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Leveraging distinctive competencies to enhance competitiveness in liner shipping: Strategic analysis and sustainability explored.

By

Tsungirirai Patience Mandebvu

*This thesis is dedicated to my parents
Dr. and Mrs. C. E. Mandevu*

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Abstract

The current recession has adversely affected every operator within the transportation value chain. However, in times of crisis there lie opportunities which carriers can re-strategize and reposition themselves better within the industry. This thesis attempts to explore how carriers can utilize their distinctive competencies, to give them a competitive advantage over competitors within the transportation value chain. For the purpose of this thesis, the following are all strategic tools at the disposal of a liner shipping company: the resource based views, leverage theory, cross-subsidization, bundling, tying, vertical integration and global network economies.

Key Words: Resource based views, distinctive competencies, network economies, transportation value chain, leverage theory and vertical integration.

Abbreviations

3PL:	Third Party Logistics
4PL:	Fourth Party Logistics
AC:	Average Cost
APL:	American President Line
BAF:	Bunker Adjustment Factor
BCG:	Boston Consulting Group
BCO:	Beneficial Cargo Owners
BDI:	Baltic Dry Index
CAF:	Currency Adjustment Factor
CIF:	Cost Insurance Freight
CMA-CGM:	Compagnie Maritime d'Affrètement-Compagnie Générale Maritime
COSCO:	China Ocean Shipping Company
CSCCL:	China Shipping Container Line
DC:	Distinctive Competencies
ERS:	European Rail Shuttle
EU:	European Union
FAK:	Freight All Kinds
FCL:	Full Container Load
FCLG:	Full Container Load-Groupage
FEU:	Forty-foot Equivalent Unit
FOB:	Free on Board
GDP:	Gross Domestic Product
HPH:	Hutchison Port Holdings
IKEA:	Ingvar Kamprad Elmtaryd Agunnaryd
JV:	Joint Venture
KM:	Knowledge Management
KPI:	Key Performance Indicator
LCL:	Less than Container Load
LSC:	Liner Shipping Company
LSRM:	Liner Shipping Revenue Management
MC:	Marginal Cost
MEL:	Maritime Economics and Logistics
MOL:	Mitsui O.S.K. Lines
MSC:	Mediterranean Shipping Company
NE:	Network economies
NOL:	Neptune Orient Line
NTV:	Net to Vessel
NVOCC:	Non-Vessel-Operating Common Carrier
OOCL:	Orient Overseas Container Line
P&ONL:	P&O Nedlloyd
PSA:	Port of Singapore Authority
RBC:	Resource Based Competition
RBS:	Resource Based System
RBV:	Resource Based Views
RM:	Resource Management

ROI:	Return on Investment
ROS:	Return on Sales
SCM:	Supply Chain Management
SM:	Strategic Management
SSA:	Stevedoring Services of America
TEU:	Twenty-foot Equivalent Unit
THC:	Terminal Handling Charges
TP10:	Trans-Pacific 10
TP3:	Trans-Pacific 3
TP9:	Trans-Pacific 9
UK:	United Kingdom
US:	United States
VSA:	Vessel Sharing Agreement
WOS:	Wholly Owned Subsidiary

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CHAPTER 1 FOUNDATION OF STUDY

1. Introduction

The intent of the research is to focus on the role of resource based views, supply chain networks, strategic management and network economies in maritime economics. Carriers can benefit from the holistic analysis of their operations; as they play a fundamental role in the transportation of goods. Through integrating their various functions within value chain, it is possible for carriers to further establish their positioning and benefit from knowledge transfer. Carriers have in their possession ships, which no other intermediaries in the transportation value chain have. If carriers can harness this competency, they can further enhance their presence in other functions in the transportation value chain where their presence is not as established.

This section gives an overview of the research. Essentially this chapter highlights the research propositions, the research design and methodology. Furthermore, this thesis addresses the implications of converting a firm's distinctive competencies into its competitive advantage. The difference between the two is that with the prior, a firm can deliver the same benefits as rivals at a lower cost, although rivals can imitate this competency in the long term. With the latter, a firm creates an enhanced advantage as it leverages its competency. Moreover, it can establish itself in a manner such that rivals remain unable to imitate, thus resulting in a sustainable resource.

International shipping has evolved over the years due to regionalization and globalization. As a result, the business dynamics have changed for carriers as they integrate forward into the transportation value chain. This has resulted in the emergence of global carriers, global terminal operators and global service providers. Some carriers have opted to retain the traditional view on shipping and concentrate on their core business; however others have ventured into vertical integration. Maritime shipping has also allowed carriers to expand their service networks through horizontal integration through shared services, operations and mergers & acquisitions. Carriers belong to networks; these can either be shared or independent, depending on a carrier's strategy and size. Some carriers have various subsidiaries and belong to a group; others are stand-alone companies, partnerships, or joint ventures.

1.1 Research Overview

This section addresses the contents of this research. All of these subsections are elaborated in detail thereafter. In chronological order, the research topic is defined followed by the research relevance, the importance of the study, the research propositions and the research design. This is followed by the research methodology, assumptions and research limitations. The thesis structure is illustrated in Figure 1-1 towards the end of this chapter.

1.2 Research Topic Defined

The research title is 'leveraging distinctive competencies to enhance competitiveness in liner shipping strategic analysis and sustainability explored'. The objective of this research is to see how a carrier can bundle services around distinctive competencies (i.e. the ship) to achieve competitive advantage. By exploring and integrating the supply chain network, carriers can capitalize and draw from their core business and extend their functions to include value added services thus creating a bundle of interrelated competencies. Given the current recession, coupled with weaker players' resultant exposure, a sustainable competitive advantage may be gained by adopting strategic and operational management, thereby improving their positioning. Integrating the supply chain together with the establishment of network economies are important elements within the liner shipping industry. The ability of carriers to provide two different functions more cheaply than individual intermediaries can be explained by the notion of economies of scope. This research can be broken into two: the key drivers within liner shipping and the adoption of distinctive competencies and strategy to ensure sustainability

1.3 Research Relevance

Conferences are price-setting cartels where two or more liner carriers agree to provide scheduled cargo services for a particular trade route under uniform rates and common terms. Brooks (2000) defines a conference as 'a group of two or more vessel-operating carriers which provide international liner services for the carriage of cargo on a particular route within specified geographical limits, under an agreement whatever its nature, these carriers operate under uniform/common freight rates and any other agreed conditions with respect to the provision of liner service.' It is important to note the impact of the abolishment of conferences in the European Union (EU). After October 2008, it is important to understand the notion of alliances in terms of contestability and market dominance, which may be linked with carrier competencies. It has been argued by some that conferences protected carriers and ensured stable as well as predictable freight rates. However, some carriers like American President Line (APL) have argued that carriers did not benefit from conferences.

Since the abolishment of conferences, market conditions have remained unfavourable within the liner shipping sector. The global recession has dampened international trade growth, widening the gap between demand for transport and its supply. This differential has resulted in unstable and uncertain freight rates. As a result, organizations within the maritime industry have placed more emphasis on surviving the current turbulent market conditions. What is evident is that carriers need to seek alternative means of stable and predictable revenues given the current market trends of volatile freight rates.

To understand the industry better the following factors must be considered, the analysis of the liner shipping market environment, the industry's market characteristics, the integration of corporate and organizational strategies, the significance of vertical integration and the significance of value added services within the shipping environment. It is important to ensure that growth and prominence within the liner shipping are in fact sustainable in the long-term as this ensures that carriers remain going concerns.

It is important to understand what drives an industry to start with and what makes the businesses successful. This will result in a more coordinated attempt of positioning and integration within the value chain from an organization's perspective in the long-run. It should be noted that the liner shipping industry data reveals imperfect competition traits.

1.4 Importance of the Study

Liner shipping has a few conglomerate giants who lead the market and various smaller players mostly in alliances who are followers. It is important to determine the distinctive competencies such giants exploit to be market leaders and the tactics smaller carriers utilize to compete with such giants respectively. Although researchers have studied maritime economics and logistics there still remains a gap between the management aspects of shipping in particular distinctive competency, the leverage theory, pricing and knowledge management.

Given that vessel capacity keeps increasing one should question the rationality of increasing size. Despite it being well documented that carriers enjoy economies of scale with larger vessels, this is only true when the vessel is fully utilized. Another problem with these large vessels is that carriers are unable to effectively sell all this capacity. As a result, capacity is sold off to service providers at discounted rates. This is a problem as it deprives carriers from benefiting from extensive and effective pricing while enabling their competitors. Carriers should price indiscriminately as they are the one intermediary in the transportation value chain with a ship. This indicates the importance of assessing the knowledge based pricing options available to carriers. The author therefore poses these questions: do carriers adopt holistic pricing, do they consider the whole transportation value chain or is pricing marginalized and/or fragmented?

1.5 Research Propositions

This research is categorized into prepositions, which cover the areas of analysis, adopting strategic management, resource based views in organizations, analyzing supply chain networks, effective supply chain management, knowledge management in value creation and liner shipping network economies. The research prepositions are:

Preposition 1: Supply Chain Management (SCM) allows for value creation within networks, giving organizations a competitive advantage.

Preposition 2: Resource Based Views (RBV) impact theory on strategy, cluster analysis, positioning and competitive advantage.

Preposition 3: What are a carrier's distinctive competencies and how can they provide leverage against rivals and competitors?

Preposition 4: How value addition options benefit liner shipping companies through vertical integration and network economies.

Preposition 5: How can carriers' influence and challenge competitors through vessel/capacity leasing?

1.6 Research Design

This research was exploratory due to the limited information on liner shipping with respect to RBV. This is further compounded by the sensitive environment and nature of how carriers operate. The main technique used in this research is a qualitative approach, with an inclusion of secondary statistical information to enrich the findings. Qualitative research methods are prescriptive, implying that this type of research is bound to subjectivity, thus some bias comes into play. Of importance is the context within which the data resides, together with the macro-environment organizations find themselves in.

1.7 Research Methodology

The methodology used in this analysis employs literature with regard to liner shipping growth and dominance strategies, SCM techniques and contemporary logistics approaches. For this research the author adopted a hybrid qualitative approach, which essentially is desk research. This involves the collection of information which already exists through previous publications, organizational information available on the internet and various databases. Given the three month time constraint, the advantage of the aforementioned information is that it is readily available and cheap. The literature for this thesis was obtained from academic sources and the following electronic journals:

- Academy of Management Review;
- Advances in Business Marketing and Purchasing;
- International Journal of Operations and Production Management;
- Journal of Economic Perspectives;
- Journal of Institutional and Theoretical Economics;
- Journal of International Economics;
- Journal of Management Decision Volume;
- Journal of Management;
- Journal of Pricing Strategy and Practice;
- Journal of Revenue and Pricing Management;
- Journal of Transport Economics and Policy;
- Marine Policy;
- Maritime Economics and Logistics;
- Maritime Policy and Management;
- Review of Network Economics and;
- Strategic Management Journal.

Furthermore, the author managed to conduct some in-depth interviews with individuals who are affiliated with the following carriers Compagnie Maritime d'Affrètement-Compagnie Générale Maritime (CMA-CGM) and APL. This research is a hybrid approach of organizational strategic management and academic literature with respect to the maritime industry.

1.8 Sample Selection

In determining the impact of leveraging distinctive competencies, the research study is focused on the following two sampling frames, which ensure a holistic analysis of the maritime industry. This includes carriers within these categories:

- Stand-alone carriers (soloists);
- Alliance members and;
- Global logistics providers.

Of interest is that both soloist and alliance members are in strategic partnerships and/or collaborations. Carriers ensure vessel capacity optimization by utilizing slot sharing options, which is essentially capacity pooling.

1.9 Assumptions

All organizations operating within the maritime industry, in particular liner shipping are subjected to the same macroeconomic factors. Furthermore, the macroeconomic indicators are assumed to be stated in this research thesis.

1.10 Limitations

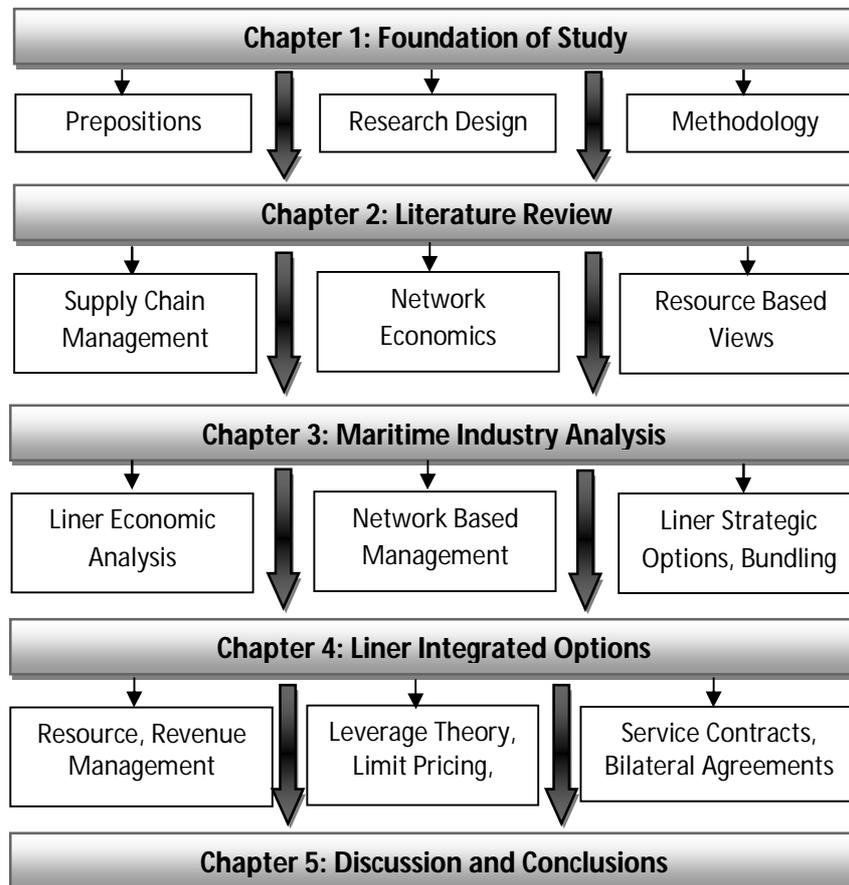
This research thesis is desk research and hence it gives a general holistic perspective of the maritime industry. Moreover, there are various dynamics which affect leveraging of distinctive competencies and the sustainability of competitive advantages which are not all covered in this thesis. Given the vast dynamics of the shipping industry, this research does not extend beyond the confines of liner shipping. Consideration must be made for the oligopolistic and perfect competition traits displayed in this industry, with pricing resembling significant competition and rivalry.

This industry is closed in the sense that it has high barriers to entry due to the high investment costs required to enter. If capacity is considered with respect to global players, liner shipping is dominated by five market leaders. These include Maersk Line, CHKY Alliance, the Grand Alliance, Mediterranean Shipping Company (MSC) and CMA-CGM respectively. These players effectively have seventy-five percent of the industry market share with respect to vessel capacity. This industry has a few market leaders and numerous smaller carriers, indicating it is highly fragmented. The degree of integration varies with size and carrier strategy. As a result, each carrier needs to adopt a tailor-made solution on how to bundle its services around its distinctive competencies to achieve competitive advantage. It should be noted that this research will be skewed towards the market leaders as their role is established and significant in the industry. Finally this thesis will not address the notion of conferences given that they were abolished in October 2008.

1.11 Chapter Layout

Figure 1-1 gives an illustration of the chapter layout, used within this research. This research has five chapters, which are listed and elaborated hereunder:

Figure 1-1 Thesis Structure



Chapter 1: The foundation of the study introduces the research. An in-depth elaboration of the context of the research is then provided, giving the reader a clear understanding of the broad objectives and purpose of the study. Essentially, this chapter highlights the research propositions, the research design and research methodology.

Chapter 2: The literature review contains extensive information of previous studies and findings related to the research question and theories described. The relevant studies are critically analyzed and evaluated. Shortcomings of previously published work are mentioned indicating the need for further research.

Chapter 3: The maritime industry analysis provides a detailed explanation of the liner economic analysis. Emphasis is placed on soloist carriers and alliance members in terms of the capacity options utilized, network economies and the vulnerabilities within the supply chain from a holistic perspective.

Chapter 4: The liner integrated options, addresses pricing in relation to leveraging distinctive competencies in the value chain, with scrutiny on carriers and global logistics players. In addition, some analysis is made on the other service options carriers can adopt within the transportation value chain.

Chapter 5: Discussion and conclusions, this chapter explains some of the challenges and issues liner carriers experience when pricing their services.

Table 1-1 below provides a more holistic approach to the research, thereby facilitating the reader how the prepositions are integrated into the research.

Table 1-1 Relationship between the Thesis Objectives and Report Structure

Thesis Objective	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5
Preposition One	o	•	o	o	•
Preposition Two	o	•	o	o	•
Preposition Three	o	o	•	o	•
Preposition Four	o	o	•	o	•
Preposition Five	o	o	o	•	•

•=strong relationship; o=weaker relationship

1.12 Summary

This chapter dealt with the orientation of this research thesis. The research overview addresses the organization used within the research. The research topic is then stated and defined. Sub-problems are then established into research questions, which are then modified into research objectives. This is then followed by the relevance of the study, the context of the study, basic assumptions, delimitations and limitations. This chapter also deals with a brief description of the theoretical foundation of this research. A description of the scope of the research is stated together with the research prepositions. The research design, methodology and sample selection are also included in this section and explained.

Note: two of the five prepositions are dealt with in the next chapter, Chapter 2 which explores the literature review.

CHAPTER 2 LITERATURE REVIEW

2. Introduction

The objective of this research is to see how a carrier can bundle services around distinctive competencies (i.e. the ship) to achieve competitive advantage; by doing so a carrier can acquire/transfer knowledge. This chapter evaluates theoretical models and places them into context. Explored models include the role of RBV, supply chain networks and network economies. Organizations need to manage resources effectively within the value chain to ensure sustainability. This section addresses the influence and management of resources within a value chain, the importance of knowledge management and sustainability of supply chains. The discussion of prepositions occurs in either the literature review or the maritime industry analysis chapters. This chapter explores the first two prepositions.

2.1 Strategic Management

Preposition 1: Supply Chain Management (SCM) allows for value creation within networks, giving organizations a competitive advantage.

To explore this preposition it is imperative for carriers to control and monitor their networks through effective SCM. While a carrier may have a distinctive competency when compared to other transport intermediaries, carriers still compete amongst them-selves. Consequently, carriers need to capitalize their networks and resources adequately in order to outperform their direct and immediate competition. One of the known business practices of outsmarting a competitor is through Strategic Management (SM).

In essence, this analysis looks at leveraging distinctive competencies of an organization. For the correct prognosis of SM, it is important to identify the parties impacted by the organization's strategy. This is because firms do not operate in isolation and their decisions, as well as their actions, have an impact on stakeholders. Every organization has primary (direct) and secondary (indirect) stakeholders. A stakeholder is an individual or group that has an interest or share in an undertaking or a business (Carroll & Buchholtz, 2006). Stakeholders may be characterised into five groups:

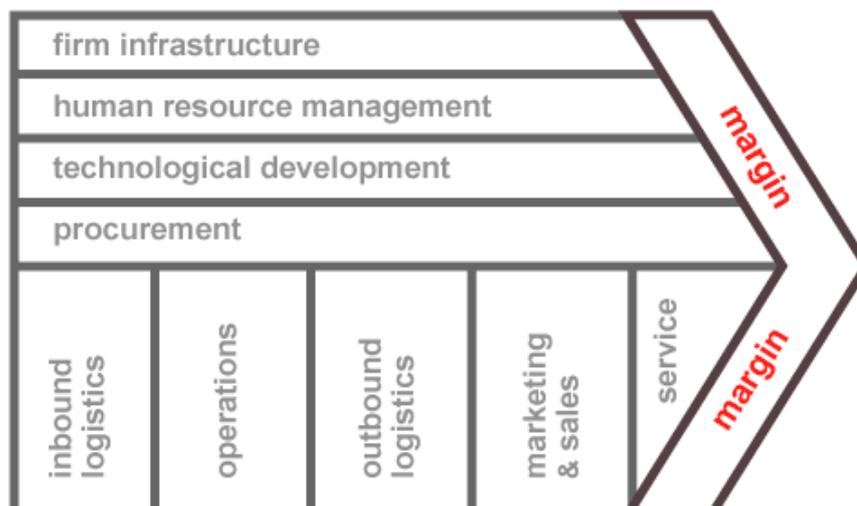
- Customers - all the insiders, anyone who buys the organization's products or services;
- Competitors - all rivals who attempt to take the organization's customer base;
- Suppliers - all whose business is to supply a particular service or commodity;
- Influences - industry associations, media trade unions and activist factions and;
- Facilitators - include government, regulators, licensing agencies and standards authorities.

With respect to this thesis it is important to note that stakeholders play an important role in the liner industry and influence decisions both in a direct and indirect manner. The most influential contributors are the customers and/or intermediaries, competitors and facilitators.

If a holistic model were to be considered, the most accurate model would be the value net model. Grant, (2006) states that the value net model indicates the role of stakeholders, based on two economic theories of product relationships, that is substitutes and complements. This model is an improvement from Porter's model. Grant's model illustrates the production view of the firm, by showing the relationship between the organization, its 'complementors' (this is Grant's additional sixth force) and competitors. It is important to view an organization from a holistic perspective in respect to its stakeholders as these groups can affect the operations and the organization's ability in the sector and/or industry.

Every organization has a value chain, which separates organizational activities into a sequential chain. Porter (1980) makes a distinction between primary activities, those involved in the transformation of inputs and interface with the customer and support activities. The value chain analysis describes the activities the organization performs, linking them to its competitive position as illustrated in Figure 2-1 below. The margin refers to the revenue an organization generates from rendering a service or selling a particular product. It is however, very unusual for each company to fully execute each link within the value chain and therefore the need to outsource.

Figure 2-1 Porter's Value Chain



Source: Porter, 1980

If a typical liner company were considered, the value model would not necessarily include market and sales as a direct function. This rather, would be an outsourced function for freight forwarders. For carriers in the liner shipping industry, functions of the value model include deep-sea shipping, inland shipping, intermodal operations and logistics. Organizations operate on a microeconomic environment while the industry operates on a macroeconomic environment. Industry attractiveness is based on profitability, growth potential and market share respectively.

An attractive industry is one which portrays monopolistic and/or oligopolistic traits. Any industry that moves away from one of pure perfect competition would increase its overall profitability. By increasing the price and restricting output, producers are able to absorb and reduce the consumer surplus. Porter's five forces model should be used at the macroeconomic level, as it portrays three levels of horizontal competition and two levels of vertical competition.

Figure 2-2 Porter's Five Forces Model



Source: Graham, 2006

The criticism of this model is that it excludes complementors which have since been added to the model based on Brandenburger and Nalebuff, (1990) utilizing game theory analysis. In addition, other authors indicate, it is not feasible to evaluate the attractiveness of an industry independent of the resources a firm brings to that industry. Thus, it has been argued that this theory should be coupled with the RBV, in order for the firm to develop a much more sound strategy. Although Porter addresses the nature of organizational competition, this alone is limited as it fails to address the sustainability of resources, the coordination and improvement of such resources and hence the need to look at RBV. Essentially Porter merely serves as a foundation for this thesis.

Organizations strive to be market leaders in order to acquire a competitive advantage over their rivals. The intensity of such rivalry is dependent on the industry an organization is positioned in and its characteristics. The degree of openness has an impact on the industry concentration and market share balance. An industry is said to be concentrated when a few large organizations control most of the market share. Therefore, the industry could possibly be monopolistic, indicating that organizations are price-makers as less rivalry is observed. On the other hand, a low concentration implies that the industry is fragmented and very competitive. Hence, no single organization has significant market share, indicating organizations are price-takers.

In any industry the impact of rivalry is based and affected by the following features which depend on the industry's characteristics:

- Number of firms
- Market growth/share
- Portion of fixed costs
- Product cost allocation
- Switching costs
- Product differentiation
- Strategic stakes
- Barriers to entry and exit
- Diversity of rivals
- Industry shack-out

The liner shipping industry is a closed niche. There are a few firms present within the industry and this number progressively decreases with time. This industry is highly capital intensive given the price of vessels and requirements of servicing dedicated and feeder routes. The operating costs within this industry are very high. In an effort to curb and control these costs, carriers utilize network optimization systems to determine port calls, utilization, services etc. Within the industry, there is very little potential to obtain significant market share by improving a carrier's performance. Market share can be acquired through merger & acquisitions. However, in most cases a significant portion of that market share is lost to competitors. This can be seen by analyzing Maersk's market share, which was 15.10% in 2005 and 15.70% by 2008. For more information, please refer to Table 3-2: Top Twenty Liner Carriers 1998-2008.

Laws and legislation usually determine barriers of entry. In some cases, the government intervenes to regulate or deregulate an industry. The transport industry has seen government intervention in the railway, airline, road haulage, and maritime economics. Regulation in most cases has been due to the notion of making the market contestable, ensuring sustainable development and equity redistribution.

Economies of scale play a crucial part in terms of cost efficiency. However, the notion of economies of scope has a more crucial purpose for carriers as this indicates one firm's ability to render two services more efficiently than two separate firms. In addition, route and density economies must also be considered when addressing barriers to entry into an industry. While this may be termed bundling, in some industries with large investments costs, this phenomenon surfaces more frequently with regard to dominant market leaders.

There are three strategies advocated by Porter, which organizations can adopt to obtain and maintain competitive advantage. These strategies are centred on cost and market segmentation. They are defined by strategic scope and strategic strength. Figure 2-3 below shows these strategies. The type of strategy an organization adopts is largely dependent on the organization's function, structure, shareholders, and industry. Furthermore, some organizations adopt a hybrid strategy or a focused strategy, which focuses on specific core business aspects, which generate eighty percent of its revenue as a rule of thumb.

