & Beresford, 2004).

An efficient but complex network on the major trade lanes is a result of alliances and consolidation. Such multi-string systems have some advantage which shows in more frequent sailings than in a single loop sailing programme. In the multi-string sailings the vessels are of moderate size (not the largest type) but instead offer more frequent service. In this system, risk is minimized by putting sailings on many loops instead of relying on a few large vessels on only a few loops. The bargaining power between shippers and carriers will be the critical factor as to which system will become the norm. If the tendency shifts to “cargo follows the ship” then there will be more pressure for direct calls. In fact this is already processing in the way of more direct calls and goes hand in hand with a more customer oriented differentiation of the liner service network. The multi loop transshipment system plays a vital part in the logistics organisation despite increased tendency for more direct ports of call. Larger vessels will probably continue to base their operation on end to end services (Gilman, 1999; Robinson, 1998).

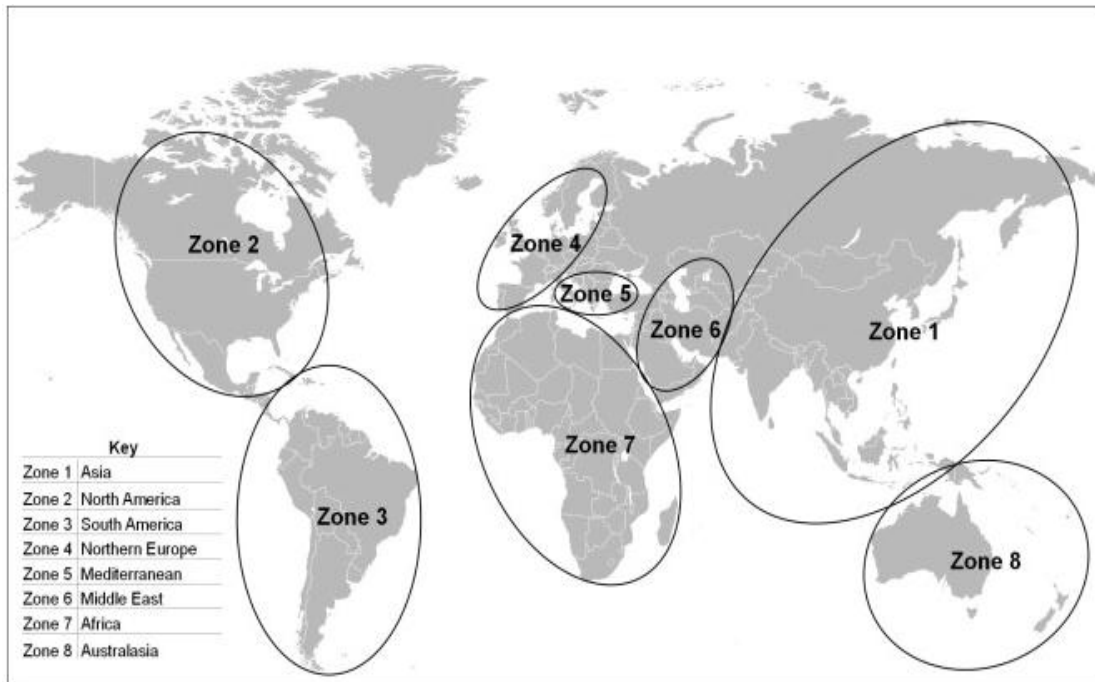
### **3.5.2 Global liner services**

Alliances are a union that protects the shipping lines' positions on their main trading routes while other less important routes are left out. Global shipping line services can be very diverse in global network coverage. The busiest routes, those of East Asia, North America and Europe, use around 90 per cent of shipping line slot capacity. The sailings occur on a limited bundle of major trade routes, not on the secondary shipping lanes. The reason for this development is the economies of scale achieved by using the major trade lanes. Despite growing globalization with resulting demand for a global network, the service relies largely on only a few trade routes and remains regionally based. For some reason, the extent of trade within regions is larger than between them. However, inter-regional trade is steadily growing.

East Asia is the fastest growing continent in terms of trade flows, with China in the lead. Many of the biggest shipping lines like APL, NYK and Hanjin focus on trade linked with the East Asia region. One reason for this dependency is that their headquarters were originally operated in the Asia region. Other regions, such as South America and Africa, are called secondary routes with a few shipping lines offering service with some degree of frequency. The high competition on these main routes makes the market share of each carrier relatively low, resulting in a lack of leadership in the market. In order to minimize market fluctuation on these routes many shipping lines have offered strategic alliances most of their slot capacity. The structure of alliance among these Asian carriers opens a window of opportunities to be a truly global player with higher frequencies in more places, resulting in improved utilization and flexibility, but still without sudden heavy investment requirements (Ducruet & Nottebom, 2012).

One way to increase market share is to develop the home market. This could be done by increased service frequency or by offering a larger network of routes. Another way is to add new routes and try to gain a foothold in new market areas. It is the network and which ports are included in it that defines how globally the carrier operates. The network structure also determines the strategic approach of the shipping line (Lim & Das, 2009).

The shipping industry is international and relies on global networks of ports, although many companies limit their service to home territories. A survey of the international shipping network was conducted by Gadhi, Kozab and Prockl (2011). They compiled database limited to the bigger shipping companies, providing a perspective of how company strategies can be revealed through comparisons of their container port networks. They classified the operations by eight regional zones and the links between them (figure 2).



**Figure 2: Zone differentiation of global ports. Shipping lines often limit their capacity to one zone.**  
**Source: (Degerlund, 2006).**

In their assessment they categorized the operation into four basic groups of companies which showed similarities in their network strategies.

Gadhia, Kotzab, and Prockl (2011) used the Uppsala Model of incremental internationalization to explain and classify the container shipping industry. The focus seems to be limited on the shipping lines' home regions and the strategy for expansion is as explained by the Uppsala Model (Johanson & Vahlne, 1977).

The results are four levels of internationalization. A description is offered in figure 3, showing how the field is divided by four strategies based on home territory, core expansion, prospecting and global operation.

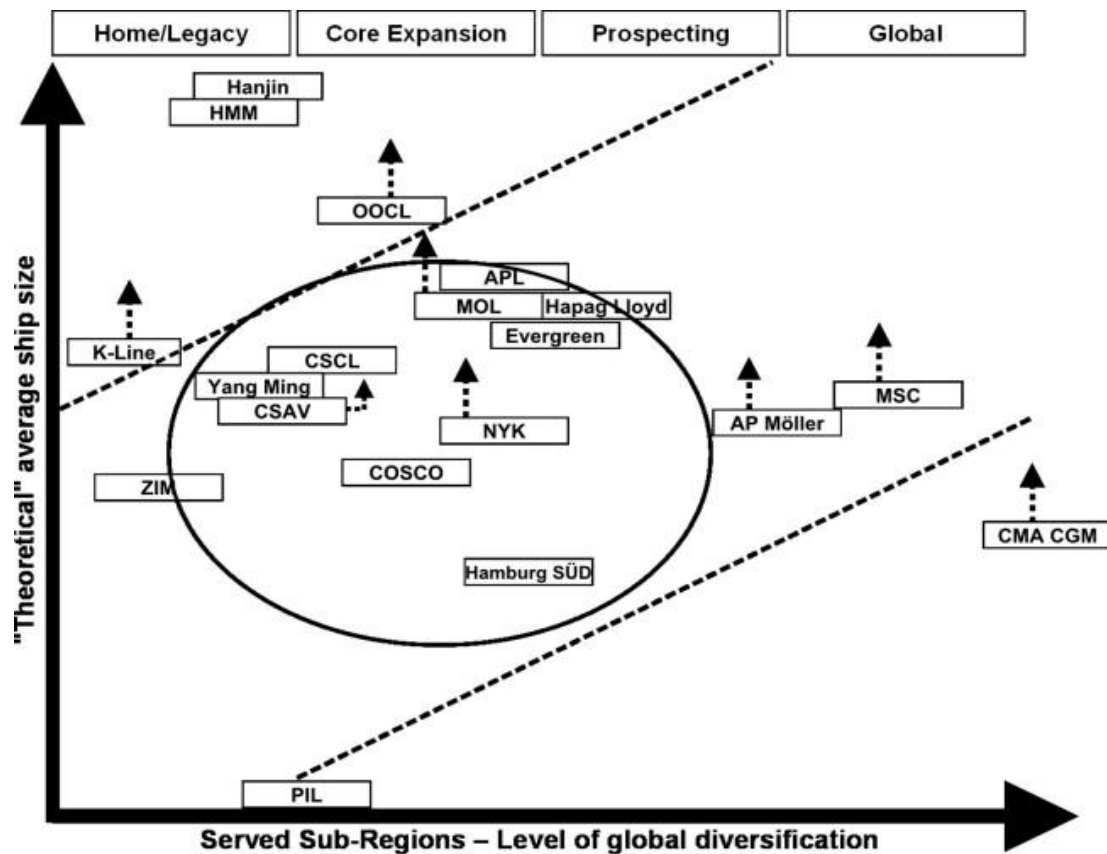


Figure 3: The horizontal axis reflects the coverage rate on port networks in the different sub-regions. On the vertical axis the bigger the average ship size, the more is the commitment of a shipping company to serving a specific region. Source: (Gadhia, et al, 2011).

The first level is where companies are established in their home territory and the company focuses on its home region. The pattern here is where companies are serving only a few major ports outside their home territory. These companies might have limited resources to expand in other areas and possess a largely regional customer base.

On the second level, the companies have expanded their operation into another zone. The operation is limited to some major ports and does not cover many of the smaller ones. In the research made by Gadhia et al (2011) PIL is the best example of a company using this strategy.

The company covers its home region but also offers some service in Europe. The Europe line service is very limited and only a few major ports are included in the schedule. The company is also looking to establish itself on the transpacific service but limits the service to only two ports on the North American west coast.

The third level is based on companies which develop their network by extending their service to areas adjacent to their network. The network for this kind of shipping lines relies on the major ports on the container belt with some addition of smaller ports

in emerging regions. This network strategy is to offer networks of some core regions but always in search of opportunities in new emerging markets (Gadhia et al, 2011).

On the fourth level, the companies are truly global with extensive global networks offering services all over the world. Examples of companies in this group are Maersk, MSC and CMA CGM. The strength of their services is based on their wide network which places them in a key position. Despite this advantage, they are not always dominant at regional level, since smaller companies can be very competitive in their home region (Gadhia et al, 2011).

#### **Level 1: The networking companies**

Gadhia et al (2011) classified these companies by their strategy and how globalized they are. Group one comprises the most globalized shipping lines with a service network extending to all regions which can offer specialized services to cater for specific market needs. The companies that form this group are Maersk, CMA CGM and MSC.

Since 2005 Maersk has been the world's dominant leader. The company has developed an extensive service network with emphasis on quality personal service. The shipping line operates a highly modern fleet with various sizes of vessels, positioned according to service demand, and with the larger vessels placed along the main container belt while smaller ones serve peripheral zones. The company's competitive advantages lie in geographical differentiation. This globalized service has earned recognition by the global shipping line community and has won the "Best Global Shipping Line" award 18 years in a row. In addition, the company has won awards for its safety and risk management system (Maersk Line, 2011). To sustain its globalized position, Maersk calls at 208 ports and covers all of the 8 zones, which, however, does not make it the largest network in existence. Some have argued that the company strategy of focusing on market development and seeking opportunities in emerging markets could be categorized as a defender strategy (Hertzel, Smith, & Smith, 2001). Maersk line development has largely been on the east coast of South America, West Africa and the Philippines (Fremont, 2007).

MSC is a globalized shipping line operator. They offer services in Asia South America, North America and Asia. The service network is large, extending from the East Coast of America through Europe to Africa.



The company with the largest port network, serving 262 ports, is **CMA CGM**. The company's territories include all regions except the South America. The service is mainly on offer in major TEU ports. A significant increase in average ship size is evident in this group, with a growing emphasis on large modern vessels.

#### **Level 2: Home based internationals**

In this group, the strategy is to serve primary ports, the logic being that the biggest markets are well connected to major ports and therefore provide a fair chance of obtaining maximum fleet utility. This group of shipping lines is in a strong position in their home regions, but offer limited coverage in other zones. Examples of such shipping lines are K- Line in Japan and OOCL from Hong Kong which have wide networks within Asia. In this group, ship size is average. HMM is a company from Korea with a heavy emphasis on the Asian market, especially Korea. Outside the Asian market, the service is limited to primary ports in North America and Europe (Gadhia et al, 2011).

#### **Level 3: The “niche companies”**

The shipping line PIL focuses on smaller ports which are neglected by other large shipping companies. The fleet is around 100 vessels and covers a large part of Asia, or 66 ports out of total of 125. The wide network is limited to Asia and several popular ports in Africa and only 3 additional ports in Europe (Gadhia et al, 2011).

#### **Level 4 “other players that show unclear traits”**

Some companies remain stuck in the middle and could in some respects fall into all the first three groups. This is evident when looking at port structure. The strategy of those companies is somewhat unclear. CSAV is Chilean based company which has a strong presence in its home region, combined with a service network in Brazil and Chile. The company also has good connections on the American East coast, but has, for some reason, left Canada out. The company has a presence in Asia serving 9 major ports. In Europe, the company is focused on Amsterdam with coverage of both major ports and smaller ones, but leaves Scandinavia out of its network. Company strategy is unclear, although it has a strong network in key areas around the world. CSAV's operation was difficult until the third quarter of 2012 when it returned into profit, for the first time since 2010, with earnings of \$55.8 million (Gadhia, et al, 2011).

Evergreen has focused on technology solutions to attract customer attention. The company has received awards from LOG-NET for its efficient advertising practices (Evergreen Marine Corporation, 2011). The network strategy practised by Evergreen is to use the ports with the highest container turnover.

Evergreen covers 51 out of 125 ports and uses those with highest TEU turnovers. Hapag- Lloyd's network is similar to Evergreen's, using and calling only at major ports. The aim here is to secure maximum utility of the companies' vessels (Gadhia, et al, 2011).

An important element of the research by Gadhia, et al (2011) is that carriers limit themselves to regional territories and provide networks to other regions. This choice is made despite having access to sufficient assets to try another territory. Going against the industry norm is difficult, especially in a relatively mature industry. It would be revealing to investigate how each company's network is impacted by old shipping conference rules and alliances.

Maersk is known by its different approach to the market which consists in treating secondary routes as a valuable option on their schedule. The Maersk recipe for success is operating on both main and secondary routes; the company has maintained its worldwide presence based on this successful balance. The other two giants, CMA CGM and MSC, do not have this emphasis although some signs of it have appeared. MSC has developed a position in Africa, the East Mediterranean and the Caribbean. Their operations are mainly in the form of a hub and spoke system on the container belt, with selective destinations based on cargo volume (Merckx & Notteboom, 2006).

Most of the shipping lines have a strategy to build on; some, however, appear not to have formulated a clear strategy. However, the inimitable operation is a key to success. It is for instance very difficult to imitate the operation that Maersk line has to offer because of their successful strategic approach by providing global services along with development in promising areas. The task of this research is to come up with a competitive strategy for a small/medium sized Nordic shipping line, which is unique enough to compete with the global players. Before the discussion of strategy focus, however, there must be some coverage of the difference of the shipping line industry relative to others and the main problems or tasks ahead. As already referred to, the

overriding issue in the industry is an overcapacity problem. This is a fact that a shipping line must consider before determining its strategy focus. Small or middle sized Nordic Shipping lines cannot compete on the same terms as the largest global players. Another difference is the cooperation between global line operators which has made possible the creation of a complex global transport system network. This alliance limits competition on the market to some extent and smaller players have to consider carefully, before they make a move into a new market area, whether this can hurt their interest on other markets. One reason for cooperation among shipping companies is limited opportunities for cost savings. Cost savings in maritime logistics are much more restricted than in landside logistics. An important difference lies in the control and management of resources. Instead of avoiding integration with inland logistics, shipping lines should increasingly look for opportunities to take an active role in it.

The shipping industry often requires highly capital intensive investment. Before defining its strategy, a shipping line must choose between owning the fleets, which could be cost effective, or leasing them. This is a trade-off between a cost effective operation and a flexible one. Small shipping lines must show operational effectiveness, but their strategy should also focus on flexibility, both in services to the customer and in their operation as a whole. Flexibility is important in a risky market with no guaranteed revenues. The focus of the liner network service is increasingly pointed at shippers' needs and the demand for a better service, resulting in a change in direction from the narrow carrier-specific operational mode. This discussion is important because the formation of a shipping line's strategy is the decisive factor. Although global presence is important, it is not a necessary element of running a successful shipping line. In case of smaller shipping lines, differentiation is important, because they generally do not have the same access to assets or connections as the big players. The search for new opportunities is also a priority issue for smaller shipping lines. Their service specialisation and flexibility can open opportunities in many niche markets and strengthen their foothold in new territories. In many instances, the large shipping lines are competing on a cost basis which often barely covers their service expenses. Therefore it is also important to understand that smaller players must strengthen their alliances among others in the field and avoid any price competition in new territories that may upset their marketing plans (Merckx & Notteboom, 2006).

Knowledge of the shipping market itself is crucial and it is also necessary to know how the industry is connected to the markets and how it is in fact an integral part of a service or product process towards final consumption. In Chapter 4 the discussion shifts from general coverage of the transport industry to logistics as a link in the value chain of a service or product. The logistics concept is defined and it is explained how transport is often categorized in relation to service within the commodity chain. Freight transport is increasingly recognized as part of commodity production and in many cases it defines the product or service.

## 4 Logistics

In this chapter, the aim is to grasp the concept of logistics and discuss how it is an important element of a commodity chains and how logistics services can be categorized within commodity chains, before the discussion proceeds to focus primarily on cold chain logistics.

The question of what logistics is about first appeared in an academic journal in 1954. The first thought of logistics as a concept came from the retired admiral Henry Eccles. In his research he used a discussion in book named *Pure Logistics*: “Logistics is about mobilizing means for the conduct of military action, preparing for war and maintaining war during its duration” (Klaus, 2010).

Henry added that the quality of logistics is based upon the practice and structure of labour. The difference is that in 2012 logistics is addressed primarily in business terms, but the practical relevance of logistics is still recognized and it is today an integral part of the world economic chain. Logistics has become more complex and demand has evolved with new technology and solutions. The process in the supply chains is constantly being adapted to the changing business environment. This has resulted in the growing popularity of addressing logistics in accordance with the business model approach (Klaus, 2010).

With increasing globalization of the shipping industry the operation of logistics has become more standardized and simplified, accomplished through the new age of the computer interface (Hamel and Prahalad, 1989). Importantly, carriers can analyze various market needs and design their specific supply chains to suit specific customer groups (Barratt, 2004). A new area of the logistics process is supply management where important decisions are made as to how the service process develops. Among the questions asked is the following: is logistics offering enough differentiation and is the communication interface sufficient for quality service?

#### **4.1 Commodity chains**

The concept of a commodity chain involves a range of activities from the very beginning of designing the product, the production itself and the marketing process (Gereffi, 1999). Others define the commodity chain as conceptual structure. This structure gives a manager the opportunity to assess and analyze the entire process from the beginning of production until the product reaches the consumer (Leslie & Reimer, 1999).

