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Recent Consolidation Trend in the Container Terminal Industry

By

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Abstract

This thesis mainly focuses on the trend of consolidation in container terminal industry.

Consolidation activities in container terminal industry have gathered pace during recent years. This thesis will first give a general introduction and analysis on the characteristics of the container terminal industry and then review the recent consolidation history in this field. The following chapters will illustrate reasons and impacts of the trend of consolidation, and then analyze the container terminal market and the whole maritime chain.

Linear regression will be raised in order to underlie the internal factors behind the consolidation. After that several organizational options for consolidation will be shown, as well as a case study on DP world acquiring P&O Ports, which will help us to see how this activity occur in practice.

List of Tables

List of Figures

Chapter 1 Introduction

1.1 Background of this thesis

The maritime sector is undergoing great changes, which has been more and more apparent in the shift of competition in recent years. No other technical improvement has contributed to the process of globalization more than the innovation of the container since 1960s. The rise of containerization worldwide in the past fifty years is absolutely the result of the inter-play of macroeconomic, microeconomic and many policy factors. On the other hand, market liberalization has promoted the development of logistics throughout the world to a great extend. In general, world trade has been facilitated much more than before due to the elimination of trade barriers and the liberalization as well as deregulation of markets. In maritime activity, international supply chains have become more complex than before in which more parties have been involved; and new logistics models have been evolved continuously to accommodate those influences such as the globalization and expansion to new markets. The port and shipping industry have been redefined by the globalization, containerization, privatization, and logistics integration and other factors.

Those concepts appear to be applicable to the port sector and to cargo handling in particular. Large container terminal players such as Hutchison Port Holdings (HPH), Port of Singapore Authority (PSA), APM Terminals have all expanded their market and attained market power over cargo-handling activities through their networks which cover the ports almost in all continents. The efficiencies of those container terminal companies are of great importance and because they can affect the cost of sea-borne trade as the top firms in the terminal industry. In 2000, at least 50% of total trade in value and 70% in volume made use of maritime transport and therefore required cargo handling (Crook, 2002). Shipping charges on average stand for 6.11% of the value of commodities imported (UNCTAD, 2003, p.118). Expansion and trying to gain efficiency also affect their price, and therefore such decisions are to be carefully considered. Thus we have seen many consolidation activities among the container terminal industry, both in horizontal aspect such as mergers and acquisitions with other terminal companies and vertical aspect such as integration activities in the supply chain. This thesis then will do in-depth study on the consolidation in the terminal industry and will forecast whether there will more these activities in the future.

1.2 Objective of the study

The general environment in which ports and shipping lines are operating is quite different than before. One of the main driving forces which contribute to this change is the globalization process and the large-scale adoption of the container during the past fifty years. Since the rise of world containerization is the result of the interplay of macroeconomic, microeconomic and policy factors, ocean carriers and terminal operators have developed gradually with the expansion of world trade, providing a critical infrastructure for trade. Besides, the public sector such as the local government or the port authority has redefined its role in the maritime sector through privatization, commercialization and cooperation schemes and policies.

For terminal operators, the terminal and stevedoring industry as to face larger and fewer shipping lines as their customers, which hold great market power in maritime sector. Shipping lines have seen much more demands in terms of terminal productivity, priority servicing and flexibility while they have been taking many measures to get landside costs down as well. To response this change, more and more expansion decisions have been put into practice. For example, PSA's (two-step) acquisition of Hesse Noord Natie involved cash expenses of 585 m EURO by the Asean operator, which made it control terminals in Antwerp, Zeebruges and Rotterdam (Drewry Shipping Consultants, 2003, p. 15). International Container Terminal Services, Inc (ICTSI) at Gdynia acquired BCT, the stateowned local operator, against payment of 41 m USD, and committed themselves to investing 80 m USD more in the terminal (World Cargo News Online, 2003b).

This thesis, therefore, will attempt to present historical review on the consolidation activities in the container terminal industry, as well as the reasons and consequences of these activities. Furthermore, we will continue our research by establishing a modal to illustrate the trend of this activity using the linear regression. In general we want to answer the question that why those terminals operators took so many consolidations and what they will do in the future. A case study on consolidation will also be used in order to present a comprehensive approach on how to do the consolidation activities from an operational point of view.

1.3 Methodology

There are three methods used in this thesis: literature review, regression analysis, and case study. Literature will be reviewed to get the concept of the container terminal industry, reasons and impacts of the consolidation activities, extensive networks, and future trend of the terminal business, which are helpful to understand the emergency of consolidation in the terminal industry.

The regression analysis will focus on the main factors underlying the consolidation activities based on the previous years by using a linear regression modal. The case study will be the DP World acquiring P&O Ports, in which we can see the background, the process and the impacts on of this typical consolidation.

1.4 Thesis structure

Apart from the introduction, the thesis consists of the following chapters:

Chapter 2 General Overview: this chapter will be essential in introducing the container terminal industry and the rise of consolidation activities among terminal operators. It is a basic grounding in understanding the container terminal industry in general.

Chapter 3 Theoretical analysis: in this chapter we will analyze the reasons behind the consolidation among terminal operators from different perspectives including external and internal factors. After that we will see what impact this consolidation will bring to the shipping and terminal industry.

Chapter 4 Networks in consolidation of terminal operators: this chapter will focus on the networks that the terminal operators build to set up their services. We will try to find how the potential synergies among the different terminals within the same network can manage to the optimum and what impact it will make to the terminal operators' consolidation activities.

Chapter 5 The changing role of port terminals in supply chain: in this chapter we will do the analysis based on the whole supply chain. We will see that the complexity of the maritime supply should be paid great attention, and dedicated operators and

global terminal operators will have different strategies. The future trend of supply chain as well as the integration will make port terminals new roles in the operating process.

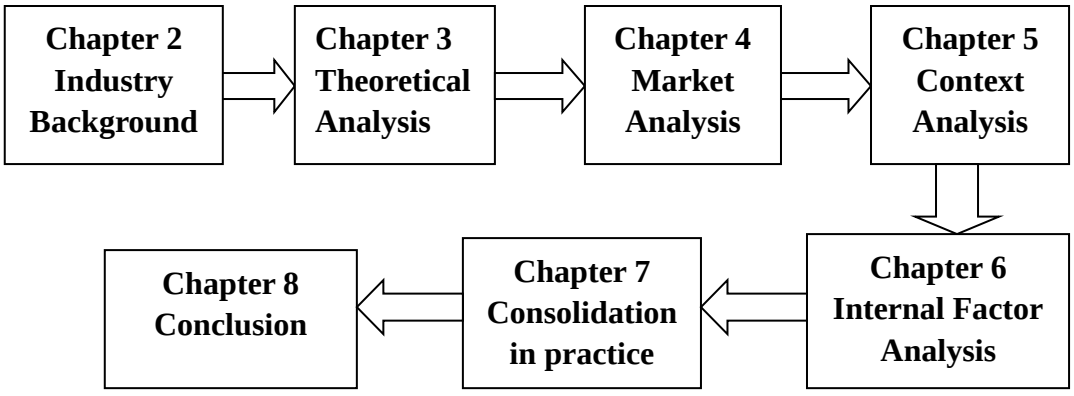
Chapter 6 Structure factors underlying consolidation in container terminal industry: after the previous analysis we can get a clear picture on the terminal operators' response to a changing environment, in chapter 6 we will do the analysis on the main factors underlying the consolidation activities based on the previous years by using a linear regression modal and explore the motivation behind the consolidation.

Chapter 7 Organizational structure choices for consolidation among TOCs and Case Study: in this chapter will provide some modals for terminals to do the consolidation and acquisition activities. Then s case study will be illustrated on how the DP World acquired the P&O Ports.

Chapter 8 Conclusion: this chapter is a conclusion of this thesis obtained from analyzing the knowledge and information in the above chapters. Further recommendations will be specified on the future consolidation in the international market.

In summary, the relationship and the logic between chapters are in the following:

Figure 1-1 Relationship and logic between chapters



Chapter 2 General overview

2.1 Container terminal industry

A terminal refers to a place that changes the mode of transporting cargoes. A container terminal is a facility where containers (with cargos or empty) are transshipped between different transport vehicles, for convenient transportation. And a deep-sea cargo terminal is a facility developed along a deep-water coastline to handle the transfer of domestic and international cargo – imports and exports – from ocean-going ships to their final land-side destination or from the originating point inland to the ships. It is widely accepted that the container terminal at a seaport is a critical link in the logistics chain, by means of which manufactured products are delivered to the final consumer (Crook, 2002). Increasing a country's port efficiency can reduce shipping charges on average by 12%. Among all port-related charges, cargo handling charges with a 70% share are the most important ones, so that the largest efficiency effects are to be expected in this part(Stopford, 2002).

Global Terminal Operators share holds high ratio at many Hub-Ports such as Singapore, Hong Kong, Shanghai, Rotterdam and so on. Most of terminals equipped with gantry crane suitable for post Panamax containerships are managed by a few Global Terminal Operators. The share of Global Terminal Operators increases with an investment to new terminals, not only through organic growth but also through mergers and acquisitions. In 2004, 55% of world containers are controlled by top ten terminal operators. For example, Hutchison Port Holdings (HPH) handled container 47,800,000TEU in 2004 had the top share of 13.3%, and then share follows AP Moller Terminal (APMT) 9.5%, PSA 9.3%, DPW 9.2%, and COSCO 3.7%. These big five operators share was 41.3% in total. By 22 Global Terminal Operators, which manage and administrate container terminal services, have 65% share all over the world (Takayuki Mori, 2005).

A global terminal operator who defines its business for seeking "profit" has worldwide expanse, but it also hold its strong presence in its own region. HPH started from Hong Kong in 1970s and establishes its presence which covers the Far East, North Europe, Central America and the Caribbean. PSA started the terminal business in Southeast Asia around the port of Singapore, and now it also hold high market share all around the world. In addition, P&O Ports acquired by DPW has a strong base in Australia and South Asia. APMT concentrates its power mostly on Middle East, Africa and Central and South America.

In the meanwhile, terminal operators have to face the constant risk of losing important clients, not because of deficiencies in port infrastructure or low efficiencies of terminal operations, but because the client has set up its service networks or has engaged in new partnerships with other carriers (Slack et al, 1996). Terminal operators also face fierce competition from new entrants such as shipping carriers, railway and logistics companies, and investment groups, all of which would like to promote the integration in supply chains. For instance, in Europe, shipping lines have recently entered the terminal market by establishing dedicated terminals at major load ports and centers. Dedicated terminals are even more widespread in Asia and in North America (Hansen, R.K, 2005). Great challenges have been seen in recent years for those independent terminal operators.

2.2 Historical review of the consolidation of the container terminal industry

When the consolidation in container terminal industry is applied in practice, it can be reached in various agreements between different parties, such as one or several container terminal companies and one or several horizontal or vertical supply chain partners or even some non-related investors and financial groups. The common forms of horizontal consolidation aiming at expansion are provided in the following:

• Mergers/acquisitions: DP World took over all parts of P&O Ports except North America in 2005 (Manoj, 2006).
• Joint ventures: Shanghai Container Terminals Ltd was set up as a 50/50 joint venture between Shanghai Port Container Ltd and Hutchison Ports Shanghai Ltd (Port of Busan, 2005).

Like many other industries, the container terminal industry has been undergoing restructuring and consolidation in the 1990s, reflected in both M&A activity and in the formation of global strategic alliances. By rationalizing operations through several horizontal integration mechanisms, those operators aim to seek better utilization of resources and cost reductions.

Smaller terminal operators have not been successful in dealing with the giant market power from larger operators. Many of them choose to avoid direct competition with larger ones by concentrating on market niches and their suitable locations, for example on the short-sea market (Pedro Pita, 1998). It then provides more opportunities to global operators. Therefore the global operators can expand their markets more than before. By 2005, the top 10 operators have controlled over half of

total world container port capacity.

The increasing consolidation did not miss its effect on the maritime sector: a few years ago more than 10 big players took less than 50% of the total market share, but the picture has been changed greatly today. Table 2-1 in the below provides an overview of throughput and market share for the top-ten global terminal operators in two different years, 2001 and 2005. In 2001, the volume handled by the top-ten players amounted to 103 million TEU totally, with a market share of 42%. These figures grew to about 220 million TEU and the 55% of the market share in 2005.

We can find that the global container terminal industry today is dominated by four main operating companies, with a dramatic leading over their rivals in terms of throughput as well as market share. The combined throughput of the top 4 operators have increased to about 170 million TEU in 2005, representing some 42% of total container handling. This figure grew even larger after the P&O Ports portfolio is added to DP World's. For comparison, the market share of the top 4 operators was still below 30% in 2001. As far as the market concentration is concerned, this current situation in container terminal industry is somehow like that in the liner shipping, in which the four biggest liner shipping companies (Maersk, MSC, CMA-CGM, Cosco) also control about 40% of the market share (Bichou, K., 2006).