Figure 2-3 Porter's Generic Strategies

<i>Target Scope</i>	<i>Advantage</i>	
	Low Cost	Product Uniqueness
Broad (Industry Wide)	Cost Leadership Strategy	Differentiation Strategy
Narrow (Market Segment)	Focus Strategy (low cost)	Focus Strategy (differentiation)

Source: Porter, 1995

Such niche specializations are usually in very cost intensive industries such as airline, maritime, petrochemical etc. It should be noted that despite the existence of generic strategies, most organizations have tailor made strategies which are uniquely aligned to their business. This is because a generic one-size-fits-all strategy is unlikely to be robust enough to integrate into all organizations despite being in the same industry. Furthermore, for a more holistic framework, organizations need to combine their generic strategies with the industry forces model. Strategies formulation occurs on three levels:

- 1) Corporate level;
- 2) Business unit and;
- 3) Functional/divisional level.

It should be noted that each sub-category cascades the strategy down but quantifies it into measurable and precise objectives of each particular level within the organization in question.

2.2 Knowledge Management

Knowledge Management (KM) is the sharing of knowledge (i.e. both tacit and explicit in nature), best practices and experiences in an organization by synthesising these into a common accessible knowledge base. In other words, KM is an organizational process. This information can support the decision-making process and lead to actions aimed at improving efficiencies, productivity and profitability (Bookbinder, 2005). KM addresses two aspects, the creation of knowledge and the use of knowledge.

The three levels in which KM operates include: employees, information technology and infrastructure/organizational processes. KM does not operate on one level in isolation; it can operate on two or more levels at any given time. In addition, it has four drivers: culture, competition, technology and leadership. Furthermore, it is a strategic tool, which should be utilized effectively as this has potential implications

for any organization's competitive advantage. In effect, knowledge is one of an organization's intangible assets. Bou-Liusar et al, (2006) highlighted the importance of the competitive advantages derived from the nature of knowledge itself and the effective management of knowledge as a way of creating core competencies in an organization. The first perspective focuses on the analysis of attributes that should provide the resources for generating a competitive advantage, while the second perspective focuses on knowledge acquisition, transfer and generation; it also considers these activities as organizational capabilities.

Carriers tend to guard their operational knowledge and resources to prevent competitors from imitating them. This is evident in all the different sophisticated information systems carriers utilize in their operations. For example, APL's complex quotation system for direct shippers, which factors in the cost portion of empty container repositioning. Carriers need to protect such resources which give them a competitive advantage over competitors. Such resources remain sustainable, as long as it remains unique to that specific firm. This usually implies that the firm is a learning organization and has acquired KM principles in its business.

2.3 Effective Supply Chain Management

Carriers have various objectives to meet. These include operational objectives, financial objectives, economic objectives etc. Carriers focus their objectives to suit their strategic deliverables and Key Performance Indicators (KPI). If liner shipping companies effectively manage their supply chain they can achieve these objectives easily as they belong to extensive networks.

A supply chain is an involved network. In other words, there is a flow of goods, information and funds between the supplier, manufacturer, distributor, retailer and the customer. SCM involves managing the flows between different stages in a supply chain to maximise profitability (Chopra & Meindi, 2001). It is a business approach, which continuously increases efficiency in the value chain by concurrently reducing complexity, increasing visibility and increasing velocity. SCM also involves decisions evolving within Porters value chain. The benefits derived from utilizing SCM include cost reductions, increased customer satisfaction, revenues, profits and competitiveness.

Important elements in SCM for carriers include shipping, terminals, hinterland operations and logistics. Integration can occur within the supply chain and this can either be vertical or horizontal. For effective SCM to take place, organizations must create sustainable supply network solutions which are managed and occur within a system context. Supply chains are technically linked within an organization's network and operations. These operations contain a delivery process affected by three variables: equipment (together with facilities), processes and the human component element. Each organization needs to understand its supply chain, the function and services it renders for it to adopt a strategy which fits its organizational needs. For an organization to benefit from value creation it should be in a position to acquire, retain and convert its knowledge to enhance its position.

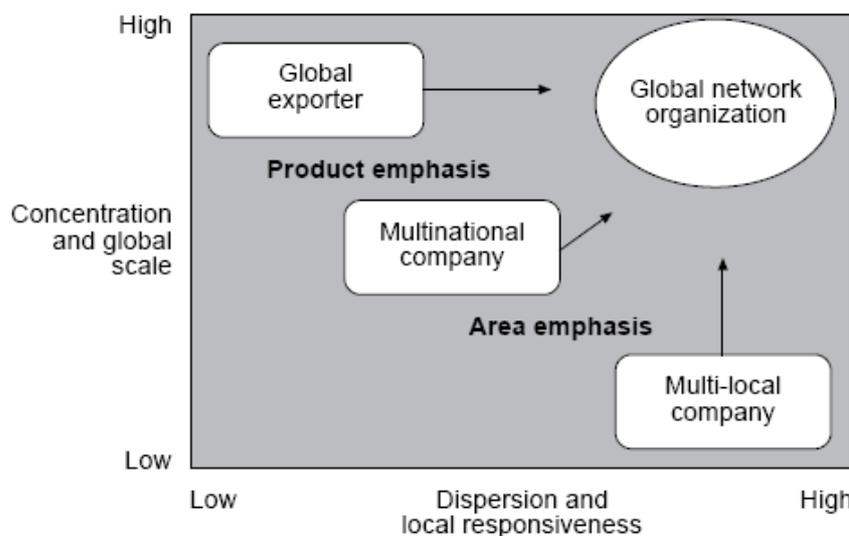
2.4 Network Economies and Synergies

There is no direct market for transportation services. The demand for transport is actually derived demand; which can either be factor demand or Marshallian demand (Slaughter, 2001). Transport economics include all modes of transport which range from airlines economics, maritime economics, road haulage, railways and pipelines. All these sub-categories have very different market characteristics which range from perfect competition, monopolistic competition, pure monopoly and oligopoly. There are various attributes and characteristics which govern each category, and hence the *modus operandi* applicable.

Transport is essentially a network of various functions and services integrated together through service provision. Lun et al, (2008) state 'a liner shipping network is a form of collaboration in the liner shipping industry, where players share resources and assets to develop mutually beneficial strategies and seek operational performance gains'. Such a network essentially includes a number of various services which cover different trade routes and extend into the hinterland operations. The business rationale is to maximize revenue by minimizing costs and specifically for carriers to effectively service trade routes. As a result, a network can be viewed from an infrastructure cost and spatial objective perspective.

Networks consist of clusters of organizations joined by a variety of links; these clusters distribute goods and services, information and influence (Tichy, 1983). Carriers fall into a sub-category of a network, as mentioned above; moreover they ensure the shortest route allowing the maximum flow for a carrier. Each port is called once during the multiple destination route coverage. The nodes and the links forming the liner shipping network become effectively connected the moment a liner shipping operator decides to serve a certain port. Prior to this decision, the network exists only potentially. A shipping company therefore, can be identified within a sub-network. This represents a set of shipping companies operating their vessels, and includes various components of the global liner shipping network (Bergantino & Veenstra, 2002).

Figure 2-4 Global Network Organization



Source: Juga, 1996

Global network organizations seek benefits of having extensive divisions which can either be intrinsic or extrinsic. When an organization's operations fall within a network, bundling becomes evident. Some organizations even move away from their core business and venture into other businesses. This in turn has an impact on the organization's overall positioning and existence. A network organization must align itself with the firm's logistics; this business process is essentially the most fundamental aspect in the value chain. Synergy benefits are important as this allows a firm to benefit from subsidiary interaction creating efficiencies and value addition for end users. In the 21st Century, it is evident that logistics drives the change together with knowledge management. The mere fact that a parent company has subsidiaries can result in various synergies which can be visible through shared resources, spill-over benefits through marketing, shared image and KM. Forwarders play a crucial role in bridging the gap between the carrier and intermediaries and serve as one-stop shop solutions. Synergies are more easily identifiable in logistics service providers as they provide door-to-door services and are more visible in the market.

Networks however, remain the backbone of liner shipping. Carriers need to maximize the use of their vessels to ensure favourable revenue, but also minimize costs through planning and routing. Given that liner shipping is a capital intensive industry, the return on investment remains relatively low resulting in the asset management problem. In these times of economic downturn, carriers have increased fleet productivity, reduced the number of vessels operating service routes, laid off vessels, increased resource sharing options and opted for slow steaming around the Cape of Good Hope. It should be noted that carriers place significant emphasis on network planning. The economic analysis of a network occurs on three levels: micro, meso and macro level respectively. Furthermore, the application of network economies is interdisciplinary hence; its impact affects the total transport value chain. Network economies address three examples of network problems within a supply chain:

- 1) the shortest route problem;
- 2) the maximum flow problem and;
- 3) the minimum cost flow problem.

The impact on networks can either be positive or negative which has consequences for both demand and supply. There is a correlation between intermediaries and the value of a network, in terms of cost savings and value addition. For instance the Metcalfe's Law states that the value of a network of size (n) is proportional to (n^2) where (n) resembles the number of users within the network (Gilder, 1993). The networks connections through the nodes (n) represented mathematically as $[\frac{n(n-1)}{2}]$ which is proportional to (n^2). The demand for transport is not based on its price. However, the transportation cost includes various components: economic distance, hindrances to trade facilitation, number of users in the network, network capacity, network utilization and other attributes related to transport such as the freight rates, customs, etc.

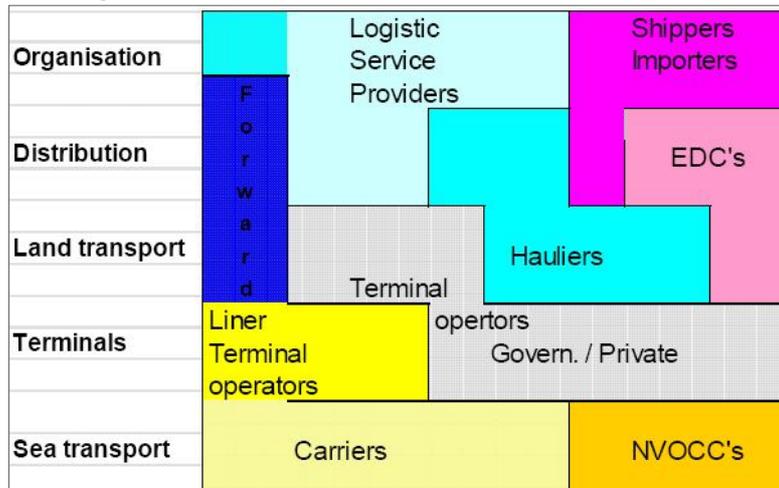
The literature review on liner shipping economies indicates that this is a specialist sector dealing with containerized cargo. Optimization in liner shipping is based on the ability to allocate vessels and service networks. As a result, routing options and capacity utilization become imperative for a carrier. Furthermore, another prevalent issue for carriers within this sector are the trade imbalances. This brings additional

costs for a carrier through the repositioning of empty containers, which is a tedious and complex task. The market is characterized with high fixed costs therefore; excessive competition could potentially make this sector unattractive, as carriers will be unable to recover their initial investments. This resulted in conferences, which were effectively route-based cartels who used price setting/discrimination and basically portrayed monopolistic traits.

One could then argue, given that conferences have been banned, that this brings more scrutiny on alliances which place emphasis on geographic coverage. In addition, it should be noted that the industry's sustainability is based on limited competition. The theory of contestability solidifies the existence of this liner structure. Alliances seek to capitalize economies of scope and market dominance due to low individual capacity. Therefore, the author is of the opinion that within the liner sector, there is still room for carriers to integrate further. The prominent and established players in liner shipping sector have adopted vertical integration across the supply chain. The market leaders are so well positioned due to their extensive networks and the manner in which such networks are controlled. Within these network economies, the planning of capacity and coordination of service routing play a crucial role. Due to the current economic downturn, the ridiculously low and unrealistic freight rates, and the vulnerability of liner carriers, what options are valuable for carriers? What type of collusion tactics are likely to surface, which resemble the prior conference structures?

There are various intermediaries in the transport value chain; which can be split into the following categories: sea transporters (carriers), Non-Vessel-Operating Common Carrier (NVOCC), liner terminal operators (these can either be government, private or global operators), haulage (merchant/carrier), hinterland operators (rail and barge operators) and logistics service providers (forwarding agents, distributors and warehouses). It should be noted that the roles of these intermediaries has become more blurred due to vertical integration and outsourcing within the value chain. Figure 2-5 hereunder shows how their functions overlap due to bundling within the transportation industry. One could then question the impact or rather, the potential impact a carrier can have in this transportation supply value chain given that carriers are the sole link in this chain with a distinctive competence which other intermediaries do not have i.e. capacity through 'vessels'. Furthermore, what pricing elements can these carriers adopt when selling excess capacity to service providers such that they can position themselves more favourably in the value chain?

Figure 2-5 Transportation Intermediaries



Source: Bottema, 2009

As previously mentioned, the demand for maritime economics is derived. The supply of transport is assumed to minimize costs, as transport costs account for an insignificant portion of shippers' total costs. The cost portion of transport in relation to the value of the goods remains insignificant and as a result, consumers and intermediaries are price insensitive. In liner shipping, demand is extremely inelastic, due to the small percentage of transport costs in relation to the price of the final goods transported (Haralambides, 2009). In other words, the price inelasticity in relation to transport costs provides some leeway to influence rates. The supply in the maritime sector is calculated on vessel capacity, which either can be actual capacity or anticipated capacity in the order book.

2.5 Strategic Pricing for Leveraging Distinctive Competencies

When the transportation value chain is considered from a holistic strategic perspective, value based pricing plays a crucial role. In retrospect, a carrier is in a positioned advantage over other service providers in general. Carriers determine how much space can be sold to service providers and at what price. Given that a carrier also competes in the other sectors in the transport value chain, a carrier can use this to its advantage. If a carrier sold space indiscriminately to direct customers and global service providers, the carrier would benefit tremendously from high freight rates. Furthermore, the carrier would then be in a position to discount the rate of other services such as forwarding, warehousing, distribution and haulage-therby competing competitively in areas where the carrier is not dominant, by utilizing the vessel as its distinctive competency to position it in the transportation value chain.

The author then questions why carriers fail to harness and feed off this strategic positioning within the transport value chain. The question the author is posing is how carriers price vessel capacity. As carriers continue to build larger vessels, the only way to benefit from economies of scale is to ensure that a vessel is optimally loaded. To emphasize this point, Emma Maersk built in 2006 is the world's largest built container ship with a listed capacity of 11,000 Twenty-foot Equivalent Unit (TEU). The actual capacity of this vessel is debatable; it is also the longest ship at 397 metres, width a width of 58 metres. Various scholars are of the opinion Emma Maersk's actual capacity exceeds the listed figure; it is estimated between 13,500 to

15,200 TEU. Such larger vessels allow carriers to enjoy economies of scale, but also make them more dependent on global service providers who have the clientele base required to fill such ships.

Global service providers tend to have the upper hand as these operators buy capacity at discounted rates and sell capacity at a premium. After an analysis of the top twenty global service providers, the only carrier on this list is NYK Line. The reason why global service providers do well is due to their extended global networks and their pricing tactics. Carriers only effectively started entering into logistics between 2000/1 with the exception of Sealand, APL, Hyundai and Orient Overseas Container Line (OOCL). In most cases, carriers have adopted a conventional approach to business. In other words carriers focused on their core business i.e. port-to-port operations. It took many years for carriers to extend their operations into logistics. Due to the nature and technicality of maritime economics, shippers tend to nominate service providers as their point of reference. The ability of service providers to inter-face between the shipper and liner shipping companies, their expertise and experience in delivering value added services has resulted in the need for such services. The profit potential for having a value-oriented pricing strategy that works is far greater than with any other pricing (Monroe, 2002).

The transportation sector has various sub-sections, which use different competition models. Maritime economics is a service sold by carriers; its demand is derived, as there is no direct market for shipping. Given the complex finance structures and the huge capital investment in this sector, it is important to explore the relationship between pricing options and market share. If the Boston Consulting Group (BCG) matrix were to be introduced it would indicate that liner shipping is in the category of high growth and high market share for those already established implying rising star status. The BCG is a tool for assessing a company's position in a marketplace in relation to competitors in terms of the company's product/service range (Henderson, 1979). Essentially, it is a 2X2 matrix which illustrates a firm's offering in relation to market share and growth.

It is important to note that the BCG matrix gives a framework with five aspects for analysis. These include the profile of the services/products offering, demand for such offering, development of such offerings, resource allocation and the option for (dis)investment decision. According to (Hinterhuber, 2008) there are various pricing options available these are illustrated below:

Cost-Based Pricing Approach:

- a) Cost-plus method
- b) Target ROI/ROS
- c) Breakeven based pricing
- d) Target contribution pricing

Competition Based Pricing:

- a) Penetration pricing
- b) Price skimming
- c) Average market pricing
- d) Price follower behaviour

Customer-Based Pricing Approaches:

- a) Perceived-value pricing
- b) Performance pricing
- c) Pricing according to customer's assessed willingness to pay

This begs the question of why pricing is not based on price discrimination or yield management in this industry. In liner shipping, pricing is very competitive which draws a danger when the industry enters a trough in its life cycle. Market share in

this industry could potentially be lost through a merger or acquisition, as resources tend to have imperfect immobility traits and are not solely based on pricing. If carriers are the only intermediary in the transportation value chain with a vessel, the author then questions why liner shipping companies fail to effectively utilize this distinctive competency?

According to (Hinterhuber, 2008) the implicit assumption that high prices and high market share are incompatible is incorrect. Value-creation; together with value-delivery remain key components in curbing the pricing aspect, which can be used to illuminate strategic positioning within the transport value chain. If a parent company has subsidiaries within the value chain, through the use of value addition and price discrimination, it can control the value chain. It can also benefit from its dominant positioning in one sector and transfer this benefit where it has no competitiveness so that it can compete more favourably.

2.6 Resource Based Views

Proposition 2: Resource Based Views (RBV) theory impact on strategy, cluster analysis, positioning and competitive advantage.

RBV is an economic model which determines the strategic resources available to an organization. Essentially, it is based on the premise of an organization's competitive advantage, which primarily lies in the resources available at its disposal (Wernerfelt Birger, 1984). This model addresses the short term competitive advantage of an organization and transforms it into a sustainable long-term distinctive advantage; it also includes the economic notion of bundling resources.

A competitive advantage can be attained when a firm's strategy is value creating, and not currently being implemented by present or possible future competitors (Barney, 1991: 102). This must not be confused with a comparative advantage concept used in international trade where a country can produce a bundle of good(s) more cost effectively in comparison to another. The competitive advantage concept occurs at a business level, and basically positions an organization within an industry. Building on this concept, a competitive advantage is sustainable when the efforts by competitors to render the competitive advantage are redundant and have ceased (Barney, 1991). Essentially implying that when competitors are unable to copy and/or imitate that which gives another a competitive advantage then the resource is unique and specific to that organization.

The RBV analysis occurs on the microeconomic level of an organization, which complements an organization's SM of its supply chain and resources. Hence, it could be argued that RBV allows for zero-sum games within the industry, as only one party can benefit from the competitive advantage present. A zero-sum property (i.e. if one gains, another loses) means that any result of a zero-sum situation is Pareto optimal. Generally, any game where all strategies are Pareto optimal is called a conflict game (Bowles, 2004).

The RBV approach includes the classification of the following strategic tools: physical resources, human resources and organizational resources (Penrose, 1959; Barney, 1991; Grant, 1991). The analysis of RBV must not only be considered from a single organization's perspective but rather from a cluster, sectional and/or

industry's perspective, as this provides a more holistic indication of the importance of a value chain. It is important to note that industries with large investment requirements need both individual and shared/pooled resources. For example, both soloist and alliance members within a network benefit from pooled/shared resources. In other words, given the diversity within the transportation sector, through vertical integration firms either aim to directly own or outsource a service. This allows intermediaries to benefit and enjoy the benefits of network economies within the industry. Based on Peteraf, (1993) there are four necessary conditions that must exist for a resource to be considered strategic, these include the following:

- 1) Heterogeneity;
- 2) Imperfect mobility;
- 3) Ex-ante limits to competition and;
- 4) Ex-post limits to competition.

In most cases, there is a mismatch between resources and demand and this usually results in limited supply or excess demand. From basic economics, it is common knowledge that resources are scarce and limited. Heterogeneity in an industry can involve situations in which the amount of a strategic resource is limited and scarce in relation to its demand (Peteraf, 1993). Hence, inferior or inefficient resources are used in production in order to supply the residual demand and a possibility of economic rent emerges for the most efficient firms. Moreover, this competitive advantage can be sustained as long as the firm's resources cannot be imitated or expanded to meet the demand level. The gap/difference with regards to the resource and scarcity are crucial indicators to improve performance through the use of a strategic resource. Within the maritime sector, the gap/difference was evident in the 1980s within the bulk sector and between 2007/8 within liner sector.

From pure economics, it can be concluded that organizations are rational and hence such profits attract other rivals and competitors which can give a less inferior product at lower prices. Within the liner sector, the demand curve is kinked indicating that prices are sticky downwards. As a result, more efficient organizations, within the industry are able to retain their competitive advantage as long as competitors are unable to match their resources. To improve performance through this strategic resource, two conditions need to be met. These are the presence of heterogeneity in relation to other firms' resources and the existence of scarcity in relation to demand (Wilk, 2003). Prices can be influenced by imbalances and scarcity, but collusion tactics can also yield superior economic profits. These imbalances can occur even when demand and supply are realigned, as they are dependent on the industry's characteristics.

The existence of ex-ante limits to competition means that prior to the establishment of a superior position there, must be limited competition for that position (Wilk, 2003). The value of the resource should not be known or obvious, as this would create a surge in the acquisition of such a resource. As a result, competition would diminish the benefit of acquiring the resource. Uncertainty will drive profits in the initial phase of the process, in the event of differences between the post value (ex-post) and acquisition cost (ex-ante) of the resource. The reason why liner shipping has evolved so promptly is due to the attractive freight rates. This can be partly attributed to conferences, the lucrative tax break incentives by governments and the loan scheme options available from financiers. This resulted in abnormal revenues within the sector, which have been evident over the past four years. For example,

China Shipping Container Line (CSCL) the second largest Asian carrier, its first-half net income in 2007 rose to US \$153 million from US \$ 10.7 million (Bloomberg, 2007). If the previous year's figures are considered this carrier's profits increased by more than 20%. Carriers were recouping their investments in relatively short timeframes; this resulted in enhanced liquidity which was reinvested in vessel capacity (Jessel, 2007).

Ex-post limit to competition means that when a firm establishes a superior competitive position through heterogeneous resources, in relation to its competitors, there must be some factors present, which can sustain and preserve the acquired dominant position (Wilk, 2003). A firm can only benefit and protect a resource, when its rivals are unable to imitate or substitute it. As a result, when these two conditions are met the resource is said to be sustainable, implying that it remains unique to that specific firm. By adopting KM, an organization learns and adapts its business processes continuously. Over time, the resource and process becomes tailor-made through trial and error. However, some firms gain this through bundling their resources through horizontal or vertical integration-thereby, implying that the value chain and positioning have an impact on a firm's ability to ensure resource sustainability, assuming of course, that the resource is bundled with other processes.

Despite the possibility of trading resources, the notion of imperfect mobility indicates that a resource is more valuable to the original owner. Resources are adapted and tailor-made to suit a particular firm's needs. Organizations bundle their resources to enjoy economies of scope resulting in joint transaction costs. This makes it difficult to holistically understand where a sustainable advantage is derived from. In some cases it might not necessarily be one resource but rather a mixed bundle. Information asymmetries thereby hinder proper evaluation of such resources making it difficult to understand a firm's real positioning. Moreover, while one firm may have a distinctive competency when a merger or acquisition occurs, it does not necessarily imply that competency is transferred, indicating imperfect mobility. This condition of a resource implies that although a resource can be traded, it is much more valuable in the firm in which it is currently being used than it would be in another firm (Eduardo & Jaime, 2003). This is largely due to organizational incompatibilities and strategic fit.

In certain circumstances, the ability of a resource to produce value can only be through a direct link or joint use. This implies that the notion of shared resources results in shared transaction costs and benefits. Be advised that the concept of economies of scope has already been discussed, in the network economies section. When bundling occurs, it is not always obvious what gives an organization a distinctive advantage. This is an essential and important aspect of KM for a potential buyer when evaluating merger options. This is validated by the notion that the strategic value of a firm's resources resides not only in its individual attributes but also in the total effect of its complex and systemic interaction (Black, 1994).

The notion of Resource Based Competition (RBC) seems more prominent and favourable for organizations during turbulent market conditions. Therefore, emphasis is not placed on the service and/or product, but rather on critical scarce resources, which give an organization a distinctive advantage. SM should hence place emphasis on the identification, building, managing and exploitation of such resources.

To manage a resource, this must first be quantifiable in the sense that its net worth must be known. This can be achieved by adopting a resource measurement system. The most obvious choice of measurement is the shareholders value which can be broken down into two i.e. profitability and the growth rate (Azzone, Bertelè, & Rangone, 1995). For a firm to adopt RBC, it becomes imperative to measure its resources. This can be achieved through a Resource Based System (RBS) which measures the performance of a business. If the overall performance of a firm is considered this would be the shareholder value. This is defined as the discounted value of all cash flows expected from both current and future products, theoretically over an infinite. The formula is illustrated hereunder:

$$V(0) = \sum_{t=1}^{\infty} \frac{NCF(t)}{(1+k)^t} \quad (2.1)$$

Where:

NCF (t) = Net Cash Flow at year t
k = Discount rate cost of capital

The formula highlighted above is not very useful during turbulent market conditions and hence the following should be used instead. In addition, the following formula not only includes the cost of capital and equity but, also the growth rate and profitability.

$$\frac{V(0)}{E} = \frac{ROC/k - g/k}{1 - g/k} \quad (2.2)$$

Where:

E = Cost of Equity
ROC = Return on Capital
g = Growth
k = Cost of Capital

The formula above allows an organization, to adopt a RBS which indicates the strategic resources a firm has at its disposal. A RBS measures the quality, quantity and accessibility an organizations: brand, capital, assets (both tangible and intangible), integration (both horizontal and vertical), technology and people (human resources). Table 2-1 hereunder indicates the RBS framework which can be tailored for a specific firm, in essence the relevant resources and the measuring criteria.