The word commodity is generally used to refer to an item which is eventually consumed. It can be prepared for storage for some period but with varying storage lifetimes. The commodity can be exchanged or bought on various markets. Many commodities, for example land, mining, logging and fishing rights cannot be transferred and are fixed. Other commodities, such as livestock, vegetables, orange and oil are transferable commodities. Their supply and demand on the bigger market is constantly defining their utility value.

The original goal of the logistics industry was to ensure a sufficient automotive process to serve manufacturers' need to deliver their goods promptly to the market. The logistics industry has adapted to this need by an increasing tendency of integration. The logistics management process affects almost all aspects of value creation. The logistics chain possesses important players: the supplier, the producer, the distributor (carriers or forwarders) retail, and finally consumption (Bowersox, Closs, & Stank, 2000; Hesse & Rodrigue, 2004).

The flexibility of the commodity chain is important when market conditions change. Adaptability is crucial to be able to respond to changes in price, quantity or other fluctuations that may occur. The chance to reduce production, transaction and distribution costs can be a highly significant factor of production and distribution (Rodrigue J. P., 2009).

#### **4.2 Integration**

Transportation chains are being integrated into production systems. In the today's global economy the old industries like raw material producers and assembly plants are locating their production facilities more widely around the globe. This is because of regional competitive advantage in production. In the advanced global economy, the logistics chain has been integrated into both the production and distribution process.

The global trend for manufacturers has been determining the location of assembly plants where they can have a competitive advantage driven by a country's or region's local factors. In such an environment transportation is a vital element of the whole production chain process. It is no longer only the simple old view of responding to demand and supply; logistics is interlinked into processing, assembly and distribution where the container functions as a unit of transport, production (part of storage) and distribution. Terminals have become much larger and more efficient in cargo handling. More emphasis has been placed on locating such facilities in strategically important spots which connect different regions and are suitable for long-distance cargo sailings. The distribution facilities are generally located in the production regions of the world, as the United States or Europe, where they go through major hubs or gates. These hubs and gates serve as routes allowing a large volume of goods to flow to the right market place (Rodrigue J. P., 1999).

### **4.3 Freight transport and commodity chains**

The freight distribution network has never been as effective and well connected. The global network reflects the new global economy. The structure of the network has largely focused on the flow of raw materials from the developing countries to the rich developed countries. Factories which originally had their production in the developed countries have now been transferred to the third world. The distribution links of the global network increasingly connect local production to the global market community where freight transportation is a vital component in the chain.

#### **4.3.1 Intermodalism**

Door to door service has been growing in the international transportation industry. The service has increased because of enhanced efficiency in moving commodities between modes, forming an unbroken transportation chain. Transport services are getting increasingly seamless and the requirement today is service from point of origin to the final destination under one billing and with shared liability (Slack B. , 2001).

Globalization calls for improved efficiency, resulting in the general realization of interdependence between supply chains. Carriers in the maritime transport industry have realized the importance of integrating supply chains. Cargo transport, both inland

and maritime, must operate efficiently which means high integration and interdependence between modes. New concepts in warehouse management, for example just in time, serve the aim of lowering inventory cost (Rodrigue & Browne, 2008).

Increasing online purchases and internet solutions have simplified transport practices resulting in reduced barriers between different transport modes. This increased quality of transport services has allowed some commodity chains to expand their markets to new territories. One of the most effective cost saving factors is saving time by following new ideas and technologies. An obvious method, which has already been discussed, is the containerization of various transports modes whether by sea, rail or road (Slack B. , 2001).

#### **4.3.2 Categorization of freight transport services**

*Management of shipments:* The general rule is that carriers own their fleets, but the freight operations can be subcontracted to specialized operators who possess the “know how” to provide efficient service according to the best cost-saving practices.

*Network coverage:* How international is the service? Is it intercontinental and connecting different regions, or does it merely connect to a specific local area. The transport service modes can be specific according to network coverage.

*Time fulfilment:* In freight operations, time is often the element which defines the quality of service. This does not only apply to express service where air mode is often used but also to maritime freight. Many supply chains have to rely on quick and efficient organisation when it is a question of fulfilling the needs of inventory practices like *just in time* storage management where low storage level usually leads to significant cost savings.

*Commodity order size:* Cargo can be ordered in many sizes and not necessarily in fully loaded units. Carriers usually offer partially loaded service or LTL (less than truck load)

*Cargo type:* Various cargo types need various handling and storage methods. Some need containers or pallets; other bulk commodities require more specialized vehicles and storage facilities.



*Mode:* Cargo transport can be intermodal and go through many different modes (maritime, air, rail or road) or be limited to a single mode, like road transport between locations.

*Cold chain:* One category of service is the transport of cold commodities which require special thermal handling from the start to the end of the chain in order to preserve the freshness of the cargo. The definition is: “The transportation of temperature sensitive products along a supply chain through thermal and refrigerated packing methods and the logistical planning to protect the integrity of these shipments” (Rodrigue & Notteboom, 2009).

Many value adding elements exist within transport activities in the product value chain. The transport service can be value added by offering customized service to different customers’ needs. The cold chain is one type of value adding service within the commodity chain and must therefore be reliable, timely and ensure quality handling of the cargo. This service requires that no breakage occurs in the transport chain, since this could affect the delicate products transported. Any damage to cargo will result in reduced consignment quality and a dissatisfied end consumer. New technology and seamlessness has opened up many new market opportunities. The transport network has increasingly connected local production to the worldwide market; a development which will continue in many emerging economies. New developing markets also place pressure on logistics providers who must maintain their standard in any location, deliver on schedule and in appropriate condition as promised. The freight service discussed in this research is focused on a particular cargo type, namely cold chain transportation, because this category presents a competitive value chain of Nordic shipping lines. According to Porter (1985), a system’s value chain is a set of many chains of activities within in the industry. A shipping line must be integrated into many aspects of the system chain within which it operates. A progressive company has to be active in many parts of the industry and must be part of every aspect of the chain which, in turn, will provide opportunities to improve the service.

The focus of this thesis is primarily on cargo type and mode in a cold chain service the Nordic shipping companies can provide and in which they are globally competitive after a long history of transporting frozen fish to the market. The Nordic shipping

companies have played an important role as part of the value chain of a successful fish industry in the Nordic countries. This has produced valuable experience and the task of this paper is to bring local knowledge and competence into the global market. The discussion on cold chain logistics in Chapter 5 is, therefore, continued, since this is the commodity group on which the Nordic shipping line should base its strategy.

## **5 The reefer market**

There are important differences between reefer markets with regard to general market environment. Where does the demand come from, the transport challenges, the commodity groups and the difference in handling the commodities? This calls for sophisticated handling and knowledge of how to ensure quality.

The transport of refrigerated or frozen products from the developing side of the world to the industrialized countries has been steadily increasing. The cold chain environment has changed with increased emphasis on containerization rather than on specialized reefer vehicles. As compared to container transport, reefer transport has a long history that goes way back to 1875 when the United States started their export of frozen meat and fish. Originally, the general method in reefer transport was using salted ice. In 1880 United States started to export frozen meat to Britain, followed by export of frozen meat from Australia. Since then, dramatic changes in cooling methods have occurred as the cooling industry took great strides forward with greatly improved compressor technologies. Further developments leading to more efficient cargo handling with increasingly lower delays and improved reliability have turned reefer shipping into an up to date option. From the late 1960s the banana transports started to use cardboard boxes which later were loaded on pallets. The main drive for the cold chain industry lies in production regions with a surplus of fresh food to export. The objective of the reefer industry is to balance the needs of these regions. The refrigerated shipping industry has been on the rise because new reefer vessels are coming on the market along with constant rise in demand for refrigerated commodities in the global economy (Drewry Shipping Consultants, 2011).

### **5.1 The cold chain network for food**

Food products are the main category of commodities in the cold chain. The cold chain process needs to take care of thermal issues along with the right packing methods to keep the product within its optimum thermal range. Perishable food has various optimum temperature ranges; bananas, for example, have different handling methods

than yogurt. The cold chain management task is to monitor and maintain the right temperatures. It is also necessary to monitor the operation of equipment and programmes. The first step in the process is loading, handling issues and storage and finally the unloading process. Keeping time schedules is also important, especially when transporting perishable commodities. Other important tasks are to ensure that containers are receiving the electricity needed and that all doors are closed (Salin & Nayga, 2003).

The concept of the cold chain can be seen from another angle. The value based view describes the process as chains which serve as actors in networks by working together where the final aim is to add value for customers' benefit. The chain is not only the process from suppliers to companies, but also includes the final consumption of the commodity. The added value of cold chain is to move goods from the production region to areas where the product is considered more valuable. The purpose of the cold chain is to add value by keeping the product in stable condition. The transport usually takes time and therefore a well functioning cold chain is important to enhance value. The new globalized economy relies on cold chains for preserving higher valued foods on various markets around the world regardless of origin (Omta, Trienekens, & Beers, 2001).

Distance remains an important reality in transportation despite globalization and ever growing transport networks between places. Although a new technology in cold chain transport has made the process more reliable, the risk of failure increases with increased travelling distance. Greater separation between locations is often followed by more complexity in transport operations. If a firm's responsibility in the pharmaceutical or food industry is to maintain the quality of a product to its place of consumption without any compromise, it has no other choice than using reliable cold chain management throughout the process (Rodrigue, Comtois, & Brian, 2009).

## **5.2 The demand for cold chain logistics**

In recent decades, containerization has brought continuous improvement in transport handling and distribution. This has led to a shift in the export methods of agricultural products. The transportation of agricultural products is no longer limited to commodities like soybeans or wheat but now also includes other non bulk products. The income and trade liberalization in the high and middle income markets worldwide

explains this shift, particularly in the rise of perishable product export (Coyle, Hall, & Ballenger, 2001).

The trend in the developed countries has been in the direction of more consumption of fresh food, in fruits, vegetables and meat products. A change in diet comes with an increasing income. The rich consumers in the developed part of the world, where demand calls for greater variety, prefer fresh vegetables and fruits and this also applies to meat products.

Many countries have answered this demand and are focusing their export economy on fresh food and food production. The latest technology and transport practices are providing supplies of fresh and exotic food all around the world, thus fulfilling demand by the upper classes of the developed economies (James & Ngarmsak, 2011).

### **5.3 The challenge of providing temperature controlled environments**

It is no coincidence that the cold chain industry has been returning profits. The products are usually high profile and have a high profit potential if they are treated appropriately. An important “know how” in the industry is the knowledge of how to control temperatures in various shipping environments. Commodities have various temperature levels, some have to be chilled, others frozen and yet others deep frozen. The optimal shelf life of the product is at stake and any mistake in the process is usually results in irreversible damage which can be in the form of loss of product quality, or more expensively, result in losing some of the market territories of the product in question (Smith, 2005).

The container type and the refrigeration method are the main service factors that enable the cargo shipment to remain within the right temperature range through various outside environment changes and long-term storage. The critical variables of deciding which type of package is chosen are the time of travel, the size of shipment and the various climate changes in the environment. Many options are available, for example using dry ice or gel packs in small boxes, or a large reefer ship which operates its own powered refrigeration unit. Pharmaceutical and medical products are in most circumstances handled as chilled, which requires storage at temperatures ranging from 2°C to 8°C. Gel packs are often used to keep products in either solid or liquid state. The

gel packs can start off at different temperature levels, based on shipment requirements (Rodrigue & Notteboom, 2009).

The most popular transport modes of perishable commodities are using specialized containers with temperature control systems. These containers are generally called reefers and account for the growing share of cold chain commodities which go through the container belt around the world. Refrigerated container cargo transport has risen from 33% in 1980 to around 90% in 2010. In 2004 the reefer cargo volume reached to 1.1 million TEUs. The reefers are distinguished from general containers by their white colour, the purpose of which is to minimise the effect of long exposure of containers to sunlight and limit the absorption of solar energy. Two sizes of containers are produced, either 6 or 12 metres long, which allows the loading of 26 tons at most. The reefers are insulated and have an inbuilt refrigeration system. The reefers must be plugged to a power source in a vehicle or terminal storage. Another option is a direct connection to specialized air handling equipment from the storage or vehicle. An effective way to ensure correct temperature level is when the containers are placed in an insulated warehouse or vehicle and connected to its refrigeration unit. One of the most important variables in managers' effort to protect the integrity of the commodities is to find suitable inland facilities and equipment to transport overland (James, James, & Evans, 2006).

Access to a power source is necessary in the cold chain process and this fact can limit the journey to facilities that fulfil these requirements. The design of the refrigeration unit is not to bring the food to the right temperature. The reefer operates only to keep the temperature constant and the products need be brought to the right temperature before they are loaded. This treatment calls for specialized warehousing and loading / unloading facilities (Bogataj, Bogataj, & Vodopivec, 2005).

It is a much more reliable method to transport cargo overland in reefers rather than in insulated containers. The containers are highly vulnerable when transported by sea and must face large heat gains, making temperature control difficult. Containers placed on top of the container stack are particularly vulnerable to heat gain by sunlight. Ports have limits in their capacity of handling reefer containers and at some point they can reach a situation where they cannot supply enough power plugs. The methodology and

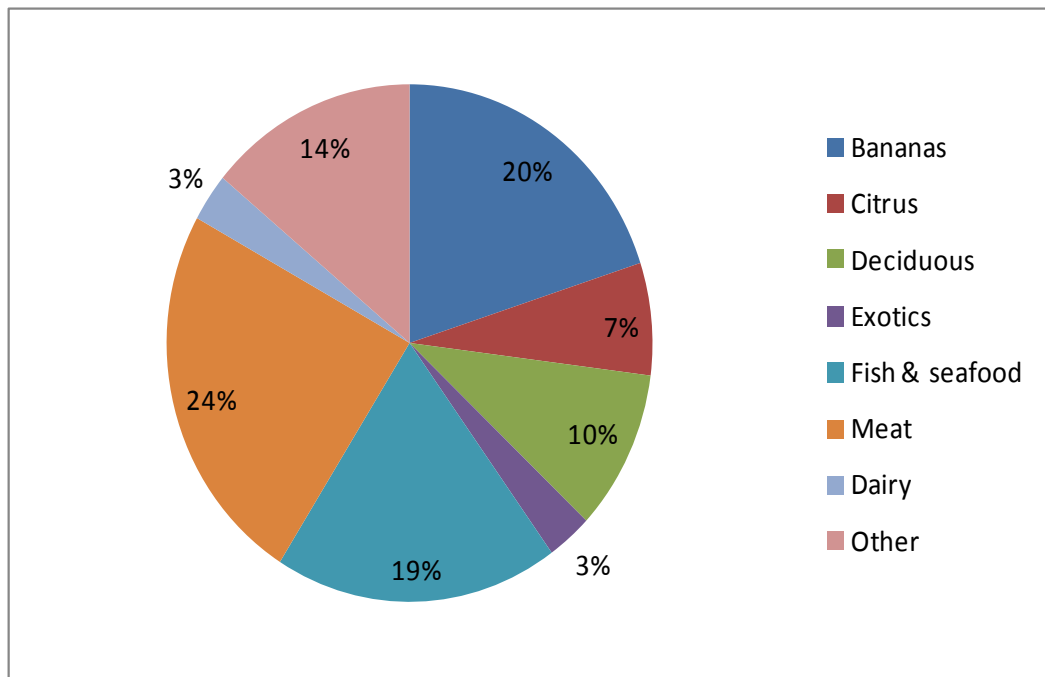
technology is evolving increasingly towards more visibility and proper control (Bogataj et al., 2005).

All special treatment of refrigerated containers involves higher terminal cost. Requirements for adjacent power outlets are expensive because of the need to handle this manually which costs time and effort. The terminal operation has the obligation to keep the temperature at a certain level and to accomplish that they have to measure it regularly. All these extra services in the transportation of reefers mean an increasing demand for transport terminals (ports) that have a special area of their storage yards dedicated to reefers. For regular ports (not transshipment hubs) this part of the storage usually accounts for 1% to 5% of terminal capacity. An overhead gantry crane could be ruled out because of the need for specialized treatment in the reefer area. Although the special treatment of refrigerated containers involves higher terminal cost, the high value of the commodities they transport makes the treatment worthwhile (Rodrigue et al, 2009).

#### **5.4 The types of food**

As mentioned before, there are many methods of transporting food. The structure of the cold chain can vary, according to whether it is transported by the air, land or sea. This largely depends on what type of food is being transported. Bananas are the most popular fruit in the world, accounting for 20% of the trade in perishable food (Dole, 2010). Because of the limited shelf life of perishable products, there has been constant evolution in the packaging process and bioengineering which has resulted in longer shelf life, flexibility and extended opportunities for shippers.

According to figures from Drewry Shipping Consultants covering the period 2000 to 2009, the annual growth rate of the perishable food trade was on average 3.8%. The meat cargo showed the highest volume growth of approximately 9 million tons over the period. Drewry expected the reefer trade to grow from 157 million tons in 2009 to 203 tons in 2015, (Drewry Shipping Consultants, 2011).



**Figure 4: The proportions of world trade commodity groups. Bananas and meat have the largest share of the commodity trade. Source: (Drewry Shipping Consultants, 2010).**

The main reefer commodity groups are divided into living and non-living commodities. Bananas, citrus fruits, exotic fruits and deciduous fruits belong to the living products. The non-living commodities are seafood and meat. The dairy category comprises for example milk and cheese. The category Other includes vegetables and other trade fruits which can either be living or non-living products. Figure 4 shows the percentage of each commodity group (Drewry shipping consultants, 2010).

The reason for the categorization into non-living and living commodities is to simplify and facilitate the decision process with regard to a suitable temperature range for the product during the journey. Commodities that fall under the living category must be in a refrigerated state and they have limited shelf life. The non-living group is much easier to handle and can be frozen which, in turn, allows a longer shelf life. The riskiest and most fragile process in cold chain logistics is when transport is intermodal or combines more than one mode. Containers play a vital part in making the cold chain stable by providing better conditions when loading on and off vehicles. The risk of damage is much lower when commodities are transported in reefer containers as long as there is access to an electrical power source (Rodrigue, Comtois, & Slack, 2009).

The size of the global food market grew dramatically when the shipment method evolved from ice refrigeration. This has provided many nations with large potential of



agricultural production opportunities in new and larger markets. For very perishable and valuable commodities the air mode is normally used, since shorter travel times are preferred. This, however, can be at the expense of reduced control of the environment. While on board the cargo can be at 15°C – 20°C; the loading and unloading environment is very fragile as the cargo may have to wait up to 80% of the logistics time exposed to weather. This risk can vary between airports and companies and is a tradeoff between quality and the importance of receiving the goods in time. A more regulated process needs to be practised to enable increased usage of air mode in cold chain logistics (Rodrigue, Comtois, & Slack, 2009).

Despite difficulties in some aspects of cold chain logistics, the industry has adapted well to the shifts of quality demand. Most food products can tolerate some variation in temperature within a certain time range. Therefore it is unlikely that severe damage will result from small mistakes or errors in the process. However, the errors can add up and if there are too many they can have a compounded impact resulting in irreversible spoilage. The reefer containers are among the most reliable and effective ways to transport cooled products, and account for more than a 50% of the cool logistics in the world. This share is no coincidence when looking at meat transport, for instance. Chilled meat transport in reefer containers is estimated to gain 25 days of shelf life, compared to conventional methods (Rodrigue, Comtois, & Slack, 2009).