Table 2-1: Throughput of top-10 global container terminal operators

2001			2005		
Operator	**m TEU**	**share**	**Operator**	**m TEU**	**share**
Hutchison	29.3	11.8%	Hutchison	51.8	13.0%
PSA	19.5	7.9%	APM Terminals	40.4	10.1%
APM Terminals	13.5	5.5%	PSA	40.3	10.1%
P&O Ports	10.0	4.0%	P&O Ports	23.8	6.0%
Eurogate	8.6	3.5%	Cosco	14.7	3.7%
DPA	4.7	1.9%	DP World	12.9	3.2%
Evergreen	4.5	1.8%	Eurogate	12.1	3.0%
Cosco	4.4	1.8%	Evergreen	8.7	2.2%
Hanjin	4.2	1.7%	MSC	7.8	2.0%
SSA Marine	4.0	1.6%	SSA Marine	7.3	1.8%
Top-10	**102.7**	**41.5%**	**Top-10**	**219.8**	**55.1%**

(Source: Drewry Shipping Consultants (2003, 2006))

However, the concentration drive, once particularly strong during the late 1990s, has begun to lose momentum, which can be seen from Table 2-2. The most recent transaction with great influence was the takeover of P&O Ports by Dubai Ports Authority, which made the newly-built company, DP World, become one of the largest operators in the world.

Given the fact that at present no really big companies are left to acquire, it is believed that the top-four players will still maintain their leading positions and dominate the container terminal industry for some years in the near future. Furthermore, due to some shortages of terminal capacity in several parts of the world which makes existing terminals quite attractive to invest to expand their markets, as well as high profitability levels in those regions, this trend of consolidation activity such as M&A in the container terminal industry is likely to continue in the years to come, despite of a smaller scale witnessed recently. In the next chapter, we will focus in detail on the motivation and impacts of those consolidation activities among terminal operators.

Table 2-2 Mergers and takeovers between terminal operating companies

	1996	2001	2003	2006	2008
1	PSA	HPH	HPH	HPH	HPH
2	HPH	PSA	PSA	PSA	PSA
3	P&O Ports	APM Terminals	APM Terminals	APM Terminals	APM Terminals
4	Maersk	P&O Ports	P&O Ports	DP World	DP World
5	Sea-Land	Eurogate	Eurogate	Cosco Pacific	Cosco Pacific
6	Eurokai	DPA	Cosco	Eurogate	Eurogate
7	DPA	Evergreen	Evergreen	SSA Marine	SSA Marine
8	ICTSI	Cosco	DPA	APL/NOL	APL/NOL
9	SSA	Hanjin	SSA	HHLA	HHLA
10	Hamburger Hafen und Lagerhaus Aktiengesellschaft	SSA	APL/NOL	Hanjin	Hanjin
11	Pacific Ports Co.	HHLA	HHLA	MSC	MSC
12	Ceres Terminals Inc.	APL/NOL	Hanjin	NYK	NYK
13	Europe Combined	NYK	MSC	OOCL	OOCL
14	Bremer Lagerhaus Gesellschaft	Hyundai	NYK	CSXWT	CSXWT
15	NYK	CSXWT	OOCL	OSK Lines	OSK Lines
16	APL/NOL	OSK Lines	CSXWT	Dragados	K Line
17	OOCL	OOCL	OSK Lines	K Line	TCB
18	Hanjin	K Line	Dragados	TCB	ICTSI
19	Mitsui	Dragados	K Line	ICTSI	
20	Evergreen	TCB	TCB		
21	K Line	MSC	ICTSI		
22	Cosco	ICTSI	P&O Nedlloyd		
23	CSXWT	Yang Ming			
24	Terminal Contenedores de Barcelona (TCB)				
25	Yang Ming Line				
…	Hyundai				
	Hessenatie	Hessenatie			
…	Noord Natie	Noord Natie			
…	Contship Italia sa				
…	Sinport Sinergie Portuali				
…	Egis Ports	Egis Ports			

Chapter 3 Theoretical Analysis

Consolidation of container terminal companies can be mainly divided into two forms: at their own strength or through some kind of co-operation. But the consolidation at own strength can also be internal or external. Internal activity at own strength occurs through organic growth of a terminal, in which many terminals can hardly keep pace in expanding their terminals' capacity enduringly in reaction to rising demand (Robinson, R, 2002). External activity at own strength will need direct investments and the subsidiary development in cargo handling activities. In this chapter, we will do the analysis on the reasons and the effects of the consolidation in a theoretical way.

3.1 Reasons for the consolidation of container terminal operators

Definitely there are various reasons that can be attributed to the increasing prominence of consolidation activities within the terminal industry.

3.1.1 Globalization

As globalization progresses, the world becomes increasingly borderless, with the expansion of currency transactions and capital inflows and outflows reaching levels never seen before, world trade reaching an unprecedented scale as well. Therefore, the world trade has been rapidly developed with telecommunications, information technology, and the revolution in transport (Narendra Kumar Sharma, 2008).

The essence of a global strategy is the ability to regard the world (or the most significant regions of it) as a single market. This implies an increasing homogenization of consumer tastes across the world and the ability to produce and sell a standardized product in response to such tastes. It also suggests the ability to compete effectively on a worldwide basis.

Maritime transport remains the backbone of international trade with over 75 per cent of world merchandise trade by volume being carried by sea. During the past three decades, the annual average growth rate of world seaborne trade is estimated at 3.1 per cent. At this rate, global seaborne trade would be expected to increase by 44 per cent in 2020 and double by 2031, potentially reaching 11.5 billion tons and 16.04 billion tons, respectively (Review of transport report, 2007).

Container shipping and terminal operators are essentially a global phenomenon, and they have developed dramatically with the expansion of world trade, providing a critical infrastructure for that, which leads to the marine transport a global industry. The terminal operators, as the key elements in the maritime logistics chain, need to

establish themselves globally work in order to provide the global service and satisfy their customers' needs, because customers can obtain large-volume, stable transport at reasonable costs, use today's logistics system to instantly check the conditions and locations of their cargoes, and benefit more efficient inventory control. The terminal operators can enjoy large market share and higher profit from that.

Trade is growing faster than world GDP, and the share of transport costs within the total costs of merchandise goods has gone up despite a reduction in transport costs per ton. This may appear contradictory, but can be explained by the fact that products components and raw materials are increasingly purchased abroad. In recent years, especially before 2008, growing demand and containerization led to high growth rates and expansion for terminal operations, which has encouraged the use and development of new technologies.

3.1.2 Economies of scale

Global terminal operators want to obtain economies of scale through consolidation activities. In other words, they would like to obtain a larger market share and to build barriers to market entry with a view to blocking potential competition.

Generally speaking, a firm can be treated as economies of scale when its average costs falls while output increases, and long-run economies of scale occur when a doubling of all inputs leads to more than a doubling of total output. Product-level returns to scale are related to the total production of single product variety, plant-level returns to scale are related to the total production of all product varieties within a plant, and firm-level returns to scale are related to economies realized by managing many plants within the same firm.

In order to realize long-run economies of scale through a consolidation, the assets of the partners should be combined and integrated. In the long run, it may be less costly to integrate the newly created firm and can promote the firm to make future investments. Future investments occur for mainly two reasons. First, the firms' current capital depreciates and old plants need renovation, which includes both physical capital and intangible assets such as brand name. Second, the firm can meet more investment opportunities with the increasing of the market.

Thus, after a merger or other kind of consolidation between firms selling similar products, firms can benefit from concentrating the production of the some products within the same plant, rather than to produce the whole product line within the same plant in the former firm. Such a specialization of production can reduce down the production time. Long-run economies of scale may arise in both production area and in research and development, and they may also occur in marketing activities. For

example, a single brand name may be created to economies of scale on advertising and marketing expenditures, and the sales group and the distribution network can be combined into integration. However, the exploitation of economies of scale through a merger between firms which once produced differentiated products may face a reduction in product diversity. Therefore firms should take great consideration about this issue when measuring the net benefits from economies of scale.

Container industry is capital-intensive. Many terminal operators have been searching for scale increases in a response to the concentration trend that is unfolding in container shipping. This trend is facilitated by the emergence of privatization of port activities. The nature of the container handling business (high fixed costs and lack of service differentiation) in theory can create significant opportunities to improve service level through co-operation. However, traditional co-operation in this container handling market do not come easily and mostly firms combined into one through mergers and acquisitions (Notteboom, 2002; Musso et al, 2001; Slack and Fremont, 2004). For example, the present major container terminal companies do not seem to have appealed to legal partnerships, societies or joint study groups because connected boards of commissioners seem to be very rare from the very limited data that are available on container-handling companies' commissioners.

Since the companies' optimal shape depends on the benefits of increasing scale, they have tended to large-scale production and service provision resulting in economies. Sometimes the scale will be increased without considering the optimal size. They also affect service pricing, entry and exit behavior, whether a long-term sustainability of the competitive advantage can be achieved. The sources of economies of scale are diverse: indivisibilities of the whole business and the low average fixed costs; increased productivity of variable inputs as a result of specialization; a reduction of joint stocks (Besanko, 2007, p.78). Other sources relate mainly to joint purchases, marketing, and research and development. Even if total costs and demand remain the same, the reduction in variable costs versus increased fixed costs leads to concentration in the container terminal industry.

3.1.3 Integration among the supply chain

Container terminal companies may integrate horizontally, vertically or in a conglomerate manner. Logistics is a business often sought after by container terminal companies. Terminal operators have been well aware of the fact that the maritime transport chain should be treated as a totally integrated system from a overall perspective. The leading terminal operating companies want to control larger parts of the supply chain through different strategies. The door-to-door philosophy (which means that customers prefer to choose those service providers who can

transfer their cargo from orientation to destination in an integrated way) has transformed a number of terminal operators into inland logistics organizations. Many logistics services may be included, such as warehousing, distribution as well as other low-end and value-added logistical services (like customizing their products for local markets).

Damas and Mottley (2003) illustrate how container terminals owned by carriers may be influenced by their integrated character: carriers often seek for third-party container business for the terminal. This traffic is often not enough to make the facility profitable, but it helps in bearing part of the terminal's fixed costs. Vertical integration is often used as a means to create entry barriers, especially market-based barriers: terminals that go in transport and logistics for instance have a hinterland network which newcomers usually don't have. Less than in other sectors, vertical integration is used for acquiring technologies on the input side.

Some examples can be shown. In Germany, many terminal operators have been directly involved in some inter-modal rail transport (Notteboom, 2002). In recent years, the newly-built terminal operator Eurogate have succeeded in building up a European "land bridge" between its German and Italian loading centers. The Hannibal express, a north-south rail corridor that connects the inter-modal services of subsidiary Sogemar in Italy to the shuttle network of boxexpress.de in Germany, offers carriers more flexibility in liner service design and transit times (Alberghini, 2002). Overall, many terminal operators have integrated inland terminals in their logistics networks in order to fulfill their customers' need (seen in table 3-1 for the European example). Those inland terminals can be treated as extended gates for deep-sea terminals in many cases, and these integration activities have strengthened the pace of consolidation in the terminal industry. For the impact of vertical integration in the supply chain, it presents a constant challenge to the regulating authorities for good governance. Riordan (2008, p.145) asserts in this context that "antitrust policy in the United States recognizes that a vertical merger can create incentives for anticompetitive foreclosure or facilitate collusion, while remaining mindful that vertical integration can achieve efficiencies".

Table 3-1: Some involvement of terminal operators into inland terminals
(Source: Notteboom (2002))

ECT of Rotterdam operates a rail terminal in Venlo (since 1982) and trimodal terminals in Willebroek (TCT Belgium – since 1999) and Duisburg (also since 1999). ECT plans to build a barge terminal in Venlo (Venlo Barge Terminal). ECT, Rotterdam Municipal Port Management and the forwarding company Eurotrafo have a joint share of 53 per cent in a network of rail terminals in the Czech Republic and Slovakia operated by CSKD-Intrans.
Seaport Terminals/Katoen Natie has invested in an inland terminal network in the Benelux (for example in Wielsbeke and Terneuzen).
The combination P&O Ports/Logport has developed a logistics zone and trimodal terminal on the site of Hafen Rheinhausen in Duisburg.
Gerd Buss of Hamburg is an indirect shareholder of DCH (Düsseldorfer Container-Hafen).
Unikai Hafenbetrieb, a subsidiary of HHLA (Hamburger Hafen- und Lagerhaus) recently sold its rivercontainer terminals in Wörth (Middle Rhine) and Ottmarsheim (Upper Rhine) to Rhenus.
CSX World Terminals is partner in the Rhine terminal CTG – Germersheim.

3.2 Impacts of consolidation in the container terminal industry

The impacts of the consolidation activities in this industry are both internal and external. Internally, the impacts are mainly on economic impacts such as cost savings and efficiency improving; externally, there are impacts on the whole maritime and terminal markets, all the participants in the markets and regulations.