Table 2-1 Resource Measurement System

Measures Resources	Quantity	Quality	Accessibility
Capacity Fleet: Vessels	Number of Vessels	Vessel Type and Size	Lease or Own
Brand: Group or subsidiary	Brand Awareness	Customer Retention	New verses old segments
Technical Employees	Number of skilled people	Employee Rating	Firms reputation
Capital Investments	Capital Assets	Cost of Capital	Finance Leverage
Integration: Vertical or horizontal	Number of services	Value Addition	Silo structure verses matrix

Source: Compiled by Author Adapted from Bertele & Rangone, 1995

2.7 Summary

Effective SCM together with the establishment of networks give organizations the ability to offer value added services. When an organization utilizes and combines its services within its value chain it can potentially result in a competitive advantage. While Porter's value chain indicates the service offering of organizations, it is important to note that some firms may opt to focus on their core business and outsource non-core activities. Nevertheless, whether a service is rendered directly or indirectly, carriers need to adopt a holistic perspective when it comes to strategic analysis and decision making. Therefore the strategy must include decisions on investment, vessel analysis, networks, operations management, sustainability and the environment.

Optimizing an organization's supply chain culminates in cost-effective results. To obtain a competitive advantage, an organization must concentrate on its core business or the activities it can do adequately and outsource other functions required for functionality. In particular, based on the value chain, there are primary activities which are fundamental to the organization while the secondary activities are essential but do not have to be fulfilled by the organization since they can be outsourced. Adopting a value chain, understanding and focusing on core business activities and outsourcing supporting roles could potentially result in the development of a competitive advantage. It should be noted that a competitive advantage can be copied by competitors and hence the need for a sustainable competitive advantage also known as a distinctive advantage and/or resource based view theory.

Note: two prepositions are dealt with in the following chapter, Chapter 3 Maritime Industry Analysis.

CHAPTER 3 MARITIME INDUSTRY ANALYSIS

3. Introduction

International trade drives liner shipping; the trend in the past years has seen unprecedented growth. This has been facilitated by containerization, which accounts for approximately 20% of EU25 external trade in value terms of trade (European Commission, 2004). Liner shipping is very competitive with the top three carriers being European, while the remaining top ten carriers are all Asian with the exception of Hapag-Lloyd. The most important trade route in this sector is the Europe-Asia trade based on the sheer volumes moved per annum. Liner shipping occurs on specific trade routes and fixed schedules with pre-advertised rates. This industry has gone through recent changes as conferences, which essentially represented pricing cartels, were abolished in October 2008.

The global recession has adversely affected the maritime economics sector. Second quarter results of 2009 indicate significant decreases in revenues of approximately 52%, from the first quarter (Winland, 2009). For the first half of 2009 the market leader Maersk Line reported a net loss of US \$1.25 billion. While the NOL group announced a net loss of US \$391 million for the first half of 2009 compared to a net profit of US \$196 million for the same period in 2008. The reality for most carriers is very gloomy with some carriers having failed to meet their financial covenants, which are stern financial requirements from their financiers. It is unfortunate that analysts failed to predict this crisis let alone its impact, as there were signs a crisis was looming.

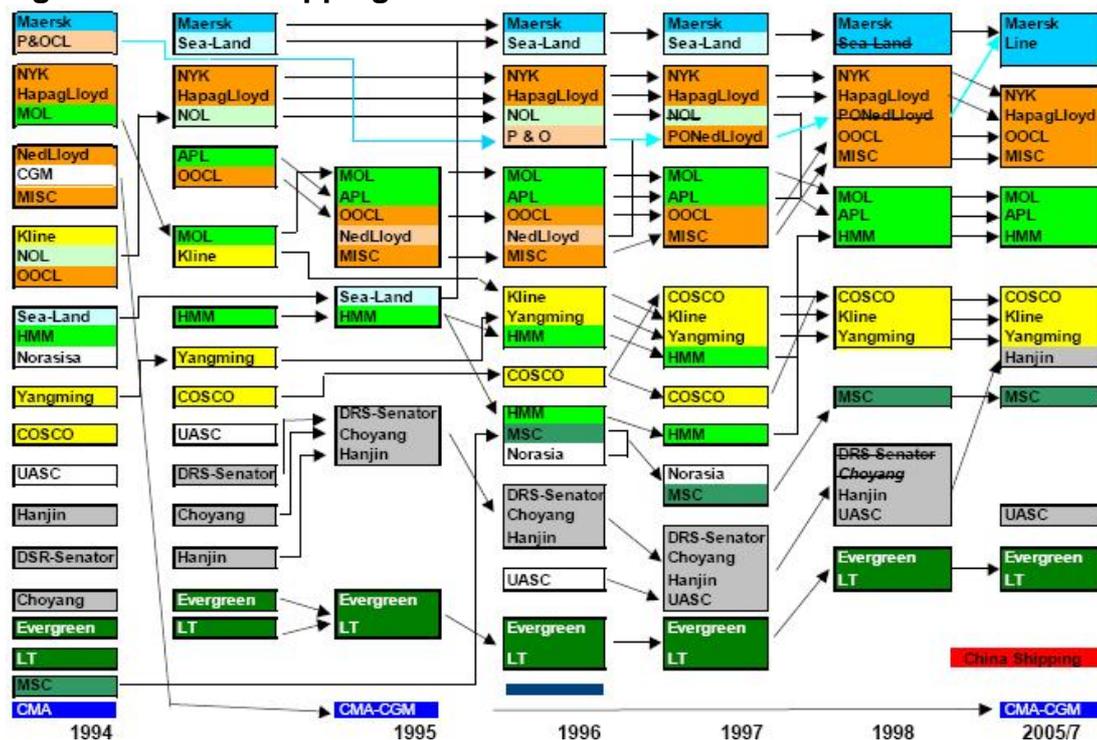
The maritime economics signal which indicated that something was amiss was the Baltic Dry Index (BDI). In May 2008, this index peaked to 11,793 points from 663 points in December 2007. The BDI mimics the growth pattern of the shipping industry and measures shipping route combinations i.e. supply in terms of capacity and the demand in terms of volumes. This index is not susceptible to speculation or subject to revisions and manipulation as it gives real-time daily updates (Basenese, 2008). Since inception the BDI seemed very stable in terms of variations. The order book for new vessels was another indicator, as by 2008 fifty percent of the world fleet of liner shipping were new orders. In maritime shipping carriers can wait up to two years before they can take receipt of their new orders. Reckless lending from financial institutions was another signal and this was not unique to maritime economics. This was also prevalent in the housing and automobile sectors. Borrowing was extremely cheap for carriers, as they could borrow more than a vessel's value. In some cases, carriers could receive up to twenty percent additional financing (Lunde, 2009). The justification of such 'easy' loans was the long-term voyage contracts and the favourable freight rates.

The following section of the chapter provides an analysis on the liner shipping industry. Two propositions are explored in this Chapter 3 i.e. propositions 3 and 4.

3.1 Liner Shipping Analyzed

Liner shipping has evolved over the years as carriers have moved away from the conventional setup previously established under conferences. Being a very competitive niche, the liner shipping sector has a few market players who are faced with volatile and unpredictable freight rates. To retain market share and dominance over the years, carriers have expanded their network coverage and service-offerings on various trade routes. The economic downturn in the global economy has adversely affected the industry, specifically the financing and purchasing of new vessels. The growth in maritime economics has been facilitated by containerization thereby resulting in more cooperation agreements among carriers. As there is no direct market for the demand of transport, carriers have sought various strategic options to build and position themselves competitively within the industry. Carriers have resorted to network economies together with horizontal integration (mergers & acquisitions) to increase their coverage and market share within the sector. Through mergers & acquisitions carriers acquire important geographical hubs, thereby building up a genuine global network. Figure 3-1 below illustrates the evolution of carriers within the liner shipping sector. The last column indicates whether a carrier is a soloist (stand-alone) or if a carrier belongs to an alliance.

Figure 3-1 Liner Shipping Carriers Evolution



Source: Bottema, 2009

The top four carriers in 2008 are all stand-alone carriers, of which three are European and one is Taiwanese. Considering the top ten LSCs, half of the carriers are members of alliances while the remainder are soloists. Table 3-1 indicates the alliance members and the relevant capacity for each alliance. There are three prominent alliances, which include CHKY Alliance, the Grand Alliance and the New

World Alliance. When analyzing the overall capacity of the industry alliance members fair favourably. By pooling their resources, alliance members can compete with the larger soloist carriers within the liner shipping industry. Carriers' capacity is measured in TEU millions.

Table 3-1 Alliance Members and Capacity

Alliance Name	TEU Millions	Members
CKYH Alliance	1.4	COSCO Container Lines Ltd
		K Line
		Yang Ming Marine Transport Corp.
		Hanjin Shipping Co. Ltd
Grand Alliance	1.3	Hapag-Lloyd
		M.I.S.C. Berhad
		NYK Line
		OOCL
New World Alliance	1	APL Ltd
		Hyundai Merchant Marine Co. Ltd
		Mitsui O.S.K. Lines Ltd

Source: K Line Annual report, 2008

Based on Haralambides, (2009) the objectives of global shipping alliances include the following:

- 1) Wider geographical coverage, as alliances can share services and networks providing shippers wider and better services;
- 2) Operational efficiency through the ability to collectively undertake vessel planning and coordination on a global scale, thereby reducing redundancies in service capacities, increasing productivity and lowering costs;
- 3) Risk and investment sharing, as the significant capital investments required for ships and equipment can be better predicted and coordinated;
- 4) Economies of scale, as alliances can deploy fewer and bigger ships and yet ensure enough volume to bring capacity utilization to required levels. What is indivisible to one is divisible to many in terms of capacity;
- 5) Entry in new markets, as multi trade alliances can allow a carrier to enter into a new trade even without using its own tonnage, but using slots on a partner's existing service instead;
- 6) Increase in service frequency with the combined assets of alliances thus providing better services and flexibility to shippers;
- 7) Combined purchasing power and volumes of alliance that allow members to increase leverage when negotiating with terminals for cargo handling, feeder and intermodal services. Lower cost is thus achieved and;
- 8) Profit maximization, which is achieved through better cost control.

Strategic alliances represent cooperation networks within the liner shipping industry. To compete effectively in the liner shipping industry, carriers require between five to six vessels with adequate capacity to service a specific trade route. Liner shipping requires a carrier to have space availability and offer frequent sailing. Bergantino & Veenstra, (2002) suggest that the net advantages of cooperation are positive after

overcoming a minimum critical mass, thereby allowing alliance members to enjoy the economies from the demand side. Each network has transactions costs and hence the optimal size will allow carriers to grow and reach a peak. However, if the network grows excessively an alliance will then have to endure the associated transactions costs. The benefit for alliances is that smaller carriers are able to compete with the larger soloist carriers and offer more diversified services. Some alliance members concentrate on their niche/home markets.

Table 3-2 highlights the top twenty liner carriers within the liner shipping industry. This table illustrates carriers ranking and market share between the periods 1998 to 2008. Maersk Line has retained its position as number one operator over the years. During 1998, Maersk merged with Sea-land which saw a significant increase in Maersk's market share from 11.10% to 15.10%. Maersk's acquisition of Sea-land was facilitated by two factors, low profitability of Sea-land due to persistent low freight rates on the pacific routes and the interest in Sea-land's parent company CSX Corporation, whose core business was predominately linked in multi-modal logistics operations (Francesetti & Foschi, 2000). In 2005, Maersk-Sealand merged with P&O Nedlloyd which further increased its market share to 15.70%. The soloist carriers within the top ten include Maersk Line, Evergreen, MSC and CMA-CGM; all the remaining carriers are in members of alliances.

From Table 3-2 it is clear that both Maersk Line and MSC have a dominant position within the market. Between these two soloist carriers, they control 26.85% of the liner shipping sector. The market share values provide an insight of how large the market leaders are in comparison to their competition. Hence, it is understandable why smaller carriers have joined alliances. Seaborne trade has increased significantly over the years and so has the carriers' top 20 market share. Between the years 1998 to 2008, the overall market share of carriers within the top twenty increased 53% to 82%. This provides some insight of how small the liner shipping industry really is. It is also interesting to note that over the years most of the smaller carriers have lost some of their market share to the larger dominant players.

Table 3-2 Top Twenty Liner Carriers 1998-2008

Rank	Operator	1998	Rank	Operator	2005	Rank	Operator	2008
1	Maersk	11.10%	1	Maersk-Sealand	15.10%	1	Maersk Line	15.70%
2	Evergreen	9.00%	2	MSC	10.80%	2	MSC	11.10%
3	P&O Nedlloyd	8.10%	3	P&O Nedlloyd	7.40%	3	CMA-CGM	7.60%
4	MSC	7.10%	4	Evergreen	6.80%	4	Evergreen	4.80%
5	Hanjin	6.80%	5	CMA-CGM	6.40%	5	Hapag-Lloyd	3.80%
6	Sea-land	6.80%	6	APL	4.90%	6	COSCO	3.80%
7	COSCO	6.50%	7	CSCL	4.60%	7	APL	3.80%
8	APL	6.50%	8	COSCO	4.50%	8	CSCL	3.40%
9	NYK Line	5.30%	9	Hanjin	4.50%	9	NYK Line	3.20%
10	MOL	4.30%	10	NYK Line	4.30%	10	Hanjin/Senator	2.90%
	Share: Top 10	38.00%		Share: Top 10	49.00%		Share: Top 10	60.20%
11	Hyundai M.M.	3.70%	11	MOL	3.60%	11	MOL	2.90%
12	Zim	3.60%	12	K Line	3.50%	12	OOCL	2.50%
13	CP Ships Group	3.40%	13	Zim	3.40%	13	Yang Ming Line	2.40%
14	CMA-CGM	2.90%	14	OOCL	3.30%	14	K Line	2.50%
15	Hapag-Lloyd	2.90%	15	CP Ships Group	3.30%	15	Hamburg Sud	2.30%
16	OOCL	2.90%	16	Hapag-Lloyd	3.20%	16	CSAV Group	2.20%
17	K Line	2.90%	17	Hyundai M.M	2.90%	17	Zim	2.20%
18	Yang Ming Line	2.60%	18	Yang Ming Line	2.90%	18	Hyundai M.M.	1.90%
19	UASC	1.90%	19	PIL	2.70%	19	PIL	1.40%
20	Safmarine	1.80%	20	CSAV	2.10%	20	UASC	1.20%
	Share: Top 20	53.00%		Share: Top 20	71.00%		Share: Top 20	82.00%

Source: Compiled by Author adapted from Alphaliner

3.2 Liner Network Based Management

Proposition 3: What are a carrier's distinctive competencies and how can they provide leverage against rivals and competitors?

A carrier's distinctive competencies lie in its vessels. Each carrier should ensure that the strategy it adopts allows it to exploit its resources effectively. The type of port-call system a carrier adopts is based on the size of the carrier's fleet. Smaller carriers may opt for a point-to-point system as opposed to the hub-and-spoke system. The former is a direct calling system for carriers i.e. from port of origin to port of destination. While the latter is a network with interconnected seaports where large mother vessels call a central hub, cargo is then directed to other ports through a feeder service. The hub-and-spoke system enables carriers to increase service options to various seaports throughout a network. However, this does not mean that smaller carriers do not utilize hub-and-spoke systems. Some smaller carriers have larger mother vessels, which call main transshipment ports (i.e. a central hub). Liner shipping networks essentially resemble collaborations within the industry which can include intermodal operators, terminal operators and service providers. Resources and assets are shared within each network to ensure operational gains and mutually beneficial strategies. Through combining their assets carriers are able to realize growth and venture into markets/trade routes, they ordinarily would not have had access.

While there is need for a carrier to extend its services through intermodal operations, this does not imply diverting from ones core business. Carriers can join networks to gain access to resources and collaboration partners with intermodal operators. By being part to such arrangements each member can benefit from being part of a global network. However, due to synergies some networks are more effective than others. The network-based form of organization is conducive to restructuring a mature industry (Powell, 1996). In most cases, carriers have extended their offering to include functions which deviate from their core business. Of late carriers seem to advance more into the transportation value chain. This can be explained by shippers' need for more integrated services. As result, carriers have embraced a more holistic approach to transportation. It could also be argued that if carriers continue to ignore shippers' needs, they will continue to lose their market share which is currently being absorbed by service providers. The services rendered by service providers' exist because there is a demand for them. Whether it is in the interest of carriers' to extend in such operations is largely dependent on every carrier's strategy.

A Liner Shipping Company (LSC) consists of a fleet of vessels with common ownership or management, which provide a fixed service at regular intervals between various ports, and offers transport services in the catchment area served by those ports ready for transit by their sailing dates (Brooks, 2000). Trade demand and global networks characterize liner shipping. Trust and cooperation among members both play an important role in the success of global networks. The bargaining power of LSCs has increased over the years, due to the increase in volumes traded. As a result, carriers are in a position to dictate the Terminal Handling Charges (THC) they deem acceptable. In the past terminal operators have not charged full recovering prices. Bear in mind if a terminal operator loses a global carrier, this could potentially result in a significant market share loss. For example, ECT an independent terminal operator based in Rotterdam year-on-year figures

during the period 2004/5 show there was a considerable dip. P&O Nedlloyd utilized ECT terminals however, when Maersk Line absorbed this carrier its container volumes were transferred to Maersk Lines terminal operator (i.e. APM Terminal). It is important to recognize the elements required to manage a shipping liner network, in other words understand what the driving forces are. Lun et al, (2008) identified the SMART factors used to explain why LSCs utilize network-based management:

- **S**trategic initiative for performance gain;
- **M**arket coverage;
- **A**dditional business;
- **R**eduction in waste and;
- **T**echnology development.

Resource pooling allows carriers to reduce their investments in fleet size and gives carriers options of entering new trade routes. The market coverage of carriers is very diverse given the various trade routes and differing servicing options. LSC's keep investing in larger vessels and as a result, it is virtually impossible for one carrier to fill a vessel independently. For a carrier to be self-sufficient this would imply that it has the correct number of vessels to service a trade route. Carriers invest in larger vessels as they seek economies of scale, thereby reducing the unit cost per slot. However, as the vessel size increases so do the operational costs. As a result carriers require a large network, to recoup and reduce the unit cost of slots. When a vessel size increases from 6800 to 8800 TEU, the cost saving is US \$48 (i.e. from US \$416 to US \$368) a reduction of approximately 12%. If a 12,500 TEU vessel is used the actual cost is reduced to US \$333, which is a further saving of 9% (Tozer, 2003). However, there is an optimal vessel size thereafter no extra cost reduction benefits will be observed. At this point LSCs will begin to experience diseconomies of scale.

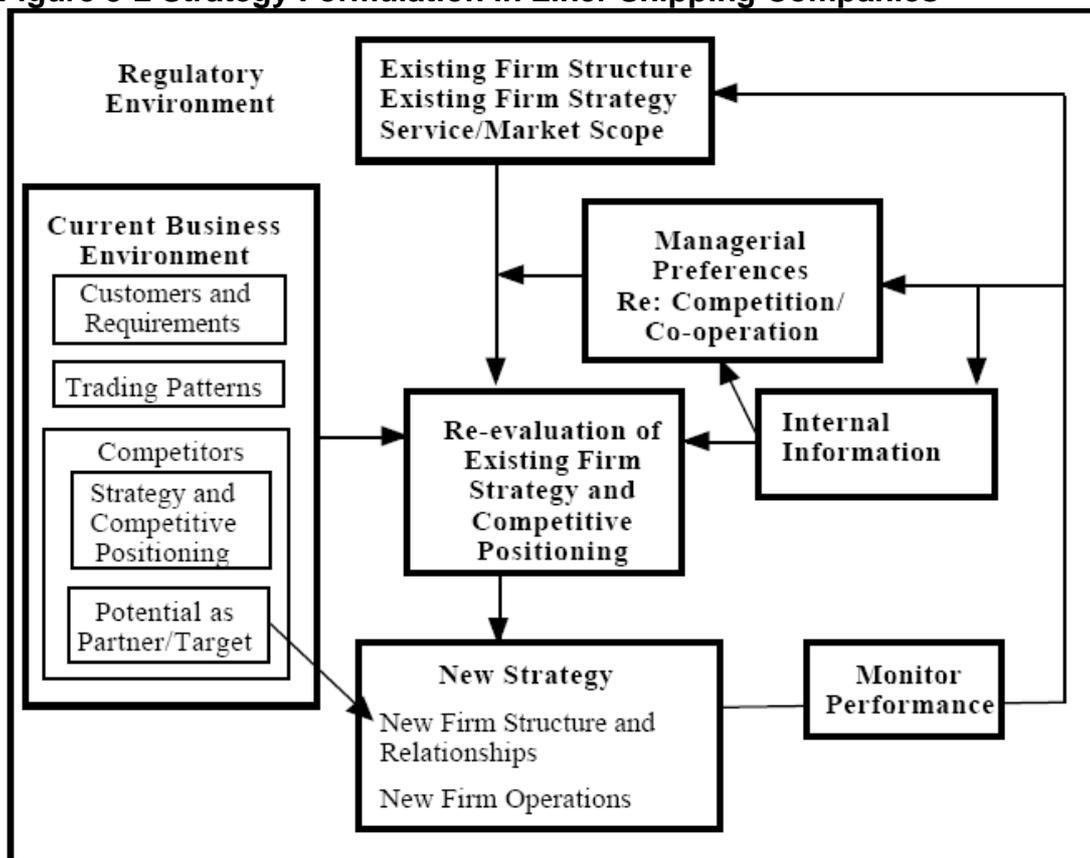
LSCs adopt different strategies within their networks. The more established lines are global players while smaller lines are more regional and local players. The Chinese and the Asian regions are important trade partners for global players. This can be attributed to trade policy initiatives of unilateral, regional and multilateral liberalization together with the adoption of various trade agreements which have aided and facilitated trade (Zhao, Malouche, & Newfarmer, 2008). Liner shipping networks allow members to benefit from the extension service offerings resulting in economies of scope. Such economies are aided through the provision of multi-product bundles, technological development in the vessel design and innovation in terminal equipment.

Cooperative behaviour allows smaller carriers within alliances to compete with highly integrated soloist carriers. However, it should be noted that even soloist carriers are members of liner shipping networks. Maersk Line has an independent network due to its sheer size as carrier, terminal operator, intermodal operators and logistics services. The top four carriers: Maersk Line, MSC, CMA-CGM and Evergreen are the few LSCs which can provide a holistic integrated service to its customers. This is not a setback for other carriers as they can outsource these functions or buy service providers and establish network partners. Based on Lam et al, (2007) the key objectives that motivate networks in LSCs include:

- 1) Network economies, which can be reaped through vessel co-ordination and planning on a global scale;
- 2) Investments, which can be shared and associated risks diversified;
- 3) Scale economies, that can be obtained through the deployment of larger and newer vessels that can reduce cost and improve utilisation levels;
- 4) The frequency of services offered, which can be increased across multiple trade routes;
- 5) Entry into new markets, that can be facilitated without the need to deploy additional tonnage;
- 6) The cargo of competitors, which can be poached and simultaneously the generation of new cargo movements that can be stimulated and;
- 7) Bargaining power, which can be increased thus lowering the cost per TEU of container handling, feeder and intermodal services.

While carriers benefit from networks, each carrier has to adopt a strategy which suits its business environment. This should be broken down into quantifiable and measurable objectives and goals. It is in this strategy where a carrier can distinguish itself from its rivals and competitors and convert its distinctive competencies into a competitive advantage. Brooks introduced the liner shipping strategy formulation shown below in Figure 3-2.

Figure 3-2 Strategy Formulation in Liner Shipping Companies



Source: Books, 2000

To create solid strategies carriers need to continually analyze and reassess their internal and external environments, as their current business environment is dynamic and constantly changing. Effective strategy analysis will enhance a carrier's positioning; thereby allowing a carrier to exploit its strengths and opportunities while working on its threats and weaknesses. Carriers need to adopt a strategy, but also remain flexible enough to adapt and respond to market changes. The implementation of SM and value creation can assist carriers to focus on areas where they can extend their operations. By investing in the right strategy and belonging to a solid network, a carrier can offer multi-product services while moving containers from origin to designated destination. While this may seem like a simple task, the detail which goes into the planning and management of such a network are far more complex.

Maersk Line announced in June that it was reconsidering its strategy after it registered huge first half losses for the year 2009. Maersk Line refocused its strategy to focus on the following core elements:

- Vessel utilization with preference to profitable cargo;
- Provision of a more reliable customer centric services;
- Provision of a fast responsive service closer to end users and;
- Reduction of complexity and costs.

While there are various market players who play a significant role within liner shipping, carriers need to find strategic partners with business synergies in areas they have deficiencies. Carriers in alliances can face difficulty in strategy adoption tactics, as alliance objectives can conflict with theirs. As a result, carriers need to place a lot of consideration into choosing their collaborative partners and networks. All carriers have joint/shared services, as illustrated by the Table 3-3 below.