When it comes to exporting meat and seafood to foreign markets, it is generally transported frozen. This applies to countries like Argentina and Brazil which are big exporters of meat. These countries have to transport their products a long distance to the major consumption markets. A shortcoming of long distance sailing is that can result in some loss of quality. Other alternatives, like air transportation, are not only more expensive but also different. The meat is transported from the plant to cold storage where it is brought to freezing point (0 Celsius) and then placed into air transport containers. Using maritime shipping, including a cold storage facility to load the meat into reefers in addition to the 15 days that the ocean journey may take on average, shaves half off the expected shelf life of about a month. The advantage is that this alternative is much cheaper than the air mode. A notable time advantage may also be achieved by loading the cargo directly into reefers at the packing plant which can

extend shelf life by about 25 days. This is the result of the elimination of intermediary stages in handling the cargo, which cause potential breaks in the integrity of the transport cold chain. So, the advantages of expanded shelf life are combined with the cost effectiveness of maritime shipping with a net gain of about 10 days of shelf life (Rodrigue, Comtois, & Brian, 2009).

In this chapter, the discussion aims at describing how different the cold chain logistics market is from the general cargo transport market. Transportation of perishable products relies on careful planning and knowledge of optimum product temperature requirements. Environmental factors are important in cold chain management and effective service control is necessary to ensure product quality and, in turn, customers' happiness. Containers are a breakthrough technology in transport methods, especially for perishable goods which need to be kept within a certain range of temperature. This has limited the breakage potential of the cold chain to fewer errors which are often related to equipment breakdown or quality assurance of the service. This means that efficient cold chain transport relies mainly on high quality service which can provide reliable consignments because of the effective management of the cold chain. Complexities may arise in arrangements which require knowledge and skills which a successful shipping service should possess, both regarding products and markets. The added value of the industry involves keeping the product stable between distant locations and transferring products from surplus areas to richer regions of the world. To provide an effective service, companies must activate their processes in the right order and with each activity the service or product gains more value. Logistics are activities in the value chain and one way to increase product value is improving logistics performance.

The task required here from the Nordic shipping line is to perform activities uniquely and efficiently enough in order to distinguish themselves from their rivals. This is done by means of cost or quality differences in the service offered. For example, when transporting fish the greatest contribution to value creation is bringing the product to the customer as fresh as possible without making a tradeoff in the quality of delivery. Success in all activities within the value chain is very important when delivering time sensitive products, such as fresh food. This requires the right expert knowledge and

resources which the company can build on to gain competitiveness on the market. This discussion is put into the context of theories of competitiveness in Chapter 6. The strategy framework is set forth, based on discussion from chapters 3, 4 and 5 and put in the context of management theories and tools. Finally the choice is made as to which theory applies to this research.

## 6 Strategy framework

The discussion has covered how shipping lines have organized their networks which to some extent reveal their market focus. Deciding which markets they are providing with their services is one sign of how a firm will compete. Another strategy is how the companies are competing within their chosen market territories. An example is to offer a quality service that could extend the general service and is better integrated, resulting in more convenience for the customer. The shipping industry is a relatively mature industry where companies form network relationships to create enough synergy in their operations to reach operational effectiveness. Companies must use every resource available that can help in their aim of offering competitive solutions on the market. One strategy component is to use the help of other companies, even, in some cases, competitors, to form synergy simply because all the players are better off (Barney & Hesterly, 2010).

Michael Porter is known for his development of the five force model. In this model he uses five external market conditions to estimate where the company is positioned on a particular market. Those conditions are: The customer's bargaining power; is it easy or hard to enter the market? Are the suppliers in a strong or weak position? Is there any threat of substitution of products? How severe is the rivalry of competitors?

The conditions, or forces, can vary between industries. If there are too many threats the company is in a weak position on the market resulting in decreased profitability (Porter M. , 2008). In order to compete on the market it is also necessary set up a framework relating to the way the company organizes itself in its efforts to reach its established goals. In Porter's view there are three distinctive positions which a company can choose between when trying to gain competitive advantage. The aim is to differentiate its services and make the firm somewhat unique in its market approach. These frameworks are cost leadership, Differentiation and focused position (Porter M. E., 1985).

The most obvious choice for a well organized and successful company is to focus on cost leadership. As the term "cost leader" indicates, the company has the operational

aim of bearing the lowest cost in the industry, whether this is done by means of size and scope or efficiency and the firm's cumulative experience. This would, in turn, result in a higher average profit than that of other players on the market (Porter M. E., 1985). The second strategy in Porter's discussion is the differentiation approach. By this strategy, the company gains a distinctive appearance on the market by its offering of different solutions which provide the company with uniqueness competency.

A company which enjoys differentiation is in a better position than its competitors to charge higher prices for its services. It is only an advantage, however, if the customer values this service and is ready to choose it in spite of it being more expensive. The final positioning is focus, or market segmentation, which is narrower in scope than the other two choices and is more of a description of the market sector the company, should compete in. The question is whether the company should compete in a mass market with a broad scope or focus on particular market segment with a narrow scope. The competition would still be based on cost leadership or differentiation, but within a specific market sector (Porter M. E., 1985).

### **6.1 Operational effectiveness and strategic positioning**

Michael Porter defined operational effectiveness as a need for companies to perform similar activities better than their rivals (Porter, 1996). In the shipping industry competition can be fierce and many of the large companies enjoy better operational performance, both in terms of service and cost. This implies that smaller shipping lines need to act more strategically than their larger competitors when operating in an international environment. The importance of strategy is vital for successful performance in the international shipping industry. This also applies to operational effectiveness; the shipping company must organize and utilize its sources as effectively as possible. A big issue for shipping lines is how best to manage empty containers to obtain maximum utilization of its important assets. Shipping lines need to improve constantly to gain a sufficiently favourable cost position on the market. By means of good managerial practices and quality control waste in the operation can be minimised, resulting in increased profitability (Porter M. E., 1996).

The essence of a competitive strategy is companies' ability of showing differentiation compared to the rest of the market. These differences do not need to be totally

divergent from the general practice, but specialised enough to provide the customer with a unique solution, resulting in added value for the customer. Porter goes further in his description of a successful strategy by underlining the importance of the unique strategic approach. A manager who wants his company to adapt successfully to a new strategic positioning has to make tradeoffs when he selects one option over another and should not use any other strategies when the decision has been made. The concept of tradeoff is essential to a strategic approach, because it makes it difficult for others to imitate. Porter has offered three basic approaches of strategic uniqueness. Variety based positioning is an emphasis by the company on products rather than a specific customer segment. Variety based positioning is applicable to companies which are, or may be, able to offer a product or service that involves uniqueness and new features for the market. The focus on a narrow path of products or services in industry enables the company to produce faster and with lower cost than competitors with a broader operation can provide. Another position strategy is to focus on the needs of a specific group of customers. Need-based positioning requires particular solutions which aim to meet customers' different needs. Customers can have many diverse needs, based on their preferences regarding price, information, reliability, timeliness and so forth. A company practising need-based positioning takes advantage of focusing on these distinctive needs and can therefore outperform competitors in order to meet those needs through their distinctive value chain. For example, if a carrier wants to serve the South American area, he has to provide the customers in this area with a competitive service, connecting them effectively with their trading partners at competitive prices. The third market positioning is based on access. Here the strategy is to focus on accessible customers in different areas. The company must apply all the practices that can effectively reach large numbers of customers (Porter, 1996).

## **6.2 The resource-based view**

The resource-based view, on the other hand, is a business management tool, describing the mechanisms of sustained competitiveness, and looking more closely into internal procedures in the company and the company's performance. Sustained competitive advantage is gained by a firm when it is operated on the basis of a value creating strategy. This strategy must be unique enough and not used by any current or

potential competitors, since they are unable to imitate this strategic approach (Barney J. , 1991).

Wernerfelt (1984) developed the resource-based view model with the aim of providing a view on how a firm uses its internal resources, such as technology, finance, and labour to take competitive advantage and produce profitability, through analyzing its strengths and weaknesses. Wernerfelt (1984) believed that most of a firm's resources are used in production and most products require using the potential of a firm's resources. Therefore, resources and internal capability are heterogeneous fundamentals that involve a firm's strategic management. Penrose (1959) suggested that the balance between exploiting existing resources and developing new ones can lead to a firm's optimal growth. Consistent with Barney (1991), the resource-based view examines the implications of two assumptions: the first assumption is that a firm's resources within an industry might be adapted to its controlled strategic resources; the second assumption is that these resources may not be completely changeable across companies. After analyzing the above assumptions, the revealed implications would lead to identifying the sources of a firm's competitive advantages. Hence, the resource-based view is a critical approach to have an in-depth look into a firm's resources, and see how firms are able to use their resources to gain competitive advantage. A firm's resources comprise all the assets, knowledge, information, capabilities, organizational processes and others that are controlled and implemented by the firm, together with its strategy for improving the firm's efficiency and effectiveness (Barney J. , 1991). A model has been built round the resource-based view which sets the conditions for sustained competitiveness. The conditions are: valuable, rare, inimitable and non-substitutable, or called, in more general terms, the VRIN-model.

A resource must be able to create competitive advantages. By improving efficiency and effectiveness the resource can be recognized as **valuable**. This can be in terms of lower costs compared to competitors, or differentiated products. **Rarity** of the value-creating resource is an important condition for remaining competitive. However, industry leaders are often in a position to monopolise rare resources which partly explains their rareness. Companies armed with a rare and valuable resource may have competitive advantage. But others may imitate these resources. If the resource yields sustained competitive advantages it should be **inimitable**. The final term to sustain the competitiveness is the non-**substitutability** of the resource. When this term is fulfilled

no one can replace it by another resource that delivers the same result (Ambrosini, Bowman, & Collier, 2009).

Although Michael Porter's theories have been widely recognized, they can nonetheless be criticized. The model was developed in 1980 and one could therefore consider it obsolete. Other criticisms might relate to the model's adaptation to globalization and deregulation of the current economic environment. However, the five forces remain valid and company strategy should still be based on internal and external factor analysis. In this research, Porter's model is presented as a recommended but limited theory and used as part of a larger framework of theories and techniques. In this approach, the strategy is to build on cold chain logistics knowledge and valuable resources that is high-end service in the logistics field. As for rarity, not many shipping lines have decades of experience of cold chain logistics. Although it takes time, money and errors to obtain the right knowledge and experience, competitors can eventually imitate the service and deliver a similar result.

### **6.3 Strategy for a small Nordic shipping line**

Strategies in the shipping line industry are not much different from those of other industries. There are, however, some features in the business environment that are special for example how industry players can form alliances and the internationality of companies. Shipping strategies must take the business environment into account. One of the first things to look when assessing the business environment for a shipping line is opportunities and threats. Container service is similar worldwide, but the customers are located in many countries with different economies, cultures and infrastructures and so forth. Therefore, the opportunities and threats depend largely on the economic shape of the shipping line's territory (Porter, 2008).

New opportunities and threats occur when the market environment changes. Many changes can affect shipping line operation and undermine a company if no response is forthcoming from the company's operation. New technology on the market or world trade developments can change the market and this requires the company to respond to the new environmental circumstances. To estimate how the response to the new environment should be formulated, the company needs to have sufficient information, both regarding its internal and external environment (Porter M. , 2008).



The shipping company must evaluate the elements of the target market:

- Size of the market: The largest volume markets are the most difficult markets for smaller shipping companies in terms of competition. Those are the markets where the largest and most globalized companies have the best access and can compete by means of lower prices.
- Development of the market cluster: This option is good for companies which have limited growth opportunities in their current market operation and want to increase their transport volume. If this development is vulnerable to imitation there is a risk of competition in the new market, resulting in lower profits for the company.
- Market structure: Estimation of potential market profitability is important for a shipping company. The current size and development of the market might be attractive, but there may be threats, such as other modes of transport services.
- Company assets and resources: A typical shipping line has assets like vessels and offices and resources like connections and human resources. These are the current internal conditions of the company which have to match the chosen market.

(Porter M. , 2008)

### **6.3.1 The choice of market expansion strategy**

The shipping market is always based on customer needs. The need for transporting specific cargo to another location also entails a specification of vessel or container type with specific handling and a specific transport route or location need. Customers can be categorized by how they operate, whether they are international forwarders or more general domestic exporters and the shipping strategy is based on customer segmentation. Another way is to base the segmentation on the various types of commodities, vessel types or the transport routes. The customer's behaviour is, however, the main element in every segment.

- The vessel types: Container ship, reefer ship or bulk carrier
- The type of commodities: Are they in dry or liquid form or are they specialized and need to be chilled or frozen.
- Type of trading routes: Does the shipping line operate on main trading routes or does it divide its service into many smaller emerging markets.

Shipping lines need to map up the needs of the targeted market and form their strategy, based on customer preference. Shipping lines generally target their customers

by their shared needs and their expression for particular services. The target market is the sum of shippers that have the same transportation needs, they express eagerness to buy the transport services and they show a high degree of buying force. The shipping company can selectively choose a number of promising market segments to offer its transport services. This kind of strategy suits best larger shipping companies with access to many assets or resources and there might be no relation between these segments. By operating with diverse market segments the company can lower the risk related to the profitability of each market segment.

However, small and specialized shipping companies should focus on one market segment (for instance chilled or frozen commodities), with a clear focus on market strategy. This concentration on a few markets emphasizes new opportunities on the market and its development. The focus is on natural growth in the chosen markets (Lee & Yang, 1990). The advantages of concentration strategy include specialization, economy of scale and growth by penetration. The differentiation lies in the expertise of the company in that particular market. This strategy could be applied by a Nordic shipping line with their expertise in cold chain logistics. They could achieve a strong position because of market knowledge and enjoy operational benefits resulting from expertise in the chosen field. A clear, focused strategy like this would, in turn, ensure high performance due to efficient utility of assets and resources (Katsikeas & Leonidou, 1996).

Before the analysis of suitable markets for a Nordic shipping line can be carried out, one should draw up a picture of factors that must be considered, estimate the competitive strength of a typical Nordic shipping line and envisage what can lie ahead. This discussion is based on Porter's theory on competitive strategy. The strategy for the Nordic shipping line should have a needs-based focus relying on company expertise in bringing customers distinctive service based on their specific needs. The Nordic shipping line should focus on the customer segments which it can serve best and on competitive terms. The value chain of the company should reflect the needs of the market segment it chooses to compete in. This is also related to the discussion regarding the type of products the Nordic shipping line should emphasise in its strategic positioning on new markets (see Chapter 3). The main reason for the emphasis on discussing cold chain

logistics is that this mode of transport offers opportunities to many Nordic shipping lines that possess a suitable value chain after a long history of servicing frozen or chilled fish products. Therefore the company should focus on segments which are in need of expertise in transferring their products in the most effective manner to the worldwide market. For comparison, the VRIN model is discussed as an alternative when estimating market opportunities and business competitiveness.

To draw a conclusion from this discussion; the elements of the target market must have some niche factor enabling the company to develop the market cluster, based on its competitiveness. However, entering and developing a new market could easily attract other companies, especially if this threatens other alliances in the market territory. A secondary route market, or emerging trade routes, will offer market opportunities for a small shipping company with access to average vessel size (see Chapter 3). A small or medium/sized shipping line focusing on the market's special needs could be in a relatively favourable position when competing in a low base market. In this research, the segmentation criteria relate to the containership and the reefer market, specializing in chilled or frozen products. Before our research into opportunities in the cold chain logistics market, it is necessary to consider what questions must be answered regarding market size, structure and development. The competition environment and market structure must suit a small/middle sized Nordic shipping line.

After a determining which types of commodities are suitable and what strategy should be followed, the choice is based on which routes and regions are in need for this service. In Chapter 7 the discussion deals with which type of market development and structure offers strategically advantageous opportunities. Emerging trade routes and markets provide shelter and diversity in a difficult economic situation in developed countries. The discussion is also related to the overcapacity problem discussed in Chapter 3 and presents an attempt to tackle this challenge and explain why it is important in a need-based strategy.

## **7 Developments on emerging trade routes**

When looking into the financial storm and stagnancy problem in Europe and USA, other markets come more attractive for competitive firms from that region. Many of the emerging market economies have recovered well from the economic crisis of 2008-2009. Many of these economies, particularly in Asia, are beginning to enjoy substantial growth owing to the strong rebound in exports. Nonetheless, as downside risks to global growth still persist, the export sector of some emerging markets still remains vulnerable and the pace of growth in exports varies (Euromonitor International, 2010).

The industry trend is to raise the capacity of the vessels as many of the top 20 carriers are doing. Maersk Line, for example, the industry leader, has raised the bar to a new level with an order for 10 ships of 18,000 TEU. However, the market leader is also looking into emerging trade routes (ETRs) by ordering vessels specially designed for these routes and received in March the first of its South America Maximum (SAMMAX) class vessels (8,700TEU) (A.P Moller - Maersk A/S, 2011).

It is important for shipping lines to offer a degree of diversity away from the oversaturated developed trade routes by strengthening their role on emerging routes, not least with a view to the economic outlook in the US and the eurozone crisis.

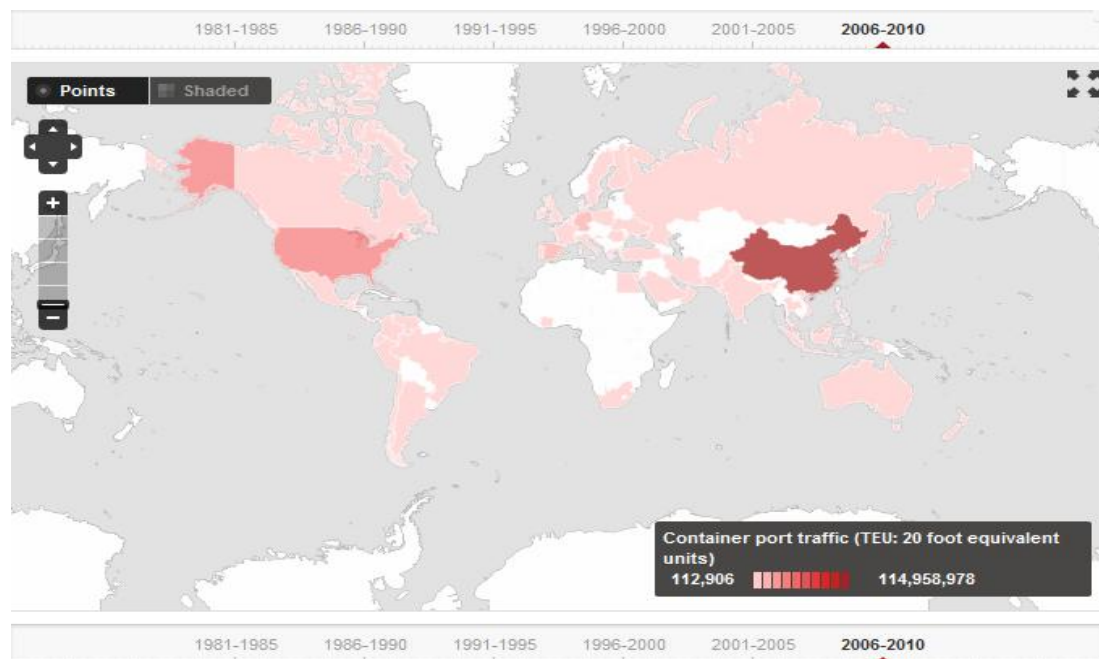
Wan Hai Lines is a shipping company which posted a profit in the third quarter of 2011, while the rest of the market reported loss. One major factor in the company's success is its route portfolio. It offers only two Asia-Europe routes and two transpacific services, those being the two routes that were worst hit by overcapacity in 2011. The firm places more emphasis on emerging markets (Business Monitor International, 2011).