3.2.1 Economic impacts

With respect to the economic effects of consolidation activities such as mergers and acquisitions, it can bring mainly two effects: transaction and size effects. Farrell and Shapiro defined the first type of effects as synergies, the latter as efficiencies. Efficiencies can but don't have to be merger-specific as it can be achieved through some other routes. In container handling, size effects can be obtained in the operational fields which can be seen from Table 3-2.

The transaction cost savings under the assumption of bounded rationality: in contractual arrangements, for each contract, a new search has to be initiated. This cost is avoided in a unified company setting (Notteboom, 1999). On the other hand, firm size can make efficient hierarchical control impossible. In Table 3-2, the firm structure is assumed to be efficiently managed.

A consolidation may also lead to a lower cost of capital. It is observed that capital markets do not function perfectly every time. In many cases, firms can not always borrow at a competitive interest rate for a variety of reasons, such as asymmetric information about risk and expected return. Large corporations usually have their access to the outside capital markets, which can help them to acquire small and expanding firms who have to face stringent liquidity constraints. Through this way, a small firm with limited possibilities for internal expansion can obtain new possibilities in raising capital by joining a large corporation or being bought by a larger firm.

However, in container handling, mergers do only allow to reduce process setup costs when terminals are within the same market, and when the terminal operator decides to shift all operations to the least-cost terminal. This contrast with what Cordts (2001) observes in many other businesses, also in logistics. As closing down a terminal is often not an option due to lease agreements, such shifts are not likely to happen.

Table 3-2: Operational fields affected by economic effects of M&A

Operational field	Size effect
Administration	Fixed administrative costs can be spread over larger volume; possibility of standardization and automation
Contracting	Bargaining power in negotiating; avoiding intermediaries
Equipment	Sufficient equipment volumes to bargain input prices; equipment can be used more efficiently
Handling operations technology	Possibility to standardize within constraints imposed by shipping companies; product specialization is efficient
ICT	ICT setup, installation and maintenance costs can be spread over larger volume; standardization; sufficient volume to have in-house development, installation and maintenance of systems
Labor	In-house training is efficient due to job specialization
Marketing	Fixed administrative costs can be spread over larger volume; more terminals provide more attractive network; sufficient volume to do promotion with own staff
R&D	Technology development costs can be spread over larger volume; sufficient volume to have knowledge in house
Security	Fixed security costs to be spread over larger volume; security provision can efficiently be provided in house

(Source: Wisner, JD., 2003)

3.2.2 Oligopoly and barriers to entry

The globalization of economy promoted expansion of further trade and expansion of a market, in total 3 billion populations entering the global market including China with 1.3 billion populations, also Russia and India. Outsourcing and an off shore ring progressed for a capital saving and efficient marketing have begun to accelerate further globalization. Logistics, in no doubt, supports the global economy and global activities in good condition. Especially, liner shipping and terminal operations does great contribution to the international logistics and distributions.

In order to run the business under global economy with this background, terminal operators, therefore, must extend its business scale and scope and increase service quality from a global perspective. Mergers and acquisitions is the shortest way to achieve the target. The greatest merit immediately from this method is a saving of construction time of a terminal. Since there has been an existing customer holds the acquired terminal, new comer does not need to worried about suffering from oversupply. As a result, it extends a share and gets power to influence a market.

Container terminal operators would like to choose the lowest risk/ lowest reward strategy- pursuing organic growth to maintain their market share (Pallis Langen, 2006). Through this way, today's large global operators have progressed from being single location/regional players into the global market. When developing a global expansion strategy, HPH, PSA, APM Terminals and DP World all try to keep a competitive edge to new comers by building many barriers to prevent them entering their own domains and markets. If their rivals do enter the market, they will take measures to prevent them succeeding in those regions. These barriers are partly based on the setting up strongholds and networks in the selected ports to enlarge their market share, and also based on applying many advanced techniques about the construction and management of container terminals which their competitors can not achieve. The large scale of operations, which has created deep pockets and substantial surplus resources, allow global terminal operators to withstand an intensive marketing war and help them to financially outperform their rivals by bidding procedures for new terminal operations. The deep pockets are often used to move resources either when they need to preserve their own interests or when they want to tackle competition.

Market concentration is very evident when looking at the regional scale, although systems used might differ regionally based on factors embedded in institutional and governance aspects that are regionally bound. For instance, PSA does not use a global central network directive stating that particular systems should be used or are preferred. But, container terminal performance indicators are reported in a uniform way to a central system in Singapore (Notteboom, 2007). Slack and Fremont (2004)

demonstrate that the non-carrier based global terminal operators have not been able to penetrate the North American stevedoring market, while at the same time they have expanded business considerably in Asia and Europe. A lack of liberalization in the port sector, dock labor problems and a strong preference towards liner-operated terminals to secure port cargo (port concern) and space (carrier concern) are the main reasons for the specific North American situation.

3.2.3 Privatization of port activities

As we have seen before, the economies of scale obtained by the transport of large quantities in maritime sector have led shipping companies to build larger and more specialized ships, which would require more and more investments in new infrastructure and equipment. Moreover, customers now have more options for choosing the services providers, because the large development of integration and supply chains has reduced transport costs so much that it is often preferable for a shipper to use a distant port instead of a closer one, if the former one has better facilities and connections with the destinations of the cargos (Estache and de Rus 2000). This consolidation trend has made governments are more aware of the way that ports are run and permit more private ownership and service delivery, and this consolidation activities in port sector can make multiservice operations in a better way (seen in Figure 3-1).

Generally speaking, the common port organizing and governance can be divided into three forms, landlord ports, tool ports, and services ports.

Landlord port: The port authority owns and controls the port infrastructure, and private sector owns the port superstructure and provides all other services.

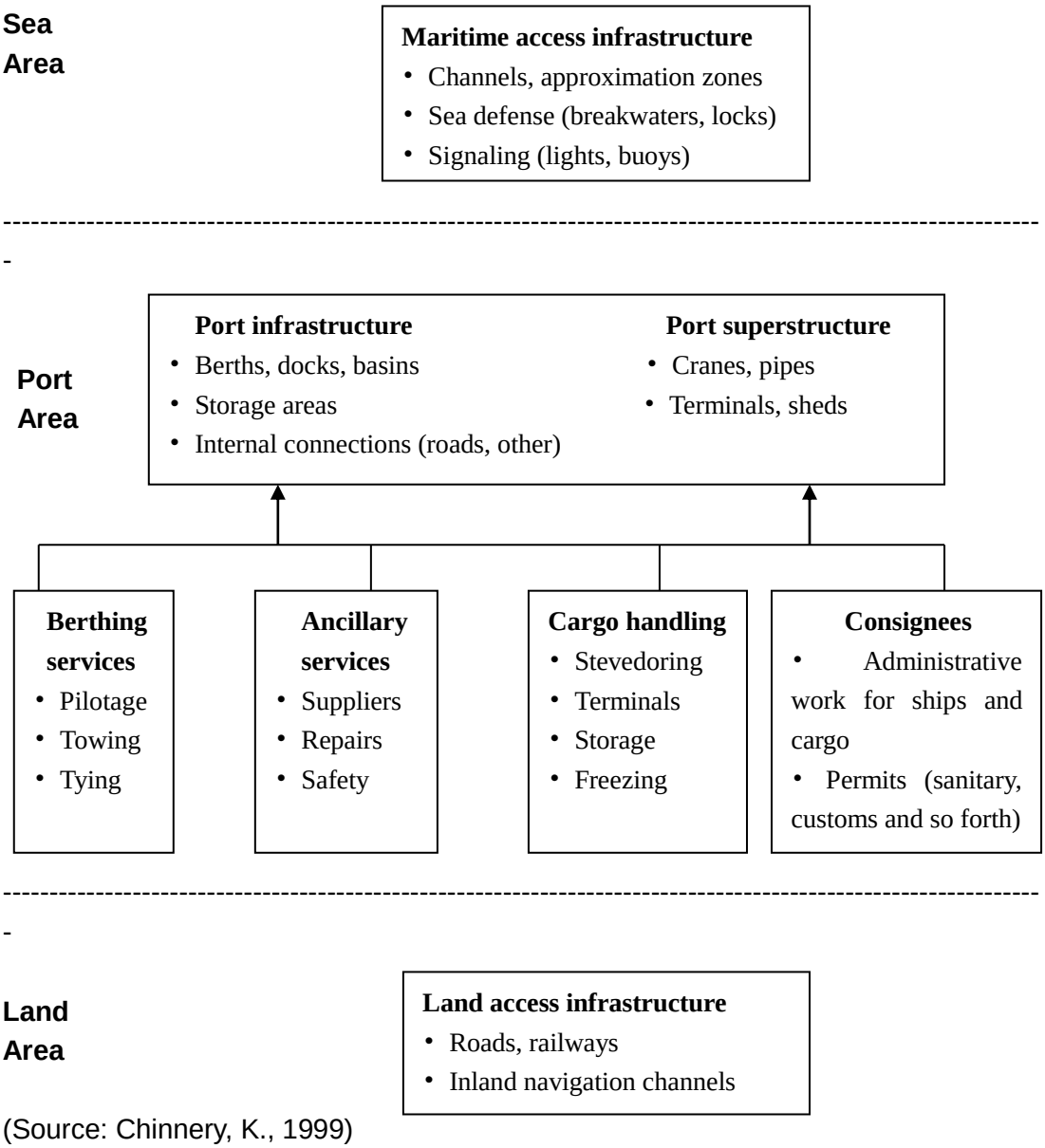
Tool port: The port authority owns both infrastructure and superstructure. Private firms can provide various services by renting some of port assets with concessions or licenses from the port authority.

Services port: The port authority owns the infrastructure and superstructure, and can provide port-related services itself (or through companies which are under control of port authority), and should be responsible for the port in every sector.

Many ports around the world are managed in the landlord way, in which port authorities lease the land to private port operators by signing long-term concession

agreements. Port authorities grant concessions to the best possible candidates through specific bidding procedures (Goss, 1990). Besides, port authorities can protect their own interest by partially shaping the entry profile of segments of the local port industry through the bidding procedures used. For example, they can add some clauses in the concession agreement in which the port authority can end the concession in case that specific performance measures (for example traffic volumes) are not as good as expected after a specified period of operation. The firms, on the other hand, attempt to impose barriers to differentiation upon rivals (especially foreign ones) through government regulation. The global investors can enter the market through acquiring local terminal operators or doing cooperation with the port authorities with deep pockets and specific technology, which can be made based on their investment strategy on exhaustive analyses of profitability and of operational efficiency. Thus, the consolidation activities can make those terminal operators expand their business to most of the supply chain points, which can strengthen the process of the privatization. The ability to take firm control is also a key issue, for example, sometimes operators may set up for a joint venture with local partners in order to build up successful operation network within the combination of the local commercial, economic and governmental environment. Finally, a stable political and economic outlook should be essential in this issue.

Figure 3-1 Multiservice operations in port activity



(Source: Chinnery, K., 1999)

3.3 conclusions

The container terminal industry is a global industry, which has been undergoing a period of restructuring and consolidation in the 1990s. Thus, the consolidation activities are not an occasional phenomenon, and there are global-based background and economic reasons behind it.

As globalization progresses, the world becomes increasingly borderless. The container terminal companies' efforts have met the needs of customers who themselves face the challenge of globalization. The reasons behind the consolidation activities in the container terminal industry can range from globalization, economies of scale, and integration in the supply chain. The economic and financial environments have also been favorable for deal making. Economic growth, rising stock prices and relatively low interest rates has favored internal growth as well as a range of consolidation activities.

The consolidation activities in the container terminal industry have wide impacts that are both internal and external. Internally, the impacts are mainly on economic impacts such as cost savings; externally, there are impacts on the whole maritime and terminal markets, all the participants in the markets and regulations. With respect to the number of players, all facts seem to confirm that container handling is characterized by an oligopoly situation. This has important repercussions on the market dynamics and relationships between terminals. On the one hand, different terminal cost structures may lead to different market shares of individual terminals, whereas on the other hand, different market shares may lead to different reaction patterns, which make individual terminals behave in a way that would be different under a different market setting. Then they have to build a network of facilities, otherwise they may feel the impact of the large players invading their market.

The next chapter will see the Rationale behind the consolidation, and will go into the detail of the consolidation network for container-handling process. Furthermore, the next chapter will also try to find out the how those global operators share the resources in order to meet the costs savings and a better services to their customer.

Chapter 4 Networks in the consolidation of container terminal industry

4.1 The rising of port competition

Traditionally, due to the exclusive and immovable geographical location of the port, port markets have been perceived as monopolistic or oligopolistic to the local operators or even the port authority. The competition between ports was thought as relatively minor before the containerization. However, with the introduction of hub-and-spoke systems and rapid development of intermodal transportation services, dramatically changes have been seen this situation. On the one hand, the trend of fewer ports of call in liner shipping services has led to the emergence of many super-large container ports (such as Hong Kong, Rotterdam, and Singapore) which serve as regional load centers, and the ambition to become a regional load center greatly stimulates the expansion of some potential ports and, thereby, the leading role played by large hub ports is frequently challenged.