Table 3-3 Carrier Operated and Shared Services

Carrier	Operated Services (A)	Overall Services (Operated +Shared) (B)	Ratio (A/B)	Growth (%)
NYK Line	22	42	0.524	91
MSC	70	74	0.946	6
APL	40	66	0.606	65
CP Ships	26	35	0.743	35
Maersk Line	86	111	0.775	25
CMA-CGM	47	74	0.635	57
Hapag-Lloyd	24	61	0.393	154
MOL	29	57	0.509	97
K Line	28	59	0.475	111
Hanjin	23	56	0.411	143

Source: Bergantino & Veenstra, 2002

Only independent carriers like MSC and Maersk Line respectively have significant individual operated services (**A**). These carriers have the least growth in combined services (**B**). However, smaller carriers such as Hapag-Lloyd, K Line and Hanjin

show tremendous growth when they combine their services. While it may be true that all carriers can expand their offering through shared services, it is probable that larger soloist carriers might benefit less from such arrangements. Growth through shared services is only true for large soloist carriers if they can effectively organize and control their vessels. In addition, this gives such carriers more flexibility to manoeuvre and respond to changes within the industry. However, even carriers with little growth in combined services can benefit from such undertakings, if they do this tactfully. Network economies are also enhanced through the provision of horizontal agreements between carriers.

3.3 Carrier Networks and Routes

The vertical integration of carriers initially started through the provision of port operation (i.e. dedicated terminals). Network economies have aided liner operators to enjoy economies of scope overtime. However, there are some discrepancies between the vessel carrying capacity and the throughput handled by ports. As the vessel size increases, the call size increases exponentially, thereby increasing the time a vessel spends in a port. Irrespective of vessel size, carriers require terminal operators to turnaround vessels under the stipulated agreement times within their service level agreements, thereby straining their operations. The maritime network can be managed more effectively, if ports can guarantee faster vessel turnaround times irrespective of vessel size. Carriers can also manage their shipping networks better by factoring in the port and terminal throughput figures as this will give them a better estimate of how long a vessel will be inactive as it loads and discharges. Carriers tend to service their home markets more efficiently in comparison to other trades routes, resulting in the under serving of some regions. There remains some potential to capitalize on other regions given the overall picture of the supply chain. Due to the limited competition in underserved trade routes, carriers can adopt premium pricing. In most cases, carriers choose the most profitable routes as these usually have short sailing days, which increases the number of round trips per year.

The degree of vertical integration can be analyzed by comparing carriers' carrying capacity and their port investments (Fremont, 2009). When carriers initially started integrating vertically and they started by entering terminal operations. Initially carriers opted for dedicated facilities. What is now more prevalent is that carriers have moved away from terminals as cost centres, as terminals currently run optimally, so they can recover the cost of their investments. Network diversification is a competitive competency, which enhances a carrier's competitiveness. Not only does this enhance a carrier's connectivity and coverage, but also its ability to create value added services. Cooperation through alliances can create network economies for LSCs. Moreover, it can significantly increase a carrier's geographic coverage, market size and capacity. When combined, all these variables can create a network economy for a carrier.

Carriers choose the service routes and the ports they call, but this is also dependent on the type of service the specific LSC is offering. When LSCs want to determine a service route, a carrier must first decide on the service and scope of trade. LSCs can choose one of the three types of route service options: end-to-end service, pendulum service or around the world service. In August 2008, Maersk Line extended its diversified global network, through a Vessel Sharing Agreement (VSA) with CMA-CGM. The VSA is for the Trans-Pacific trade route. These carriers were of

the opinion that this agreement would have an impact on their freight rates and capacity. The VSA essentially has two strings: the Trans-Pacific 3 (TP3), which takes advantage of the scale benefits of a Suez Canal crossing and the Trans-Pacific 10 (TP10), which utilizes the Panama Canal (Maersk Line, 2009). The TP3 is a pendulum service from the Far-East, the Pacific Northwest and US East Coast. A pendulum service involves a set of sequential port calls along a maritime range, commonly including a transoceanic service from ports in another range structured as a continuous loop (Transport Systems, 2009). The second segment of the pendulum service consists of the revised Trans-Pacific 9 (TP9). Thirteen vessels are required to service this route each with a capacity of 6400 TEU. Of this total capacity, seven vessels are under Maersk Lines control while the remaining six are under CMA-CGM. The TP10 services Central China, North China and the American East Coast. The total vessel capacity required to service this route is eight Panamax vessels each with a capacity of 4300 TEU. In this case, each carrier will operate four of the vessels. Due to the weak demand in the market, the TP10 service shall be suspended as from the 31st of October 2009.

By analyzing the geographic coverage of LSCs, it is evident that the global players within the industry are Maersk Line, MSC, and CMA-CGM due to their strong presence in both the dominated primary and secondary trade routes. The following carriers APL, Hanjin, NYK Line and CSCL also service the primary trade routes (i.e. Europe Far-East and the Trans-Pacific trade routes). Mitsui O.S.K. Lines (MOL) and Evergreen concentrate on the secondary trade routes, which essentially are feeding services to Africa and South America. Table 3-4 hereunder, shows the various routes used by LSCs. NYK Line and MOL service the North-East Asia, while MSC and CSCL service the Northern Europe route. The remaining carriers all service East Asia as indicated, but under different route options. Within the liner shipping industry the most serviced route is the Europe Far-East trade, as indicated by the sampled carriers. The servicing of other routes depends on alliances and joint service arrangements carriers have in place.

Table 3-4 Liner Carrier Routes

Carrier	Route (1)	Route (2)	Route (3)	Route (4)	Route (5)
NYK Line	North-East Asia	Northern Europe	East Asia	South-East Asia	North America West Coast
MSC	Northern Europe	East Asia	East Med / Black Sea	West Med	North America West Coast
APL	East Asia	South-East Asia	North-East Asia	North America West Coast	Northern Europe
CSCL	Northern Europe	North America East Coast	Central America	North America East Coast	East Asia
Maersk Line	East Asia	Northern Europe	West Med	West Med	South-East Asia
CMA-CGM	East Asia	Northern Europe	West Med	South-East Asia	East Med / Black Sea
Hapag-Lloyd	East Asia	Northern Europe	North America East Coast	South-East Asia	North-East Asia
MOL	North-East Asia	East Asia	South-East Asia	Northern Europe	North America West Coast
K Line	East Asia	North-East Asia	South-East Asia	Northern Europe	North America West Coast
Hanjin	East Asia	North-East Asia	Northern Europe	South-East Asia	North America West Coast

Source: Containerized International, 2009

When carriers integrate, this has an impact on how a LSC will service specific trade routes. For example when Maersk acquired Sealand, this had an impact on its service deployment patterns. After the acquisition of Sea-land, Maersk’s strategy changed to a more independent one, as its services account for 79% while slot charters account for 21% (Lam, Yap, & Cullinane, 2007). While market leaders become more independent, the opposite is true for smaller carriers (i.e. followers). Slot charters account for approximately 80% while the remaining 20% are joint service arrangements. Carriers in alliances tend to benefit more from capacity-pooling arrangements as their alliances provide most of their slot capacity.

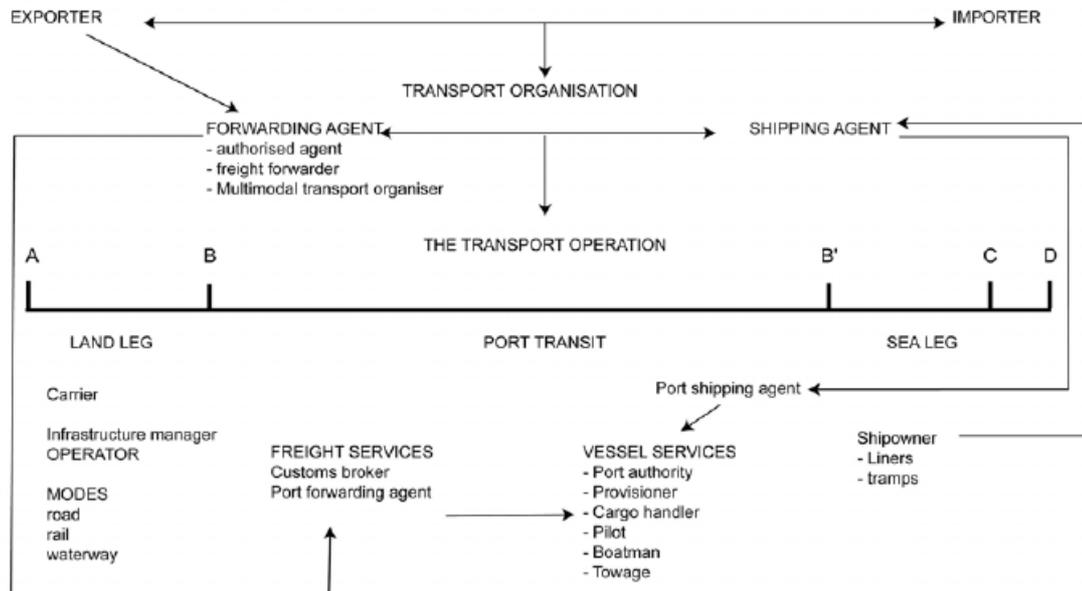
3.4 Liner Shipping Strategic Options

Proposition 4: How value addition options benefit liner shipping companies through vertical integration and network economies.

This section looks at the different players within the transport value chain. It gives a holistic view how the role of LSCs has changed. The transportation sector usually has multiple legs, which can be broken down to the sea and land leg. The former can include inland shipping through barges and deep-sea shipping; while the latter can occur via road haulage or rail. The channel intermediaries, with respect to LSCs include: forwarding agent also referred to as forwarder, shipping agent, the terminal

operator and service providers. Figure 3-3 hereunder shows the various channels and interfaces between the movements from point A to D.

Figure 3-3 Shipping Channel Intermediaries



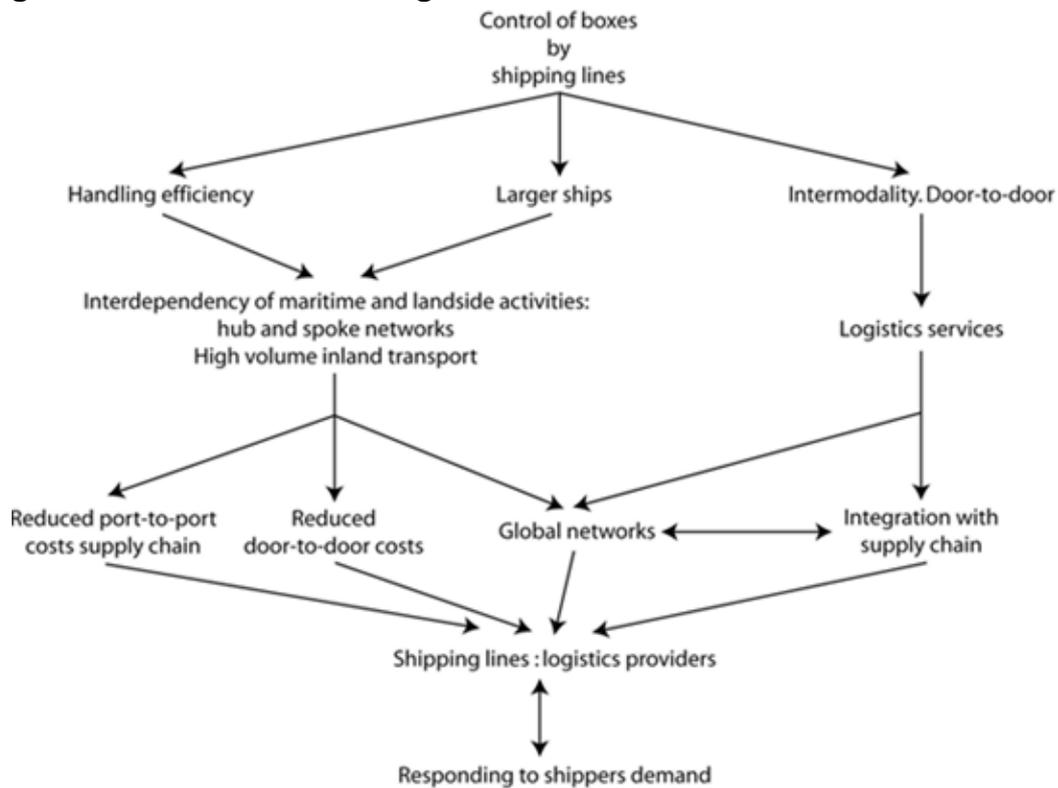
Source: Fremont, 2005

For better understanding, the intermediary roles are explained briefly. A forwarding agent arranges the collection of the goods from the exporter to the terminal on behalf of the importer. While a shipping agent works and operates on behalf of the carrier. A shipping agent liaises with the forwarder, however in some cases a forwarding agent can liaise directly with a LSC. This is usually rare and only applies to the larger established forwarding agents, which have volumes that can warrant such arrangements. Upon agreement, a contract is drawn up for the movement of goods from origin to the designated destination. Liner carriers operate on fixed routes and schedules; this is largely due to the impact of containerization.

These are the three types of containerization available: Full Container Load (FCL), Less than full Container Load (LCL) and Full Container Load-Groupage (FCLG). It is important to note the difference between FCLG and LCL. With the prior a forwarder will consolidate a container with various importers' shipments, while the latter indicates that the container is not full, which it was transported. Given that there will always be demand for transport; there are numerous advantages of integration within the transportation sector. Integration results in the reduction of transaction costs and value addition for end users. Within the transportation value chain, carriers are the most asset-based operators. Other intermediaries like Third Party Logistics (3PL) operators have fewer assets while Fourth Party Logistics (4PL) operators have no assets, as these functions are usually outsourced. The distinction between these two is that a 4PL is a non-asset based service provider which manages a 3PL. Initially shippers outsourced logistics services, however what is now evident is that carriers have reintegrated these services primarily to reduce their transaction costs. The need for carriers to operate dedicated terminals was based on the need for flexibility, as these initially served as cost centres, this has since

changed. Terminal operators have become more efficient as carriers opt not to utilize uncompetitive terminals. This applies even if the terminal in question is a subsidiary company. Competitiveness is based on quality of the service rendered and price.

Figure 3-4 Liner Carriers: Logistics Services



Source: International Transport Forum, 2009

Figure 3-4 above indicates the interaction between global networks, service providers, carriers and terminal operators. Apart from transaction costs, there are various other costs incurred by a carrier. These include ex-ante costs, which occur prior entering a contractual agreement and ex-post costs also known as lock-in costs, which arise after an agreement has been concluded. Carriers require high levels of reliability to ensure that the ex-post costs remain low at any given time. By having an integrated service a carrier can reduce uncertainty and guarantee services.

3.5 Vertical Integration Explored

New forms of cooperation between LSCs and various intermediaries within the transport value chain have aided carriers' integration. The notable examples of such arrangements include contractual agreements, minority stakes, joint ventures and mergers & acquisitions (Notteboom & Merckx, 2004). Carriers attempt to leverage their services to develop capabilities, which distinguish them from their competitors. The notion of integration in liner shipping stems from the economies of scope. This simply means that it is relatively cheaper for one organization to produce multiple

services as opposed to two different organizations. This explanation a direct translation of the economies of scope formula:

$$C(Y_1; Y_2) < C(Y_1; 0) + C(0; Y_2) \quad (3.1)$$

Where:

Y = represents the different services rendered

C = Cost

Given that carriers utilize networks, when combined with the concept of economies of scope this, enhances a LSC's operational efficiencies. Essentially this is where value creation occurs, thereby reducing transaction costs for LSCs. Given the market dynamics and changing needs of shippers, a carrier can have the ability to tap into this demand and become established as a global service provider. According to (Heaver, 2001) integration yields three important benefits for carriers these include:

- 1) Demand complementarity, this essentially is an extension of the transportation leg to include both the sea and land leg;
- 2) Opportunity for cost reduction and shared expertise, economies of scope highlight the bundling i.e. joint costs through sharing resources the overall transaction costs are reduced and;
- 3) Enhanced visibility or market power, through portfolio diversification a carrier is able to increase visibility and market share.

Carriers can provide three different types of services by integrating vertically in the transport value chain. These service types include: terminal operators, intermodal operations and logistics services. These have been mentioned in the chronological order based on how well LSCs have managed to extend their offerings. Logistics is the last entry indicating that that LSCs are yet to be fully established in this role. The relationship of LSCs and terminals is more pronounced with an increase in volumes moved. LSCs have home markets and preferred port choices. This may be attributed to preferences, collaborations and history. For example, MSC base is in Antwerp (Belgium), while Maersk Line base is Rotterdam (Netherlands) and Bremerhaven (Germany). The selection of these home terminals is primarily based, on the hinterland connections and the network base of LSCs' clientele. What is important for both MSC and Maersk Line is that their home terminals have relatively low congestion, sufficient depth to accommodate larger mother ships (i.e. Panamax, Post-Panamax and Super Post-Panamax vessels), good proximity (i.e. geographic location) and hinterland access (i.e. connectivity), as approximately eighty percent of their imports is cargo destined for Germany.

The need for door-to-door and port-to-port services resulted in LSCs extending their offerings to include intermodal operations. This allowed carriers to establish a competitive advantage, through the provision of extended services. While there are synergies in the value chain, there are also differences in the nature and management of LSCs and service providers. LSCs value reliability and flexibility but only benefit from economies of scale when a vessel is optimally loaded. This is why it is important for LSCs to have detailed and well planned network economies. On

the other hand, service providers' KPI's are based on availability. It could be argued that a carrier is in a better position to manage both functions. In the sections below, the author focuses on the pricing benefits for carriers by controlling and bringing these two offerings under one umbrella. Vertical integration has been the main type of integration discussed. However, this does not imply that horizontal integration does not occur. Carriers can exploit the benefits of horizontal integration through technical cooperation agreements. Such agreements have aided the survival of the shipping industry. There are numerous agreements a carrier can adopt: vessel pooling consortiums, joint ventures, coordinated services, equipment sharing and slot charter agreements.

Table 3-5 below gives an overview of the various offerings and subsidiaries of LSCs, in the liner shipping industry. When a carrier enters intermodal operations, this is usually through collaborations with rail and inland operators through outsourced contracts, thereby allowing LSCs to benefit from such shared-resource operations without having to invest in the required infrastructure. If the intermodal operations are considered the subsidiaries are actually collaborations with existing established operators. LSCs do not actually own the intermodal operators.

Table 3-5 Group Subsidiaries in Port Handling, Intermodal and Logistics

Group	Carrier	Port Handling	Intermodal	Logistics
AP Moller Group	Maersk Line	APM Terminals	ERS	Maersk Logistics
CMA-CGM	CMA-CGM		RSC Progeco LTI France CMA Rail Link	CMA-CGM Logistics TCX Multimodal Logistics
CSCCL	CSCCL	China Shipping Terminal		China Shipping Logistics
NOL	APL	APL Terminals		APL Logistics
NYK Group	NYK Line	Terminal & Harbour services		NYK Logistics
MOL	MOL			Logistics
Hanjin	Hanjin Shipping			Hanjin Logistics
OOCL	OOCL	Terminal Operations		OOCL Logistics

Source Fremont, 2009

Integration in this case is solely to enhance a LSC's positioning through providing extended services. Maersk Lines intermodal subsidiary is European Rail Shuttle (ERS) while CMA-CGM intermodal subsidiary is CMA Rail Link. By controlling and monitoring such activities, a carrier is in a better position to monitor container movements. This also allows carriers to plan their networks and optimize their

container flows better. Essentially, LSCs seek seamless flows of container movements from origin to destination, which saves times and provides carriers with flexibility through modal choices.

Maritime economics has grown exponentially due to globalization and delocalization of factories and plants in low-cost countries, in particular the Asian region. During the mid 1990s, significant restructuring occurred within portfolios of LSCs as they experienced aggression from terminal operators and progressive competition from forwarding agents. As a result, carriers were seen expanding and diverging from their core business. It is important to note that some carriers are in shared global networks while others are mere independent (i.e. stand-alone) business entities. This is largely dependent on the nature of a group or the way a LSC is structured. The AP Moller group together with the Neptune Oriental Lines (NOL) control and manage their subsidiaries as profit centres. Each subsidiary prices its services independently and seeks to maximize profits. For instance, Maersk Line can opt to use a competitor's terminal if the pricing and service rendered is more favourable. The turnover from these subsidiaries, in particular the carrier and terminals is well documented in company annual reports accessible from the respective websites. However, this information is not readily available when logistics service providers are considered. When assessing reports in the maritime sector there is no clear distinction made between inland, intermodal operations and logistics. Carriers can convert market uncertainty to probability, which in turn can be converted to revenue gains. As mentioned before, carriers operate on a fixed schedule irrespective of whether the vessel is full or not; scheduled sailing must prevail.

Table 3-6 below shows the top twenty-five global service providers, of which NYK Logistics is the only LSC present. Maersk Line falls within the top forty and it was ranked 38th in 2008. The top three service providers: DHL Logistics, Kuehne+Nagel and Schenker Logistics have retained their positioning over the past three years. Of these three Kuehne+Nagel is the only maritime forwarder, the remaining two provide both air and sea freight forwarding services. It is interesting to note that freight forwarders outperform LSCs, yet it is carriers that own the asset used to transport cargo. LSCs sell most of their capacity to direct shippers and freight forwarders/forwarding agents. One then questions why carriers continue to buy larger vessels when it is clear that they are unable fill them. Selling capacity is business, in the sense that carriers make money from it. However, to have service providers make more revenue from an asset they do not own indicates poor management on the part of carriers.

Table 3-6 Top 25 Global Logistics Providers

Rank	Global Service Provider	2006	Rank	Global Service Provider	2007	Rank	Global Service Provider	2008
1	DHL Logistics	\$30,015	1	DHL Logistics	\$32,523	1	DHL Logistics	\$39,900
2	Kuehne + Nagel	\$14,919	2	Kuehne + Nagel	\$25,179	2	Kuehne + Nagel	\$20,220
3	Schenker Logistics	\$14,000	3	Schenker Logistics	\$10,552	3	Schenker Logistics	\$12,503
4	UPS Supply Chain Solutions	\$7,706	4	Geodis	\$3,456	4	Geodis	\$9,700
5	Panalpina	\$7,200	5	CEVA Logistics (TNT)	\$6,032	5	CEVA Logistics (TNT)	\$9,523
6	C.H. Robinson Worldwide	\$6,556	6	Panalpina	\$10,424	6	Panalpina	\$8,394
7	Geodis	\$5,016	7	Altadis/Logista	\$7,800	7	Altadis/Logista	\$8,190
8	Agility Logistics	\$4,900	8	C.H. Robinson Worldwide	\$5,972	8	C.H. Robinson Worldwide	\$7,130
9	Expeditors Int'l of Washington	\$4,626	9	Agility Logistics	\$5,625	9	Agility Logistics	\$6,316
10	CEVA Logistics (TNT)	\$4,600	10	UPS Supply Chain Solutions	\$5,911	10	UPS Supply Chain Solutions	\$6,293
11	NYK Logistics	\$4,200	11	Expeditors Int'l of Washington	\$5,235	11	Expeditors Int'l of Washington	\$5,650
12	UTi Worldwide	\$3,561	12	DACHSER & Co.	\$4,422	12	DACHSER & Co.	\$5,377
13	Nippon Express	\$3,400	13	DSV	N/R	13	DSV	\$5,531
14	Hellmann Worldwide Logistics	\$3,300	14	UTi Worldwide	\$2,265	14	UTi Worldwide	\$4,896
15	Wincanton Logistics	\$3,300	15	Sinotrans	\$4,034	15	Sinotrans	\$4,757
16	EGL Eagle Global Logistics	\$3,217	16	NYK Logistics	\$4,597	16	NYK Logistics	\$4,723
17	Penske Logistics	\$3,050	17	Wincanton	\$4,422	17	Wincanton	\$4,331
18	ABX Logistics Worldwide	\$3,037	18	Bolloré	\$5,163	18	Bolloré	\$4,330
19	Sinotrans Limited	\$2,900	19	Hellmann Worldwide Logistics	\$3,563	19	Hellmann Worldwide Logistics	\$4,209
20	Ryder System	\$2,597	20	Rhenus & Co.	\$4,170	20	Rhenus & Co.	\$3,940
21	Thiel Logistik	\$2,496	21	Toll Holdings	\$3,128	21	Toll Holdings	\$3,125
22	Caterpillar Logistics Services	\$2,400	22	J.B. Hunt Transport Services	\$2,681	22	J.B. Hunt Transport Services	\$3,088
23	Fiege Logistics	\$2,300	23	Logwin	\$1,620	23	Logwin	\$3,081
24	Kintetsu World Express	\$2,288	24	Kintetsu World Express	\$2,481	24	Kintetsu World Express	\$2,991
25	Hub Group	\$1,610	25	Penske Logistics	\$2,860	25	Penske Logistics	\$2,910

Source: Compiled by Author adapted from Logistics Management

What is evident is that LSCs have placed more emphasis on technology systems in terminals and intermodal operations than logistics. Over the years LSCs have managed to integrate their services; however this took approximately two decades. Table 3-7 below shows how LSCs have integrated their services over the years. The pioneer of change in the liner shipping industry was Sea-land in the 1970s when it entered the intermodal services and logistics in the 1990s. Maersk has since acquired this company. P&O Nedlloyd (P&ONL) also took an aggressive approach with respect to terminal operations in 1999 and entered into logistics in 2005. It could be argued at that time, when these pioneers attempted to integrate, the market was not as receptive as it currently is towards integration. At that time LSCs were protected under conferences and most LSCs concentrated on their core business.