Emerging markets offer high growth, albeit from a low base level which is sufficient for smaller players. The ETR option also offers some diversification and protection from the developed trade routes. It is therefore a wise short and long-term move for carriers to make a move towards trade routes on ETRs. Wan Hai Lines offers the Asia – East Africa loop, six Asia – Middle East and India services, two Asia – South America routes

and exposure to niche markets via its two intra-Middle East services (Wan Hai Lines LTD., 2002).

Another strategy which Wan Hai has opted for is to keep fleet capacity relatively small. Primarily an intra Asia provider, the company does not need to boast fleets with large capacity ships, as only a few Chinese ports and the Asian transshipment hub facilities have developed installations to handle mega vessels. The company has a total of 12 ships with an average capacity of 2,884 TEU. The biggest Wan Hai's vessels are four of size 6,039 TEU, and the largest proportion of Wan Hai operation is with the 1,000 – 1,500 TEU class of vessels (Business Monitor International, 2011).

The international shipping market is relatively mature and companies need to show courage by thinking outside the box and going against the industry norm. The shortcoming of this strategy is that if ports on ETRs will invest to allow them to cater the larger ships which would drive the price level down (see Figure 5 for container port traffic). However, that kind of infrastructure change doesn't happen overnight.



**Figure 5: World's container port traffic.** Here the port container traffic is measured by flow of containers from land to sea transport modes, and vice versa, in a twenty foot equivalent container which is a standard size of container. The data refer both to coastal and international shipping. Source: (World Bank, 2009).

The task in Chapter 8 is to choose applicable emerging trade routes. It is important to pick a region which is developing and with promising economic conditions. In order to lower operational risk diversity is important, especially as a long-term strategy. The

small/medium shipping line should develop its role on an emerging trade route which limits vessel capacity in the terminals. A company with a need-based positioning strategy (Chapter 6) must focus on a particular group of customers. In this case it should emphasize regions that are productive in perishable food products and have access to major markets.

## **8 The cold chain between north and south regions**

As mentioned before, small shipping firms have to use a differentiation strategy against the bigger players in the market. A good example is the niche market approach by Wan Hai Lines and PIL. Cold chain logistics is a specialized service that demands quality control of the environment when shipping temperature sensitive products. Many companies in the Nordic hemispheric, for example in Iceland, Norway and Canada have developed high technological expertise in transporting perishable foods which they have gained after decades of experience in fresh fish transport.

To achieve differentiation, small Nordic transport companies should stay focused on their transportation expertise of perishable food. A suitable strategy for a small Nordic shipping company is thus to increase their market share of cold chain logistics in another region and possibly connect the home region with yet another, with enhanced service in this cluster. Transportation in cold chain logistics has become very efficient and reliable allowing the food industry to transport perishable foods all year around, even between distant regions.

The Russian-based company Sea Brothers Shipping is an example of a firm which specializes in cold chain food logistics from South America to Petersburg in Russia. The reefer chartering department of the company is young and has been operated since 1999 by chartering vessels for South America frozen food liner service, West Africa frozen food service, European frozen meat line and European fresh fruit line. In 2002 the company launched a frozen meat parceling service from South America to Russia with optional calls to ports of the Baltic Sea. Now about 50 reefer ships are contracted annually to carry about 150-200,000 tons worth of goods. The loading ports in Brazil are Itajai, Imbituba and Antonina. In Argentina the company uses the port in Zarate (Sea Brotherhood Holding, 2011).

A new market region must be a very productive fresh food market, an emerging economy with emerging trade routes and have terminal capacity that handles average ship size. South America is highly productive in agriculture and the trade routes from the region could be classified as an emerging trade routes or a secondary routes outside

the main container belt. The Chilean Compañía SudAmericana de Vapores' (CSAV) has an extensive network in the region. It covers almost every port in Chile and Brazil. However it excludes the Scandinavia region and the east coast of Canada from its operations and has only one port of call in North Europe (Gadhia, Kotzab, & Prockl, 2011). All these criteria are positive signs for a small or medium sized shipping company attempting to gain a foothold on the market. South America is also an emerging economy with increasing demand for developed machinery or products from the developed countries in the North. The opportunities for a small shipping company lie in servicing those smaller terminal ports in the region which cannot handle the largest cargo vessels. The limiting capacity of terminals in the region cuts down some of the cost advantages that larger carriers have. Therefore, South America could be a favourable market for small or medium sized Nordic shipping lines to focus on. The next question is which countries in the region are suitable for this kind of service.

## **8.1 The Latin America region for cold chain logistics services**

### **Access to markets**

The trade policy in the region has increasingly become more open, reflected in reasonable external tariffs. There have also been bilateral or multilateral free trade agreements that secure trade with a number of key partners (Guerrero, Lucenti, & Galarza S., 2009).

### **Quality of exportable goods**

One of the demands by the most lucrative markets is high quality products. Quality is a key to gain access to the market. A good example is how the South America region has to keep the beef sector clean of foot and mouth disease before it can gain similar market access as the beef sector in Australia (Guerrero, Lucenti, & Galarza S., 2009).

### **Infrastructure and associated services**

The infrastructure in this region has a large price impact on the logistics service resulting in relatively high logistics cost in the Latin America region (LAC). Other services in logistics transport are expensive (Guerrero, Lucenti, & Galarza S., 2009).



## **Measuring logistics lost**

There is no concrete way to assess logistics performance although it can be measured by means of three methods: a) logistics cost as a percentage of GDP, b) logistics cost as a percentage of product value and c) a logistics perception index compiled from the subjective views of freight forwarders (Guerrero, Lucenti, & Galarza S., 2009). All three approaches show correlated results, but the most accurate method is the micro method measure. This is, however, not as convenient as the logistics performance index by means of which evaluation is relatively easy.

There is a correlation among these three approaches though they differ in terms of difficulty of measuring and the value of information. The most accurate method is the micro approach, which estimates costs as a percentage of product value. Despite its usefulness, this method is too expensive in terms of time and effort. A more accessible method is the logistic perception index which is relatively easy to evaluate. The macro approach can be ruled out because of lack of accuracy.

Measured logistics cost in the LAC region is much higher than in the more developed countries, ranging between 18 and 35 per cent while OECD shows numbers around 8 percent (Guerrero, Lucenti, & Galarza S., 2009). The benchmark of logistics cost in OECD is around 9 per cent of GDP. The LAC region shows some lack of performance in logistics cost compared to OECD and is reporting between 16 and 26 percent of GDP. The logistics cost surges up to 40 per cent of product value for small and medium-sized enterprises. Based on the logistics cost measure in GDP logistics cost is affecting trade in LAC and is a major barrier due to lack of development of an effective logistics framework. Two other variables can give some idea of the region's logistics performance. They are losses/spoilage rates and inventory levels. The rate of spoilage or damage in LAC is relatively high, or on average 25 per cent and reaches up to 50 per cent for perishable foods. The inventory level is much too high and compared to the U.S. it is up to three times higher. This high inventory results in increased cost and reduced competitiveness in the region. One of the main reasons for the lack of competitiveness is the maritime and road haulage component which on its own can rise up to 20 per cent of the free on board value of the product. When the product has been transferred, handled, stored and distributed domestically, the logistics share of the final

price is often more than 50 percent of the total price of the product. This is a sign of lack of competition in the market and indicates room for other players (Guerrero, et al, 2009).

### **Problems with customs clearance and border crossings**

Customs clearance in LAC has caused delays which evidence suggests that can cost up to 12 percent of the product. It is important for the region to reduce customs clearance time because this is directly linked to lower transport cost (Guasch & Kogan, 2008). This finding is consistent with the Logistics Performance Index (LPI). According to an LPI survey made by the World Bank in 2010 the LAC region scored 2.74 out of a total of 5 (The World Bank, 2012).

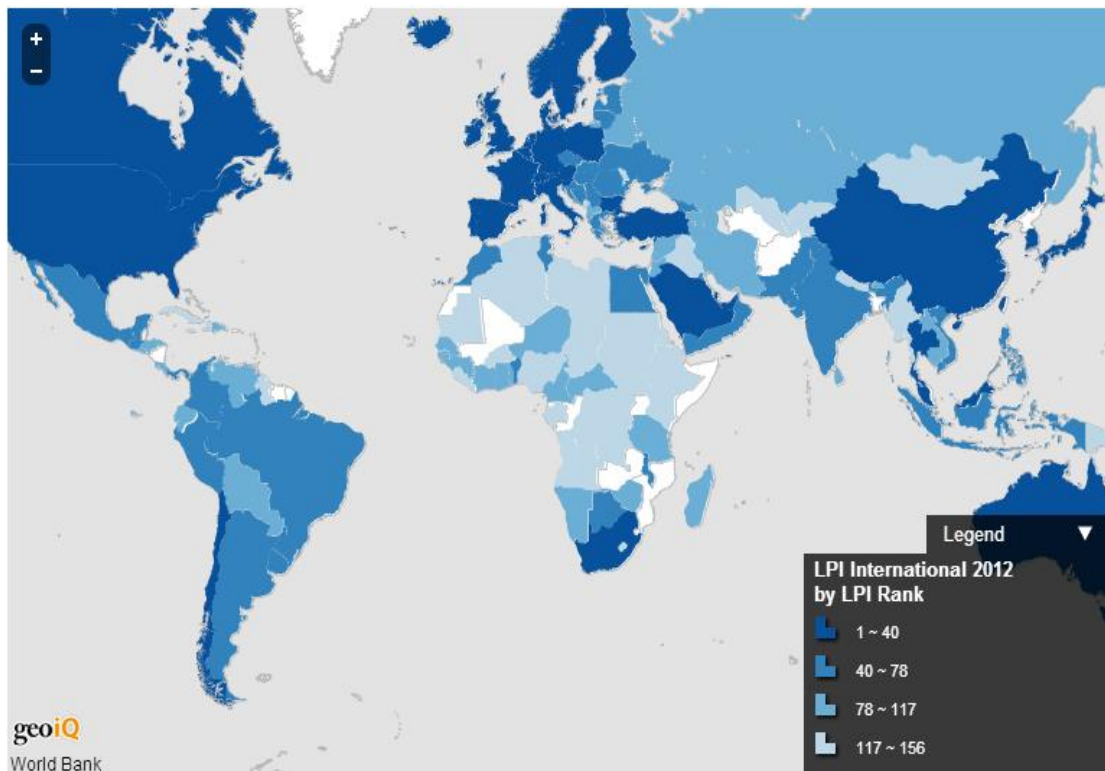
### **Warehousing, storage and inventory costs**

One of the logistics drawbacks in the region is high inventory cost. The United States show inventory cost at around 15 per cent GDP while the LAC companies have to bear inventory cost of around 35 per cent (Guasch & Kogan, 2006). Warehouse capacity in the region is too scarce which causes problems for food producers and exporters. This inadequate supply of inventory facilities drives up the cost for small players. The cause of extensive storage facilities is the inefficiency of important terminals.

This underlines how critical infrastructure can be with regard to shipping cost and there is a relationship between freight rates and connectivity. It is of vital importance that countries be able to provide sufficient services for cold chain logistics systems. A cold chain system cannot afford a slack of service in cooling maintenance which can lead to irreversible damage and stand in obstruct the development of perishable transport in the region.

The LPI provides a simple, global benchmark to measure logistics performance; thus filling gaps in datasets providing systematic cross-country comparison. The LPI score is the work of World Bank logistics service providers and academics and is built around a survey by logistics professionals. Freight forwarders are asked to submit country ratings, including factors which are critical in logistical efficiency such as: the efficiency of customs clearance, commodity tracking ability and the quality of infrastructure. This approach looks at the logistics overall constraints within countries, not merely the gateways, such as ports or borders. It analyses country performance in four major

determinants: time, infrastructure services, border procedures and the reliability of the supply chain. According to an LPI ranking score compiled by The World Bank, Chile ranks 39th on worldwide scale with an LPI score of 3.17 and is the South America region's best performer (figure 7). Brazil comes second, in 45th place, with a score of 3.13 (see figure 6). Both of these nations are large fresh food exporters and are connected by emerging trade routes and increasing demand by business worldwide (Arvis, Mustra, Ojala, Shepherd, & Saslavsky, 2012).



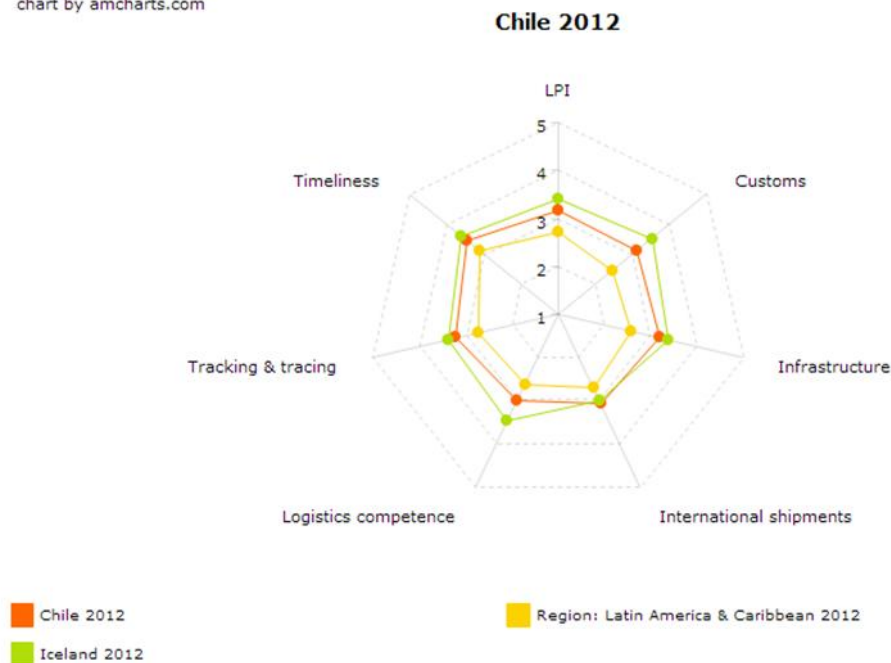
**Figure 6: The LPI international score map for 2012. Source: (The World Bank, 2012)**

The LPI index created by the World Bank covers 155 countries and rates them on a scale of 1 to 5. The following components compiled by the World Bank are:

- How efficient is the clearance process of the countries/region? It is crucial for countries to provide simple and fast service, both to reduce transport time and improve the business environment.
- Does the region have the infrastructure quality to meet international demand? It is important that terminals should have the facilities, equipment and space to handle commodities efficiently.
- Does the region offer a competitive shipping line environment? It is important for the export market to have access to competitively priced shipments.

- Is the logistical service offering quality service? The quality of logistical performance is the permanent responsibility of transport operators or service providers.
- Can the customer track or trace his commodity consignments?
- How often are commodities delivered on time?

chart by amcharts.com



**Figure 7 : The LPI score for Chile compared to the Latin America & Caribbean region and Iceland: (The World Bank, 2012)**

This research limits its focus to Chile and Brazil in the South America region. Other countries in the region show less efficiency in their logistics systems and are ranked lower on the LPI. Seamlessness is important in cold chain logistics services and transport service efficiency is a necessary factor if a shipping line is to provide promised quality service to the customer. Access and trade agreements with respect to larger markets are also highly important issues and these countries, especially Chile, have built a strong relationship with markets in North America and more recently China. Chile and Brazil are both very productive in the perishable food sector and have a history of exporting to many regions around the world. While these countries export a large amount of commodities, their neighbouring regions use them as a gate to the larger world markets.

## 9 Results

The reliability of the cold chain has increased by more intermodal and efficient logistics practice. Transporting perishable food products relies on quality control service where each link of the chain must hold to avoid damage. There has been an increasing tendency in the developed countries to import perishable food products from less developed regions of the world, due to better climate conditions for agriculture and cheaper manpower in those areas. It is, therefore, important for developing countries to emphasize sufficient transport infrastructure to serve this industry. Countries such as Chile and Brazil have been in this position, have taken advantage of it and responded well to market demands.

### 9.1 Trade in the Chilean food market

Chile has benefited from increased demand for agricultural and food products and a better connection to the North American market resulting in more wine and grape export (see figure 8).

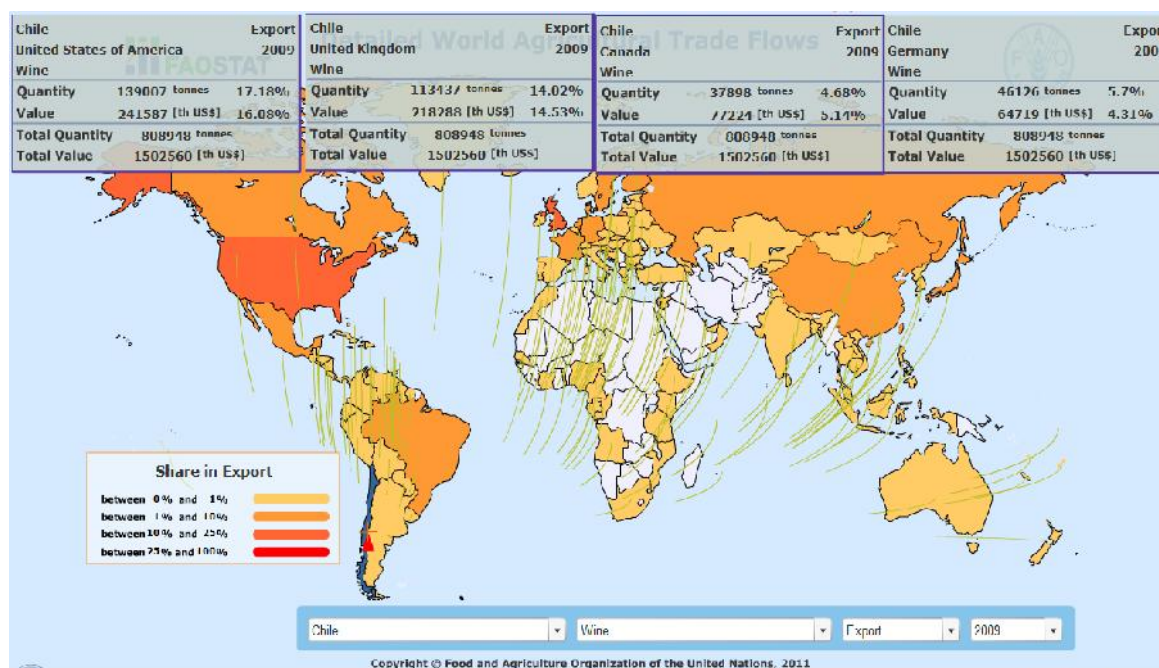
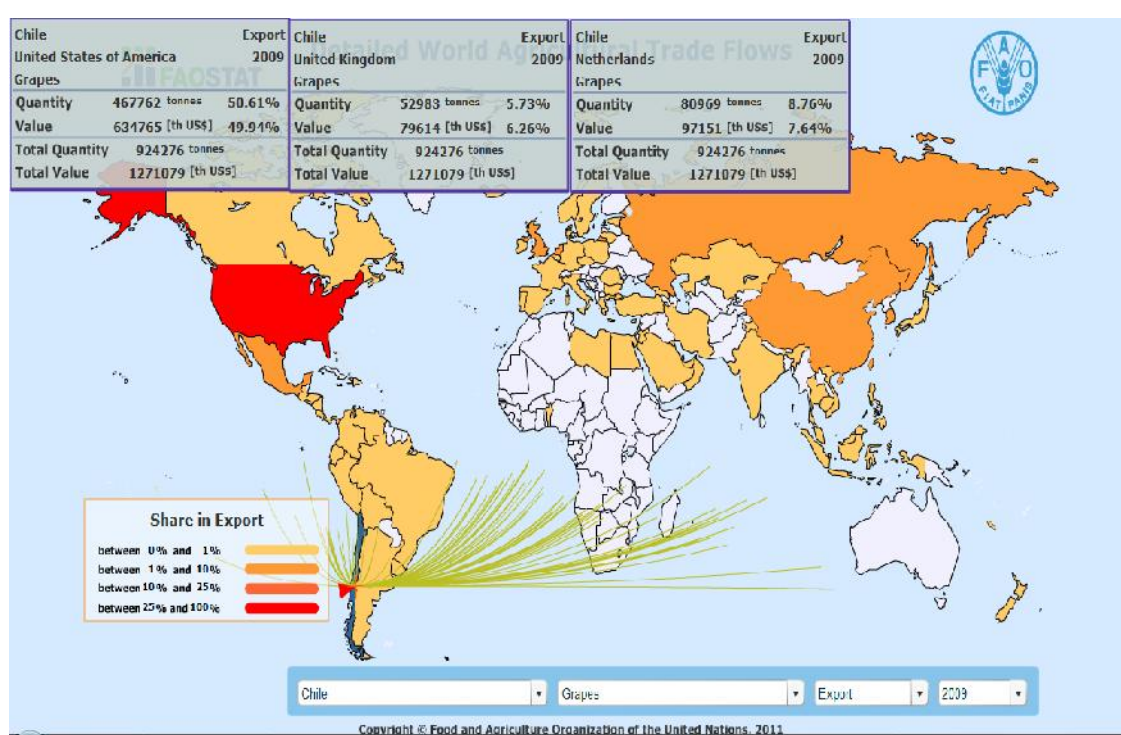


Figure 8: Chile's wine export. The map shows how Chile's wine is distributed to the world. Source: (Food and Agriculture Organization of the United Nations, 2012).