Port competition is “a process whereby port operators attempt to acquire trade and traffic volume in specific traffic categories” (Haezendonck, 2001). Those previous non-competing ports have been forced into head-to–head competition as a result of the emergence of larger ships, fewer ports of call, improved logistics systems and infrastructure, and the overlap for the hinterlands connections. Therefore, ports are continuously challenged both physically and operationally. Another factor for the existence of port competition nowadays is the horizontal integration in shipping lines, which give them more power to negotiate with ports due to their large share of the market. Therefore, ports have to compete with other ones to retain those shipping lines and attract more, for losing one alliance means a big share lost of the market. Furthermore, a port has to invest heavily in sophisticated equipment as well as in dredging channels to accommodate their customers-- those most advanced super-large containerships, in order to maintain its competitiveness. Besides, the network of the port is of great importance in the port competition.

4.2 The extensive networks- an effective method for economic of scale

A successful maritime logistics chain is just like a well-oiled machine in which every nut and bolt is perfectly managed and in good condition, and the modern seaports are important nodes in international logistics chains and their associated networks. The global terminal operators are expanding their markets in a large number of countries all over the world. Despite of some problems like cultural detachment and other issues related to the specific local environment (such as policies and regulations), global terminal operators seem to be quite successful in their globalization strategy. The extensive terminal networks are generally regarded as an effective way to counterbalance the power of carrier combinations and alliances in liner shipping industry, to realize economies of scale for the market (i.e. too many players will dilute the market), and to strengthen the optimal terminal functions in logistics networks (Notteboom T, 2006). However, at the same time the industry structure has become so concentrated that one important question was raised whether the abuse of market power can be prevented, given the fact that market forces are not sufficient any more.

As was said before, a number of terminal operators have opted for scale increases in a response to the concentration trend that is unfolding in container shipping. The response of the port sector to the shipping sector is inherently complementary and inter-related to the changes in the shipping industry. A network of efficient seaports is needed, for the reason that global welfare might lead to an efficient maritime transport system, which implies that both shipping lines and terminal operators should be in a position to work in similar working conditions. An important issue in network industries like container terminal operations is the size of the network.

Typical economies of scope benefits in terminal business are often realized by meeting the shipping lines' needs and objectives through the extensive network. The global terminal operators always try to get control over the supply chain and secure container terminal assets in strategic locations through many investment polices. In the meanwhile the "global" service levels of the terminal operators are applied to attract more container shipping customers. Using their proven track record and good reputation, global terminal operators would like to convince the same container shipping customers to start berthing at other operated port facilities within the network as well.

Technically speaking, most of the major container terminal companies are in a cash position that allows them to sustain limit behavior at least for a while. However, pushing a terminal out of the market only helps as long as this terminal can compensate with other, more profitable markets. If the terminal goes bankrupt or its owners decide to leave the facility, the terminal will be handed over to a new owner

under a new lease agreement, and the incumbent will have to start its action all over again. This contrasts with most other businesses, where a site can remain empty if a supplier leaves business or where the site can get a totally different function. In the next part, we will analysis the resources and competencies that terminals of the same global operator would like to share in one system.

4.3 Resources and competencies shared in the same global operator

Keeping an elaborate network will contribute mostly to costs saving and a better product/service to the customer. About the costs saving, it is primarily realized through economies of scale, and typical economies of scale benefits are shown in the following.

4.3.1 Centralized sourcing/purchasing

As a terminal operator, the company tends to purchase the equipments such as gantry cranes and other terminal equipment in the same time and to all the terminals, which can not only fit the economies of scale, but also make the terminal operations under the uniformed standard. But sometimes the scale effect of a large terminal operator is limited by its bargaining power towards suppliers, and this kind of bargaining power is mainly influenced by the existence of other big players in the industry, the demand/supply balance in the market, and the level of market concentration at the supplier side. For instance, as the building capacity for gantry cranes is rather tight, several global terminal operators are fighting for building slots at ZPMC, the largest gantry crane supplier in the world, which will certainly reduce the bargaining power for those demand side (terminal operators).

4.3.2 Centralized IT investments

Global investors have made exhaustive analyses on profitability and operational efficiency based on their investment strategy, and Information Technology (IT) is regarded as a promising field. Investments in IT for a unique management system can create scale economies when they are “implemented centrally and deployed within several container terminal network nodes” (Notteboom T, 2006). Thus the information among the different terminals can be transferred very efficiently and fluently. In practice, despite of the uniform system in all departments, the choice of IT solutions used in the headquarters and in individual subsidiaries may not be exactly the same. For instance, in PSA, container terminal performance indicators are reported in a uniform way to a central system in Singapore, but no particular IT solutions are preferred for the global central network.

4.4 New terminal management systems

As we can see, the global control of container terminal management has come about in part by the appearance on the scene of several specialized international companies. Again the stevedoring and terminal management firms have expanded from their former local spheres of operations and now control container docks in many parts of the world. Their growth is an example of horizontal integration, and the literature has suggested several factors behind their burgeoning expansion (Musso et al., 2001). Expansion allowed the companies to use their highly refined and efficient management and operating practices in new situations, thereby reaping greater profits than the previous managers had been capable of producing (Bascombe, 1998). This has proved to be a very successful strategy, and these global terminal operators have realized much higher profit levels than most other sectors of the industry (Brennan, 2002).

The growth is also seen as an outcome of privatization and liberalization in the ports industry, which has been discussed in Chapter 2. Privatization of the ports sector has been a policy response in many countries to improve efficiency and reduce the burden on public finances. New opportunities have been created, therefore, for terminal operators to enter new markets and apply their management and operational expertise. These firms have seized opportunities to acquire entire ports (Felixstowe, UK, in 1991) and major terminals in ports, or to obtain joint venture participation with other actors, such as municipalities (Shanghai, P. R. of China, in 1998). The other source of global management of terminals has come from the shipping industry, which can enrich the network extensively to other elements of the whole logistics chain. It is widely recognized that many shipping lines have sought to expand their operations into other sectors. Vertical integration is seen as giving these lines control of more links of transport chains (Musso et al., 2001; Notteboom, 2002). This provides economies of scope and enables the carriers to control global door-to-door services more effectively. Therefore, terminal operations have been a particularly attractive sector for several major carriers. It is in the terminal where up to 50% of all costs involved in container transport are generated (Fossey, 2002). Internalizing these costs through direct management of terminals is seen as allowing the carriers greater control over operations.

In the maritime sector, traditionally the carriers are to seek control only for the berths use, while the terminal operators have to manage multi-user facilities. However, there are more and more container shipping lines which are involved in the terminal management. Several of the largest liner companies have set up separate terminal operating divisions that, operationally at least, stand apart from the shipping sector. P&O Ports is a stand-alone division of a business group that includes a major

shipping line. It operates terminals on a multi-user basis. For example, Maersk, the largest shipping line, has established a separate terminal management company, APM. Because of a wide range of ownership relations, from joint ventures to total control, APM manages some facilities that are dedicated and others that are multi-user. In the discussions that follow, these firms are referred to as ‘hybrids’. More typical are the carriers that have obtained leases to operate berths in ports dedicated to their own services. Thus, Hanjin operates its own berths in Long Beach, CA, USA, and Evergreen has a terminal in Taranto, Italy. More details about the integration between the shipping lines and the terminal operators will be discussed in Chapter 5.

The effects of these developments have been profound. Port operations have become less locally differentiated. Whether owned or managed by the terminal operators or leased or owned by shipping lines, port terminals have seen a decline in local participation in the port community (Martin and Thomas, 2001). This is most apparent in the role of the local port authorities themselves and this state of affairs has already received much academic attention. Port authorities are seen as pawns in a global system that is imposing new organizational structures. For the new actors, individual ports are but one node in networks that span the oceans and the world. Former local stevedoring and terminal companies have also undergone a transformation, with outright purchases or significant intervention from the new global players (Ferrari and Benacchio, 2000). The need to install expensive information technology systems, the pressures to replace equipment and to operate berths at ever higher levels of throughput have imposed pressure on the traditional terminal operating firms that many were unable to meet. The international players offer such services, and hence have made rapid and extensive inroads in ports around the world (Notteboom, 2002).

4.5 Conclusion

The internationalization and consolidation of container terminal operations cannot hide significant regional and local differences to the networks. Modern seaports are crucially important nodes in international networks and they have to face much more competition than before.

A large number of terminal operators have been seeking ways for scale increases in response to the concentration trend in container shipping. Benefits from economies of scale are mainly realized through meeting business objectives of shipping lines throughout the network, and thus the network is raised great importance for the terminal operations.

There are some resources and competencies that terminal of the same global operator can share, such as centralized sourcing and purchasing and centralized IT investments.

Competition between global terminal operators is quite fierce, and shipping lines would like to take advantage of this situation by choosing the most efficient or interesting services from the particular terminal. The need to install expensive information technology systems, but the pressures to replace equipment and to operate berths at ever higher levels of throughput have imposed pressure on the traditional terminal operating firms. The container handling industry tries to respond to customers' constant drive to get costs down, and increasingly specialized ship-side services require more sophisticated equipment and increased capital requirements.

In general, there are still potential synergies among different terminals within the same network which should be managed to the maximum, because the networks of the global terminal operators have not matured yet. Therefore, the consolidation activities will also continue. While reinforcing and expanding existing operations, container terminal companies have to actively identify new opportunities, striving to generate satisfactory profits for their customers and shareholders.

In the next chapter, we will discuss the role of the terminal operations into the whole supply chain and do the in-depth analysis, in order to assess the changing role of port terminals in the supply chain from an aggregate prospective and to see how it can influence the consolidation activities among the Terminal Operating Companies (TOCs).

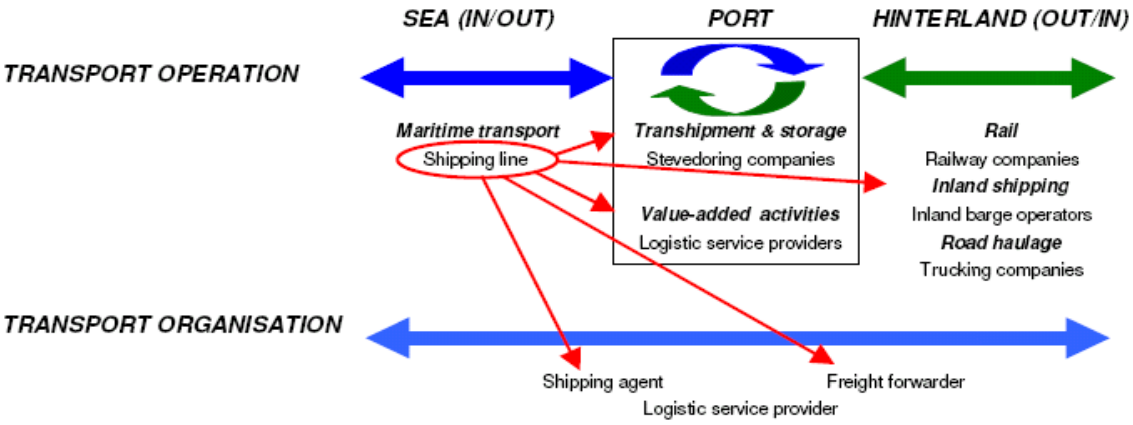
Chapter 5 The changing role of port terminals in supply chains

Nowadays, maritime sector is undergoing constant change, and market players are no longer selected so much for their own competitiveness, but on the basis of whether they belong to a competitive supply chain. Thereby, market players are continuously trying to attain greater control over these chains and make them stronger than their rivals. Nowadays container terminal operators are forced to re-think their function and the role they play in the whole logistics process in order to accommodate the evolution in supply chain.

5.1 The complexity of the maritime logistics chain

Ports are important nodes within the logistics networks, and the success of the logistics chain depends to a very large extent on the performance and competence of the seaports belonging to that chain. Roughly speaking, a maritime logistics chain consists of three large chapters: the purely maritime activities, goods handling at the port, and hinterland transport services. The changing strategies of the market players such as shipping lines, forwarders, shippers, transport operators and inland logistics groups, have blurred the traditional division of tasks within the chain (Figure 5-1).