Table 3-7 Carriers Integrated Services

Carrier	Intermodal	Terminal	Logistics
Maersk	Maersk 1980	Maersk 1980	Maersk 2000
	Sea-land 1970	Sea-land 1965	Sea-land 1990
		P&ONL 1999	P&ONL 2005
MSC	-	2001	-
CMA-CGM	2000	2002	2002
Evergreen	Entry unknown	1980	2007
Hapag-Lloyd	1999-2004	2001	1980-2004
COSCO	1990	1995	2002
APL	APL 1979	1972	1997
	NOL 1997	-	-
CSCL	1998	2001	1998
NYK	1985	1972	2000
Hanjin/Senator	1989	1986	2001

Source: International Transport Forum, 2009

The takeover of APL in 1997, allowed NOL to venture into logistics and stevedoring, through aggressive financial operations. It is important to note that certain liner carriers were reluctant to enter logistics such as MSC, CMA-CGM and Evergreen. Only recently has CMA-CGM changed its focus to include logistics. Nevertheless, the gap between the established leaders and followers remains considerable. It is important to consider the control and degree of power a carrier has on a logistics subsidiary. In most cases, LSCs do not directly control this function. It is interesting to note that despite some carriers having control of their subsidiaries, the logistics divisions have remained completely independent business units. In other words, this function serves as a strategic tool to boost turnover for a carrier. It is important for functions to have autonomy and control. However, given that LSCs are not well established in logistics, they can consider pricing as a strategic tool by adopting product bundling. This can be achieved by combining the shipping and logistics elements; as a result LSCs can transfer their competitive advantage in shipping through bundling and adopt holistic pricing.

Dynamic changes within the industry, global demand and competition have made forced LSCs to adapt their strategies with time. The model of integration indicates that carriers can integrate on three levels: highly integrated, latecomers and de-

verticalization. It should be noted that the role of home markets, geographic focus, range of services, power & control and organizational structure affect the degree and depth of integration. LSCs can opt for either an aggressive or a conservative approach to integration. Table 3-8 below illustrates various models carriers adopt with respect to vertical integration within the logistics sector. A distinction is made between the highly integrated carriers and the followers in liner shipping. Followers' have adopted a more conservative approach, as these carriers outsource their logistics to 3PL operators. On the contrary, highly integrated carriers have adopted a more aggressive approach and offer numerous services through an extensive network. The other factors which affect the model of integrated a LSC adopts include: home markets, geographic focus, range of services, power & control and organizational framework. A carrier's power and control factor can be mixture of both a Wholly Owned Subsidiary (WOS) and a Joint Venture (JV) or a JV and a 3PL.

Table 3-8 Models of Vertical Integration in Logistics

Factors	Highly Integrated		Followers		De-verticalization
	Linear Path	Aggressive Path	Alliance Members	Port-to-Port	
Home Market	Very Strong	Weak	Strong	Strong	-
Geographic Focus	Global	Global	Multi-regional	Local	-
Range of Services	Wide	Wide	Quiet Poor	Very Poor	-
Power and Control	WOS	WOS	WOS and JV	JV and 3PL	3PL
Organizational Framework	logistics unit	logistics unit	logistics unit	no logistics unit	disinvestment & refocusing
Examples	NYK, MOL, K-Line, (APL), (Sea-land)	Maersk Line, NOL	COSCO, Hanjin, OOCL, (P&ONL)	MSC, CMA-GM, Evergreen, CSCL	Hapag-Llyold

Source: Midoro & Parola, 2006

Table 3-9 below indicates LSCs' depth of integration by means of a score which ranges from 1.18 (which indicates the lowest integration level) to 5 (which indicates the highest integration level). From Table 2-9 it is clear that most carriers are freight integrators, however the degree of establishment differs. Highly integrated carriers are found predominately within the European and Asian continents. Furthermore, Asia has a greater number of second tier integrators in comparison to Europe. However, Asia remains the only continent where some carriers have not developed into freight integrators. The Middle-East and North America progress is identical in terms of the LSCs' advancement into freight integration. South America has the limited development in freight integration when compared to the other continents.

Table 3-9 Carrier Freight Integration Levels

Shipping Line	Score	Nationality	Comment
AP Moller Group	5.00	European	Highly developed freight integrators (8)
COSCO	4.80	Asian	
Evergreen Group	4.50	Asian	
CMA-CGN Group	4.48	European	
NYK Group	4.29	Asian	
K Line	4.25	Asian	
P&O Nedlloyd	4.17	European	
Mitsui-O.S.K. Lines	4.13	Asian	
CSCCL	3.89	Asian	Companies developing towards freight integrators (9)
Hanjin	3.83	Asian	
Hyundai M.M.	3.81	Asian	
OOCL	3.77	Asian	
APL	3.56	North American	
Zim	3.16	Middle East	
MSC	3.10	European	
Hapag-Lloyd	3.06	European	
Yang Ming	3.04	Asian	Companies with little development towards freight integrators (13)
Hamburg-Sud Group	2.96	European	
CSAV Group	2.88	South American	
Grimaldi	2.83	European	
UASC	2.73	Middle East	
Crowley	2.72	North American	
CP Ships Group	2.63	North American	
IRIS Lines	2.35	Middle East	
Libra Companies	2.32	South American	
MISC	2.21	Asian	
Costa Group	2.18	European	
Delmas Group	2.12	European	
Pacific Int. Lines	2.1	Asian	
DAL	2.06	European	Not developed towards freight integration (4)
RCL	1.53	Asian	
Wan Han Lines	1.42	Asian	
China Navigation Com.	1.21	Asian	
Gold Star Line Ltd.	1.18	Asian	

Source: Notteboom & Merckx, 2004

3.6 Bundling Options

Product bundling within the transportations sector should occur within these services: THC, warehousing, container services, container logistics, cargo logistics, value added services and hinterland operations. Services rendered by carriers revolve around three types of logistics: container, vessel and freight. LSCs place a lot of emphasis on container logistics, which consists of optimizing container fleet management (Fremont, 2009). This is understandable as carrier's fleet/vessels represent a significant portion of capital investments.

Container logistics play a crucial part given the imbalance of trade, thereby providing carriers with an option to extend their services through carrier haulage. It is relatively easier for carriers to coordinate and monitor the imbalances within their network flows than freight forwarders. Container logistics play a very important role, as carriers need to optimize the repositioning of empty containers. Repositioning of containers is a crucial component in freight rates. Either a LSC or a forwarder can render a haulage service. When forwarders do the inland haulage (i.e. merchant haulage), this hampers the turnaround time of containers, as carriers do not have full control of information. Carrier haulage is predominately found in the United Kingdom (UK) and North America, where forwarders have lost their control in this regard. However, in Europe and Asia, the role of forwarders remains strong and competitive in service provision.

Vessel logistics simply refers to the efficient operation of a LSC's fleet. It is important that carriers minimize operational costs and maximize revenues, to recoup their investment. Furthermore, carriers need to ensure that they carry optimal container loads to cover the fixed cost portion of running a vessel at any given time. While a carrier's primary objective is to move containers from origin to destination, this goes hand-in-hand with vessel logistics.

Freight forwarders and LSCs both provide freight logistics. Carriers occasionally operate on contracts for volume-based shipments. In this case, the movement of these FCL is done through carrier haulage, as there is no need for a freight forwarder to consolidate. These types of arrangements work well with carriers as they fill up slots and provide LSCs with guaranteed utilization. In addition, the voyage is fixed over an agreement period, thereby creating essential volumes for inland/hinterland services. However, in most cases shipments will require some type of second handling, consolidation, warehousing and repacking. In such cases, a freight forwarder deals with LCL and consolidated FCLG cargo. The technicalities of how full a container is are not important to a carrier, which seeks a fully laden vessel. Given the differences in operations, when a LSC wants to enter into service provision a logistics company will provide that service on its behalf. The rationale is that the business nature (i.e. freight logistics) of carriers and forwarding agents are very diverse and different.

The notion of bundling is very important in logistics as proven by the presence of third party service providers. Bundling is the ability to combine two unrelated complementary services. A multi-modal operator can combine land and sea transport operations. It is interesting to note that carriers normally quote an inclusive charge for services rendered within its network extension. Of course, a shipper is not bothered by the intricacies of how the shipment arrives. What is merely required is a one point of reference, this is how the role of service providers was created and

established. Carriers can utilize multi-modal transport; they can combine deep-sea shipping with inland waterways or rail/road for the final leg. This all depends on a carrier's flexibility and cost structure. Bundling in and of itself creates a more complex picture in the transport value chain.

The rationale for bundling could be based on the opportunity for a LSC to differentiate a service and effectively utilize price discrimination. Bundling allows service providers to consolidate prices such that a shipper is unable to pinpoint the exact portion pricing. This type of option would benefit carriers particularly in current market conditions. Based on Acciaro & Haralambides, (2007) there are four types of market players with respect to bundling, these include the following:

- 1) A pure liner shipping company, in this case the core business of the carriers remains maritime transportation;
- 2) An integrated liner company, these companies have intergraded vertical and offer hinterland services;
- 3) Third party service provider linked to a liner company, in this case a liner carrier has a subsidiary which services as an independent service provider and;
- 4) A pure third party logistics service provider, these companies are not connected or affiliated with a specific carrier; ocean transportation is bought independently from all carriers.

Freight forwarders are essentially convenient buyers of carriers' capacity. As a result, forwarders receive preferential rates and in turn they guarantee and provide crucial volumes for LSCs. Undoubtedly, forwarders also venture into logistics to make money from the service. However, there is room for forwarders to influence prices. Forwarders receive preferential rates from LSCs and then sell this capacity to customers at a margin. If LSCs cannot fill their vessels, why do carriers continue to invest in larger vessels? While such vessels can bring LSCs economies of scale, forwarders seem to benefit more from this than LSCs do. In an attempt to gain economies, LSCs sell their competitive advantage to freight forwarders. One then questions if a reduction in slot costs, is worth this opportunity cost. Haralambides (2005) states 'carriers continue to build larger vessels in pursuit of the holy grail of economies of scale, when they know in advance they are not able to fill them; and what do they do next? They sell the space to integrators, giving them in this way the knife that will stab them in the back, is this rational. They should instead build smaller ships and try to fill them intelligently; in co-operation with their alliance partners.' incidentally this is the predicament the liner industry finds itself in. While it can be argued that freight forwarders are LSCs' customers, the opposite is also true, they are also their competitors. Carriers sell capacity to freight forwarders (i.e. their customers) who then compete directly with them for shippers. LSCs have unintentionally placed freight forwarders in a position of advantage. Carriers should rather concentrate on technical agreements, which focus on capacity pooling within the liner shipping industry. This may be a better solution than selling their advantage to freight forwarders.

The year 2008 started off a good year in liner shipping, the freight rates were high and carriers awaited delivery of larger vessels. The financial crisis then turned into a global recession which affected carriers in an unprecedented manner. Freight rates dropped so low that carriers were barely surviving. The impact of freight

forwarders can have an adverse effect for LSCs, especially when market conditions push downwards. LSCs sell capacity to forwarders at discounted rates and this has an impact on the overall freight rates. By serving as agents (i.e. the middle-man) freight forwarders buy cheap capacity and sell it at a premium. Given the current recession LSCs need to ensure that their vessel utilization is sufficient to ensure economies of scale. As a result, LSCs continue discounting their rates to freight forwarders to retain these volumes. This has a spiral effect as the current freight rates are unsustainable and LSCs are unable to cover their fixed costs. LSCs can no longer use the market as a benchmark for freight rates; if they do forwarders will continue to disadvantage them. If carriers lack foresight they could potentially end up bankrupt. As much as forwarders fill vessels for carriers, they have also contributed to the demise of liner shipping through pricing twitching. It goes without saying that the rising freight rates were bound to fall. However, the manner in which this occurred serves as a signal that perhaps bundling can give back some control and reliable measures to protect carriers.

It is important to note that the overall objective must be to reduce transaction costs (i.e. holding costs of goods), improve efficiency in the transport value chain or reduce transportation costs for shippers (i.e. the customer). While bundling may be convenient for a shipper it could result in shippers paying. Such services are offered and rendered because there is a demand for them. Shippers are generally price inelastic; this may be attributed to the fact that shippers are unaware of the actual price of transportation and the technicalities which underlie the value chain. One could argue that the price increase in bundling is based on the quality of the service rendered in comparison to a services offered in isolation. It could also be argued that this is how a carrier controls the total end-to-end supply chain. LSCs are able to reduce the turnaround lead times for delivery as processes can be synchronized more effectively; shippers should pay for the provision of such a service.

Furthermore, it is common practice for service providers to outsource the function. In most cases, the smaller service providers are actually cheaper from a cost standpoint. However, they still deliver an indifferent service. The shipper ideally benefits through lowered coordination costs and compensates the carrier for absorbing such risk. Bundling remains a viable option for carriers, if managed properly this could see a significant shift of market share towards carriers in service provision. Bundling creates a complex market structure, as it allows integrated and non-integrated carriers to compete on the same platform. This results in more management structures such as 4PLs, which ensure the function of the service provider is delivered effectively given the diversity of bundled portfolios.

Competition is based on how well a bundle is mixed which also shows the degree and depth of integration. Various scholars argue that when a bundle is priced, the individual components must be considered separately. Of importance is the ability of a bundler to acquire lower prices for outsourced functions. In most cases, it is cheaper for a service provider to outsource terminal and intermodal operations given the capital-intensive investment requirements. With respect to pricing, it is important to note the true value of a service. If a carrier is in a position to provide discounts to its customers then this can be factored in. However, it should be noted that there is a price for offering such integrated services. This can explain why carriers, which are not directly linked to any service providers, have done so well in the past; they understand the notion of compartmental pricing and cross-subsidization.

One then questions why service providers are better pricing masters than LSCs. This can be partially explained by the differences in these two industry objectives. Service providers understand the notion of price elasticity of transport and capitalize on pricing, whenever the opportunity presents itself. It is assumed that bundling will afford a shipper the same price of individual components, this is not true. Service providers actually premium price these bundles. Based on Acciaro & Haralambides, (2007) this price is relatively higher than the actual separated cost of each component. Shippers benefit from bundled services as they render flexible value added offerings. By bundling services for shippers, service providers can actually acquire a comparative advantage. It is evident that carriers with integrated services are more inclined to logistics services. If the annual reports of LSCs are to be considered, the impact of venturing into logistics remains to be seen. The exceptions to this are Maersk Line, NYK Line and NOL/APL.

Table 3-10 Liner Shipping Companies Extended Services

Group	US\$ Billion	Shipping	Terminals	Logistics	TEU Million
AP Moller	51.2	21.1	2.5	3	13.6
NYK Line	20.7	5.2	1.1	4.3	?
CMA-CGM	11.8	11.5	-	0.3	7.7
NOL/APL	8.6	6.7	0.6	1.3	4.7
MOL	8.5	-	-	-	-
Hanjin	6.5	-	-	-	3.6
OOCL	5.6	-	-	-	4.6

Source: International Transport Forum, 2009

Table 3-10 shows LSCs and subsidiaries in relation to the services offered by carriers. Note that NYK Lines turnover is not as significant as AP Moller but if the global logistics service providers' figures are considered, NYK Line has tremendously out-performed the AP Moller Group. It is important to compare like-for-like as this makes the analysis more objective. NYK Line is a LSC while AP Moller is a group as a result such comparisons are skewed and biased. MSC, Evergreen and Hapag-Lloyd remain the only carriers which do not have a logistics subsidiary when the top ten LSCs are considered.

Table 3-11 Services offered by Logistics Service Providers

Operator	Total (%)	Freight Forwarding		Intermodal	Logistics
		Air	Maritime		
DHL Logistics	100.0	21.9	14.1	13.8	50.1
Kuehne+Nagel	100.0	23.6	39.8	14.7	21.5
Schenker	100.0	47.8	0.0	41.0	11.2
Panalpina	100.0	48.7	36.8	0.0	15.8

Source: International Transport Forum, 2009

Global service providers move significantly much less volumes in TEU than LSCs, but make more on the logistics portion in terms of pricing. Table 3-11 shows the portion logistics contributes to service providers' turnover: Schenker 50%, Panalpina

85.5%, and Kuehne+Nagel 63.4%. These are the traditional forwarders, whose core business is freight forwarding. Schenker is an airfreight forwarder while the last two are mixed forwarders: air and sea freight. DHL Logistics is more focused on the logistics than freight forwarding and intermodal operations. However, DHL Logistics still competes competitively when it comes to these two functions.

3.7 Summary

Chapter 3 gives an analysis of the liner shipping industry. International trade drives liner shipping and the trend in the past years has seen unprecedented growth. This has resulted in some carriers expanding their core business into other services in the transportation value chain. Liner shipping has evolved over the years as carriers have moved away from the conventional setup under conferences, to a more competitive one under volatile and unpredictable freight rates. This chapter introduces LSCs' value addition options through vertical, integration and network economies. The synergies of integration are explained together with the three types of logistics available to LSCs. The concept of bundling is explained in detail, and how carriers can utilize this strategic tool to price competitively within the transportation value chain.

This chapter explores prepositions 3 and 4 in detail; the remaining preposition is dealt with in Chapter 4 Liner Shipping Integrated Options.

CHAPTER 4 LINER SHIPPING INTEGRATED OPTIONS

4. Introduction

Integrated pricing is a new concept with respect to LSCs. The previous conference system protected and allowed carriers to capitalize extensively on economic rents and producer surpluses. Conferences created a viable system immune to market failure, as freight rates within the liner shipping industry remained controlled and fixed. LSCs could plan investments well in advance as carriers knew beforehand what they would receive for services rendered. While conferences negatively affected the economic interaction of markets, the system ensured carriers of steady and predictable rates. Conferences in essence protected carriers, as they had the ability to influence prices.

The liner shipping conference system had been in place for 133 years. On the 18th of October 2008 the EU abolished conferences. Had the conference structure still been in place European carriers would have been protected from the global downturn. The industry now subscribes to the maritime services guidelines. One could question why shipping was initially protected. The argument, in this research, was to deter carriers from adopting marginal cost pricing irrespective of vessel capacity. In order for carriers to keep pre-advertised schedules, a ship must leave port regardless if it is full or not (Haralambides, 2000).

In a market with so many uncertainties, fixed contracts provide carriers with some normality. Fixed contracts are independent of demand fluctuations. As a result, these provide carriers with fixed volumes over a specified period. Over the past five years the demand for liner shipping has grown tremendously aided by the increase in international trade. Furthermore, freight rates increased to an all time high and the over inflated prices which resulted in excessive revenues. Carriers then re-invested this excess liquidity in extra vessel capacity. Given LSCs' relationship with financial institutions, carriers had easy access to loans. Unfortunately, the lack of foresight together with the anticipation that freight rates would continue to rise resulted to poor financial management; culminating in carriers' over financing their vessels. The liner shipping industry now faces an excess supply of vessel capacity, which creates an imbalance between supply and demand. This excess capacity has a negative impact on freight rates. Given the dampened freight rates LSCs' poor liquidity has increased their operational risk; thereby exposing carriers further (DVD-Bank, 2009).

The industry's protection can partially be attributed to the high capital investment requirements, the need for economies of scale, risk and uncertainty of carriers' expansion operations. The maritime industry analysis indicated carriers' initial reluctance to enter logistics. The exception was P&O Nedlloyd, who undertook a rather aggressive approach to integration. During that time integrated services were not an important venture as freight rates were stable, a feature emanating from the conference schemes which protected carriers. However, this is no longer the case. Carriers now seek to extend their services in search of offerings that can provide them with stable and predictable sources of revenue, given the volatile and unstable freight rates. This chapter explores the last preposition, i.e. preposition 5.

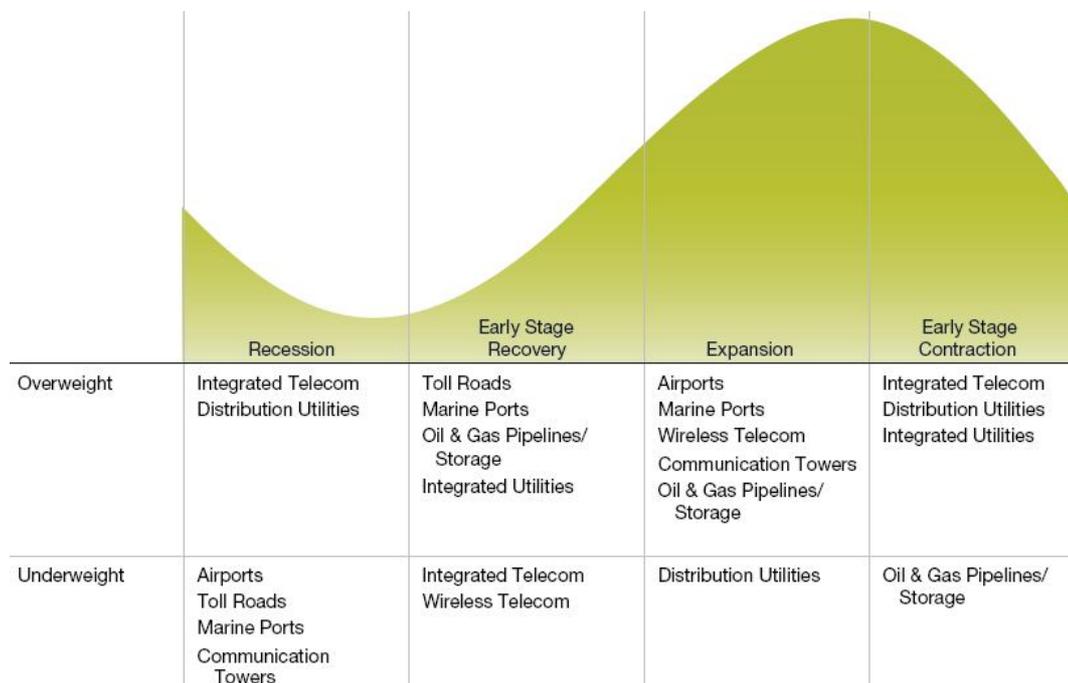
4.1 Resource Management

Preposition 5: How can carriers' influence and challenge competitors through vessel/capacity leasing?

LSCs can adapt various strategies and utilize revenue management to assist them survive periods of economic downturn. LSCs need to leverage themselves over their competitors as every carrier within liner shipping is exposed to the same market conditions. The only way carriers can differentiate themselves is through the strategy they adopt based on their organizational competencies. LSCs need to make better revenue management decisions. In a market with repressed freight rates carriers need to adopt survival tactics. Despite what the market dictates in terms of freight rates, LSCs need to ensure they only provide a service which covers its fixed costs and ensures carriers remain going concerns in the near future.

Figure 4-1 below illustrates the industry's infrastructure economic cycles. The maritime activities: maritime economics, port operations and integrated services fall into the early stage recovery phase. The National Bureau of Economic Research, (2009) states that over the last 10 cycles the recovery and expansion stages, on average, have lasted over five times longer than the contraction and recession stages.

Figure 4-1: The Economic Cycle and Infrastructure Investments



Source: Duff & Phelps, 2009

The liner shipping industry has a lot to learn from the airline industry in terms of tailor-making revenue management systems to suit its needs. In both industries, freight forwarders control the clientele base and carriers are heavily reliant on their customers (i.e. freight forwarders) who are also their competitors. According to (Duff

& Phelps, 2009) a typical economic cycle consists of four major phases with each exhibiting certain characteristics:

- 1) Recession: indicates shrinking demand, revenue and profitability declines, excessive leverage is troublesome, deflation is the worry, interest rates are low, commodity prices drop;
- 2) Early stage recovery: indicates modest pickup in demand, revenue and profitability stabilize, leverage is reduced, worries turn to inflation, interest rates remain low, commodity prices are low and then rise;
- 3) Expansion: indicates demand grows, revenue and profitability soars, leverage increases, inflation is a concern, interest rates peak, commodity prices peak and;
- 4) Early stage contraction: indicates growth in demand slows, revenue and profitability flattens, excessive leverage is a threat, inflation peaks, interest rates begin to decline, commodity prices decline.

In an effort to leverage their distinctive resource, LSCs should adopt a strategy of tying services assuming that market is competitive. The rationale for this is that LSCs use their competitive advantage in shipping where they are not as established as global service providers, for example in value added services. Monopolists engage in tying to benefit from enhanced efficiencies, improve their positioning and market power. This can be achieved through: price discrimination, cost-savings, quality control and leverage (Slade, 1998). LSCs should tie their services thereby stipulating if customers require goods moved through maritime shipping, by default they utilize their intermodal and extended services. Tying can have the same cost-saving effects just as vertical integration. Blair & Kasserian, (1978) indicate that when a LSC utilizes price discrimination it places emphasis on the role of complementary products. However, under cost-saving a LSC places emphasis on substitutes. LSCs need to place more emphasis on their logistics services as global forwarders services are their direct competition that provide customers with substitute alternatives. As a result, LSCs remain unable to enjoy the full monopolistic rents from maritime economics as customers mostly utilize carriers for the sea leg of the transportation value chain.

When a monopolist exercises power in one market to gain an advantage over rivals in another market the traditional leverage theory is implicated. The leverage theory is explained hereunder using a carrier's perspective. A carrier can offer its customers a service (**s1**) at cost (**c1**). Global service providers compete directly with this LSC and offer service (**s2**) at a cost of (**c2**). In the absence of tying, the demand for (**s1**) denoted $hMonopoly(p1,c2)$, where (**p1**) is the price of (**s1**) and (**c2**) is the price of (**s2**). In the event of tying the demand for (**s1**) changes to $h1Tying(p1,p2,c2)$, where $p = (p1,p2)Tying$ is the vector of prices set by the monopolist and (**c2**) is the price of (**s2**) in the competitive sector. In this case, the LSC has no control of the overall market from (**s2**). The LSC adopts a take-it-or-leave-it strategy which forces customers to take both services as they are tied together irrespective if the customer wants the service. In the event a customer requires service (**s1**), there is no alternative provider for service (**s2**). The tied demand for (**s2**) is $h2Tying(p2,p1,c2)$. As a result, the tied demand for (**s2**) is independent of (**s1**) and (**p1**).