One million workers are employed in work relating to the Chilean food industry which represents around 15% of the country's economically active population. By 2030, it is expected that the food sector will account for around 35% of Chile's GDP and almost one-third of the total number of jobs. In Chile's food export sector, the most important products are fresh fruits, cultivated salmon, processed foods, other seafood, wine and meats. If exports continue at the current pace, Chile is expected to become one of the world's top 10 food exporters in the near future (Business Monitor International, 2011).

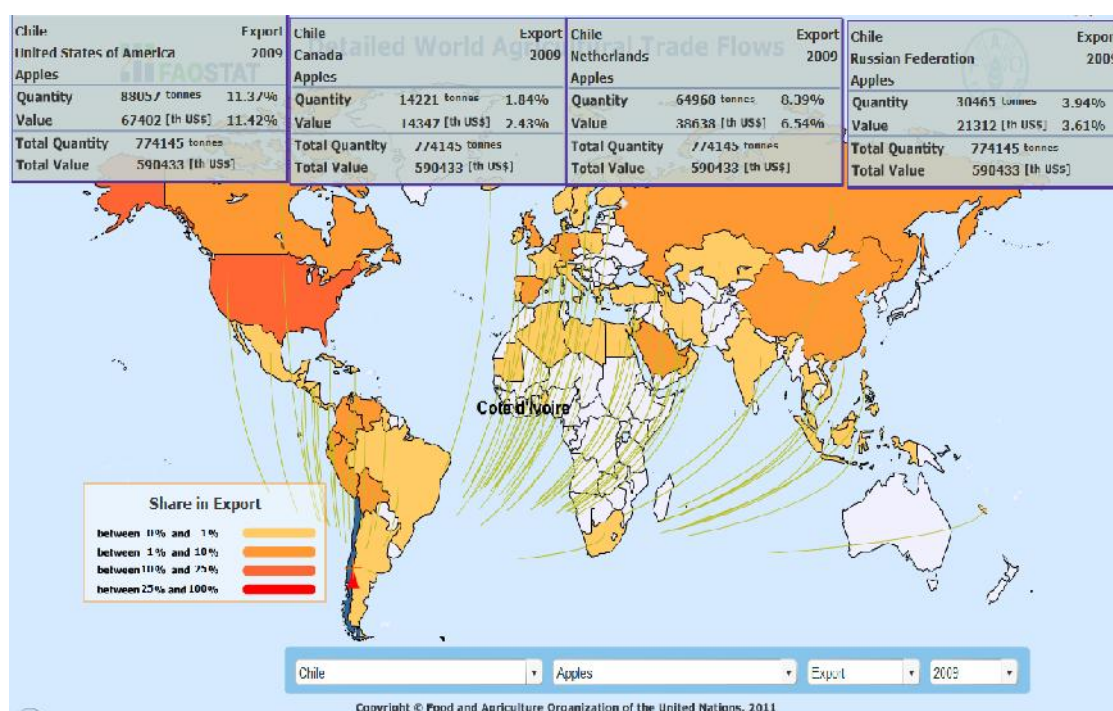


**Figure 9: Detailed distribution net of grapes from Chile where North America and North Europe are largest and have extensive connections. Source: (Food and Agriculture Organization of the United Nations, 2012).**

The Chilean food-processing industry is working to become increasingly competitive and efficient in order to be able to compete and take advantage of the opportunities offered by the many free trade agreements that Chile has signed, for example with the US, Canada, Mexico, the EU, Central America, the European Free Trade Association (EFTA) and South Korea. A further impetus to growth for the industry could be provided by the realization of plans to create an EU-like trade bloc by merging South America's two existing trade blocs, Mercosur and the



Andean Community. Energy and infrastructure integration alone should do much to open up intra-regional trade and relations (Business Monitor International, 2011).



**Figure 10: Export of apples from Chile, shown as a proportion of world export. Source: (Food and Agriculture Organization of the United Nations, 2012).**

The fruit (figure 9 and 10), wine (figure 8), poultry, pork, beef and fish-seafood (table 1) sectors can be expected to experience the fastest growth rates over the coming years, as a result of global trade liberalization, allowing access to large new markets, particularly in Asia. The sectors benefit from Chile's efforts to diversify its export sector away from copper to high value-added agricultural exports, most notably salmon and wine. The biggest import of an agricultural product is wheat from North America (figure 11) (Business Monitor International, 2011).

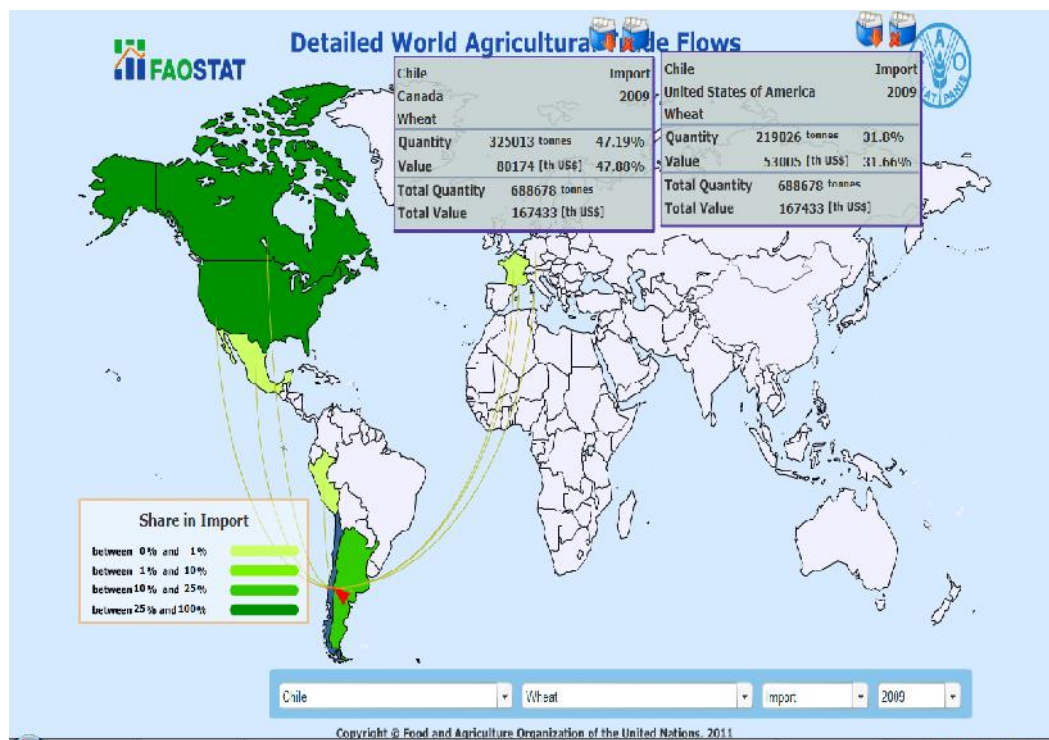
**Table 1. Export of seafood in the South America region. Source: (Food and Agriculture Organization of the United Nations, 2012)**

**EXPORT QUANTITY**

Country	Item	Year	
		2009	
Argentina	Fish, Seafood	683,665.00	tonnes
Bolivia (Plurinational State of)	Fish, Seafood	29.00	tonnes
Brazil	Fish, Seafood	60,712.00	tonnes
Chile	Fish, Seafood	3,418,011.00	tonnes
Colombia	Fish, Seafood	81,422.00	tonnes
Ecuador	Fish, Seafood	459,446.00	tonnes
Guyana	Fish, Seafood	37,188.00	tonnes
Paraguay	Fish, Seafood	153.00	tonnes
Peru	Fish, Seafood	6,168,311.00	tonnes
Suriname	Fish, Seafood	11,864.00	tonnes
Uruguay	Fish, Seafood	117,836.00	tonnes
Venezuela (Bolivarian Republic of)	Fish, Seafood	19,649.00	tonnes

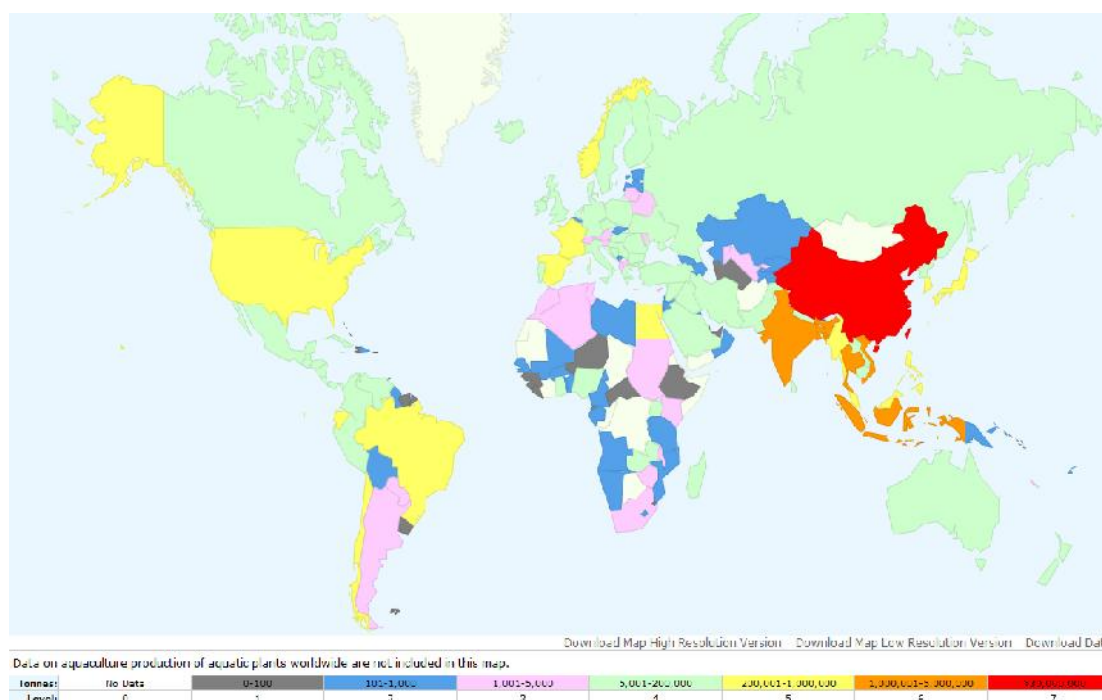
Asia accounted for 88.8 percent of world by quantity and 78.7 percent by value. China has the largest production share in the region accounting for approximately 62 per cent by quantity and 51 per cent by value. In the period 1970 to 2008 the average growth rate of China has been around 10.4 per cent. Latin American countries have also shown dramatic changes in their production, with 21 percent average annual growth and consequently are the outperformers in terms of growth (Food and Agriculture Organization of the United Nations, 2010).





**Figure 11: Largest proportional agricultural import. The green zone in this map shows the share of import of wheat to Chile. Source: (Food and Agriculture Organization of the United Nations, 2012).**

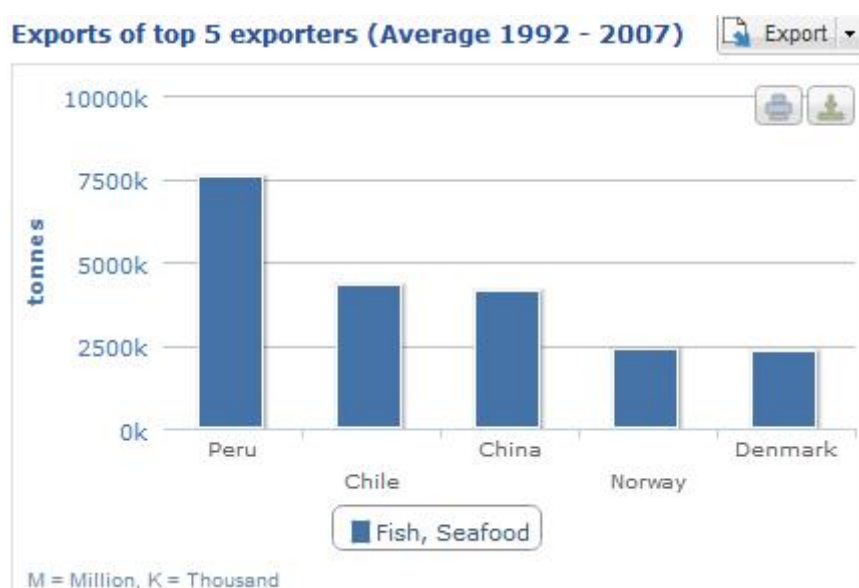
The companies in Chile's aquaculture market range from small to large, operating in a diversity of export markets. Competition between incumbents is strengthened by low product differentiation, low switching costs for buyers and relatively high exit costs owing to the dissolution of stock and equipment (which is becoming more technologically complex). Storage costs tend to be high as refrigeration systems are needed for transportation. Players can expand in terms of the countries they export to, or the level of processing they conduct themselves. One of the main factors affecting expansion is new regulations that the players will need to comply with. Some product diversity exists, with some companies more focused on farming fish (e.g. marine harvest), whilst others concentrate on shellfish (Datamonitor, 2011).



**Figure 12: The map shows the distribution of aquaculture in the world (the data excludes aquatic plants). Source: (Food and Agriculture Organization of the United Nations, 2012).**

The leading countries in aquaculture development are listed in table 3 (see also table 1, table 2 and figure 12). When looking at economic class, the developing countries' share of world production is 48.63 million tonnes, or 92.5 percent, and valued at US\$84.03 billion or 85.4 percent (Food and Agriculture Organization of the United Nations, 2010).

**Table 2. The top 5 exporters. Chile comes second after Peru in exporting fish, with approximately 4300k tonnes of export. Source: (Food and Agriculture Organization of the United Nations, 2012).**



**Table 3. Growth rate of top 15 fish aquaculture producers. The table shows countries which harvest 92.4 percent of total world production (the data excludes aquatic plants). Source: (Food and Agriculture Organization of the United Nations, 2010).**

Countries	Production			Average annual growth rate		
	1990	2000	2008	1990-2000	2000-2008	1990-2008
China	6482	21522	32736	12.7	5.4	9.4
India	1017	1943	3479	6.7	7.6	7.1
Vietnam	160	499	2462	12	22.1	16.4
Indonesia	500	789	1690	4.7	10	7
Thailand	292	738	1374	9.7	8.1	9
Bangladesh	193	657	1006	13.1	5.5	9.6
Norway	151	491	844	12.6	7	10
Chile	32	392	843	28.3	10.1	19.8
Philippines	380	394	741	0.4	82	3.8
Japan	804	763	732	-0.5	-0.5	-0.5
Egypt	62	340	694	18.6	9.3	14.4
Myanmar	7	99	675	30.2	27.1	28.8
U.S.	315	456	500	3.8	1.2	2.6
South Korea	377	293	474	-2.5	6.2	1.3
Taiwan	333	244	324	-3.1	3.6	-0.2

### 9.1.1 The transport system in Chile

Chile is ranked as the most competitive economy in South America according to the World Economic Forum and possesses a fairly developed infrastructure, ranked 40<sup>th</sup> of 144 countries (World Economic Forum, 2012).

#### Air

Chile's main cargo hub is the SCL Airport in Santiago, which is the international hub of LAN Airlines. As of 2011, Chile's network is extensive, comprising 366 airports, with 84 of these having paved runways. Chile's airport infrastructure is ranked 39<sup>th</sup> by the World Economic Forum's Global Competitiveness Index, placing it fifth in the Americas, behind Panama and Canada, but one place ahead of the US

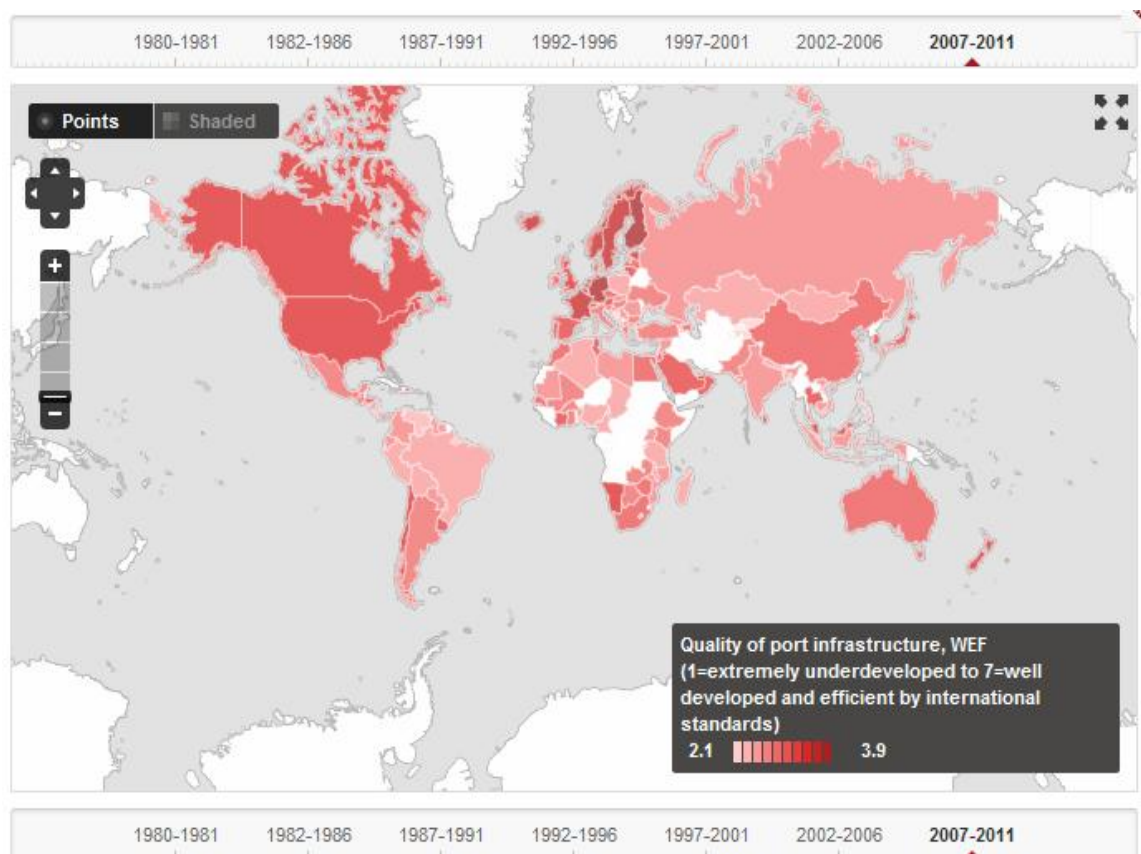
#### Rail

EFE operate Chile's railways network and are owned by the state. The network covers a total distance of 5,483km of railways and operates to some extent with broad gauge, or 1,706, the remainder being narrow gauge. Chile's rail network is ranked 64<sup>th</sup> by The World Economic Forum from a pool of 144 countries. Compared to the country's

roads in 23<sup>rd</sup> place out of 144 countries, the ranking is considerable lower (World Economic Forum, 2012).