Figure 5-1: Examples of the changing services provided within a logistics chain

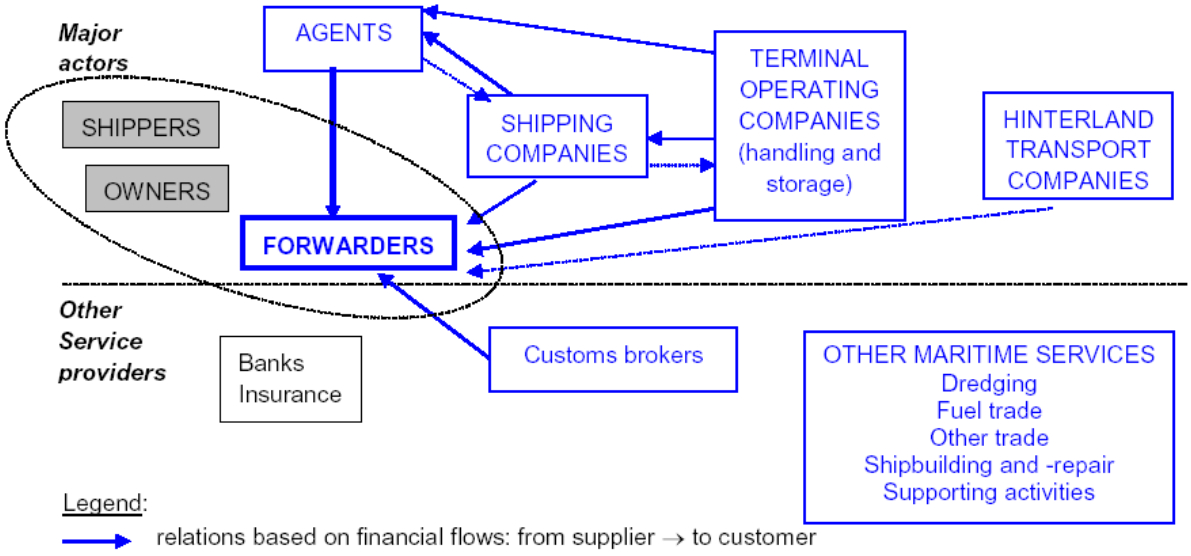


(Source: Notteboom, 2007)

Seaports are often controlled or managed by different players for different kinds of services, but sometimes activities are also integrated across links to improve efficiency. Here in Figure 5-2 is a typical example of interactions in the logistics chain players. The chain reaction will be raised if more aggregated decisions are made.

Usually a port is performed by three parties-- the port authority as the governing body, the shipping companies as principal customer and terminal operating companies (TOCs) as the main services providers. But the value added services provided by smaller players like fuel trading, forwarding and hinterland transport take the biggest share of total revenue, more than share of the terminal operators (Coppens et al, 2007). So the largest players (such as shipping companies and terminal operating companies) will to try their best to engage in those value-added services in order to increase the revenue as well as the market power. Possibly, they will increase their control over logistics chains through acquisitions of relatively small but strategically important players in the long run.

Figure 5-2: Interactions of the financial flows between port-related players



(Source: Eddy van de Voorde, 2009)

For shippers and customers, what matters is the performance of the supply chain in terms of price, service quality and reliability, and they don't care too much about the form of the services. Then the focus on the chain as a whole is reflected in efforts of the players in various segments to consolidate, vertically integrate or otherwise enter into long-term contracts, in order to drive costs down but also to increase the level of coordination and service providing. But such concentration and restructuring carries a risk of generating excessive market power for some of the actors in the chain, and it has also increased volatility, which referred that small deviations from expected or planned processes have large consequences for system performance. Volatility increases uncertainty and induces logistics providers to build in redundancy by using more than one of a set of routing options, so as to mitigate route risk. This trend further weakens the shipper or customer's reliance on a specific port and the terminal operator

5.2 Different strategy between global terminal operators and dedicated terminal operators

Since the globalization of world economy, traditional stevedoring firms have evolved towards more complex terminal operating companies (TOCs) by means of necessitated mergers and acquisitions, takeovers and expansion projects. In many cases, shipping companies invest in the terminal operations for the purpose of establishing their own terminal operating branches. These may operate as dedicated terminals for the shipping company itself (e.g. Cosco Pacific). A dedicated terminal operator is defined as a terminal provided by a port authority or terminal operator for the exclusive use of a carrier or a carrier's alliance partners. This form of vertical co-operation or integration is applied commonly by shipping companies in order to gain more control over port capacity (Takayuki Mori, 2006). Table 5-1 presents an overview of the agreements for dedicated terminals which are involved in the top-5 liner shipping companies.

For those independent global operators, they may find that circumstances are in their favor sometimes, but more often than not it is the carriers that impose their conditions. Thus the global terminal operators must develop a strategy in order to maintain an acceptable degree of control and still be able to provide its customer with the services it requires.

It is found that in order for carriers to run dedicated terminals profitably, shipping companies have to operate them as multi-user terminals catering to the carrier, the alliance partners and third party carriers (Brennan, J.R, 2003). Besides, a professional terminal operator has to be involved in the operations and management of the terminal. Therefore, sometimes it can be problematic in the relationship between such terminal subsidiaries and their parent companies. APM Terminals can be set up as an example. Originally a dedicated terminal subsidiary of the AP Moeller Group, with the name of Maersk Terminals, was established in 2002, in which its business is relative independent. To underline this autonomy, the headquarters were moved from Copenhagen to The Hague afterwards (Scheepvartnieuws, 2007). It is free to negotiate dedicated terminal handling capacity, with the precondition that sufficient port capacity has been reserved for the parent company (Alberghini, 2004). And that means that APM Terminals still has a preferred supplier relationship with its parent company. In addition, this multi-user decision also depends on other aspects, such as the market power of other shipping companies, their shares in total port throughput, and the stakes they take in joint ventures with Maersk. After all, it appear that vertical integration is now applied more commonly than before as a means of getting control over port-related activities.

Table 5-1: Dedicated terminals top-5 container shipping companies

Shipping company	Terminal	Date of announcement	Terminal operator
Maersk	Rotterdam	1998	APM Terminals
	Bremerhaven	1999	APM Terminals- Eurogate
	Algeciras	2005	APM Terminals
	Lazaro Cardenas	2007	HPH
	Felixstowe	2008	HPH
	Tanger	2008	APM Terminals - Akwa Group
MSC	La Spezia	1971	Eurogate - MSC
	Napels	2002	MSC - Cosco
	Bremerhaven	2004	Eurogate
	Antwerp	2005	PSA - MSC
	Valencia	2006	MSC
	Las Palmas	2007	MSC - Dragados
	Le Havre	2007	MSC
	Kumport	2007	Limar Port and Ship Operators SA
CMA-CGM	Le Havre	2006	CMA-CGM - GMP
	Busan	2007	Macquarie - Bouygues - Hyundai - KMCT - BPA - KUKJE - KCTC
Hapag-Lloyd	Hamburg CTA	2001	HHLA - Hapag-Lloyd
Cosco	Singapore	2003	PSA

(Source: on the basis of Containerization International and carrier information)

5.3 Future trend of container terminal business

Container terminal operators operate in a highly dynamic sector that is constantly changing and shifting, which requires the operators to not only respond to changes, but also to anticipate them and prepare for them. In the future, there will many changes from what we have today in container terminal business.

5.3.1 Scale increases in vessel size

Since 1990s, shipping companies have paid great attention to development of larger, more fuel-economic containerships and the reductions in cost per TEU of capacity. Larger ships have a relatively lower cost per TEU-mile than smaller ones within the same loading environment. Calculations made by Drewry for the trans-Pacific route point out that there is about “50 percent of potential cost differences between a panamax unit of 4000 TEU and a mega postpanamax unit of 10000 TEU” (Drewry, 2001). The trans-Pacific and Europe – Far East routes can enjoy the economies of scale to a great extend if the ship size is beyond 8000 TEU, despite of different scenarios in port productivity (Cullinane et al, 1999). Table 5-2 is a percentage of different size of ships in different years.

Table 5-2: Scale increases in vessel size: evolution of the world cellular fleet 1996-2006

	Jan 1996	Shares	Jan 2001	Shares	Jan 2006	Shares
>5000 (TEU)	30648	1.0%	621855	12.7%	2355033	30.0%
4000/4999	428429	14.4%	766048	15.6%	1339978	17.1%
3000/3999	612377	20.6%	814713	16.6%	892463	11.4%
2000/2999	673074	22.6%	1006006	20.5%	1391216	17.7%
1500/1999	367853	12.3%	604713	12.3%	719631	9.2%
1000/1499	480270	16.1%	567952	11.6%	596047	7.6%
500/999	269339	9.0%	393744	8.0%	438249	5.6%
100/499	117187	3.9%	132472	2.7%	114976	1.5%
TOTAL	2979177	100.0%	4907503	100.0%	7847593	100.0%

(Source: BRS Alphaliner Fleet Report, 2006)

Then port operators have to change their business model and engage in massive investments to best meet the changing trends. Dredging has to take place due to the increasing sizes of ships. The terminal operators need to get bigger cranes,

automated systems, and heavy equipment in order to handle the growing number of container throughput, which have brought large pressure on them.

5.3.2 More use of temporary storage at terminals

Container terminals, according to their function, are those facilities which are mostly used to load or unload containers with many specialized equipment including container cranes, straddle carriers, and enough stacking areas (Jean-Paul Rodrigue, 2009). The emergence of ULCC (Ultra Large Container Carrier) has set higher standards or requirement on cargo volumes per port call as well as handling times per volume. Large stacking areas would be left in or around the port as a buffer of terminals. Thus a system of indirect transshipment should be set up if each transport mode wants to follow its own time schedule without any congestion. Under the indirect transshipment system, some of terminal stacking areas were used as temporary storage areas between deep-sea operations and inland transport and logistics operations which occur in the following process. As a result, the storage space increased substantially. In the meantime, those larger-space requirements changed the geography of port activity and immigrated the terminals operations to new peripheral sites.

Furthermore, a new function was put on the temporary storage at terminals as a result of great development in the logistics area for the last decades. Shippers and other logistics service providers started to use terminals as places for the temperate storage of consignments because of the low inventory cost, instead of using them as a facilitator only. This change give the some ports with fewer calls more opportunities because it has implied that high dwell times of port yards were no longer an indication of a low productivity of the terminal or a poor connectivity between deep-sea operations and inland transport (Chung, K, 1993). High dwell times were more and more associated with deliberate actions in terminal operations afterwards. The terminal is now regarded, no longer as a factor of delay or a bottleneck, but as a temporary storage unit.

5.3.3 Rising concerns about securing terminal capacity

Port operators have gain benefits from the process of both vertical integration and horizontal integration in the maritime transport sector. Lower freight-rates and more efficient logistical control have lead to a general growth of the market, and additional transshipment to an increased demand for port services. Because of privatization, liberalization and the increasing need for transshipment, the extension of port services is growing faster than the demand for trade flows as a whole. However, capacity extension is a process that in container handling requires many types of modifications to be put into practice. Capacity expansion is very frequent: nearly all

container terminals have seen their capacity increase one or several times through organizational or infrastructural changes (S, Dekker, 2005). Terminal operators always have to face the serious problem of losing large and important clients, not because there is some deficiencies in port infrastructure or terminal operations, but because the client has rearranged its own service networks (most of the time it is provided by dedicated terminal operators) or it has been involved in new partnerships or alliances with other carriers (Masahiko Furuichi, 2005).

Market players are now more concerned about securing terminal capacity and achieving the optimal land using. It is probably that terminal operators will play a more active role in maritime sector in the future, in response to the increasing levels of vertical and horizontal integration in the maritime sector, as well as the increasing pressure on port capacity. Many measures will be taken by operators in order to increase throughput, make more intensive networks, strengthen the market power, optimize terminal capacity and make the best use of the land. In summary, the terminal operator in a port is expected to take up a more important position in the future.

5.4 Conclusion

Nowadays competition in the maritime sector is no longer among individual ports or ship-owners but rather among different logistics chains as a whole which connect origins and destinations. The changing strategies of the market players such as shipping lines, forwarders, transport operators and logistics groups, have blurred the traditional division of tasks within the logistics chain compared with the traditional way. Different players control the seaport activities, and shipping lines always want to enter the terminal operations.

Terminal operators and other logistics service providers should rethink their strategies. On the one hand, they should capture revenue and profits and provide value added services to the customers. On the other hand, they should not neglect their own operational activities which are linked to terminals. The increasing in vessel size and a new meaning of temporary storage has made terminal operators becoming more embedded within supply chain practices. Terminals have started to be used as a storage unit, and they are also quite concerned about seizing their customers to secure terminal capacity and optimizing land use.

From the previous chapters we have seen the necessity and the inevitability of the trend of consolidation among terminal operators. In general, firms seek mergers and acquisitions to capture economies of scale in production, increase management efficiencies and exploit synergies between rival operations and markets, so in next step we want to isolate and quantify recent consolidation activities in order to present some relevant statics and describe the development and estimation of a count data model.

Chapter 6 Structure factors underlying consolidation in container terminal industry

Consolidation tends to occur for a multitude of reasons, which have been discussed in the previous chapters. In this chapter, we will establish a linear regression model to reveal structural conditions that partially motivate recent consolidation activity among container terminal operators from a global perspective.