Therefore, LSCs profits in the absence of tying and under tying are as follows:

IN THE ABSENCE OF TYING:

$$\pi_{\text{Monopoly}}(p_1) = (p_1 - c_1)h_1 \text{Monopoly}(p_1, c_2) \quad (4.1)$$

UNDER TYING:

$$\pi_{\text{Tying}}(p_1, p_2) = (p_1 - c_1)h_1 \text{Tying}(p_1, p_2, c_2) + (p_2 - c_2)h_2 \text{Tying}(p_2, p_1, c_2) \quad (4.2)$$

The leverage theory also places a lot of emphasis on a LSC's brand and reputation building. Limit pricing can also explain carriers' behaviour within the liner shipping industry. While liner shipping is an attractive and lucrative sector, it has very little if any new entrants. It could be argued that LSCs adopt limit pricing to make the industry unattractive for 'real' new entrants. Limit pricing discourages new entrants, together with the vast capital-intensive requirements. Although limit pricing is intended to assure that power remains intact for a longer period, it also yields an offsetting allocative gain to the extent it brings the monopolistic pricing closer to a perfect competition level (Grimes, 2007). LSCs can strategize and capture this potential loss through another market by tying two of their services. In this case, LSCs can limit price in the shipping sector and capture the potential lost monopoly profit through value added services. By adopting this type of pricing together with leveraging a carrier's distinctive competency a LSC can benefit from various sectors of the transport value chain. Based on Haralambides et al, (2002) when LSCs integrate into the transport value chain, their investments in dedicated terminals can be perceived as a form of limit pricing. This is so because existent carriers make the operation so unattractive in terms of operating costs such that new entrants remain unwilling or deterred from entering the sector.

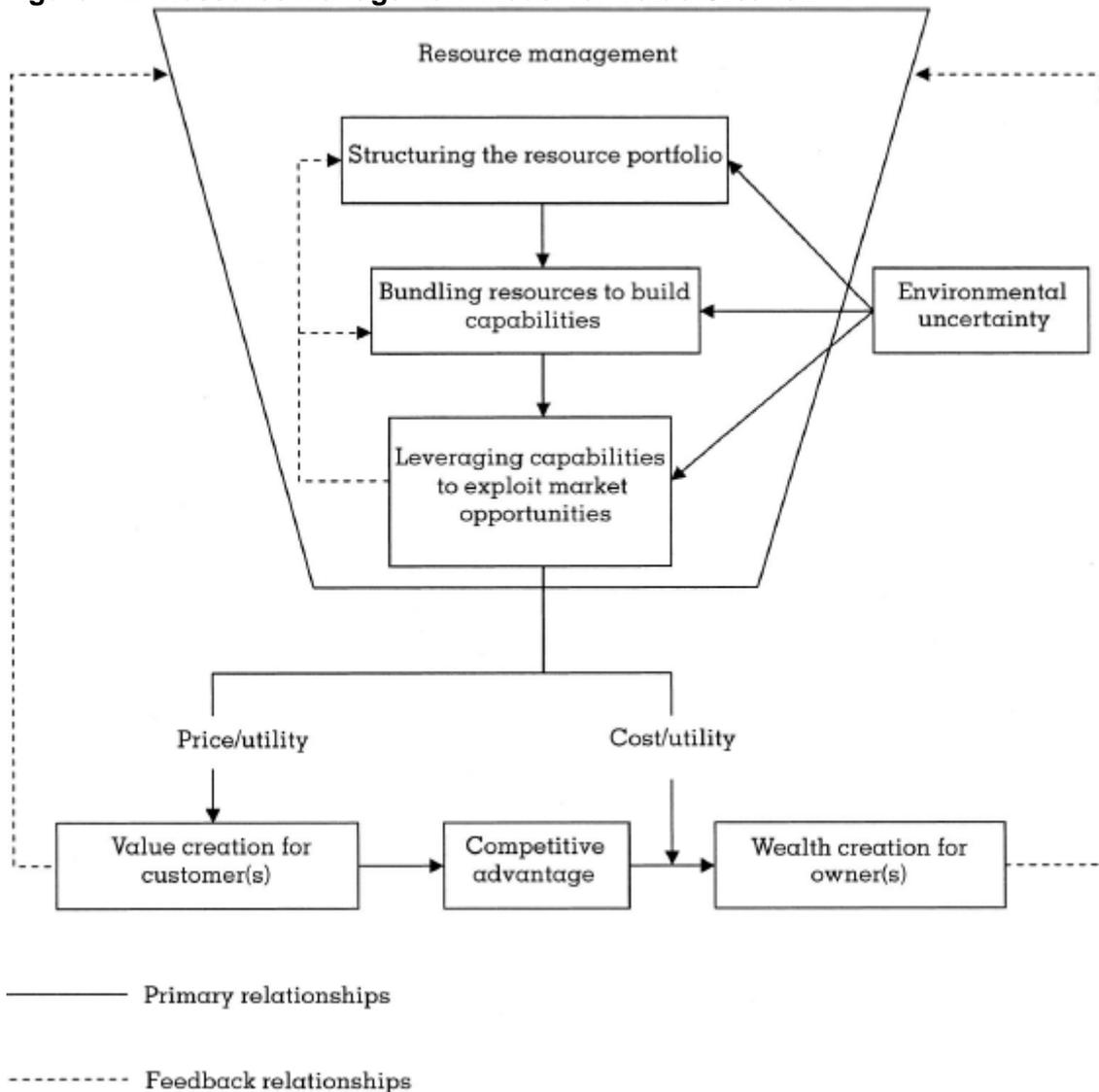
Parent companies may have an impact on a carrier's ability to manage its resources effectively. A parent company's strategy can potentially affect a LSC's ability to effectively tie its services, especially in cases where subsidiaries are viewed as separate entities. One good example which portrays this is the AP Moller Group; while each entity is profitable, the group would do much better as a whole if certain functions were more integrated. Maersk Line is an established freight integrator. However, its logistics function fails to compete effectively with other global service providers as indicated in its ranking of the 2008 global service providers.

Resource Management (RM) involves a comprehensive process of structuring the firm's resource portfolio, bundling the resources to build capabilities, leveraging those capabilities with the purpose of creating and maintaining value for customers (Sirmon, Hitt, & Ireland, 2007). Maersk Line has an extensive global network, which is its competitive advantage over its competitors. NYK Line's competitive advantage over other competitors is its positioning as a global service provider; as every other LSC has failed to adequately establish itself. Each LSC has a distinctive competency over global service providers, which lie in its capital-intensive vessels. If LSCs can harness this capability subject to their technical agreements, network and extended services, carriers will be in a better position to adopt holistic integrated pricing.

Essentially RM requires carriers to evaluate the profitability of their resources in terms of costs in relation to revenues. Accurate and adequate fleet management is one of the most important requirements for LSCs, who need to constantly reassess

their fleet position i.e. scrapping vessels which have reached their sell by date, and ordering new ships which have less operational costs than old ships. LSCs should exploit all possibilities within the transport value chain to extend their services. This can be achieved through cross-subsidization, bundling and tying services. Carriers need to have effective and competitive strategies, which allow them to leverage their resources and RM, allow a carrier to model its services to achieve this objective. Figure 4-2 hereunder illustrated the RM model LSCs can utilize to create value added services.

Figure 4-2: Resource Management Model for Value Creation



Source: Sirmon, Hitt, & Ireland, 2007

Competitiveness within various sectors in the transportation industry is very diverse. For instance, maritime shipping is a very traditional industry, while logistics is more unconventional from an operational standpoint. The investment costs and financing schemes are also every different for these two sectors; as LSCs are asset based, while 3PL are non-asset. For carriers to do well in other sectors, they need to adopt

appropriate management structuring to ensure survival and maximize revenue as opposed to profits. Shipping investments are similar to port infrastructure investments, in the sense that these are long-term. Given their long-term view, the LSCs investment criteria are based on prices: which option is cheaper to lease infrastructure or to take ownership. This is contrary to how service providers operate, who place emphasis on the quality of the investment returns, which are relatively short to the medium based. In essence the question service providers ask, is how much the investment can yield and under what turnaround times?

4.2 FOB Verses CIF: A Carriers Perspective

Carriers need to be able to adapt promptly to changes within the industry. LSCs can accomplish this through mixing and distinguishing when to carry more or less of certain cargo types. The International Chamber of Commerce, (2009) defines an incoterm as a standard trade definition used in international sales contracts. During the transportation of goods the following incoterms are used: Free on Board (FOB) and Cost Insurance & Freight (CIF). Foreign trade (2009) states under FOB the supplier remains responsible to ensure that the goods reach the designated loading point. The supplier uses a freight forwarder to transport merchandise to the port from the designated point of origin. Under CIF, the supplier makes all the necessary arrangements to transport goods from origin to destination.

Imports are booked under the FOB term, these are goods of high value, which may be perishable i.e. time sensitive. On the contrary, exports are booked under the CIF term, implying low value cargo. Freight fluctuations have an impact on the cargo volumes traded (i.e. FOB verses CIF bookings). When freight rates are high exporters (i.e. suppliers) will hold onto their goods, until rates are extremely low so they can benefit from this. Given that, they are responsible for the transportation of goods under the FOB term. When freight rates are low there will be a surge in imports as shippers (i.e. importers) attempt to get their goods before the freight rates increase. In times of crisis, a carrier would want to ensure that its balance of cargo mix is correct. That is, a carrier would want to move more FOB shipments than CIF; as a carrier does not make much from moving low value products.

Due to the zero freight rates in the major trade routes, carriers are attempting to find alternative means of revenue. The recent Across-the-Strait Shippers' Alliance meeting held on the 26th of June 2009 in Shenzhen, addressed some tactics carriers have adopted in an effort to make money. In an attempt to make money, LSCs have resorted to increasing their THC imposing additional surcharges. For example, Maersk Line and other carriers have increased their THC for mainland China. Interestingly enough some carriers have introduced an emergency bunker surcharge within the Asian trade routes, regardless of the booking terms (i.e. FOB or CIF). OOCL has introduced a container seal fee for Hong Kong and South China. The current liner shipping operations under zero freight rates has resulted in abnormal competition.

In a bid to make money, carriers have resorted to 'alternative' tactics, which involve unreasonable surcharges from the FOB exporters and CIF importers to recover their losses. It is clear that carriers within the liner shipping industry need a platform to discuss price sustainability under the current market conditions. It is unfortunate that

carriers cannot discuss freight rates, as this would be seen collusive attempts to influence the price which is prohibited under the European antitrust agreement.

4.3 Liner Shipping Pricing Options

Prior to October 2008, conferences were responsible for price negotiations. Nevertheless, some liner carriers remained independent as non-conference members. Within conferences, carriers belonged to specific councils, which negotiated the general rate increases for specific trade routes. However, market conditions now determine freight rates. The intricacies of pricing within the liner shipping sector are based on the commodity type, as some goods have high values but low volumes like electronics and telecommunications. While other goods like paper and scrap metal are heavy low values goods, which occupy a large surface area on a vessel. As a result, shippers of high volume cargo receive discounts while low value cargo is premium priced; all this being based on the weight as less cargo can be loaded on a vessel. LSCs' quotes include a description of the product transported, which allows a carrier to cross-subsidize. Shippers without any optimal volumes pay the regular freight rates. However, those with optimal base loads obtain preferential rates, based on the constant cargo flows which carriers receive over a specified period. A detailed discussion on service contract agreements is made later within this chapter.

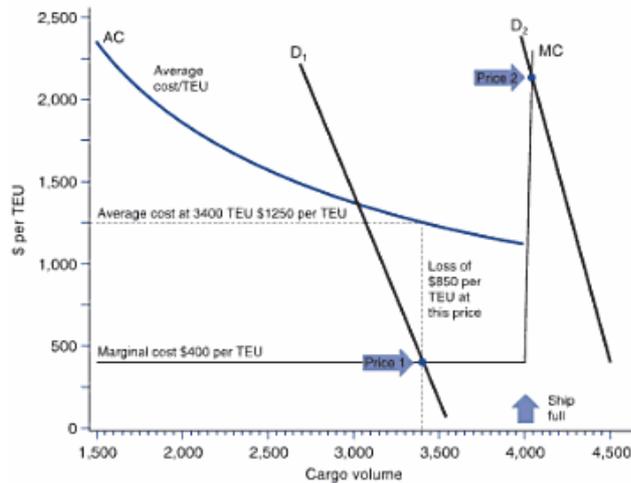
Liner carriers operate on a fixed regular schedule, irrespective of whether a vessel is fully loaded or not. Thus, resulting in high fixed costs for carriers in terms of the number of vessels required to service a specific route. The ratio of variable costs to fixed costs is small in liner shipping. As a result, full cost pricing is practiced in a way that the price must be equal or greater than the average total cost (Abrahamsson, 1968). For a carrier to make a profit, the revenue generated must be sufficient to cover the incurred Average Cost (AC). A distinction is made between the short-run and long-run with respect to operations of a carrier operating in a free market. A carrier can attempt to control its prices through Marginal Cost (MC) pricing, fixed cost pricing or through price discrimination (i.e. revenue/yield management).

When a carrier prices to MC, the cost recovery aspect covers the cost of loading a container but not the cost of providing such a service. In other words, the short-run MC only reflects the additional cost of a service. If a carrier does not carry containers, it does not incur any cost. The long-run AC corresponds with the MC of an additional service, based on vessel's capacity. In Figure 4-3 below the vertical axis indicates the cost per TEU in US dollars while the horizontal axis shows the cargo volume in TEU. The demand curve (**D1**) represents a situation when there is more shipping space than cargo to carry. As a result, carriers compete for the limited cargo, which causes freight rates to decrease to US \$400/TEU. This price is below the AC and the carrier loads 3400 TEU thereby, making a loss of US \$850 per container.

When a vessel is not full, the MC of accepting an addition container is US \$400/TEU indicated by **Price 1**. However, when a vessel is fully laden the MC increases to US \$2250 indicated by **Price 2**. When demand exceeds vessel capacity, shippers tender for slots resulting in an increase of price to US \$2250/TEU. Of importance, is the L-shaped MC curve, which is horizontal until cargo volume of 4000 TEU thereafter it becomes vertical increasing the price from US \$400 to US \$2250/TEU.

In addition, the AC decreases significantly when a vessel is optimally laden as illustrated in Figure 4-3 below.

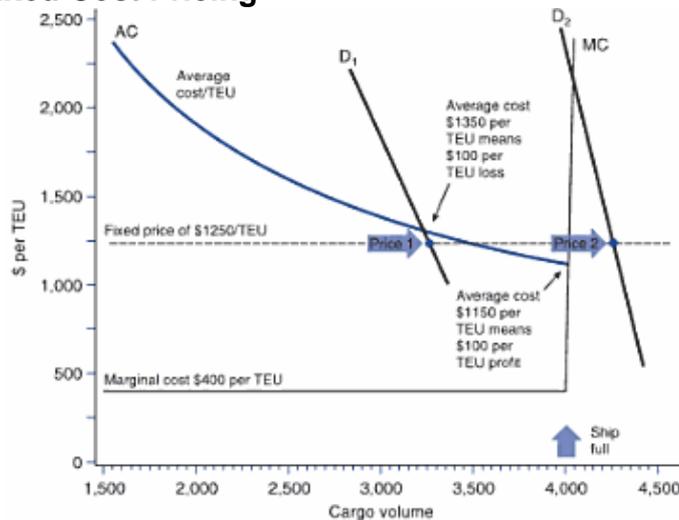
Figure 4-3 Marginal Cost Pricing



Source: Stopford, 2009

Carriers can also fix prices as an alternative as indicated by Figure 4-4 below. In this case, a carrier fixes prices above the AC to benefit from premium pricing. Assuming prices were fixed at US \$1250/TEU in the event of an economic down turn, demand would fall from 4000 TEU (D₂) to 3500 TEU (D₁). If the market experiences a boom given an assumed price of US \$1250, the cargo volume would then increase to 4250 TEU (D₂). Hence a carrier at full capacity i.e. 4000 TEU would make five million US dollars (i.e. 4000*US \$1250). A carrier would make much less in this case compared to the MC pricing alternative. However, by fixing prices a carrier is able to ensure constant cash flows, reduce losses during economic downturn and maximize revenue during economic boom.

Figure 4-4 Fixed Cost Pricing



Source: Stopford, 2009

The third option of price discrimination is yield/revenue management, defined as an integrated management of price and inventory to maximize the profitability of a company (Ting and Tzeng, 2004). The two different strategies of MC and fixed pricing both have merits and demerits. Essentially what is required is the best of both worlds which is a hybrid pricing scheme. Different cargo types have different values, low value cargo is cheap to transport but carriers make very little from it. Carriers prefer moving high value goods as they can price such cargo more competitively. In addition, LSCs can carry more of this cargo as it has no weight restrictions, given such cargo is light in nature. During booming cycles, freight rates work in favour of carriers. However, during economic down turn carriers need to price based on the actual cost of moving goods and not market rates. When freight rates fall dangerously low such that market rates fail to cover their costs, this could potentially force some LSCs out of the liner shipping industry.

Carriers use service contracts as LSCs have an increased stake in volume stability. The fundamental nature of service contracts is that shippers agree to provide carriers with minimum volumes of cargo over a designated period of time for agreed prices (Neel & Gooding, 1997). The predominant trade routes in liner shipping include Europe Far-East where most fast growing emerging economies and manufacturing factories are located. The other significant trade routes include Trans-Pacific and Trans-Atlantic. The future of liner shipping is summarized best by Neel & Gooding, (2001) who state competition remains incapable of regulating the liner industry because of its structure outlay. Therefore, self-regulation remains the next best feasible alternative. Furthermore, a competitive liner market could conceivably be organized, but the volatility of freight rates would cost shippers more due to inefficiencies. The problem essentially remains in the administration of the market in relation to rate fluctuations; this makes a competitive market unsustainable in the long-term.

The pricing strategies LSCs adopt are dependent on two principles: price stability and price discrimination (Stopford, 2009). What is evident is that carriers need to ensure that they minimize losses during recession periods, and maximize profits during booming periods. During periods of economic turmoil carriers need to apply dynamic game theory tactics to ensure competitors maintain prices at optimal levels. This should be done to ensure that the industry remains viable, as destructive pricing could potentially lead in a prisoner's dilemma. In good business cycles, the liner industry needs to maximize revenue to subsidize for periods of poor business. However, this is difficult given high levels of vessel investments and financial covenants (i.e. the high loan-to-value figures) LSCs have.

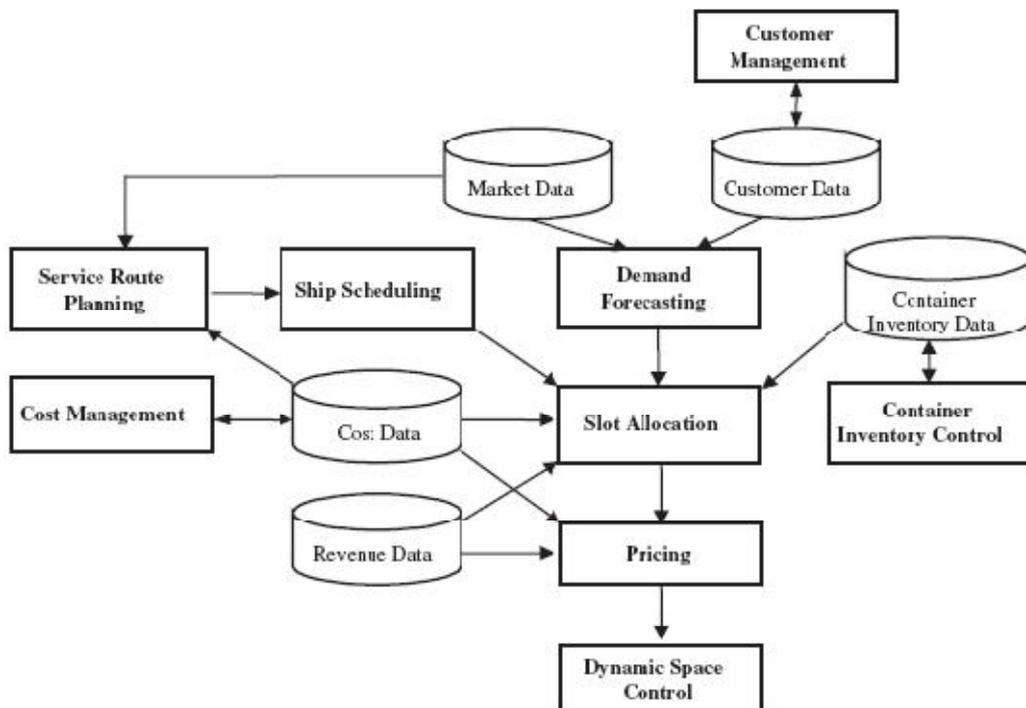
4.4 Liner Shipping Revenue Management System

When a carrier utilizes a revenue management system, it converts uncertainty into probability, thereby enhancing certainty concerning revenue maximization. Optimizing price discrimination is rather tricky in the case of a carrier. Hence pricing must not be compartmentalized as in the airline industry, but a more integrated approach is required. A carrier ought to sell capacity indiscriminately to all its customers and only utilize discrimination in other sectors of the value chain, where a clear dominance is lacking. However, carriers have one main problem uncertainty of the freight rates. To build a revenue management system for a LSC a conceptual model for Liner Shipping Revenue Management (LSRM) is required. This entails a

slot allocation model through mathematical programming to maximize freight contribution (Ting & Tzeng, 2004). This model places more emphasis on the freight contribution instead of the freight revenue. In essence, it allows full costing to occur which is more holistic but also more complicated.

If carriers are to improve on this the establishment of a LSRM solution must be adapted to each LSC's unique requirements, based on its strategy. This requires an integrated operation of long-term customer management, cost management, route planning, ship scheduling, short-term cargo demand forecasting, container inventory control, slot allocation, pricing and dynamic space control (Ting & Tzeng, 2004). By adopting a slot allocation problem this solves part of a carrier's problem. For the carrier to gain a competitive advantage in logistics its dominance in the liner sector must provide leeway for better positioning elsewhere in the transport value chain.

Figure 4-5 Revenue Management System



Source: Ting & Tzeng, 2004

Revenue management in liner shipping is very complex and would require a detailed and holistic view, as it entails bundling into other sectors and transfer pricing. In addition, carriers must find alternative ways of making shippers utilize their complete services as opposed to LSCs fragmented services. Through uncompromised contract prices and discounted road haulage, inland short-sea shipping, warehousing and THC carriers may be able to accomplish this. A comprehensive (i.e. in terms short-term operations and long-term planning), LSCs encounter the following problems:

- 1) Cost-reductions and freight rate competition;
- 2) Inappropriate pricing strategies and;
- 3) Empty container repositioning problems.

Carriers have various different types of customers: direct shippers, NVOCC and other LSCs who seek resource-pooling options. As a result, carriers need to sell slots/capacity based on their customers' willingness to pay. The problem of determining the optimal cargo rates translates into determining the optimal rate breakpoints for ranges of chargeable weight at a market commodity and service type levels. According to Vinodn & Narayan, (2008) this involves a process consisting of three distinct steps:

- Estimate elasticity of demand, this is the change in demand with respect to the change in price and can be determined with a polynomial distributed lag model based on cargo booking;
- Determine the average optimal rate for each market commodity together with customer service level and;
- Translate the average optimal rate into the standard cargo rate sheet.

Carriers have independent freight rates, which fluctuate with every different combination of origin-destination trade route. Slot allocations for routes which are not frequently serviced, tend to be higher due to the lack of competition on those particular trade routes. Feeder vessels call the less serviced routes, while the larger mother vessels call main transshipment ports. It should be noted that demand is not deterministic. There is some correlation between Gross Domestic Product (GDP) growth and the cargo flow movements; as a result a lot of estimation occurs when carriers plan.

Carriers allocate space on vessels based on agent requests and cargo demand for specific routes. Each trade routes slot allocation is complex as carriers need to ensure that, with each port call it has optimal container volumes. Another factor which has an impact on LSCs operations is the distribution of empty containers which are less profitable to transport. Hence, LSCs have to factor-in this cost due to the trade imbalances. Essentially the slot allocation problem is how carriers maximize the total freight contribution from the whole voyage. The impact of the abolishment of conferences caused freight rates to fall, however the full extent of this is currently mirrored by the global recession. Table 4-1 below shows the progression of agreements within liner shipping over time. What is interesting to note is the shift from merely price agreements, to stability agreements and strategic alliances.

Table 4-1 Liner Shipping Agreements

Year	Form Cooperation	Price	Technical
1875	Maritime Conferences	X	
1966	Consortiums		X
1992	Stability Agreements	XX	
1994	Strategic Alliances		XX

Source: Cariou, 2003

Table 4-1 above shows the various agreements LSCs have entered into over the years. Carriers can be party to these agreements; however this is subject to the rules and laws of specific regions. In addition, carriers can also be members of a

conference, which operate with antitrust immunity. Carriers can also be consortium members these are effectively operational agreements between carriers aimed at technical, operational, or commercial coordination. Carriers in the US can operate under discussion agreements these are information exchanges between carriers in conferences between freight rates, costs, capacities and conditions of service on specific routes. However, such agreements are prohibited within the EU. As mentioned before carriers can be members of global alliances covering specific trade routes. Alliance members cooperate through shared networks, routes pooled vessel capacity, etc. Technical/stability agreements based on the degree of horizontal integration and partnership collaborations include:

- Slot charter agreements;
- Coordinated services;
- Equipment sharing;
- Vessel pooling consortiums and;
- Joint ventures

If LSCs analyzed their services from an integrated perspective, carriers would be in a better position to seek alternatives which in-turn would allow them more effective pricing. Carriers should have the ability to utilize pricing structures and forecasts, to enable them to maximize pricing within various sectors of the transport value chain. This can be achieved by focusing on the needs of their customers and providing a more holistic offering. By providing a more holistic offering (i.e. offering integrated services), carriers can reduce their total average costs. LSCs can also increase their profits and increase their market share through the provision of value added services. Freight integration is the ability of transport service providers to arrange full loads (i.e. truck and/or container), door-to-door services by selecting and combining the most sustainable and efficient mode(s) of transport (ZLU et al, 2003). Integrated services provide an optimal one-stop-shop solution for shippers. In addition, integrated services provide carriers with an avenue to price competitively, given the limitation of price competition within the liner shipping industry. Integration allows carriers to differentiate their service offerings on quality, coordination and value addition.