### Maritime

The main ports are Valparaíso and San Antonio. They cater for container bulk trade, dry and liquid. Chile's ports are well placed as export hubs for Argentina to the east and land-locked Bolivia to the north. Chile's ports rank 34<sup>th</sup> out of 144 countries (World Economic Forum, 2012).



**Figure 13: Quality of port infrastructure.** The figure shows Chile's well-developed port system, as, for example, compared with Brazil's average port infrastructure. Source: (The World Bank, 2012).

The Port of Valparaíso is one of Chile's biggest ports, exporting fresh fruit, wine and copper (World Port Source, 2011).

Puerto San Antonio is another big port in Chile, handling over 6 million tonnes of cargo. The majority of imports comes from America (78.5%) and Asia (13.8%), and exports also go mostly to America (51%), Asia (28.4%), and Europe (19.4%) The major shipping lines which have been using Puerto San Antonio are APL, CCNI, Columbus Line,

CSAV, Hamburg-sued, Hyundai Merchant Marine, Libra, Maersk Line, NYK (World Port Source, 2011).

In 2010, the Port of Arica handled over 1.5 million tonnes of cargo (in more than 130 thousand containers), over 120 thousand tons of loose cargo, and over 420 thousand tons of bulk cargo, carried by 303 vessels. Out of the total of 2.1 million tons of cargo passing through the Port of Arica, 1.6 million tons were transshipments, 168 thousand tons was exports, and 142 thousand tons was imports (Empresa Portuaria Arica, 2011).

**Table 4. The main import trading partners. Source: (International Monetary Fund, 2012)**

Chile's main import partners (U \$mn)			
	2007	2008	2009
United States	7293.65	10688.50	7242.88
China	4886.47	6666.56	5726.75
Argentina	4347.13	4910.12	4347.53
Brazil	4501.28	5178.80	22729.96
South Korea	277	3107.10	2104.71

Chile's largest trading partners are the United States and China (see table 4 and 5). These tables show strong links between the largest consumer markets in the world and, interestingly, there is no EU country in those the tables.

**Table 5. The main export trading partners. Source: (International Monetary Fund, 2012)**

Chile's main export partners (US\$mn)			
	2007	2008	2009
China	9980.44	8927.57	12487.40
United States	8419.84	7610.97	6065.48
Japan	7091.41	6340.01	4942.21
South Korea	3849.31	3524.29	3137.90
Brazil	3356.24	3820.91	2735.74

Chile is increasing its port profile with a new port community system (PCS). The first version of a new port community system dates from September 2011 in the port of Arica. The first phase will allow monitoring of cargo traffic, enabling CPA to identify bottlenecks at the port and combat congestion. With help from this technology, the tracking of containers for Bolivian imports is made easier and provides tutorials for port users and clients on the logistics chain, detailing the cargo-handling process and the agencies involved in each phase (Business Monitor International , 2011).

### 9.1.2 Chile SWOT analysis

#### Strengths

A Nordic shipping line has a long history in transporting frozen fish and other perishable commodities. Their human resource knows what it takes to provide a quality service in this field. Chile is known for its aquaculture which needs good cold chain logistics practice similar that of which Nordic shipping lines have sound knowledge

A small or medium-sized Nordic shipping line has the flexibility to respond to market fluctuations because of the relatively small ownership of their operating fleet.

A small shipping company does not need a large market to reach its optimum level of operation. The focus on niche markets, such as cold chain logistics in emerging trade routes, offers some protection from fierce price competition.

### **Weaknesses**

A small or medium-sized Nordic shipping line cannot compete against bigger players only in terms of operational effectiveness. A large, global shipping line has both the resources and financial strength to drive the price below the threshold of acceptability for smaller enterprises.

Sometimes stepping on someone's toes cannot be avoided when arriving on a new market. Therefore, a small enterprise must make a hard decision as to whether it is worth sacrificing alliances on other markets. A small shipping line must keep its transport network intact around the world and, in turn, maintain its good relationship with larger players which it often relies on.

### **Opportunities**

Rising disposable incomes and increasing numbers of working women will fuel demand for convenience foods and this demand should see imports grow.

Chile's port system ranks highly relative to that of its neighbours according to The World Economic Forum's Global Competitiveness Report and is the most highly developed in Latin America (World Economic Forum, 2012).

Chile has one of the most open economies in South America and has signed many trade agreements that have facilitated both the country's trade and connections to the world. The Chilean government has emphasized value added industry, such as agricultural export and seeks diversity in the country's export practices. This policy has

placed Chile in the position of an internationally competitive economy (World Economic Forum, 2012).

Aquaculture has become very productive in Chile, resulting in a highly competitive export sector and is currently one of the country's largest exporters (see tables 2 and 3).

The food processing sector in Chile is a major source of export revenue. Key segments include wines, fisheries, aquaculture and dairy products.

### **Threats**

The country ports are expected to reach the limits of their capacity by 2014. More investment in expanding and modernizing ports is needed to handle increasing traffic (UNCTAD secretariat, 2011).

A limited domestic market is a weakness. According to the CIA World Factbook Chile's estimated population of 17.3 million in 2011 makes it one of the smaller markets in the region (Central Intelligence Agency, 2012).

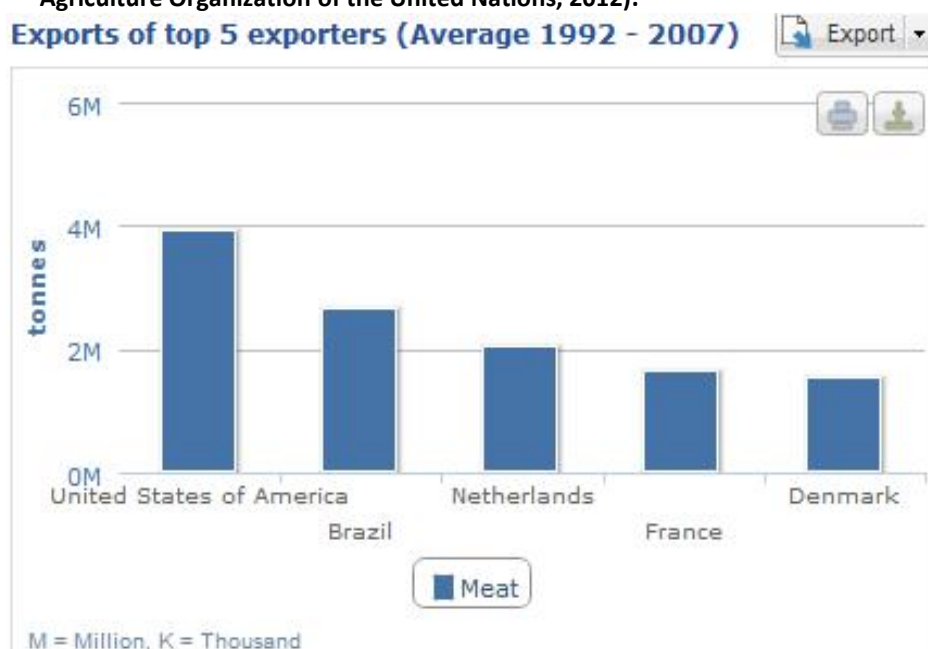
The anaemia virus has caused serious damage in the Chilean fish farming industry. There is no cure for this virus and it can be a difficult task to limit its transmission (Kibenge, 2008).

## **9.2 Trade in the Brazilian food industry**

Brazil is a large meat export nation, because of rapid growth in the developing economies and high input costs for feed grain and energy cost in the logistics sector. The Russian Federation is one of the largest meat importers and has joined the WTO resulting in increasing prospects of the opening of the international meat market. The beef market is constrained by the size of herds in the major exporting regions. By contrast, the production and trade of poultry, pork and lamb is likely to grow (OECD, 2012).

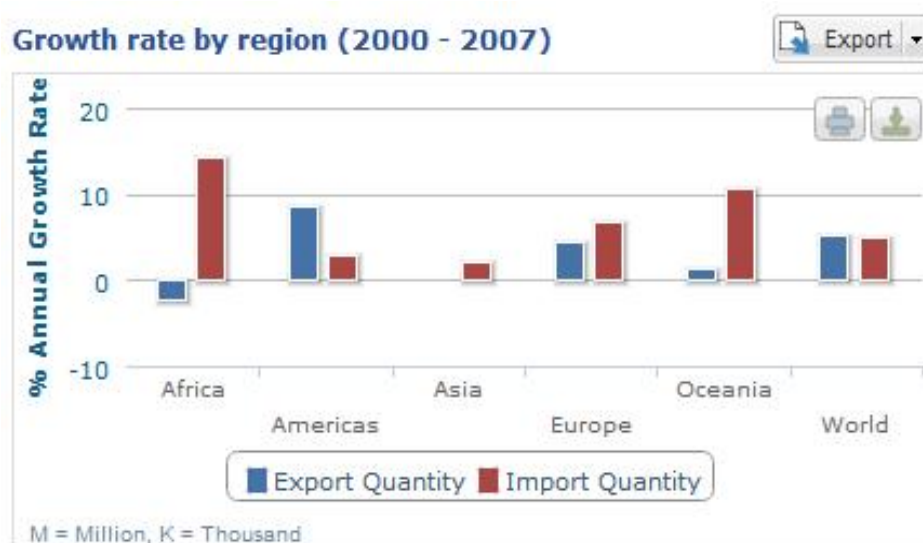


**Table 6. The five largest meat exporting nations. Brazil comes second after the US. Source: (Food and Agriculture Organization of the United Nations, 2012).**



According to the OECD-FAO agricultural outlook (2012) real prices for all meat products are currently at their highest level, compared to the past 20 years and will continue as long as feed and energy prices remain high. Higher prices are predicted to increase supply despite higher input cost. Poultry is the fastest growing meat sector with growth projected at 2.2% while the pork and lamb sector may grow 1.4% and 1.8% respectively.

**Table 7. The annual growth rate of export and import quantity by region. The steepest growth is from America. Source: (Food and Agriculture Organization of the United Nations, 2012).**



The growth rate of export is highest from the America region (table 11.2). The OECD-FAO agricultural outlook (2012) projects that the developing countries will continue to



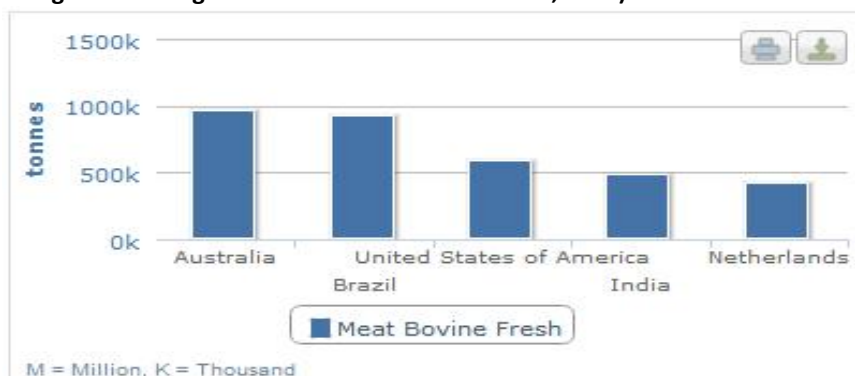
increase their share of global production in all meat categories, bovine 58%, pork 64%, poultry 63% and lamb 78%. Farms in the emerging economies are becoming larger with fewer units and Brazil comes second after the US in meat export (see table 6).



**Figure 14: The total world production quantities of meat. Brazil is the third largest after China and USA in meat production. Source: (Food and Agriculture Organization of the United Nations, 2012).**

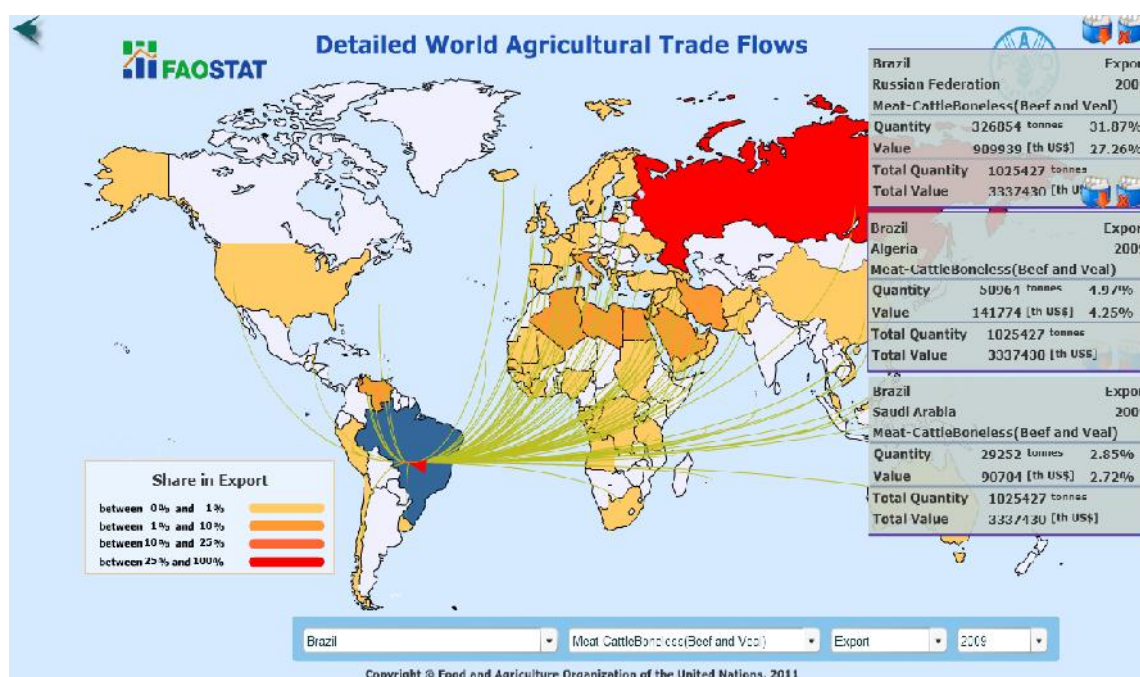
The food and drink balance in Brazil is highly positive because of the competitiveness of Brazil's food production. Brazil is the world's largest exporter of coffee, soybean, poultry (figure 14), beef (figure 15), oranges, orange juice (table 11) and sugar. Statistics from the UN Conference on Trade and Development (UNCTAD) show that between 2001 and 2006, Brazil's food and drink exports increased by more than 100%, while imports increased by 30%. In 2009, exports are believed to have fallen back slightly due to lower commodity prices and reduced global demand. However, when looking at future trends, the rapidly rising global demand for food caused by the swift economic advancement of emerging markets means that Brazil's food and drink export is likely to grow dramatically (Business Monitor International, 2011).

**Table 8. The world's 5 largest export nations of fresh bovine meat. Brazil comes second with 926,083 thousand tonnes after Australia which exports 964,271 thousand tonnes. Source: (Food and Agriculture Organization of the United Nations, 2012)**



### Boned meat (beef/veal)

Brazil is one of the world's most productive nation of meat products (figure 14). The domestic market for meat is large, but the excess supply of meat in Brazil gives the country opportunities in the world meat market.

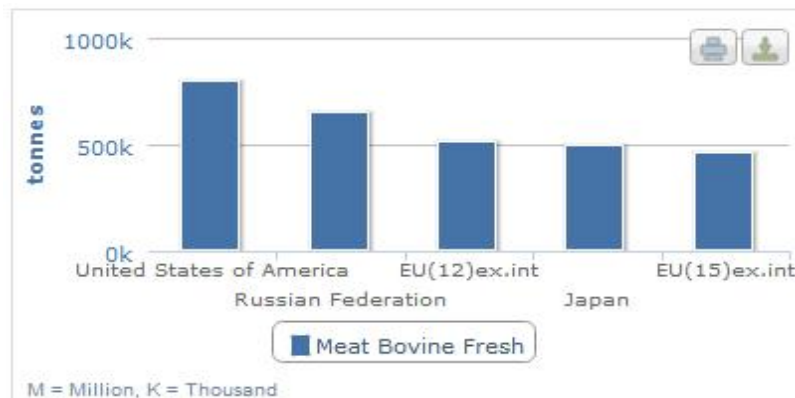


**Figure 15: Brazil's export of meat. Brazil exports 326,854 tonnes, worth 909,939 thousand US\$ and is exporting widely to the world. Source: (Food and Agriculture Organization of the United Nations, 2012).**

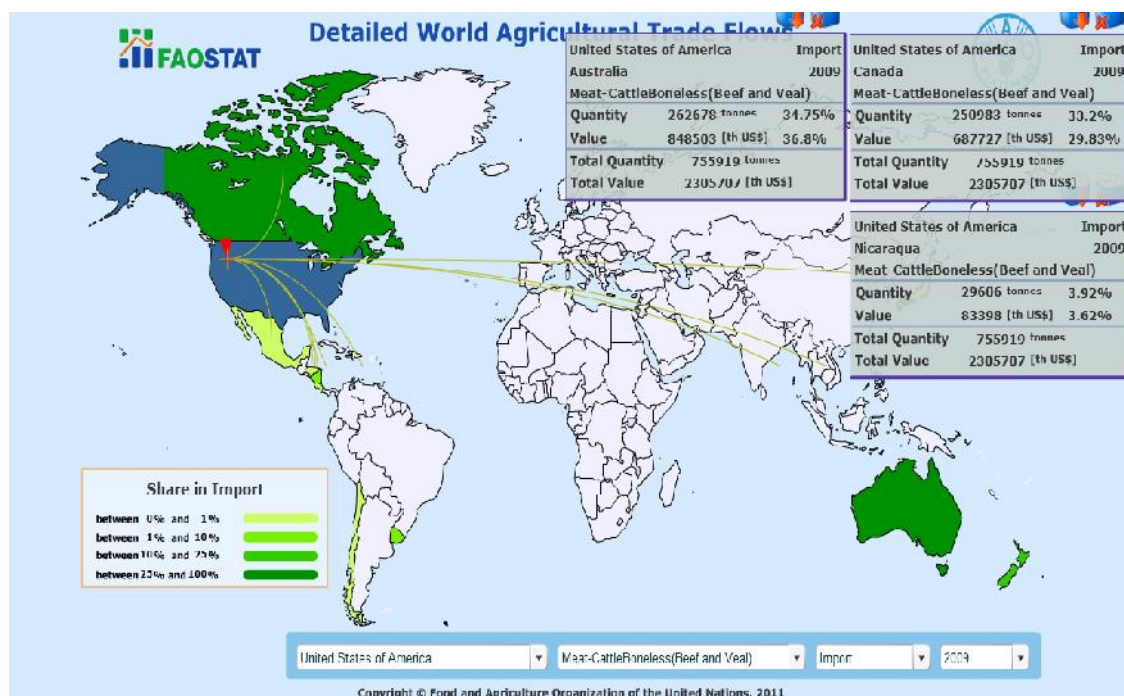
According to data from FAO (see table 9) the Russian Federation is the second largest importer of fresh bovine meat from Brazil. Declining domestic supply in Russia and the EU has forced Russia to look for meat supplies from South America. This fact is interesting and offers some opportunities for players in the cool logistics industry to

gain a foothold in the South America region which is a fast growing consumer environment.