6.1 The model

It is impossible to show the precise motivation behind each terminal operator combination. Generally, if the firm is publicly traded, financial considerations should be included, such as cash flow and the balance sheet, access to capital, market valuation, market share and commitments to shareholders, none of which not tangible. The model is motivated, however, by the structural conditions that are important factors underlying the consolidation activity. Although there is no attempt to incorporate financial effects, it is understood that such influences may be substantial.

The dependent variable is a yearly count of consolidations (including mergers or acquisitions) from 1991 to 2005. The independent variables are the determinants of strategies. The purpose of the model is to check the relations between those variables, in other words, how those factors influence the count of consolidation activities.

6.2 Structure variables

When we use a modal to illustrate the trend of the consolidation, we have to decide the determinants of strategies for the terminal operators. Those variables used in the modal will either directly measure the trend or form adequate proxies. An outline of each of the exogenous variable will be provided in the following.

Demand changes: Generally speaking, the demand for the terminal operation services mainly comes from two types of agents: shippers and carriers. Nearly 90% of revenue in container handling is generated through carriers, with the remaining 10% of revenues stemming from the interaction with shippers (importers and exporters) and leasing companies. Naturally, the demand for container handling is cyclical and
is changing with the local and global economy's performance. Positive changes to demand may create incentives to satisfy the additional demand by pursing economies of scale through horizontal integration while negative changes will raise the competition among the existing businesses and weaker firms will be forced to fail or to be acquired.

Concentration in the shipping industry: A large amount of buyer power exists in the shipping company represents 90% of the operation revenue. Furthermore, shipping companies have recently started to acquire stakes in existing container terminals, or have even set up their own terminals. Thus, Container terminal operators compete for business from the shipping lines, on the basis of their container handling charges and also the service they provide in turning ships around (Australian Productivity Commission, 2003). The concentration in the shipping industry will influence the choice process for both ports and handlers, which can strengthen the consolidation activities among terminal operators as well.

Terminal Handling Charge (THC): Shipping conferences generally negotiate short-term contracts (1 to 3 years) with container handlers, which mean that prices are negotiated and depend on a variety of factors, such as traffic volumes, ship types, the use of shipping schedules, etc. Actual charges, therefore, vary with the structure and size of the negotiated contract. But for consolidation activities, it is anticipated to decline in THC, as increasing charges may refer to improving profitability and less need for the pursuit of cost efficiencies. The increasing also signals an improvement in market power and a reduction in consolidation activity.

Technology progress: Modern terminal operations can not be carried out without effective and efficient implement of information technology as well as other appropriate optimization (operations research) methods. It is well known that the size of container ships has risen significantly over the past decade, and technical

progress will facilitate the services for the larger ships due to the high quantity and complexity of those ships. Consolidation, therefore, becomes more attractive if the operators can manage large terminal networks and reach the economies of scale. The technology progress here is referred to the quay crane productivity in an average level.

Service capacity: The service capacity also plays a positive role in the expansion for the container terminal operators. It can create incentives to combine assets because it represents a loss of market power among incumbents. Thus more consolidation will be achieved in order to seek more market and customers.

Concentration ratio: The concentration ratio is the four-firm' market share of the total container terminal industry. A decline in concentration last year signals a decline in market power and undermines the ability to set collective prices. Then more consolidation will occur next year. Thus, consolidation activities are hypothesized to decrease with more concentration ratio in terminal industry.
The consolidation decisions are based on the previous years' variables. Then the basic equation is:

$$Count_t = \beta_0 + \beta_1 D_{t-1} + \beta_2 CIS_{t-1} + \beta_3 THC_{t-1} + \beta_4 TP_{t-1} + \beta_5 C_{t-1} + \beta_6 CR_{t-1} + \varepsilon_t$$

where the Count is the number of combinations, D is the demand changes, CIS is the concentration in the shipping industry, TP is the technical progress, C is the service capacity, CR is the ratio of concentration of top four firms.

6.3 Data

Table 6.1 displays a list of firm that occurred among terminal operators during the period 1991 to 2007.

Table 6.1 Consolidation among terminal operators from 1991 to 2005

Year	Acquiring firm	Acquired firm
1991 (5)	HPH	Port of Felixstowe
1991	P&O Ports	Marina Port Services, Inc
1991	Eurogate	Carl Tiedemann GmbH & Co.
1991	APMT	Sea-Land Orient Ltd
1991	DPA	CSX Commercial Services
1992 (1)	PSA	Voltri Terminal Europe
1993(3)	APMT	EacBen Containers Line Ltd
1993	Eurogate	EUROKOMBI Transport KgaA
1993	P&O Ports	Shekou Container Terminal
1994 (2)	HPH	Mid-Stream Holdings Ltd
1994	P&O Ports	Terminales Rio de la Plata SA
1995 (1)	HPH	Freeport Harbour Company Ltd
1996 (2)	Eurogate	OCEANGATE Distribution GmbH
1996	HPH	Xiamen International Container Terminals Ltd.
1997 (6)	HPH	Myanmar Intl Terminals Ltd
1997	PSA	Vecon S.p.A
1997	P&O Ports	Gruppo Investmenti Portuali
1997	PSA	Civitavecchia Container Terminal
1997	Eurogate	DIALOG GmbH
1997	Eurogate	Contship Containerlines Ltd.
1998 (5)	HPH	Shanghai Port Container Development Co., Ltd
1998	HPH	COSCO-HIT Terminals Ltd.
1998	PSA	Gujarate Pipavav Port Ltd
1998	P&O Ports	Tilbury Container Services
1998	DPA	Conrail
1999 (11)	PSA	Royal Pakhoed
1999	APMT	Gioia Tauro Medcenter Container Terminal S.p.A.
1999	APMT	Sea Land International Terminal Operations
1999	P&O Ports	Natal Lashing
1999	P&O Ports	National Stevedores
1999	Eurogate	WienCont Container Terminal GmbH
1999	Eurogate	Eurokai City Terminal
1999	Eurogate	Eurokai Landterminal

1999	Eurogate	Eurokai KGaA
1999	DPA	Sea-Land Domestic Trade
1999	Eurogate	BLG Automobile Logistics Italia S.r.l.
2000 (5)	APMT	Maersk Kobe Terminal
2000	APMT	Port of Tanjung Pelepas
2000	APMT	Gabriel
2000	P&O Ports	Antwerp Combined Terminals
2000	HPH	Klang Multi Terminal Sdn. Bhd.
2001(11)	HPH	ECT Duisburg
2001	HPH	ECT Beheer N.V.
2001	HPH	Thai Laemchabang Terminal Co. Ltd
2001	HPH	ICTSI Int..Holding Co.
2001	HPH	Grand Bahama Development Co.
2001	APMT	Almacenadora Conacentro S.A
2001	DPA	CTG Terminal Gremersheim
2001	DPA	Terminal Port Services of Puerto Cabello
2001	APMT	Delta Dedicated West Terminal
2001	P&O Ports	New Orleans Marine Contractors
2001	P&O Ports	MGM-Intramar
2002 (11)	HPH	Hongkong Salvage and Towage Company Ltd
2002	HPH	Karachi International Container Terminal Ltd
2002	HPH	Hyundai Busan Container Terminal
2002	PSA	CWT Distribution Ltd
2002	PSA	HessenNoordNatie nv
2002	PSA	Mermaid Marine Australia
2002	Eurogate	BLG Leads Logistics GmbH
2002	Eurogate	Dettmer Container Packing
2002	Eurogate	Gmbh & Co KG
2002	Eurogate	DCP Dettmer Container Packing GmbH. & Co. KG
2002	DPA	American Commercial Lines Holdings LLC.
2003 (9)	APMT	SPS
2003	Eurogate	WienCont Container Terminal GmbH
2003	DPA	Jebel Ali Free Zone International
2003	P&O Ports	Cagliari International Container terminal
2003	P&O Ports	Port of Miami Terminal Operating Co
2003	P&O Ports	Mundra International Container Terminal
2003	P&O Ports	Canadian Stevedoring
2003	Eurogate	Ust-Luga Container terminal
2003	HPH	LC Terminal Portuaria de Contenedores S.A. de C.V.
2004 (10)	DPA	CSX World Terminals
2004	DPA	Global Material Services
2004	Eurogate	BLG Complements GmbH & Co

2004	Eurogate	Auto-Terminal Neuss
2004	APMT	Gujarate Pipavav Port Ltd
2004	APMT	Contecar
2004	PSA	Changi Int. Airport Services Pte Ltd
2004	PSA	BatamIndo Shipping & Warehousing Pte Ltd
2004	HPH	Wolny Obszar Gospodarczy
2004	HPH	Hanno Rotterdam B.V.
2005 (16)	HPH	Hong Kong International Terminals
2005	HPH	Cosco-HIT Terminals Ltd.
2005	PSA	Noordzeeterminal nv
2005	PSA	COSCO-HIT Terminals Ltd.
2005	PSA	Hong Kong International Terminals
2005	APMT	Terminal de Contêineres do Vale do Itajaí S/A
2005	APMT	Vridi Container terminal Abidjan, Ivory Cost
2005	APMT	Port of Mina Salman
2005	DPA	India Gateway Terminal Private Ltd
2005	CMA/CGM	Zeebrugge OCHZ Terminal
2005	ICTSI	Toamasina Terminal, Madagascal
2005	DPW	Aden Container Terminal
2005	DPW	Fujairah Container Terminal
2005	DPW	Rajeev Gandhi ContainerTerminal
2005	DPW	P&O Ports
2005	APMT	Apapa Container Terminal

Sources: Containerization international, HPH (2003 and 2004), HIT (2004), International Business Data, Cargo News Asia, Port of Singapore Authority (2005 and 2005b), Asia Trade Hub, The North Africa Journal, Inchcape Shipping Services (2005),APM Terminals(2004, 2005), World Cargo News Online, Journal of Commerce Online(2006), Times Journal of Construction Design, P&O Ports (2003, 2003b, 2004 and 2005), Eurokai KGaA (2005), Dubai Ports International

For the independent variables, the data will be used as the ratios those are available to the formula. The demand here is treated as the containerized trades in the worldwide and the terminal handling rate is the average level of the global operators.

Table 6-2 The structural variables of the model

Year	Demand	Concentration In Shipping	Terminal Handing Charge	Technical Progress	Capacity	Concentration ratio
1990	23	0.359	9.66	14.3	2.89	0.148
1991	26	0.356	9.62	14.5	3.11	0.161
1992	29	0.351	9.83	14.5	4.03	0.175
1993	33	0.348	9.50	14.7	4.92	0.183
1994	37	0.345	9.07	14.9	5.53	0.194
1995	39.5	0.367	8.03	15.2	6.54	0.201
1996	42	0.375	8.42	15.2	7.32	0.214
1997	44.5	0.383	8.50	15.3	8.06	0.219
1998	50	0.389	8.53	15.5	8.57	0.238
1999	56	0.401	7.94	15.9	9.65	0.265
2000	62	0.414	7.05	16.4	10.74	0.321
2001	63	0.421	6.98	18.2	11.13	0.343
2002	71	0.427	6.64	18.7	12.82	0.362
2003	80.5	0.435	6.53	18.7	14.48	0.379
2004	91	0.442	6.32	18.8	16.73	0.423
2005	102	0.450	6.09	19.1	18.62	0.425

Sources: UNCTAD Review of Maritime Transport, OECD Database, Drewry and companies' websites

6.4 Results and discussion

Following the linear regression in Excel, the result is in the below:

Figure 6-1 The result of the linear regression

Regression Statistics	
Multiple R	0.930256582
R Square	0.865377308
Adjusted R Square	0.76441029
Standard error	2.208072723
Number	15

	Coefficients	Standard error	t Stat	P-value
Intercept	-46.03319651	40.80322033	-1.12818	0.291941
D	-0.611803532	0.600976495	-1.01802	0.338466
CIS	126.5552252	75.08906487	1.685402	0.1304
THC	3.044145907	2.004602846	1.518578	0.16735
TP	-2.503448102	1.697460366	-1.47482	0.178494
C	2.340088199	2.462383205	0.950335	0.369765
CR	115.9552371	76.03058692	1.525113	0.165741

Observations	Prediction Count	Residual	Count
1	2.860019668	2.139980332	1
2	2.044725424	-1.044725424	1
3	3.992063804	-0.992063804	2
4	2.670246623	-0.670246623	2
5	0.736655868	0.263344132	3
6	1.249591558	0.750408442	5
7	5.252428309	0.747571691	5
8	7.039989594	-2.039989594	5
9	7.42163076	3.57836924	6
10	8.130133599	-3.130133599	9
11	11.18770584	-0.187705837	10
12	10.2061417	0.793858303	11
13	9.942209691	-0.942209691	11
14	10.66344733	-0.663447327	11
15	14.60301024	1.396989758	16

The result seems a little bit robust because of the accurate of the hypothesis and data. The R square is 0.865, which is not high enough, but result still makes some sense. The objective of the model is to isolate the effect of structural factors while ignoring strategic considerations, so we can treat it acceptable.