The framework for strategies for LSCs with intergraded service should include considerations on the depth of integration. Considerations should be based on the carrier's perception of its customer's needs and its ability to deliver such extended services. A LSC should consider the geographic coverage, the range of services it can offer adequately, its resources (i.e. tangible and intangible assets), the scale of operation based on its network, the cost and quality of its services which has an impact on its pricing, its market share, its revenue and Return on Investment (ROI). Global carriers have diverse strategies and based on Notteboom & Merckx (2004) these include:

- The provision of line hauls: which ships build, own, lease, charter, flag out, or contract management;
- Feeder operations: build, own/lease, charter, common-user;
- The container box fleet: build, own, lease, grey-box;
- Terminal operations: own, lease/exclusive, use/dedicated terminals, preferential berth, common user terminals;

- Inland transport road/rail/barge: own, lease, contract supplier, common-user and;
- Value added activities: freight forwarding, warehousing and distribution.

This current economic turmoil requires carriers to adapt their strategies to seek control transport costs and the volumes they move. Freight integration can achieve this. Pricing in transportation varies across different sectors of the value chain. If a holistic perspective is considered, the costs can be broken down as follows: cost from origin, port(s) of loading & discharge and place of delivery. Carrier charges include the following:

- Ocean freight charges, which is the actual cost of moving a container from place of origin to place of destination;
- Sea freight additional charges, which cover unforeseen costs a carrier incurs:
 - a) Bunker Adjustment Factor (BAF) accounts for the operation cost of fuel for a specific route
 - b) Currency Adjustment Factor (CAF) covers the volatility of exchange rate
- Other surcharges depending on the region, which can include the following:
 - a) Low Sulphur Fuel Surcharge (MAR)
 - b) Suez Canal Transit Charge (SUZ)
 - c) Peak Season Surcharge (PSS)
 - d) Gulf of Aden Surcharge (AGS)
 - e) War Risk Surcharge (WRS)
- THC, which cover the charges for loading and discharging a container;
- Container charge, which is the price for using a container for transporting goods from origin to destination;
- Port dues, which is the price a vessel pays for entering and leaving a port;
- Cargo additional charge, which occurs with special type containers, like reefers which require a genset, or open top containers which can only be positioned on deck of a vessel and;
- Service charge, which includes additional services rendered by carriers, for instance inland charges for getting the container from the supplier to the port, customs clearance, storage, transshipments etc.

In the event of carrier haulage, this cost is included in the freight charges. However, if merchant haulage occurs the carrier will only concentrate on port-to-port carriage. Evergreen and MSC are the only two carriers within liner shipping whose core business are port-to-port operations. Other factors, which are crucial in the pricing, are the container size, which can be TEU/Forty-foot Equivalent Unit (FEU) of dry cargo or forty-five foot high cube container which can either be dry cargo, reefer, or special feature. Container prices are very expensive in China but almost free in the US and Europe due to the trade imbalances. Therefore, the cost reflects the surplus or deficit of container availability and the type of container required. Another important factor to consider is the type of transportation required after the deep-sea leg, as this has an impact on the total cost i.e. inclusive price. When multi-modal transport is used there are various modalities which can be used these include: inland transport, trucking through road networks/highways, barges through inland waterways and trains through rail networks. Inland haulage charges are calculated

per kilometre travelled and zip/postal codes. Intermodal transporters can levy the following charges to a shipper:

- WTI, which is an inland haulage with waiting charges due to general congestion or customer influenced delays;
- T1D, which is a documentation charge with carrier haulage;
- MST charge, to cover additional cost associated with multiple stops on an inland move;
- Pick Up/Drop Off (PIO), which is a service of picking up or dropping off container at customer's nominated location and;
- DCI charges, associated with truck waiting time caused by general congestion or customer influenced delays.

There are different types of arrangements a service provider can make with respect to slot chartering. For instance, Kuehne+Nagel may want to buy 1000 TEU slots from Maersk Line. It is immaterial whether the service provider actually utilizes all the capacity. Maersk Line will charge a slot charge for reserved space/slots known as 'take-or-pay'. LSCs pricing should reflect the deep-sea freight rates, but this is usually discounted when haulage and containers are not required. A carrier can also enter short stability agreements with other carrier on specific trade routes. This is capacity pooling, as a carrier may not have adequate capacity to fill the available slots. Such arrangements are more prominent on the less serviced routes for instance on the Europe Africa trade. Of importance is that LSCs make money per shipment (i.e. container) as slots are sold per service. Freight forwarders, on the other hand, charge for handling LCL. These include the warehousing to port, consolidation, overseas customs and stuffing together with rigging.

The more intergraded LSCs investment criterion is complex; hence it ignores the notion of revenue management. Given that the larger carriers have the ability to call transhipments ports; it is difficult for LSCs to predetermine their cargo from that of competitors. The elements that create this difficulty lie in transhipment factor as well the empty container repositioning. A liner shipping company may have 500 international depots and may distribute its container from a central location. The regional and local offices then pool the containers required by their locations respectively. For instance, Havana in Utrecht, (Netherlands) might have a surplus of containers, while Genoa (Italy) has a deficit. This does not necessarily mean that the European region will sort itself out. In fact, in most cases it is cheaper to ship empties (i.e. containers), as opposed to haulage (i.e. trucking).

For example, if the cost for shipping a container is €150 per move, the inclusive price for loading and discharging will be €300 while road haulage is approximately €400. Essentially, what happens is that carriers end up resorting to intercontinental exchanges to redistribute containers. This is a more viable strategy from a cost factor than haulage/trucking. As a result, carriers attempt to incentivize shippers to export from areas with excess containers to areas with container shortages. Therefore, exports to Asia are priced relatively lower as these containers are freely available. While the opposite is true for Asian imports where freight rates include factored container deficit charge (i.e. a repositioning fee). However, carriers cannot over do this adjustment fee as they could potentially lose customers if competitor carriers fair more cheaply.

After the abolishment of conferences in October 2008, the liner shipping industry had excess capacity due to free lending and poor investment criteria selection by carriers. Initially the freight rates within the liner shipping industry did not reflect supply and demand. As a result, freight rates took a knock and the recession further compounded the decrease in freight rates creating problems for LSCs. In a bid to survive the recession carriers have resorted to price undercutting, to ensure that their slots are bought. The danger of this is that, LSCs do not necessarily make huge profits due to carriers' investments in new vessels. Furthermore, it is difficult for highly integrated carriers to calculate their revenue on specific legs, so carriers make a comparison between leasing verses owning. Followers/less integrated carriers have a better feel of revenue analysis in comparison to the larger carriers. This is primarily due to the feedering done which is less complicated as there is no transshipment component.

The maritime sector has been adversely affected by the recession, which is clear from the volatile freight rates. Sea freight rates fell by 2.4% from October to November in the US. The most affected service remains inland short-sea shipping with a decrease of 9.1%, deep-sea freight shipping prices fell by 3.3%. According to (Batz, 2009), the forecasts for the US maritime shipping indicate that average prices will fall by 2% in the first quarter of 2009.

The best performing sector in Netherlands is the airfreight sector, while the worst performing sector is maritime economics. The Netherlands Freight Transport Report, (2009) estimates the following for the fourth quarter: airfreight will grow by 0.9%, rail freight by 0.6%, pipelines together with road haulage by 0.5%, sea freight will be hardest with growth down to an average of 0.3% and inland waterway by 0.2%. Since the last quarter of 2008, freight rates in the liner shipping industry fell by over 80% due depressed global trade (Freight-Transport, 2009). In an effort to boost depressed freight rates, Maersk Line increased its rates in May 2009 for the following routes: Northern Europe, North Africa, Mediterranean, Middle East and South Asia. Rates increased to US \$100 per TEU and US \$200 per FEU. Carriers are independently increasing their freight rates as the current market rates are clearly unsustainable for LSCs in the long-run.

Table 4-2 highlights third quarter freight rate increases within liner shipping sector. The East West bound trade freight rates increased from US \$377 to US\$466 during June to August 2009.

Table 4-2 Freight Rates for various Trade Routes 2009

Item	Trade Route	Effective Date	Amount
BAF	Asia Europe Trade W/B & Asia Europe Trade E/B	Jun 1, 2009	USD337/TEU or USD16.85/CBM
BAF	Asia Europe Trade W/B & Asia Europe Trade E/B	Jul 1, 2009	USD395/TEU or USD19.75/CBM
BAF	Asia Europe Trade W/B & Asia Europe Trade E/B	Aug 1, 2009	USD466/TEU or USD23.3/CBM
BAF	North Europe/Bangladesh, India, Pakistan, Sri Lanka	Jun 1, 2009	USD337/TEU
BAF	North Europe/Bangladesh, India, Pakistan, Sri Lanka	Jul 1, 2009	USD395/TEU
BAF	North Europe/Bangladesh, India, Pakistan, Sri Lanka	Aug 1, 2009	USD466/TEU
BAF	North Europe/Bangladesh, India, Pakistan, Sri Lanka	Aug 1, 2009	USD466/TEU
BAF	Med/Bangladesh, India, Pakistan, Sri Lanka	Jun 1, 2009	USD337/TEU
BAF	Med/Bangladesh, India, Pakistan, Sri Lanka	Jul 1, 2009	USD395/TEU
BAF	Med/Bangladesh, India, Pakistan, Sri Lanka	Aug 1, 2009	USD466/TEU
BAF	Middle East I/B (Jeddah, Jebel Ali, Dubai) on AEC E/B	Jun 1, 2009	USD337/TEU
BAF	Middle East I/B (Jeddah, Jebel Ali, Dubai) on AEC E/B	Jul 1, 2009	USD395/TEU
BAF	Middle East I/B (Jeddah, Jebel Ali, Dubai) on AEC E/B	Aug 1, 2009	USD466/TEU
BAF	Middle East I/B (Jeddah, Jebel Ali, Dubai) on AEM E/B	Jun 1, 2009	USD337/TEU
BAF	Middle East I/B (Jeddah, Jebel Ali, Dubai) on AEM E/B	Jul 1, 2009	USD395/TEU
BAF	Middle East I/B (Jeddah, Jebel Ali, Dubai) on AEM E/B	Aug 1, 2009	USD466/TEU

Source: Compiled by author adapted from Adapted from OOCL website

4.5 Service Contracts Elaborated

Service contracts emerged as an important instrument to secure long-term relationships between carriers and shippers requiring scheduled services covering a global market (Marlow & Nair, 2008). Service contracts are used in the major trade routes i.e. Europe Far-East, Trans-Pacific and Trans-Atlantic trades. Section 21(3) of the Shipping Act defines a service contract as ‘a contract between a shipper and an ocean common carrier/conference; in which the shipper makes a commitment to provide a certain minimum quantity of cargo over a fixed period. The ocean common carrier/conference commits to a certain rate/schedule as well as a defined service level: assured space, transit time, port rotation, or similar service features.’ The importance of service contracts is that they allow a carrier to enter into private agreements with shippers for preferential rates. LSCs utilize two hauls: the head-

haul is the major trade route with a growth rate that exceeds the back-haul. The latter represents the second/return leg trip for a carrier, with limited growth potential opportunities. LSCs segment their market as follows:

- Beneficial Cargo Owners (BCO), these are direct shippers/importers;
- NVOCC, these are freight forwarders who normally move Freight All Kinds (FAK) and;
- Scrap sector, which includes bulk products usually paper and waste.

Kirton, (2009) states on average 60% of APL business consists of NVOCC, while 40% is direct contact with BCO and the remaining 10% is bulk cargo (i.e. scrap and paper). For LSCs to be able to offer services at par with global logistics service providers, carriers have to offer not only an efficient port-to-port service but extend their services to cover port-to-door services (Marlow & Nair, 2008). For these extended services LSCs provide significant discounts (i.e. service contracts) based on base-volumes to transnational retailers like Heineken, Wal-Mart's, IKEA etc. The rationale here is that these retailers provide steady volumes, which carriers require on specific trade routes over a tendered period lasting approximately two years. While retailers will never guarantee such volumes, a gentleman's agreement is reached concerning the proposed volumes which can be over or under depending on the agreed cushion. If the Earnings before Interest and Tax (EBIT) figures are taken into account the liner shipping business looks healthy. However, if the income and tax are deducted it is clear that service providers are better off. The cost structure of carriers indicates that this industry has narrow margins refer to Table 4-3 below (note that all costs indicated are calculated as a percent of gross revenue).

Table 4-3 Liner Shipping Cost Structure

Gross Revenue	100%
Cargo Costs	50-60%
Vessel and Voyage Costs	20-25%
Equipment and Repositioning Costs	15-20%
Gross Profit	(5)-15%
Business and Administrative Expenses	10-20%
Operating Results	(25)-5%

Source: Notteboom & Merckx, 2004

The benefit of segmentation allows a carrier to apportion contributions to fixed costs as opposed to profits. During recessions/weak markets vessel capacity exceeds demand. Hence a carrier should be in a position to determine the variable cost associated with moving a container. Based on this, a carrier can be in a better position to determine if it is worth carrying that particular container. The variable costs in question should include the inland charges, the terminal costs from origin to destination, fleet service and the repositioning costs/repo element. When a carrier has a surplus of containers it should repo-out (i.e. send-out containers to other regions) and if it has a deficit of containers it should repo-in (i.e. send-in containers from other regions).

Each carrier must calculate its apportioned costs of moving containers it may be unprofitable to move empties even when the vessel is empty. For instance, if a carrier is being offered US \$300 for repositioning when its calculated variable cost is

US \$500 this carrier would lose money. It is obvious that US \$300 < US \$500, therefore utilization (i.e. whether a vessel is full or not) does not matter. Rather, what should be considered is the cost recovery portion as this makes or breaks a LSC in the long-run. Sophisticated systems are essential for carriers to make such calculations as this requires various components and modal combinations. All carriers have different costs elements and hence their pricing differs per region and per haul. When a carrier can offer a better price in a specific location this is usually aided by the fact that no empty repositioning is required.

The impact of the current world recession has profoundly affected the operations of LSCs. During the fourth quarter of 2008, approximately 30% of the overall capacity was taken out of service, as carriers attempted to get out of charters in an effort to stabilize freight rates by reducing the gap between supply and demand. In periods of downturn LSCs attempt to reduce their costs by taking out capacity (i.e. laying-up vessels) and removing services. Laying-up is a term used for taking a vessel out of service (Manson, 2009). Singapore is one of the busiest ports in the liner shipping sector, in April 2009 South-East Asia anchorage was filling-up with idle vessels, and by July idle vessels were already clogging up Singapore's shores. During a recession it takes very little for carriers to react, for LSCs to get more cargo volumes, LSCs will undercut each other and a price war becomes inevitable. Certain carriers will always be able to offer cheaper rates due to their: size, vessel type, cost structures, global networks, alliance collaborations and partnerships. The problem in most cases is that with a decrease in cargo volumes it becomes difficult to fill larger vessels. While larger vessels offer economies of scale a carrier requires good utilization to fill the vessel to benefit a decrease in slot costs. LSCs are then forced to take some vessels out of service to improve utilization.

In the past China was growing on average 20% based on year-on-year figures, as a result carriers invested in extra capacity on anticipated demand. In response to the increasing share of trade in manufactured goods, the container fleet grew by 12.7% in 2008 alone (UNCTAD, 2008). Containerization has assisted the liner shipping industry to grow immensely as shipping demand is derived. Unfortunately mistiming occurred as all carriers invested in new capacity at more-or-less the same time. This then coincided with the global recession resulting in a significant dip in demand. Within this industry the gap/difference between supply and demand requires monitoring. As increase in this gap/difference has an impact on the freight rates within the industry. When demand increases this is good for carriers as the freight rates continue to rise. However, when an increase in supply occurs, this has a detrimental effect on the freight rates, this is currently evident i.e. too much capacity.

While new capacity is a decision based on the industry market growth this worked well in the past few years as the West-bound trade was booming. However, the unpredicted recession's timing has had an impact on both drivers i.e. demand and supply. Demand drastically reduced and the market was flooded with over capacity. Variables that affect the stability of freight rates: capacity (i.e. supply) and international trade (i.e. demand). The current freight rates are unsustainable. It is therefore more important for carriers to understand their cost structures. This will give carriers a better perspective when analyzing its costs and maximizing revenue. The maritime industry has survived numerous troughs and peaks in the past. The main issue is that the industry is far too fragmented, meaning there are too many carriers competing in the liner shipping market. The industry has consolidated over the years; however this process is not occurring as fast as it should. A reduction in

competitors would allow the sector to effectively control capacity, as all parties involved would be in a better position to understand what their competitors are doing in this regard.

According to (Kirton, 2009) LSCs have not been set back by the abolishment of conferences. This notion brought no surprises. In fact, the end of conferences was merely for regulatory reasons, so carriers could be in line with EU regulation. The compliance with Brussels essentially meant that carriers have individual surcharges i.e. BAF and CAF rates. Therefore, the stability and the uniformity carriers had under conferences were no longer visible. Post conferences meant that NVOCC began to view detailed pricing with the breakdown of THC, CAF, BAF, freight charges, inland charges etc which made the follow-through a rather tedious task. As a result, NVOCC adopted a more holistic approach where only the all-inclusive prices are considered. What is currently evident within the industry is that all carriers are increasing their all-inclusive prices. This has assisted LSCs realign their prices, as carriers' prices are now more-or-less in line with each other from a holistic perspective. However, individual apportioning remains different. Previously terminals were under recovering. After Brussels what is now evident is that full cost recovery, as terminal charges increased by eighty percent.

APL was the second LSC to publish its THC from origin to destination on its website; the first carrier was Hapag-Lloyd. Given the detail required in calculation of THC and that one country can have various ports a LSC can have various THC charges per country. For instance, Germany has four seaports: Hamburg, Bremerhaven, Wilhelmshaven and Rostock. APL therefore, adopted a THC structure per country where both the inbound and outbound volumes are considered, this gives a total throughput per country. To obtain the country THC the total cost (i.e. numerator) is divided by the total volume (i.e. denominator) as shown in the equation hereunder:

$$THC = \frac{\textit{Total Cost}}{\textit{Total Volume}} \quad (4.3)$$

APL's THC, compared to those of its competitors, were relatively lower than the norm on some routes. As a result, APL increased its rates from £63 to £110 to come in line with those of competitors on the Europe Far-East trade route. Maersk Line introduced a radical global formula for bunker charges, for the Trans-Atlantic trade route. This has benefited the industry as there is now a formula for Trans-Atlantic trade, which previously was non-existent. Maersk Line has very low bunker charges; as this carrier has compensated for this with higher freight rates, which bring its all-inclusive price in line with other LSCs.

The NOL/APL group has kept its functional divisions as separate entities (i.e. the carrier aspect and logistics); where each function serves as a stand-alone, essentially APL is a silo-based company. The main objective/KPI is that every stand-alone company does what is in its best interests; therefore emphasis is placed on the individual markets and/or trade lines. However, achieving objectives of an individual trade line may result in sub-optimization for a separate company/function. In this case, a more holistic view can ensure a positive-sum game. Where a mutual interest exists a group with a LSC and logistics subsidiary adopt a combined

approach. This LSC does all the maritime logistics i.e. intermodal operations, terminals and door-to-door services linked with shipping.

The APL spokesperson Simon Kirton concurs with the author, that selling slots at discounted rates is uncompetitive within the liner shipping sector. APL provides door-to-door services through extended inland logistics. If one of its BCO, for example Ford, requires its cargo moved from Cologne to inland China the system will opt for a default multi-modal mix: truck-barge, rail-barge, barge-barge, rail-barge, or truck-truck. These rates are dependent on the routes used and modality combination mix. The carrier then decides what to quote using the contribution per mix. In some cases, a door-to-door ocean rate may be used due to repo-out containers in that specific area. Repo costs are a main cost competent for carriers. While some may argue that carriers must stick to their core business, it should be noted that door-to-door services are driven by market demand. In addition, this provided LSCs with an alternative for steady revenue flows given that the unstable freight rates. The UK is a predominately port-to-port market, however carriers also do the inland haulage. Most of this cargo is from NVOCC which implies the use of FAK. Therefore the carrier has no predetermined knowledge of the cargo type which requires moving.

The reason why carriers provide haulage services is primarily due to their extensive network. This gives LSCs the ability to offer these services at much lower rates than service providers. The haulage charges are therefore stand-alone rates added to the port-to-port charges of carriers. LSCs are largely dependent on service providers who buy slots/space from them. APL has captured and absorbed most its forwarders (i.e. Schenker and Kuenhe+Nagel) markets, if APL would like to extend its market, it would be advisable to opt for another large forwarder like Panalpina or DHL Logistics as opposed to various smaller forwarders. The rationale is that larger forwarders require less servicing than various smaller ones; in addition their cargo volumes are less fragmented.

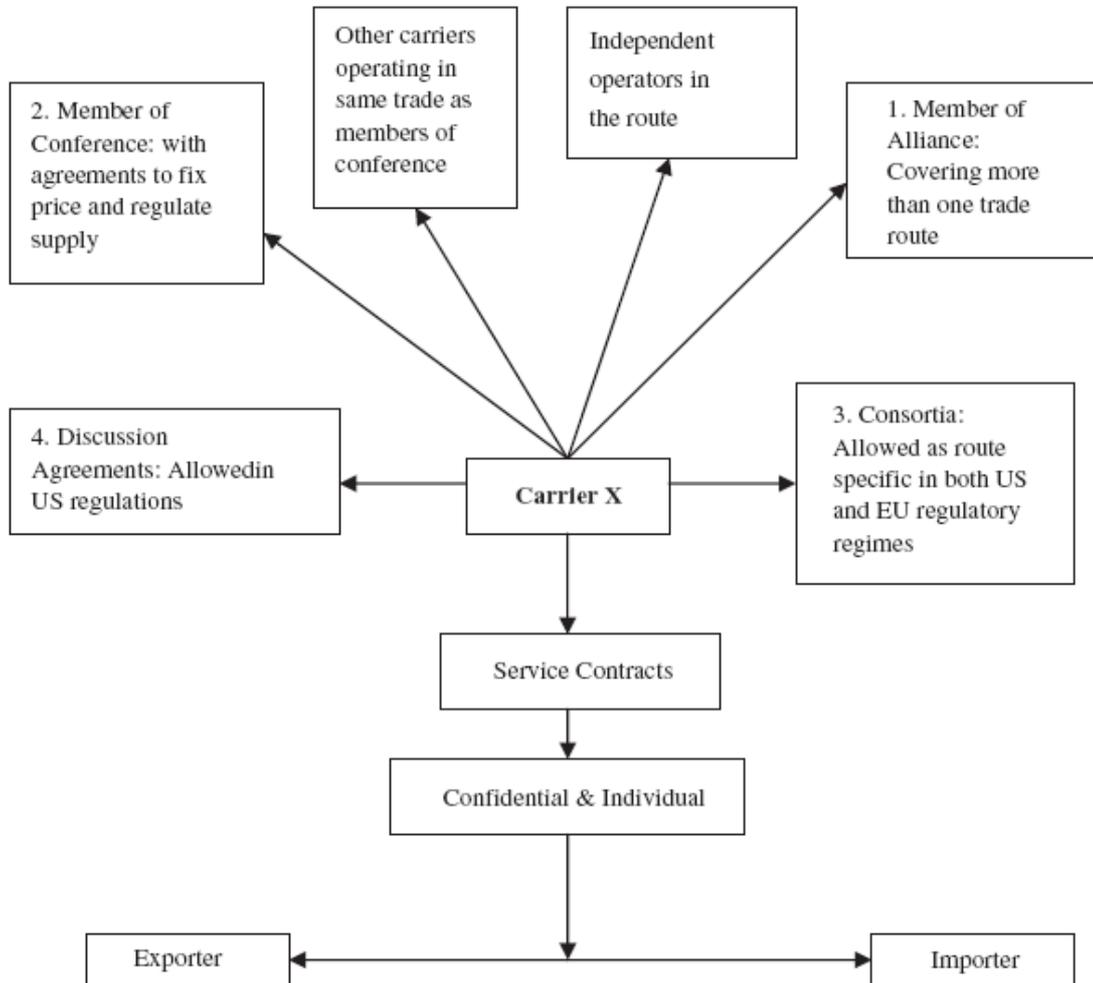
When BOC and NVOCC tender for service contracts and preferential rates, a LSC should not to discriminate on its rates. Rather, a carrier should offer both parties the same price. The only time a carrier should offer different rates is when: the service is already full or when it is offering a different service for instance, as in the case of transshipments. In this case, a carrier can offer a service at less than the Net to Vessel (NTV) contribution factor. However, the contribution factor must always be positive for a carrier to consider venturing into such extended services. When a carrier faces the task of filling slots, what criteria must it adopt to choose between two customers? The answer lies in the NTV, a carrier should ask the following questions: does the customer require high maintenance? If that is the case, a carrier can opt for BCO which has guaranteed volumes as opposed to NVOCC. It should be noted that no direct shipper/BCO have the same rates, as the arrangements are very specific and tailor-made.

Carriers also cherry pick which BOC they want to do business with, for example McLaren, Ford, Heineken, Wal-Mart, IKEA, Tesco or Samsung etc. These BCO provide LSCs considerable base-loads through steady continuous cargo flows over a specified timeframe. To optimize their vessel space, carriers may face high grading choices between two boxes. In other words a carrier cannot carry **Box X** unless the carrier removes **Box Y**. In this case the chosen box (i.e. container) is one where the customer produces the highest return for a carrier. BOC give carriers'

stability in times when the freight rates are unstable, as service contracts are usually long-term i.e. a year or two. NVOCC agreements are usually medium term i.e. three months. The last customer segment for LSCs is scrap product, which has the most volatile rates. It is currently the most profitable product for LSCs but it is also very unstable. Paper accounts for 30% of the world market trade of which APL moves 10%. LSCs have to carry some bulk cargo (i.e. scrap and paper) to fill in the slot gap on their vessels. The agreements with respect to paper are very short i.e. one-month. The ideal mix for LSCs is to transport more BCO cargo followed by NVOCC and less scrap.