**Table 9. The five biggest importers of fresh bovine meat. The United States is the biggest import market, although Brazil has no access to this market. Source: (Food and Agriculture Organization of the United Nations, 2012).**



Another interesting fact is that the biggest importer (USA) with 755,919 thousand tonnes buys mainly from Australia (34.75%) and Canada (33.2%) leaving the South America countries only with Nicaragua (3.92%) and Uruguay (2.99%), but purchasing nothing from Brazil (see figure 16).



**Figure 16: Import flow of fresh bovine meat to the United States of America. Source: (Food and Agriculture Organization of the United Nations, 2012).**

**Table 10. The biggest importer of beef from Brazil. Russia is the biggest importer of beef from Brazil, but the table also shows that the majority of exports go to the developing countries. Source: (Food and Agriculture Organization of the United Nations, 2012).**

years	countries	Meat quantity	Meat unit quantity	Meat (Value)	Meat unit value
2009	Russia	326854	tonnes	909939	1000 US\$
2009	China, Hong Kong SAR	100606	tonnes	315769	1000 US\$
2009	Iran	88995	tonnes	335352	1000 US\$
2009	Egypt	71980	tonnes	200122	1000 US\$
2009	Algeria	50964	tonnes	141774	1000 US\$
2009	Venezuela	39925	tonnes	164934	1000 US\$
2009	Saudi Arabia	29252	tonnes	90704	1000 US\$
2009	Israel	27077	tonnes	86598	1000 US\$
2009	Lebanon	25713	tonnes	104001	1000 US\$
2009	Libya	19277	tonnes	57389	1000 US\$
2009	Italy	16955	tonnes	118544	1000 US\$
2009	Netherlands	13211	tonnes	92637	1000 US\$
2009	Philippines	12895	tonnes	29482	1000 US\$
2009	Jordan	10518	tonnes	34887	1000 US\$
2009	United Arab Emirates	10234	tonnes	41103	1000 US\$
2009	Angola	7008	tonnes	25595	1000 US\$

Brazil's biggest beef market has so far been in the developing countries (table 10). The big challenge for the beef export industry in Brazil is to gain more market access in EU countries and USA. Brazil must raise their quality control and traceability to comply with European standards. This is also a matter of politics within the meat industry.

### **Orange juice, concentrated**

Concentrated orange juice is another agricultural product from Brazil which needs cool chain logistics service. The total 2009 export quantity of Brazil's concentrated orange juice to the world was 678,817 thousand tonnes, valued at 836,795 thousand dollars (Table 11) (Food and Agriculture Organization of the United Nations, 2012).

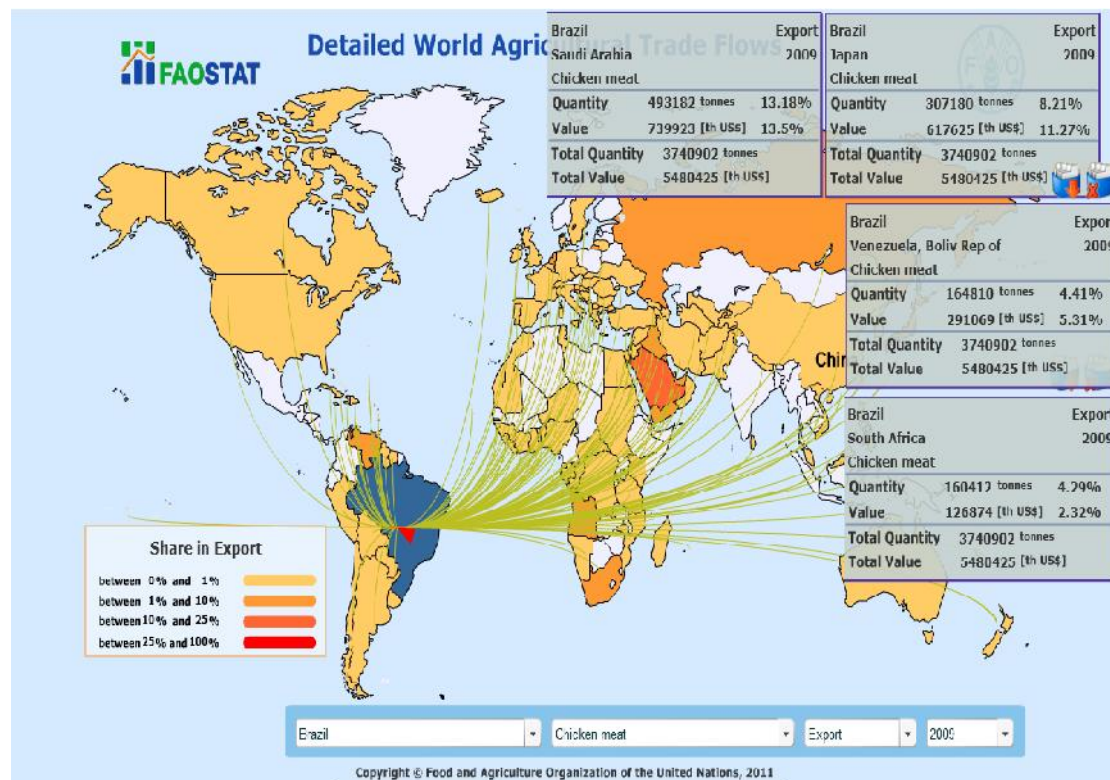
**Table 11. Distribution of orange juice concentrate. A large proportion goes to rich EU countries like Belgium and Switzerland. Source: (Food and Agriculture Organization of the United Nations, 2012).**

reporter	element	years	countries	Quantity	Value
Brazil	Export	2009	Belgium	208605	266324
Brazil	Export	2009	US	105341	124420
Brazil	Export	2009	Japan	66033	82229
Brazil	Export	2009	China	51639	64914
Brazil	Export	2009	Switzerland	46897	59941
Brazil	Export	2009	Netherlands	30749	29120
Brazil	Export	2009	Australia	12618	15090
Brazil	Export	2009	South Korea	12033	16188
Brazil	Export	2009	Israel	4890	4587
Brazil	Export	2009	Chile	4091	4649
Brazil	Export	2009	New Zealand	3396	3917
Brazil	Export	2009	United Arab Emirates	2305	2715
Brazil	Export	2009	Saudi Arabia	2279	2878
Brazil	Export	2009	Italy	2176	1781

### **Chicken meat**

Brazilian chicken is exported to many countries and has gained a worldwide presence (see figure 17). This wide distribution calls for quality, cool logistics service for the country to remain competitive and to gain more market share.





**Figure 17: Chicken meat export from Brazil.** A detailed world map of chicken meat export from Brazil shows a high proportion goes to Saudi Arabia. Source: (Food and Agriculture Organization of the United Nations, 2012).

As both figure 17 and table 12 shows, Saudi Arabia is a heavy importer of chicken meat from Brazil, involving a large quantity and high value per tonne. Japan comes third in quantity exported and notably the second highest in value per tonne. This is of interest to Nordic shipping companies, such as Eimskip and Samskip, which have significant experience in transporting fresh fish to Japan.

**Table 12. Top 23 countries that import chicken meat from Brazil and it is interesting to see the high export the value per ton to Japan. Source: (Food and Agriculture Organization of the United Nations, 2012).**

reporter	element	years	countries	Quantity	Value
Brazil	Export	2009	Saudi Arabia	493182	739923
Brazil	Export	2009	China, Hong Kong SAR	427170	587486
Brazil	Export	2009	Japan	307180	617625
Brazil	Export	2009	United Arab Emirates	209619	315486
Brazil	Export	2009	Kuwait	198772	268212
Brazil	Export	2009	Venezuela	164810	291069
Brazil	Export	2009	South Africa	160412	126874
Brazil	Export	2009	Iraq	139256	194324
Brazil	Export	2009	Singapore	73237	119139
Brazil	Export	2009	Angola	70867	86286
Brazil	Export	2009	Russian Federation	70473	107529
Brazil	Export	2009	Netherlands	69194	174395

### 9.2.1 The Transport system in Brazil

Growth in Brazil's shipping and ports sector is shaped by two factors: the government has launched a plan for a growth acceleration programme (PAC); the other factor is the projected Fifa World Cup in 2014 and the Olympic games in 2016. Export has grown by 32 per cent with a strong demand for products like iron ore, sugar and soybean which are the Brazil's biggest exporting products. Brazil's main export countries are China, the U.S. , Argentina, the Netherlands and Germany (table 13).

**Table 13. Shows Brazil's main import partners. Source: (International Monetary Fund, 2012).**

Brazil's main import partners (US\$mn)			
	2007	2008	2009
United States	20,791.30	27,944.60	22,339.40
China	13,879.50	21,736.90	17,474.70
Argentina	11,451.00	14,672.30	12,162.60
Germany	9,541.97	13,030.10	10,606.50
Japan	5,070.54	7,355.99	5,954.73

In countries with a growing middle class the import sector has also grown dramatically, or by 42 per cent. The main import trading partners are the U.S., China, Argentina, Germany and Japan (table 14).

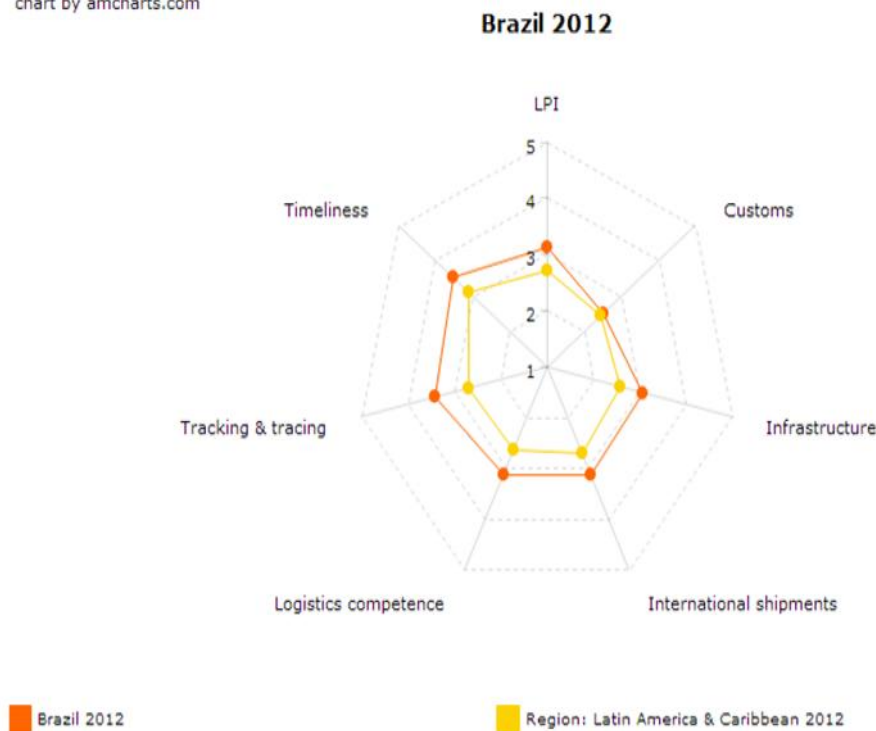
**Table 14. Shows Brazil's main export partners. Source: (International Monetary Fund, 2012).**

Brazil's main export partners (US\$m)			
	2007	2008	2009
China	10,748.80	16,403.00	18,797.80
United States	25,342.60	27,734.70	15,809.00
Argentina	14,416.90	17,605.60	12,541.10
Netherlands	8,840.87	10,482.60	8,116.50
Germany	7,211.39	8,850.81	6,102.96

The Logistics Performance Index reveals that on a global scale, with regard to Brazil, customs performance and international shipments are perceived more as a problem than infrastructure. However, Brazil is the second best performer according to the LPI score in comparison with its Latin American neighbours (see figure 18) and the country is on par with its international comparators (known as BRICs). Out of 181 countries Brazil ranks in the 125<sup>th</sup> position when looking at the cost of doing business in terms of time, cost and documentation when exporting or importing products. The cost of exporting a container (TEU) is \$1240 for Brazil and \$1069 for the OECD average. For Brazil it takes twice as long to export as it does the US. However, in comparison with China, the time it takes to export and import is better, but costs are higher in Brazil (The World Bank, 2012).



chart by amcharts.com



**Figure 18: Brazil's logistics system is the second best performer after Chile according to the LPI score for the Latin American and Caribbean region. Source: (The World Bank, 2012)**

### **Air**

Out of the 20 country's large airports, 17 are already operating at full capacity, including the largest airport, Sao Paulo Guarulhos. This puts heavy pressure on government who are hosting the next Fifa World Cup in 2014 and the Olympics two years later. In April 2011 the Institute for Applied Economic Research (Ipea) published a report for the government stating that most of Brazil's airport improvements would not be ready in time for the start of the World Cup in 2014 (Ipea, 2011).

### **Road**

A new highway linking the South American coast with the Atlantic gives Brazilian exports an alternative route that could strengthen Brazil's economic ties with Asia. Peru will be in a good strategic position, being at the centre of a big service lane between China and Brazil (Oxford Business Group, 2012).

### **Maritime**

A projected new terminal at Santos would help ease congestion and increase efficiency at Brazil's main port. The terminal would also be well positioned to take

advantage of increasing import demand from Brazilian consumers. The Inter-American Development Bank has approved a US\$ 100mn loan to finance the construction (Inter-American Development Bank, 2010).

### **9.2.2 Brazil SWOT Analysis**

#### **Strengths**

A Nordic shipping line has a long history of transporting frozen fish and other perishable commodities. Their human resource knows what it takes to provide a quality service in this field.

A small or middle-sized Nordic shipping line has the flexibility to respond to market fluctuations because of the relatively small ownership of their operating fleet.

A small shipping company does not need a large market to reach its optimum level of operation. The focus on niche markets like cold chain logistics in emerging trade routes offers some protection from fierce price competition.

#### **Weaknesses**

A small or medium-sized Nordic shipping line cannot compete against bigger players only in terms of operational effectiveness. A large and global shipping line has both the resources and financial strength to drive the price below the threshold of acceptability.

#### **Opportunities**

Brazil is one of the one the world's largest agricultural producers and has the potential to grow steadily in the coming years. The agriculture business accounts for approximately 10 per cent of GDP and represents 40% of the nation's export. Productivity gains in the agricultural sector have been around 70% since 1990.

Many small ports in Brazil can only handle a moderate size of vessels. This is a favourable condition for small enterprises that do not have the same access to big vessels or want to avoid using them.

Beef export is growing as shown by record numbers of exporters gaining EU licenses. The Brazilian meat industry is becoming more international (Business Monitor International, 2011).

Market size plays an important role and Brazil possesses an extensive domestic market whose size allows companies to benefit from economies of scale in their

production, strategies and innovation performance (Mia, Austin, Arruda, & Araújo, 2009)

From 2001 the poverty level in Brazil has changed from 40 per cent to 25 per cent in 2009. In a growing middle class environment, the convenience food industry and healthier produce will typically appeal among middle- and upper-income groups, whose lifestyles are increasingly becoming similar to those of their counterparts in developed countries. Increasing quality demand from the middle class will exert pressure for more quality from Brazil's agriculture market (Pezzini, 2012).

The growth acceleration programme (PAC) is a significant step in the right direction to upgrade Brazil's infrastructure (Mia, Austin, Arruda, & Araújo, 2009).

### Threats

An increase in the value of the real jeopardizes exports, especially those in the price sensitive agricultural sector. According to world Economic forum there are signs of overheating in the Brazil's economy (World Economic Forum, 2012).

The cost of doing business in Brazil is relatively high, and is ranked at 125 out of 181 economies in 2009. Brazil has a long way to go to improve efficiency compared to the OECD countries (see table 15) (The World Bank, 2008).

**Table 15. Efficiency of Brazil's transport system. There is some inefficiency in the Brazilian transport system which causes high cost to export and import. Source: (The World Bank, 2008).**

Country	Documents to export (number)	Export Time	Cost to export (US\$ per container)	Documents to import	Import Time	Cost to import (US\$ per container)
USA	4	6	990	5	5	1245
OECD High Income (Averages)	4	11	1069	5	11	1133
Argentina	9	13	1480	7	18	1810
India	8	17	945	9	20	960
Brazil	8	14	1240	7	19	1275
Chile	6	21	745	7	21	795
China	7	21	460	6	24	545
Mexico	5	17	1472	5	23	2700
Latin America (Average)	7	21	1246	8	24	1427
Peru	7	24	875	8	25	895
Russia Federation	8	36	2150	13	36	2150

There has been a cumulative lack of transport infrastructure investment; as a result the state of Brazil's roads, airports and ports is often inadequate for current levels of demand. The Latin America region has been left behind in infrastructure development and now faces a huge task ahead in updating its transport network system. In 2005 the region only invested less than 2 percent of GDP in the infrastructure which is too low (World Bank, 2005). Asia which is also an emerging region has put 7 per cent of its GDP into infrastructure investments (Asian Development Bank, 2005).

Brazil's ports are poorly developed by international standards. Brazil ranks 123<sup>rd</sup> for its port system and 110<sup>th</sup> for the route system out of the 133 countries in World Economic Forum's Global Competitiveness Report 2009 (Mia, Austin, Arruda, & Araújo, 2009).

Poor road conditions in particular cause delays, congestion and high trucking costs. The freight transport industry is heavily biased towards roads, despite the fact that trucks are more expensive than other modes for long haul bulk transport, whose costs are exacerbated by the lack of proper axle load enforcement causing an accelerated deterioration of the road conditions (The International Bank for Reconstruction and Development, 2012).

## 10 Conclusion

Estimation of potential cargo demand is an important factor when a liner service strategy is compiled, although it is far from being the only factor. Decisions, such as how many ports the shipping line should call on, in what order and which type of ports should be chosen, are left out of this research. Those decisions must be taken in accordance with the vessel fleet and the current shipping line assets.