D: A positive coefficient of demand would imply that terminal operators are taking advantage of demand growth to capture economies of scale. However, its coefficient is negative. It can be explained that the growth is not likely to disturb equilibrium relationships among suppliers if the demand is not unanticipated changed. Demand is relatively stable, and decisions are not made based on the demand changes.

CIS: The concentration in liner shipping can influence the consolidation activities in terminal operators positively because the terminal operators compete with the business from the shipping lines, and the concentration in shipping line would lead the terminal operators to do more expansion in order to fit the changes of their customer.

THC: Terminal handling charges also plays a positive role in the consolidation activities, which is still acceptable because more charges refer to more profits, and the increasing of profit will simulate big operators more interested in the business expansion. Moreover, the terminal handling rate is not only determined by operators themselves, but also by the regulators, policies and local governments, etc. so the handling charge is a mixed result of many factors and did not reflect the consolidation activity very accurate.

TP: Technical progress is a negative factor according to the result before. One explanation is that the rate of technical change during the sample period is too gradual to impact the consolidation greatly. We can find that the technical progress did not make too much change as years went by. Another problem is that the crane productivity may not be the best indicator of technical changes. In fact, when computing technology, both landside and seaside performances should be taken into consideration.

C: Capacity of the services provided by the terminal operators is positive as expected. Increasing in service capacity will lead the terminal operators more positive to find more markets and more customers. Thus they indicate that consolidation activities heighten when the capacity is growing.

CR: Concentration ratio of top four firms is positive again. We can explain that the concentration ratio is market share of the top four firms, and if it goes up, the market share is growing, which indicates that more consolidations will occur.

6.5 Conclusion

The objective of this chapter is to explore the motivations for consolidation in container terminal operators. The model provides some support for indicating how the specific factors can influence the consolidation activity in container handling market. In particular, the results appear to show that operators are prone to seek combination when demand conditions are unfavorable, and technical progress also may delay the consolidation. On the other hand, the model indicates that combinations also become more attractive when the concentration in liner shipping and terminal operators is increasing, the handling charges is going up, and there is more capacity that terminal operators can provide.

The result is a little robust because the accuracy of the data and the methodology, but our purpose has been achieved, which is to underlie the structural factors among the consolidation. In the next chapter, we will do more analysis on the process of doing the combination between two terminal operators by using a case study. In order to understand the function of the consolidation in the long-run strategic planning, first we would like to provide some choices in the organizational structures.

Chapter 7 Structure choices for consolidation and Case Study

From Chapter 1 to 6, we have discussed the motivations and impacts about the consolidation activities in container terminal industry, and we have analyzed the structural factors that underlie those consolidations. In this chapter, we will try to provide some choices for how to run the companies after consolidation from an organizational structure perspective, and then give a case study of DP World acquiring P&O Ports and see how the consolidation took place in the real world.

When it is necessary to take action to close a prospective difference between the firm's objectives and its potential based on its present capabilities, difficult choices must be made. And the key connection between planning and consolidation is the evaluation of current managerial and technological capabilities to reach objectives. The purpose of providing some structure choices in the following is trying to show some alternatives with different environmental reassessment, which can help us to get more insight on the consolidation in the specified industry (container terminal industry).

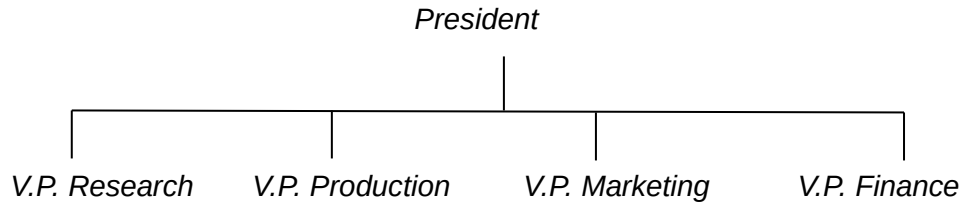
7.1 Organizational structure choices for the consolidation among TOCs

Undoubtedly, the structure of a firm is a key sector for the success of the consolidation of two companies. In the following there will be some different types of organization structures.

7.1.1 The Unitary Form (or U Form)

The unitary form, broken into functional department, is highly centralized under the president. The long term vision of the firm is often controlled by the president solely, which can lead the firm to do the rapid decision-making, but it can be only successful in smaller organizations because it is difficult to handle multiple products. If it consolidates other companies, the acquired firm has to fit into the limited span of control of the top executive group, and the new unitary is likely to be consolidated fully into the original structure.

Figure 7-1 The Unitary Form of Organization

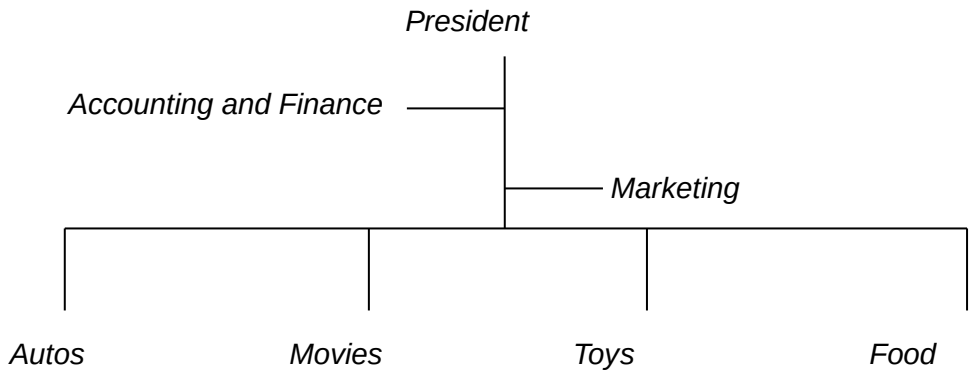


(Source: J. Fred Weston, 2001)

7.1.2 The Holding Form (or H Form)

This holding company is basically arranged around various unrelated operating business, in which the leadership is able to evaluate each unit individually and can allocate different resources according to projected returns. Thus this kind of company arrangement makes it possible for the firm to acquire unrelated activities, and almost every dissimilar operation can be permitted to function as an independent company. However, the H form may be less fully effective because of the requirement to guide activities which are widely diverse.

Figure 7-2 The organization of Holding company firm



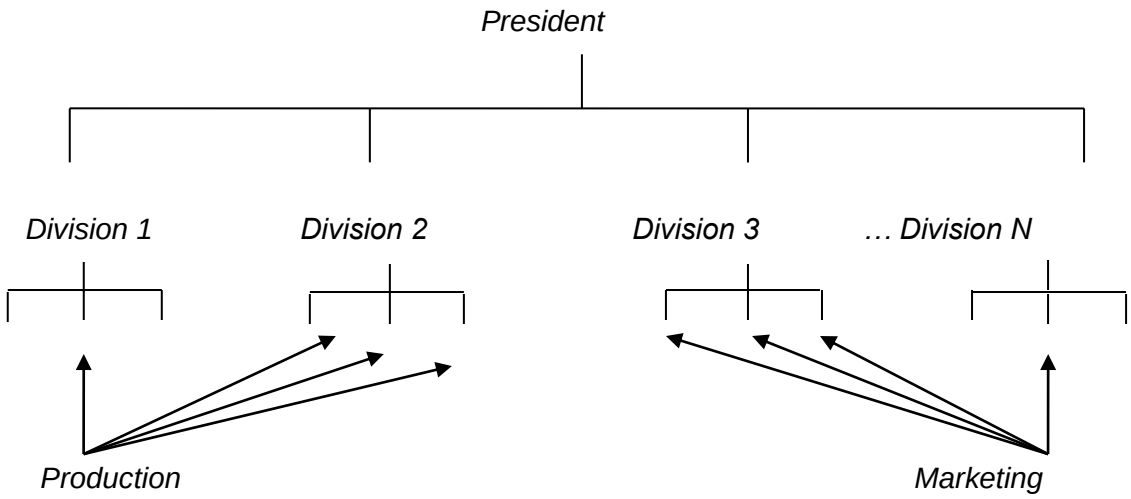
(Source: J. Fred Weston, 2001)

7.1.3 The Multidivisional Form (or the M Form)

The multidivisional organization, lies between the centralization of the U form and the decentralization of the H form. Each division can be autonomous enough to be treated as a profit center, but all divisions share some general endowments of the whole company such as production and marketing.

This kind of firm is fit for handling related product and geographic market extensions, and the acquisition of a firm with unrelated products might result in designating it as a separate division. Sometimes, groups of divisions may have several elements in common and will require their own thrust with support staffs who have the specialized knowledge.

Figure 7-3 The Organization of a Multidivisional Form

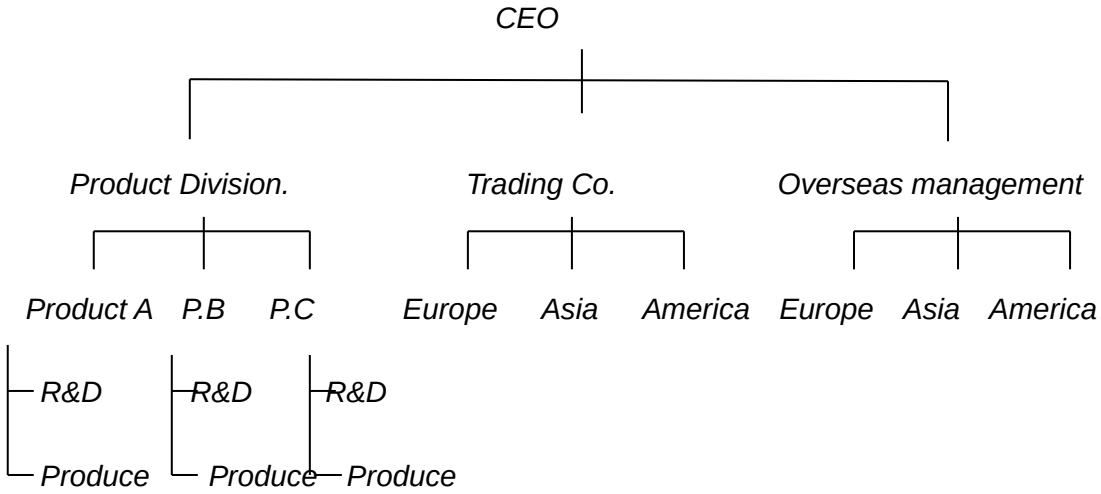


(Source: J. Fred Weston, 2001)

7.1.4 Product Division Dominant

For those multinational organizations, the management structure is based on the strategy of the company. In the Product division dominant, products groups report their work directly to the executive level. Each product has its own functional activities such as R&D and manufacturing. The advantages of this form are that economies of scale can be achieved and the products can be developed in the market quickly because the production is relatively centralized. The tight budgetary control can make top managers available to impose fiscal discipline. But this approach may not be matched effectively for the individual country's product preferences.

Figure 7-4 Product Division Dominant

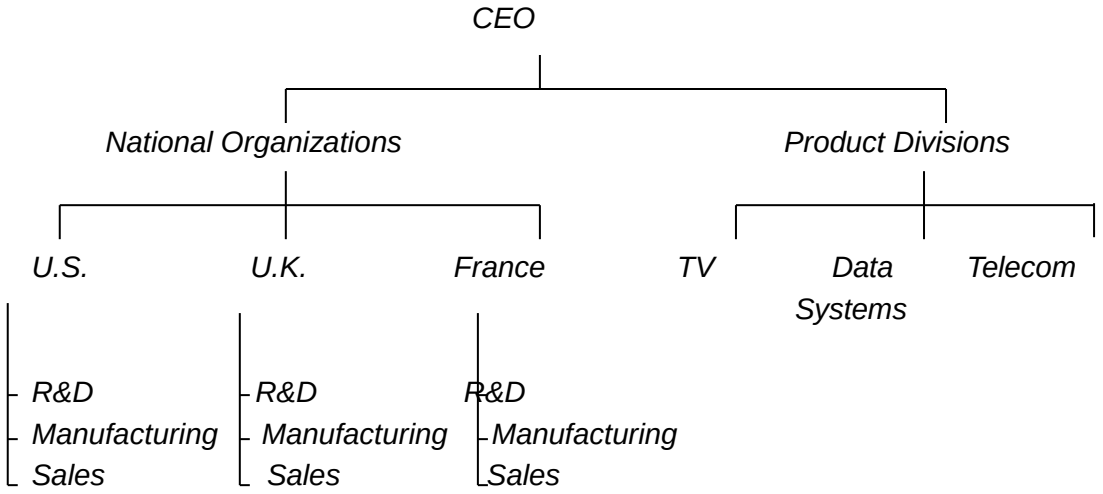


(Source: J. Fred Weston, 2001)

7.1.5 National Organizations Dominant

Another approach for the multinational companies is the National Organizations Dominant. This organization has two major groups: national organizations and product divisions. The product divisions are generally responsible for production, development, and global distribution and coordinate across national organizations. One potential problem of this structure is that economies of scale will be lost due to the geographic dispersion of manufacturing activities.