LSCs segment their markets per customer, destination and cargo deadweight. Despite certain routes being gravely affected by the recession, some routes actually fared better. The most affected trade is the Asia route due to the adverse impact on both demand and supply. China and India fair much better together with Australia. As a result, carriers can mix their route options where demand and supply is much better. However, this is only possible for smaller carriers offering feeder services. APL is more flexible in this regard if compared to the main soloist players. Its feeder network is neither fixed nor dedicated network and hence the carrier has various alternative options these include: Asia-China, Asia-Europe, or even the Trans-Atlantic trade it can utilize in an effort to fill its vessels. The head-haul normally consists of lightweight cargo, where more can be loaded per ton. The back-haul consists of heavyweight cargo, which normally places weight restrictions on a carrier. Therefore, the mix of cargo carried by a LSC is very important. The recent vessel lay-ups have balanced the gap between demand and supply, however if all these vessels start re-entering the market capacity will again exceed demand. This brings the author back to the notion that this industry needs further consolidation with fewer LSCs. Carriers need for stable freight rates and service contracts indicate the need for collaborations and cooperation within the liner shipping industry. Figure 4-6 hereunder shows a hypothetical case of **Carrier X** utilizing service contracts as a strategic tool, where a LSC is part of an established network irrespective if it is a member of an alliance or conference or independent.

Figure 4-6 Service Contracts as Strategic Tool



Source: Marlow & Nair, 2008

The importance of service contracts is that they facilitate better planning for LSCs as cargo is more or else assured. Given that LSCs face challenges in operating within such a capital-intensive sector, carriers should not constrain themselves to the maritime sector alone. The adoption of service contracts allows carriers to venture into door-to-door services whereby LSCs are more involved in the hinterland and haulage operations. Although LSCs compete with non-asset based freight forwarders and service providers they remain better positioned to provide such extended services.

LSCs face challenges when they enter into non-core business ventures. However, there are some benefits which can arise from this for a LSC in terms of pricing of such services. Carriers essentially have to price their services competitively just as service providers in that specific sector. By bundling their products, carriers can transfer benefits gained in the maritime sector to other services in the transportation value chain, thereby shifting cost variations. The repeal of Council Regulation 4056/86 has affected LSCs and the ability of carriers to discuss price setting possibilities. However, carriers can still use their distinctive competencies to price competitively within other services through cross-subsidization tactics. When the

author did some analysis on this it seemed that the smaller carriers were in a better position than larger ones. This is primarily caused by larger carriers' exorbitant investments in vessels, which erode the benefits derived from liner shipping. Moreover, smaller carriers have better-coordinated services, control and flexibility of their routes, not to mention better revenue systems in place. In particular, followers' (i.e. less integrated carriers) vessel investments are not based on cost options (i.e. which is cheaper buy-or-lease?) But, rather concise revenue calculations on what the vessel can potentially make by deploying it to a specific trade route. Larger LSCs are unable to do this as they do not know what portion of their loads are transshipments or not.

Lloyds, (2007) indicates that seaborne trade accounts for approximately ninety percent of world trade, therefore such volumes warrant LSCs extension into value added services. Service contracts provide carriers with tools for strategic positioning in the transportation value chain. Such contracts remain confidential between carrier and shippers they provide a platform where LSC can price across sectors. Thereby, allowing carriers to enjoy the benefits of forward integration through multi-modal services. Carriers, as a result, should use their dominance in shipping to position themselves within the transport value chain. Given the current market conditions, carriers should not tender for service contracts based on the current market rates, as these fail to cover their operational costs. Doing so would be reckless on the part of a LSC as carriers are currently making ridiculous losses. This would further compound the situation LSCs find themselves in. By using the current freight rates carriers would be committing to long-term losses, which would eventually lead to bankruptcy.

In periods of economic downturn, carriers need to base tender quotes on their actual costs and not market rates if they want to remain in business and outlive the recession. Carriers need to re-establish some minimum point pricing benchmark, that is, prices should be based on incurred costs and not market forces. The dominant market leaders in liner shipping need to apply some game theory tactics by sending a credible signal to other carriers, that is by increasing their freight rates. Market leaders should set a precedent within the industry and demonstrate that they will not allow uncompetitive freight rates to hold them ransom. Followers will naturally conform, as this is also in their best interest if they want to ensure their survival in the long-term. Shipping is a repeated game and in retrospect every carrier is losing money if June and July revenues reports are anything to go by. The current market cannot remain untamed any longer. LSCs need to intervene by artificially forcing an increase in freight rates, otherwise if current conditions continue to prevail this would lead to the demise of the liner shipping industry.

During depressed market conditions, with low freight rates estimates should not be market driven but rather cost driven. LSCs need to maximize revenue as opposed to profit, this boils down to cost recovery. Most conventional theory assumes that a firm will always maximize profits. However, the various theories of the firm indicate that an organization can pursue at least six options these include:

- 1) Sales revenue maximization;
- 2) Growth maximization;
- 3) Managerial utility function maximization;
- 4) Profit maximization;
- 5) Long-run survival of the firm and;

6) Entry-prevention together with risk-avoidance.

For a firm to maximize profits the marginal cost is set to its marginal revenue. Rothbard (1962) and Baumol (1967) challenged this notion stating firms are more likely to maximize revenue. Under Baumol's model firms maximize revenue subject to a minimum profit constraint. During periods of uncertainty carriers need to maximize their revenue. It has been argued that sales are a better indication of a firm's performance than profits. A firm's EBIT may seem attractive but after deductions its position may look very different. The abbreviations used to explain Figure 4-5 hereunder:

- π = Profit
- Total Revenue (TR)
- Total Cost (TC)
- Marginal Revenue (MR)
- Marginal Cost (MC)

Figure 4-5 Baumol: Revenue Maximization Model

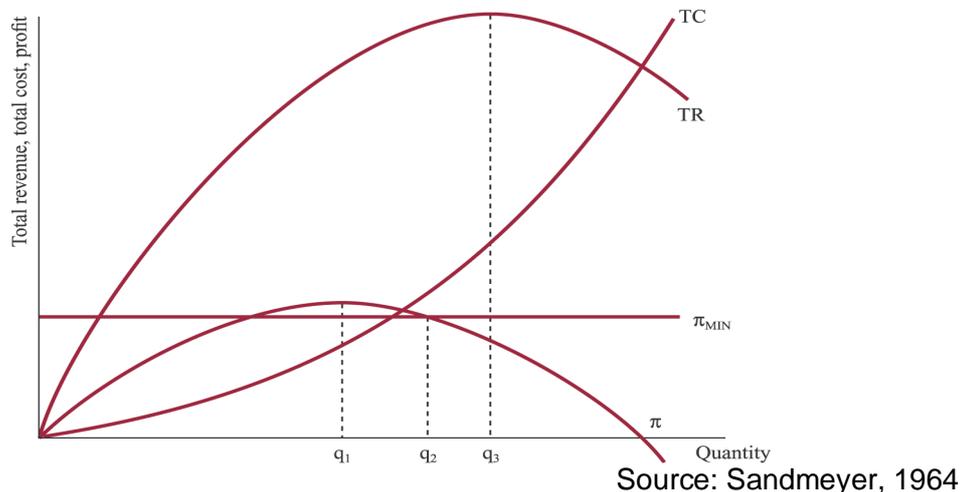


Figure 4-5 above shows a firm's revenue maximization model. Objectives of shareholders and management differ as the prior want profits to be maximized, while the later want sales/revenue maximized. In the event a firm maximizes profit, it would produce output (**q1**). However, under the Baumol model illustrated above a firm maximizes revenue/sales are subject to a profit constraint. If the minimum allowable contribution for a firm is π minimum level, the firm will produce (**q2**) of output where the sales are maximized. With an output of (**q2**) the firm would earn a contribution above the π minimum level, as indicated in Figure 4-5. Thereby, indicating that the contribution level exceeds the shareholder requirements in terms of profits as (**q1 < q2**). Therefore, a firm that maximizes π minimum level will yield much less in comparison to one maximizing revenue/sales. This goes in hand, with the findings of Heaver (1973) who states that the optimum output of a sales-maximizing firm will exceed that of a firm seeking to maximize profit. From this model, it is clear that LSCs must place more emphasis on revenues/sales as opposed to profits. Since the abolishment of conferences, LSCs now openly compete on pricing and quality of services rendered. What is interesting to note is that carriers' prices are similar depending on the freight integrator level.

4.6 Bilateral Agreements and Stevedoring Companies

Every firm within the transportation value chain focuses on enhanced efficiency, cost reduction and quality. Within the liner shipping industry, cooperation is characterized through strategic alliances, mergers & acquisitions and global economic networks. The stevedoring sector has also undergone privatization and consolidation resulting in the emergence of global pure terminals (Midoro, Musso, & Parola, 2005). There are two reasons why carriers entered terminal and port operations. One aspect can be viewed from a dedicated perspective or as a strategic tool for cost cutting, while the other is more holistic i.e. to control the transport value chain. It should be noted that both global carriers and global terminal operators want to control the transport value chain and hence compete for it. Peters, (2001) states terminal operators are classified as follows:

- Pure stevedores focus on port container handling such as Hutchison Port Holdings (HPH), Port of Singapore Authority (PSA), Stevedoring Services of America (SSA) and;
- Global carriers focus on integrating their liner activities by managing container terminal facilities.

Carriers who focus on port-to-port operations like MSC, Evergreen and China Shipping Ocean Company (COSCO) do not have their own stevedoring operations; they outsource this function by the use bilateral agreements with stevedoring operators. However, LSCs like Maersk Line, CMA-CGM, NYK Line and APL place emphasis on controlling both the sea and land operations of their business. Initially when LSCs ventured into stevedoring, this was accomplished by the use of dedicated terminals or joint ventures with stevedoring operators. The evolution of the stevedoring sector saw three waves which occurred in the 1980s, 1990s and 2000s. Figure 4-6 hereunder shows the intermediaries within the stevedoring sector.

Figure 4-6 Players in the Stevedoring Sector



Source: Midoro, Musso & Parola, 2005

From Figure 4-6, it is clear that during the 1980s (i.e. 1st wave) there were very few organizations within the stevedoring sector. It is interesting to note that CSX Corporation (which was the former parent company of Sea-land) was a second wave

pioneer in terminal operations. The CSX group primarily focused on the railway operations in the mid-1980s, this same group acquired Sea-land (Midoro, Musso, & Parola, 2005). During the early 1990s, LSCs began to invest in dedicated terminals which were initially run as cost centres. The main driver during 1960-1970 was the need for carriers to standardize their facilities. During this period, the LSCs which entered terminal operations included Sea-land, K Line and Matson. During the 1980-1990 periods, the driving force for carriers in terminal operations was the need to control the transport value chain. The LSCs which entered terminal operations during this period were NYK Line, Evergreen, Maersk Line and MOL. Finally, during 1990-2000 the main driver in terminal operations was the need for carriers to defend their assets deployed on various routes within their global networks. The LSCs which entered terminal operations during this period are CMA-CGM, CSCL and P&O Nedlloyd.

Globalization has accelerated the growth of international trade. In an attempt to cater adequately for this exponential growth, LSCs invested in larger vessels. However, such investments of LSCs have an impact on the stevedoring sector, as special Super Post-Panamax cranes are required to service these large ships which fit twenty-two containers across. The increase in vessel capacity implies that the vessel call size also increases. In addition, as the vessel capacity increases it would imply increased volumes on main corridors (i.e. East-West trade routes), hence an increase in transshipment volumes. Furthermore, the increase in vessel size also has an impact on the stevedoring costs as this requires investments in quay cranes, which can handle Super Post-Panamax vessels. Carriers would like the turnaround times for larger vessels to be as short as possible. However, stevedoring operators need to utilize their equipment optimally. Crane productivity cannot simply be increased to reduce a vessel's dwell time as terminal operators also need to consider the impact this will have on yard productivity. Such a move could potentially result in terminal congestion which would require reshuffling. Essentially this is double handling, and therefore these would be wasted moves i.e. container movements which cost money but do not yield any return for a LSC.

Over the years what is now evident is that LSCs started integrating and establishing themselves more in terminal operations. However, the pure stevedoring companies have retained control of this sector. LSCs THC have remained a significant portion of a carrier's charges. Given the enormity of LSCs volumes, it is obvious that carriers are in influential position to dictate the THC they deem acceptable. When terminal operators remain reluctant to reduce prices, carriers simply change operators and/or change the ports serviced. The ability for carriers to do this makes them very influential in terms of the pricing structure of THC. Furthermore, the fact that most LSCs have their own terminals gives them the flexibility to leverage themselves by squeezing terminal operators' rates. Table 4-4 below illustrates a few LSCs integration into terminal operators over time.

Table 4-4 Liner Shipping Companies Dedicated Terminals

Carrier	Terminal Location	Year	Terminal Operator
Maersk Line	Rotterdam	1998	APM Terminals
	Bremen	1999	APM Terminals
	Algeciras	2005	APM Terminals
	Lazaro Cardenas	2007	HPH
	Felixstowe	2008	HPH
	Tanger	2008	APM Terminals
MSC	La Spezia	1971	MSC - Eurogate
	Naples	2002	MSC - COSCO
	Bremenhaven	2004	Eurogate
	Antwerp	2005	PSA - MSC
	Valencia	2006	MSC
	Las Palmas	2007	MSC - Dragados
	Le Harve	2007	MSC
CMA-CGM	Le Harve	2006	CMA-CGM - GMP
	Busan	2007	Macquarie - Bouygues
Hapag-Lloyd	Hamburg	2001	HHLA - Hapag-Lloyd
COSCO	Singapore	2003	PSA

Source: Joint Transport Research Center, 2009

4.7 Summary

This chapter explores liner shipping integrated options with discussions on the last proposition i.e. proposition 5. The author discusses resource management from a carrier's perspective. Reference is made to the economic cycles in relation to infrastructure investments. The leverage theory model is introduced to explain the notion of tying and show how carriers can utilize revenue management in periods of economic downturn. The author then explores liner shipping pricing options and the benefits of adopting a revenue management system. This is followed by some analysis on pricing agreements and a breakdown of carriers' charges. The author then looks at how service contracts provide carriers with tools for strategic positioning in the transportation value chain. Carriers need to re-establish some minimum pricing benchmark as the current zero-rates on some routes is clearly unsustainable. Finally, the last section looks at bilateral agreements with stevedoring companies and their impact on pricing.

Chapter 5 discusses all the research propositions and provides the thesis conclusions.

CHAPTER 5 DISCUSSION AND CONCLUSIONS

5. Discussion on Prepositions

This chapter has two sections. The first section discusses all five prepositions previously explained with the use of various concepts within this research. The last section provides the research conclusions.

Preposition 1: Supply Chain Management (SCM) allows for value creation within networks, giving organizations a competitive advantage.

Through adopting SCM, carriers can effectively control their networks and resources to outperform their competitors. Given that LSCs are subjected to both the macroeconomic and microeconomics aspects of the environment carriers reside in, the notion of economies of scale and scope play important roles in the liner shipping industry. The operational analysis of LSCs is another important element in the KM in the liner sector. LSCs should guard such knowledge and trade secrets from competitors in an effort to prevent them from imitating them. LSCs also need to protect and retain such resources, which give them a competitive advantage over competitors. Carriers can effectively adopt SCM techniques by integrating into the transport value chain; which can be done either vertically or horizontally. It therefore becomes imperative for each LSC to understand its supply chain and the strategy it adopts, as this actually positions a carrier in the industry.

LSCs need to place some consideration into the network economies and synergies of their networks as well as collaborative partnerships. LSCs pricing options are another important feature for carriers, who fail to harness their competitive positioning in the overall transport value chain. While global service providers provide LSCs with guaranteed volumes, they also are carriers' competitors. They have tapped into the gap within the market, which LSCs have failed to capture. This role rendered by services providers exists because there is a demand for it. If carriers effectively monitor and control their value chain through SCM, they can enhance their competitive advantage and regain their lost market share.

Preposition 2: Resource Based Views (RBV) theory impact on strategy, cluster analysis, positioning and competitive advantage.

The RBV determine a LSC's available strategic resources in relation to its rivals. LSCs need to ensure the use of resourced-based strategies within their organizations. By placing emphasis on their resources (i.e. vessels), they can leverage this competency. Given that LSCs can retain their competitive advantage through their strategy and RM. LSCs should place more emphasis on acquiring a sustainable competitive advantage as this ensures that a carrier's operations remain unique to it. As rivals remain unable to imitate how a particular LSC adopts and embraces KM, (thus making it a learning organization), LSCs need to be more aware of improving their positioning and protect their unique resources in order to reinforce their strengths and ameliorate their weaknesses. Resource and competence-based approaches are particularly valuable when a LSC is attempting to build a sustainable and competitive advantage during periods of economic turmoil. During such periods, RBC becomes more prominent

within an industry. As a result, LSCs need to be able to adopt a RBS, which measures the true value of its resource performance which can assist it in maximizing the full potential of its resources.

While one LSC might have a distinctive competency, it does not necessarily follow that when a carrier attempts to merger or acquire another that a transfer of that competency occurs. Therefore, a resource is more valuable in the organization that already owns the specific resource in question. In most cases, such resources are bundled through joint transactions costs making it difficult to find the actual source of an organization's competitive advantage. A resource-based strategy for a LSC should focus on effectively leveraging its strategic resources and processes. This will help a LSC build a broader portfolio of its resources in various sectors of the transport value chain. Based on Mahoney (1995) the main driver behind this is 'resource learning' where separate entities learn to work under one umbrella operational strategy. In essence, this is the adoption of KM and the notion of a learning organization.

Preposition 3: What are a carrier's distinctive competencies and how can they provide leverage against rivals and competitors?

LSCs distinctive competencies lie in their vessels (i.e. fleet). Carriers' current capacity deployment strategies initially emerged prior 2008 as LSCs had failed to satisfy demand. However by late 2008 the impact of the global recession saw the postponement in orders, new building cancellations and numerous vessels being laid-up, as LSCs attempted to reduce the excess capacity within the market. In an effort to reduce transportation costs given the high Suez Canal charges, low vessel utilization and piracy along the North-East Africa region, LSCs started slow stemming around the Cape of Good Hope. Furthermore, to ensure better vessel optimization within LSCs networks, it is inevitable that horizontal agreements shall continue to occur amongst carriers within the liner shipping.

LSCs should continuously reassess their strategies and the business models they adopt. It is unlikely that the liner shipping industry will see the likes of the previous lucrative freight rates in the near future. Rather, carriers have to adopt survival tactics and payback their vessel loans. More established freight integrators are more likely to reassess their vertical integration strategies and take over followers' capacity and/or terminal operations. While a recession is bad from a business standpoint, such economic activities allow the industry to consolidate by ridding itself of unwarranted smaller LSCs. Service contracts will remain viable strategic instruments for LSCs in the long-term as they provide stable volume flows for carriers. LSCs' extensions within hinterland operations also provide carriers with the required flexibility to handle cargo volumes.

Preposition 4: How value addition options benefit liner shipping companies through vertical integration and network economies.

LSCs together with terminal operators have tailored their business strategies anticipating transport growth based on GDP growth and international trade. However, the economic crisis has shaken LSCs' pricing capabilities and investment options. LSCs seem to continuously under perform in comparison to other service providers in the transportation value chain. Carriers operations are marked with a wide variability of cost bases. LSCs own high-risk capital-intensive assets and they face pressure to fill

their vessels while simultaneously being forced to accept market freight rates (i.e. carriers are price-takers).

Of the three logistics types available to LSCs, vessel logistics and container logistics are the two vital ones. Carriers need to ensure they optimally load their vessels at any given time and factor in the repositioning of empty containers. LSCs have various bundling options at their disposal, which can give them an enhanced positioning within the transportation value chain. Vertical integration allows LSCs to enjoy economies of density and scope. The level of freight integration determines a LSC's geographic coverage abilities and the type of services a carrier can offer. Competition within the value chain is based on how well LSCs can mix their bundled services, as cross-subsidization and tying influence LSCs' abilities to price their services effectively. Given the current global recession, in an effort to retain NVOCC business, LSCs should refrain from continuous rate discounting as this would be unsustainable in the long-term (i.e. LSCs will be unable to cover their fixed costs). Instead of utilizing market rates LSCs should rather adopt a rate structure which is line with their costs.

Preposition 5: How can carriers' influence and challenge competitors through vessel/capacity leasing?

During periods of economic downturn LSCs should adapt their strategies and consider utilizing revenue management system. These two options can allow a carrier to leverage its distinctive competencies over its competitors. Given the large investments within the transport value chain and LSCs' dependence on NVOCC, tying could provide carriers with an alternative. Providing LSCs with a preferential and leveraged position gives them the ability to capitalize monopolistic pricing and cross-subsidization. If a carrier belongs to subsidiary, depending on a group's structure, LSCs may fully embrace this or face difficulty. This is largely based on the type of organizational structure (i.e. matrix or solo), the group adopts.

LSCs need to manage their resources such that they build and leverage their capabilities, which in turn can create value addition for their customers. By adopting a resource model for value creation this places emphasis on the structuring of LSCs resource portfolio handling. Which together with its leveraged capabilities allow carriers to reduce their transaction costs which has an impact on LSCs prices. LSCs require tailor made revenue managements systems, which essentially are slot allocation models that maximize freight contributions. Such models allow LSCs to adopt full recovery pricing which is complex but required in periods of economic downturn. LSCs have various horizontal agreements they can enter into with other carriers to ensure they fully optimize and load their vessels. By belonging to networks, carriers can coordinate services and enter slot charter agreements, which allow LSCs to better control their vessel logistics and fleet management. Empty repositioning is another major concern for LSCs as this has a negative impact on their pricing depending on repo-in/repo-out costs.

LSCs product-mix bookings are partly dependent on the haul (i.e. head-haul/back-haul). In most cases, a LSC has no option but to carry scarp on the back-haul service. However, LSCs should ensure that their cargo mix is reasonable, as scarp is highly volatile cargo. In the event a LSC carries too much scarp when rates fall, the carrier will be faced with challenges. The liner shipping cost structure indicates that LSCs make very narrow margins. Therefore, carriers should segment their market adequately and ensure they carry more cargo that cover it costs. LSCs need to place more emphasis

on their profitable customers (i.e. BCO and NVOCC). The use of service contracts aid carriers in retaining long-term agreements with BCO. Furthermore, in such instances given the constant guaranteed volumes LSCs can extend their services by providing extended hinterland operations. By tying, the sea and land legs LSCs can offer a more holistic value added services for BCO. Finally, carriers within liner shipping should concentrate on both their core business and extended operations, as this gives them a better platform for leveraging their distinctive competencies into a competitive advantage.

5.1 Conclusions

This thesis attempts to explain how a carrier can utilize its distinctive competency in liner shipping. Given that carriers remain the only intermediary in the transportation value chain with a vessel, they can utilize bundling and integrated pricing. A LSC's competitiveness in maritime economics can give a carrier access (i.e. back door) into other service offerings within the transportation sector. While this remains a viable option, the current market condition does not provide LSCs options to execute this effectively. The current freight rate volatility does not give a carrier a significant competitive position to transfer to other sectors, in the transport value chain.

The details and information used within this thesis were obtained through interviews with former and present employees of the following LSCs: P&O Nedlloyd (Netherlands), CMA-CGM (Netherlands) and APL/NOL (United Kingdom). DHL Logistics provided insightful information together with the following forwarding agents: Schenker, Kuenhe+Nagel and Panalpina.

Given the differences in freight integrators, this thesis noted that the fairly less integrated carriers (i.e. followers) find themselves better placed, to benefit from bundling in terms of prices. This is primarily due to the nature of carriers LSRM, together with the size of such LSCs. This partially explains why carriers like MSC and Evergreen focus to their core business, which is shipping (i.e. port-to-port services).

While some carriers have independent networks, smaller carriers in alliances benefit from shared resources. LSCs benefit from members of global networks. However, as the network size increases so do the transaction costs. The current economic down turn has had a significant impact on the operations of LSCs. Nevertheless, there remain alternate options such as bundling, tying and collaborative partnerships that can ensure the survival of carriers within the liner shipping industry.

Liner shipping decisions are based on the outward look on long-term investments. As a result, it is difficult to compare an asset-based industry with a non-asset based industry. While shipping and service provision feed off each other, these two sectors are very different. Carriers have long-term investments. As a result, their decisions are long-term (i.e. between 10-15 years). It is important to note that service providers place emphasis on the short-term (i.e. within 3-5 years). This explains why the logistics services are more flexible in comparison to the conventional maritime sector.

What is eminent is that this recession will result in some mergers & acquisitions, further enhancing the consolidation needed within the industry. With less players present within the industry it will be easier to control capacity supply, as every carrier will be aware of what their competition is doing. In addition, this would allow carriers to control

the gap between supply and demand more effectively, thereby stabilizing the freight rates. Bunker price fluctuations over the past year together with the current recession have further compounded freight fluctuations in the maritime industry. Freight rates fell drastically from US \$1400 to US \$1000 in the last quarter of 2008 but have only recently increased from US \$500 to US \$600. As a result carriers continue to make losses on most of their trade routes. The recent volume increases on the Europe Asia trade routes has been artificially created by organizations who are stocking up on safety-inventory. The main issue, rather threat in the industry is the entry of new vessels and the re-entry of laid-up capacity. The liner shipping supply and demand gap for the next 4-5 years will remain problematic but, this could potentially be resolved around 2014/15.

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