Before finding market opportunities for a small shipping line, the goal was to identify the competitive advantages and limitations of small or medium sized Nordic shipping lines in the global market. They must protect their network connections, emphasize flexibility and a niche approach in a difficult market. The smaller players on the market should practise a differentiated strategic approach, consistent with focus on value-added service. When it comes to value-added service the focus of the shipping firm has to be more directed towards customer needs than operational cost. This can be a trade-off decision and the flexibility of smaller players is important in the uncertain conditions of the global market. Therefore, the chosen market should be an emerging economy which can diversify the risks of the home market and has large potential for further development consistent competitive advantages for a small/medium sized shipping line. A cold logistics service is chosen as an ideal value-added operation around which a small/medium sized Nordic shipping line can build its strategy (need-based positioning).

A new market must be chosen by terms of its productiveness in fresh food and it must be an emerging economy or trade route and have operational limitations on ship size. These conditions form the framework on the basis of which this thesis seeks answers of the research question: "What are the opportunities for a small/medium sized Nordic shipping line in the international market".

The results from the analysis show there is a lot of potential for small specialized shipping lines in cold chain services connect to the South American region. A decision to choose Brazil and Chile is based on infrastructure competencies data and the fresh food productiveness of those countries. Chile is known for its agriculture and fish industry which requires the cold chain logistics services Nordic shipping lines are familiar with.

Brazil is known for its agriculture export sector which is one of the largest in the world and has huge growth potential. Brazil's large chicken meat market could be an interesting opportunity for Nordic shipping lines which already have built up reliable resources to transport fish. Unlike Brazilian beef/veal products, chicken meat has gained market access and is distributed to many countries on the worldwide market. For instance, Japan which is a heavy importer of fish products is importing over 6600 tons of chicken meat from Brazil. Nordic shipping lines have extensive experience in transporting fish to Japan and already have good access to warehouse and transport facilities in that country. Other market opportunities, such as fruit transportation (oranges), could open up when the Nordic shipping line has established its presence on the market.

The main differences lie in physical infrastructure (road, air, rail and ports) where Chile shows some competitive advantages. For a small flexible carrier the lack of port facilities might not be much of a problem. The limited ability of many Brazil ports to handle bigger vessels could be an advantage for smaller carrier companies. The transport system in Chile is more efficient, but it also has limited capacity to handle increasing transport demand. However, it is important for a small or medium sized shipping line to begin operations in a country with an efficient transport system, since such a system is the basis for seamlessness in a cold logistics service and thus has a vital function without which the service could easily turn out to be too fragile. Reputation on a new market is closely linked to the quality of the service provided. This especially applies to operations in a new market territory.

Another important reason for choosing Chile is an internationally competitive fish industry which needs similar services as Nordic shipping lines are known to provide. Chile has developed good trade relationships and trade agreements with USA and China and has emphasised increased trade connections with the world. Chile grapes and apples already have a strong presence in the North American market and are distributed worldwide. Chile is preferred as a starting point in the region because of its transport efficiency and competency in several cold logistics product categories which have gained access to many critical markets. However, the long term goal should be entering the Brazilian market later on.

## Bibliography

- A.P Moller - Maersk A/S. (2011, february 16). *About Us: Maersk Line, the global containerized division of the A.P. Moller - Maersk Group*. Retrieved August 30, 2012, from Maersk line Web site:  
<http://www.maerskline.com/link/?page=news&path=/news/news20110627>
- Ambrosini, V., Bowman, C., & Collier, N. (2009). Dynamic Capabilities: An Exploration of How Firms Renew their Resource Base. *British Journal of Management*, 20, 9-24.
- Arvis, J.-F., Mustra, M. A., Ojala, L., Shepherd, B., & Saslavsky, D. (2012). *Connecting to Compete 2012 Trade Logistics in the Global Economy*. Washington DC: The World Bank.
- Asian Development Bank. (2005). *Connecting East Asia: An Infrastructure Challenge*. Tokyo: Asian Development Bank, Japan Bank for International Cooperation and World Bank.
- Barney, J. B., & Hesterly, W. S. (2010). *Strategic Management and Competitive Advantage* (Third edition ed.). New Jersey: Prentice Hall.
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17 (1), 99-112.
- Bogataj, M., Bogataj, L., & Vodopivec, R. (2005). Stability of perishable goods in cold logistic chains. *International journal of production economics*, 345-356.
- Brooks, M. R. (2000). *Sea Change in Liner Shipping: Regulation and Managerial Decision Making in a Global Industry*. Oxford: Pergamon Press.
- Business Monitor International.(2011). *Chile freight transport report*. London: Business Monitor International Ltd.
- Business Monitor International. (2011). *Brazil food and drink report*. London: Business Monitor International Ltd.
- Business Monitor International. (2011). *Chile food and drink report*. London: Business Monitor International Ltd.
- Central Intelligence Agency. (2012, August 24). *The World Factbook*. Retrieved September 5, 2012, from Central Interligency Agency:  
<https://www.cia.gov/library/publications/the-world-factbook/geos/ci.html>
- Chinnery, K. (1999). Global Alliances in Container Shipping and Their Potential Effects of Ports. *Ports and Harbors*, 20-22.

- Christiansen, M., Kjetil, F., Bjorn, N., & David, R. (2007). Maritime Transportation. In C. Barnhart, & L. Gilbert, *Handbooks in operation research and management science volume 14 transportation* (pp. 189-280). Amsterdam: North-Holland.
- Clark, R. L. (1997). An Analysis of the International Ocean Shipping Conference System. *Transportation Journal*, 17-29.
- Coyle, W., Hall, W., & Ballenger, N. (2001). *Changing Structure of Global Food Consumption and Trade*. U.S. Department of Agriculture. Washington DC: U.S. Department of Agriculture.
- Datamonitor. (2011). *Aquaculture in Chile*. Sydney: Datamonitor.
- Degerlund, J. (2006). *Containerisation International Yearbook*. (J. Degerlund, Ed.) London: Informa Group.
- Dole. (2010). *Dole*. Retrieved April 6, 2011, from Dole:  
<http://investors.dole.com/phoenix.zhtml?c=231558&p=irol-reportsannual>
- Drewry Shipping Consultants. (2011). *About Us: Drewry Shipping Consultants*. Retrieved August 17, 2011, from Drewry Shipping Consultants Web site:  
<http://www.drewry.co.uk/news.php?id=74>
- Drewry Shipping Consultants. (2001). *Post-Panamax Containerships - The Next Generation*. London.
- Drewry Shipping Consultants. (2010). *Reefer Shipping Market 2010/11*. London: Drewry Publishing.
- Ducruet, C., & Nottebom. (2012). Developing Liner Service Network in Container Shipping. In D. W. Song, & P. Panayides, *Maritime Logistics: a complete guide to effective shipping and port management*, (pp. 77-100). London: Kogan Page.
- Empresa Portuaria Arica. (2011). *About US: Empresa Portuaria Arica is a standalone public corporation*. Retrieved august 17, 2011, from puertoarica web site:  
<http://web.puertoarica.cl>
- Euromonitor International. (2010). *Emerging Focus: Recovery in exports drive growth in emerging market economies*. Euromonitor International.
- Evangelista, P., & Morvillo, A. (2000). Logistical integration and co-operative strategies in liner shipping: Some empirical evidence. *International Journal of Maritime Economics*, 1-16.
- Evergreen Marine Corporation. (2011). *About Us: Evergreen Marine Corporation*. Retrieved August 24, 2011, from Evergreen Corporation Web site:  
<http://www.evergreen-marine.com>
- Food and Agriculture Organization of the United Nations. (2012, August). *Faostat*. Retrieved July 9, 2011, from Faostat website: <http://faostat.fao.org/>



- Food and Agriculture Organization of the United Nations. (2010). *World Review of Fisheries and Aquaculture*. Geneva: Food and Agriculture Organization of the United Nations.
- Fremont, A. (2007). Global maritime networks: The case of Maersk. *Journal of Transport Geography*, 431-442.
- Gadhia, H. K., Kotzab, H., & Prockl, G. (2011). Levels of internationalization in the container shipping industry: an assessment of the port network of the large container shipping companies. *Journal of Transport Geography*, 1431-1442.
- Gereffi, G. (1999). International trade and industrial upgrading in the apparel commodity chain. *Journal of International Economics*, (1), 37-70.
- Graham, M. G. (1998). Stability and Competition in Intermodal Container Shipping: Finding a Balance. *Maritime Policy and Management*, 129-147.
- Guasch, J. L., & Kogan, J. (2006). *Inventories and Logistic Cost in Developing Countries: Levels and Determinants - A Red Flag for Competitiveness and Growth*. Lima: World Bank.
- Guasch, J. L., & Kogan, J. (2008). *Reducing Logistics Costs in Latin America and the Caribbean: A Logistics Development Agenda*. Washington: World Bank.
- Guerrero, P., Lucenti, K., & Galarza S., S. (2009, December). Trade Logistics and Regional Integration in Latin America & the Caribbean. *IDB Working paper series #IDB-WP-148*.
- Hastings, P. (1997). Lines Seek New Savings on Inland Costs. *Cargo Today*, 5-9.
- Heaver, T., Meersman, H., Moglia, F., & Van de Voorde, E. (2000). Do Mergers and Alliances Influence European Shipping and Port Competition? *Maritime Policy and Management*, 363-373.
- Hertzel, M., Smith, J. K., & Smith, R. L. (2001). Competitive impact of strategic restructuring: Evidence from the telecommi. *Industrial and Corporate Change*, 10 (1), 207-246.
- Inter-American Development Bank. (2010, December 9). *IDB Inter-American Development Bank*. Retrieved September 5, 2012, from IDB Inter-American Development Bank: <http://www.iadb.org/en/news/news-releases/2010-12-09/brazil-santos-port-inter-american-development-bank,8835.html>
- International Monetary Fund. (2012, August 7). *The International Monetary Fund*. Retrieved September 4, 2012, from International Monetary Fund: <http://www.imf.org/external/data.htm>
- Ipea. (2011, May 11). *Ipea*. Retrieved September 5, 2012, from Ipea: [http://www.ipea.gov.br/portal/index.php?option=com\\_content&view=article&id=8375&Itemid=75](http://www.ipea.gov.br/portal/index.php?option=com_content&view=article&id=8375&Itemid=75)

- James, J. B., & Ngarmsak, T. (2011). Processing of fresh-cut tropical fruits and vegetables: A technical guide. *FAO Agricultural Service Bulletin* , 1-86.
- James, J. S., James, C., & Evans, J. A. (2006). Modelling of food transportation systems - a review. *International Journal of Refrigeration*, 947-957.
- Jansson, J. O., & Schneerson, D. (1982). The optimal ship size. *Journal of Transport Economics and Policy* .
- Johanson, J., & Vahlne, J. E. (1977). The internationalization process of the firm - a model of knowledge development and increasing foreign market commitments. *Journal of International Business Studies*, 1 (8), 23-32.
- Katsikeas, C. S., & Leonidou, L. C. (1996). Export Market Expansion Strategy: Differences Between Market Concentration and Market Spreading. *Journal of Marketing Management*, 12, 113-143.
- Kibenge, F. S. (2008). First detection, isolation and molecular characterization of infectious salmon anaemia virus associated with clinical disease in farmed Atlantic salmon (*Salmo salar*) in Chile. *BMC Veterinary Research*, 4-28.
- Klaus, P. (2010). Logistics as a science of networks and flows. *Logistics Research*, 55-56.
- Lee, C. S., & Yang, Y. S. (1990). Impact of Export Market Expansion Strategy on Export Performance. *Asia Pacific Journal of Marketing and Logisti* , 3 (1), 29-39.
- Leslie, D., & Reimer, S. (1999). Spatializing commodity chains. *Progress in Human Geography*, 23, 401-420.
- Lim, S. M. (1998). Economies of Scale in Container Shipping. *Maritime Policy and Management*, 361-373.
- Lim, X. P., & Das, S. S. (2009). Entry in the global liner shipping industry: a population ecology study, 1996-2006. *Maritime Policy & Management: The flagship journal of international shipping and port research*, 36 (3), 197-213.
- Maersk Line. (2011, August 23). <http://www.maerskline.com>. Retrieved August 23, 2011, from <http://www.maerskline.com>: [http://www.maerskline.com/link/?page=brochure&path=/about\\_us/awards](http://www.maerskline.com/link/?page=brochure&path=/about_us/awards)
- Martin, J., & Thomas, B. J. (2001). The Container Terminal Community. *Maritime Policy and Management*, 279-292.
- Merckx, F., & Notteboom, T. (2006). Freight integration in liner shipping: a strategy serving global production networks. *Growth and change: a journal of regional development*, 37 (4), 550-569.
- Mia, I., Austin, E. L., Arruda, C., & Araújo, M. S. (2009). *The Brazil Competitiveness Report 2009*. Geneva: World Economic Forum.

- Miduro, R., & Pitto, A. (2000). A Critical Evaluation of Strategic Alliances in Liner Shipping. *Maritime Policy and Management*, 31-40.
- Notteboom, T. E. (2004). Container Shipping And Ports: An Overview. *Review of Network Economics*, 86-106.
- Notteboom, T., & Winkelmanns, W. (2001). Reassessing Public Sector Involvement in European Seaports. *International Journal of maritime Economics*, 242-259.
- OECD. (2012). *OECD-FAO Agricultural Outlook 2012-2021*. Paris: OECD.
- Omta, S. W., Trienekens, J. H., & Beers, G. (2001). Chain and Network science: a research framework. *Journal of Chain and Network Science*, 1-6.
- Oxford Business Group. (2012). *Oxford Business Group The Inside Edge*. Retrieved September 5, 2012, from Oxford Business Group:  
<http://www.oxfordbusinessgroup.com/news/now-connecting-strong-links-improve-flow-goods-services-and-people>
- Penrose, E. T. (1959). *The Theory of the growth of the firm*. Oxford: Basil Blackwell.
- Pezzini, M. (2012). *OECD Observer*. Retrieved August 12, 2012, from OECD Observer:  
[http://www.oecdobserver.org/news/fullstory.php/aid/3681/An\\_emerging\\_middle\\_class.html](http://www.oecdobserver.org/news/fullstory.php/aid/3681/An_emerging_middle_class.html)
- Porter, M. E. (1985). *Competitive Advantages: creating and sustaining superior Performance*. New York: The Free Press.
- Porter, M. E. (1996). What is strategy? *Harward Business Review*, 61-78.
- Porter, M. (2008). The five competitive forces that shape strategy. *Harvard Business Review*, 86, 78-93.
- Rodrigue, J. P. (2009). Commodity Chain Analysis. In J. P. Rodrigue, C. Comtois, & B. Slack, *The Geography of Transport Systems*, (p. 352). New York: Routledge.
- Rodrigue, J. P. (1999). Globalization and the Synchronization of Transport Terminals. *Journal of Transport Geography*, (7), 255-261.
- Rodrigue, J. P. (2009). Transportation, Globalization and International Trade. In J. P. Rodrigue, C. Comtois, & B. Slack, *The geography of transport systems*, (p. 352). New York: Routledge.
- Rodrigue, J. P., & Browne, M. (2008). International Maritime Freight Transport and Logistics. In R. Knowles, J. Shaw, & I. Docherty, *Transport Geographies: Mobilities, Flows and Spaces*. Blackwell Publishing.
- Rodrigue, J. P., & Notteboom, T. (2009). The Cold Chain and its Logistics. In J. P. Rodrigue, C. Comtois, & B. Slack, *The Geography Of Transport Systems*. New York: Routledge.

- Rodrigue, J. P., & Notteboom, T. (2009). The future of containerization: perspectives from maritime and inland freight distribution. *Geojournal*, 7-22.
- Rodrigue, J. P., Comtois, C., & Slack, B. (2009). *The geography of transport systems*. New York: Routledge.
- Salin, V., & Nayga, R. M. (2003). A cold chain network for food exports to developing countries. *International Journal of Physical distribution & logistic Management*, 33.
- Sea Brotherhood Holding. (2011). *Sea Brothers Shipping*. Retrieved August 14, 2012, from A Sea Brothers Shipping: <http://www.seabrothers.com>
- Skjoett-Larsen, T. (2000). Third party logistics-From an interorganizational point of view. *. International journal of Physical Distirbution & Logistics Management*, 112-127.
- Slack, B. (2001). Intermodal Transportation. In A. M. Brewer, J. K. Button, & D. A. Hesner, *Handbook of Logistics and Supply Chain Management* (pp. 142-156). Amsterdam: Emerald group.
- Slack, B., Comtois, C., & Sletmo, G. (1996). Shipping Line as Agents of Change in the Port Industry. *Maritime Policy and Management*, 289-300.
- Smith, J. N. (2005). Specialized logistics for a longer perishable supply chain. *World Trade Magazine* .
- The International Bank for Reconstruction and Development. (2012). *How to decrease freight logistics costs in Brazil*. Washington DC: World Bank.
- The World Bank. (2008). *Cost of Doing Business 2009*. Washington DC: The World Bank.
- The World Bank. (2012). *How to decrease freight logistics costs in Brazil*. Washington DC: The World Bank.
- The World Bank. (2012). *Logistic Performance Index*. Retrieved August 30, 2012, from [worldbank.org: http://info.worldbank.org/etools/tradesurvey/mode1b.asp](http://info.worldbank.org/etools/tradesurvey/mode1b.asp)
- The World Bank. (2012). *Logistic Performance Index*. Retrieved December 5, 2012, from Logistic Performance Index, the LPI results 2012: <http://lpiurvey.worldbank.org/international/global?sort=desc&order=LPI+Score#datatable>
- The World Bank. (2012). *The World Bank Data*. Retrieved january 20, 2012, from The World Bank Working for a World Free of Poverty: <http://data.worldbank.org/indicator/IQ.WEF.PORT.XQ>
- UNCTAD secretariat. (2011). *Review Of Maritime Transport 2011*. New York: United Nations.
- Wan Hai Lines LTD. (2002, january 22). *Wan Hai Lines*. Retrieved August 30, 2012, from Wan Hai:

[http://web.wanhai.com/index\\_whl.jsp?file\\_num=15040&web=whlwww&i\\_url=whlwww/cargoTrack.jsp](http://web.wanhai.com/index_whl.jsp?file_num=15040&web=whlwww&i_url=whlwww/cargoTrack.jsp)

Wang, J. J., Koi-Yu Ng, A., & Olivier, D. (2004). Port governance in China: a review of policies in an era of internationalizing port management practices. *Transport Policy*, 237-250.

Wernerfelt, B. (1984). A Resource-Based View of the Firm. *Journal of Global Marketing*, 5 (2), 171-180.

World Bank. (2009). *Containerisation international, Containerisation International Yearbook*. The World Bank Group. Washington DC: The World Bank Group.

World Bank. (2005). *Infrastructure in LAC: Recent Developments and Challenges*. Washington DC: World Bank.

World Economic Forum. (2012). *The Global Competitiveness Report 2012-2013*. Cologny: World Economic Forum.

World Economic Forum. (2012). *World Economic Forum*. Retrieved September 5, 2012, from World Economic Forum: <http://reports.weforum.org/global-competitiveness-2011-2012/>

World Port Source. (2011). *worldportsource*. Retrieved August 16, 2011, from worldportsource: [www.worldportsource.com](http://www.worldportsource.com)