Figure 7-5 National Organizations Dominant



(Source: J. Fred Weston, 2001)

7.1.6 Summary

Based on the analysis before, one key respect is raised on the decisions of how to fit a consolidated entity into the organizational structure and philosophy of the acquiring firm. For example, the acquired entity should be placed in a group with related business activities, and the interactions between the existing support group and the new entity should provided opportunities for adoption of the best practices and experiences over time. Besides, both executives and the staff support for the group should have sufficient knowledge and experience with the operations of the new segment to help it to achieve performance improvements.

Most of the terminal operators are multinational companies with global network characteristic. Normally the top terminal operators have their offices worldwide, and they also establish the regional headquarters, such as Asia-Pacific headquarter, Europe headquarter, North America headquarter, etc. Under these regional headquarters there are also many country-based headquarters.

To conclude, no matter what kind of structure a terminal company applies for consolidation, it should make it easier to integrate the operation of different trades of the acquired companies. Different departments should corporate and support each other, and so it is important for the acquired companies to communicate with the original companies efficiently. Through this way can make the two companies into better combination.

Having seen the alternatives of those structure choices in the consolidation, next we will get close to a real case and do the analysis on story about the DP World acquiring P&O Ports.

7.2 Case study - DP World acquiring P&O Ports

DP World, as one of the world's largest pure-play global container terminal operators, is managing a portfolio of 42 terminals in 22 countries right now. The operator's roots go back to the unification of all container port operations in Dubai in the early 90's. The success of the operator's experience in Dubai prompted a strategy of targeted regional then global expansion, culminating in the acquisition of CSX World Terminals in 2005 and P&O in 2006. In the following part we will focus on the analysis about how the DP world did the consolidation activities to the P&O Ports.

7.2.1 DP World Profile

DP World traces its roots back to the 1970s, when the late Sheikh Rashid Al Maktoum, then ruler of Dubai, ordered the dredging of the Dubai Creek to make way for a harbor capable of handling modern ships. This development gave birth to Port Rashid, which is the city's first modern port. Situated near the city-center, and updated with all-new infrastructure, Port Rashid became an instant success. The initial success of Port Rashid encouraged Sheikh Rashid to order the construction of the world's largest man-made harbor at Jebel Ali, just outside of the city of Dubai at the time. In 1991, Jebel Ali Port and Port Rashid merged together to form the Dubai Port Authority (DPA) in order to streamline the logistics operations and thereby increase efficiency.

Despite the magnitude of growth and high utilization rates at the Dubai-based ports, DPA was soon keen on pursuing expansion opportunities outside of the UAE. In 1999, DPA established its international arm, Dubai Ports International (DPI) to identify opportunities for growth outside the UAE. In 2002, DPI won a concession in Visakha India to build and operate a new container terminal. Next DPI gained access to Eastern Europe in 2003, when it was awarded a long-term concession to operate.

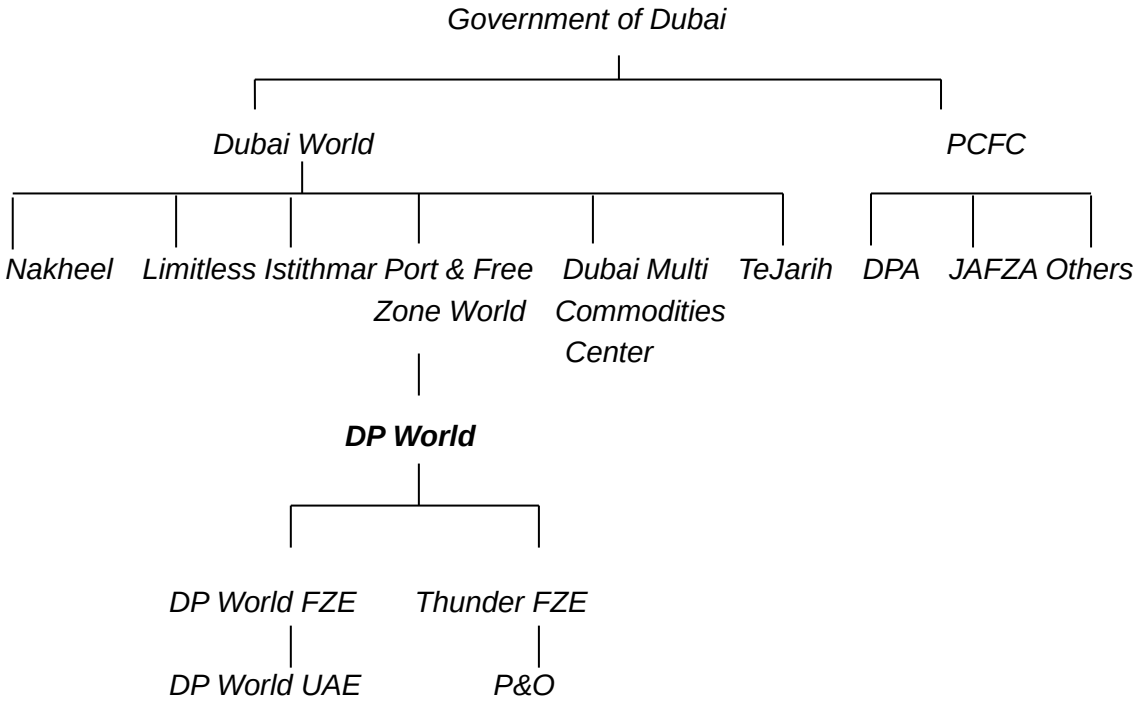
By 2005, the global carrier industry was undergoing a substantial consolidation period, which had immediate implications on container terminal operators. Operators were beginning to experience pressure to consolidate within themselves in order to improve their pricing power and better meet the global needs of the carriers while also making use of potential economies of scale. DPI thus proceeded to acquire CSX World Terminals for USD 1.2 billion in February 2005. Following the acquisition, DP World was formed in September 2005 with the integration of Dubai Ports Authority (DPA), and Dubai Ports International (DPI) which had been set up to export Dubai port's success in the UAE internationally.

The operator, as a result of a targeted global expansion strategy, is the single most

diversified operator in the world in terms of geographic coverage. The operator's portfolio is also heavily weighted towards origination and destination traffic. This mix retained by DPW implies more stability and higher yields than comparable operators that focus on specific regions.

DP World is a subsidiary of Dubai World, a holding company owned by the Government of Dubai. The company operates under the Port and Free Zone World umbrella of Dubai World. In the following is the structure of the company and sister companies.

Figure 7-6 Company structure and sister companies



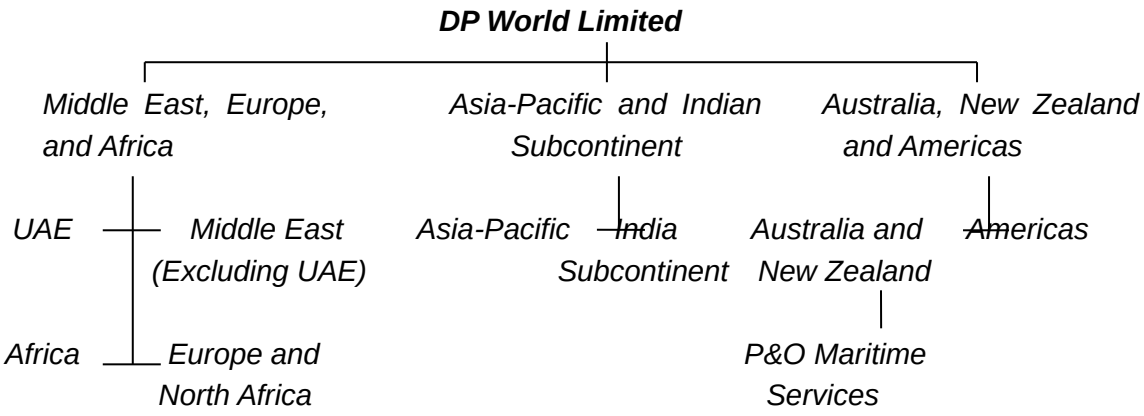
(Source: DPW)

DPW today is a global container terminal operator with a globally balanced portfolio of terminals. The company groups its operations into three main geographic areas:

1. Middle East, Europe and Africa
2. Asia Pacific and Indian Subcontinent
3. Australia, New Zealand and Americas

The organizational structure depicting the operator's three reporting regions and eight operating regions is shown below:

Figure 7-7 Regional Structure of DPW



(Source: DPW)

7.2.2 Acquiring P&O and going global

During the last quarter of the 20th century, P&O diversified into construction management, property investment and development, along with service businesses including exhibition and conference centers. However, a decision made about in 2002 that the company move away from being an unfocused conglomerate to concentrate on the company's core maritime and transport interests. Next in 2006 DPW acquired P&O Ports through a bidding war against PSA.

To manage the acquisition, DPW made UK remain a pivotal part of its operations. It regarded the management and employees of P&O as key to the ongoing success of the combined entity and the development of the London Gateway Port. The headquarter of P&O is still in London right now.

The P&O deal added 32 operating terminals and five terminals under construction to DP World’s portfolio. The acquisition included key operations in Australia, Qingdao Qianwan Container Terminal, China, Navi Mumbai, India, in two terminals in Antwerp, Belgium and in Southampton, United Kingdom.

At the commencement of the P&O acquisition, DP World also established a strong foothold in North America. However, DP World’s acquisition of P&O’s six terminals in USA faced intense scrutiny and resistance from U.S. legislators. They feared that a UAE based company’s control of such vital assets would be a threat to national security. The controversy ended with the sale of the U.S operations to AIG Global Investment Group. DPW sold the terminal operations in six ports, including New York/New Jersey and Philadelphia, cargo-handling activities in 16 eastern seaboard and Gulf of Mexico ports, and a passenger terminal in New York City to a unit of AIG, which has little experience in that business.

With the acquisition of P&O, DPW decreased its dependence on transshipment traffic since most of P&O’s ports were O&D (Origin to Destination) traffic oriented. Furthermore, the acquisition dramatically reduced the operator’s homeport share of total throughput to 21% in 2007 from 50% in 2005, thereby making DPW more diversified than most of its immediate peers.

7.2.3 Motivations and effects

1. Motivations

In the ports of Dubai, and in particular Jebel Ali, DP Authority had a very successful experience in establishing a green field project and turning it into a world-class operation by providing the right infrastructure as well as other value added services (such as the free zone and inland transportation). The experience in Dubai gave the management of DPA a solid platform and the confidence to export their experience and knowledge into other markets. The emergence of DP World reflected the operator's new global footprint.

The consolidation activities were combined with the strategic goals. DPW is always aimed to be the top operator in terminal industry. Besides, another management strategy for DPW is to build up a balanced portfolio, which can cover most of the world's trading regions. Through this way, DPW can protect it from the risk of a serious downturn in any particular region. Even though the Middle East was experiencing resurgent growth on the back of recovering oil prices, it was always a relatively volatile area. DPW considered expanding outside the region in order to diversify its operations and minimize risk. So the operator carried ambitions that extended beyond the region, and developed plans that would see it substantially expanding its network and competing globally and what was becoming a high-growth global infrastructure play. This required considerations beyond straight-forward organic growth. From 2005, operators were beginning to experience pressure to consolidate within themselves in order to boost global coverage, improve their pricing power and better meet the global needs of the carriers while also making use of potential economies of scale.

The function of ports is also concerned by DPW. DPW strategy is based on a mix between operating transshipment and peripheral ports together, which is the safest strategy to follow. But Jebel Ali is a transshipment port, and 60% of containers handled at Jebel Ali Port are transshipped to other destinations outside the UAE (Abdulla Darwish Alhayyas, 2007). Then the danger of losing customers will increase because the shipping lines can switch at any moment to other terminals.

The consolidation of port terminal operators is also driven by the demand for higher efficiency to serve expensive ships requiring larger investment in cranes, deep water and IT. However, the benefit of higher productivity and efficiency at the container terminals can be eliminated dramatically unless the links and access to terminals are in a good way. Acquiring P&O UK can make DP World construct a port and business Park at London. The project, which was initially inherited from P&O, involves a 1500-acre site with a 2,300 container quay able to handle large deep-water container

ships. Once completed, the terminal should have an annual capacity of 3.5 mn TEUs. DP World is generally well positioned to take advantage of highly favorable developments taking shape in the global container terminal industry, as well as specific opportunities that will likely present themselves going forward.

Before being acquired, P&O was already one of the top global terminal operators with much professional experience about terminal operations. As a relatively new player in the international global terminal race, DPW could benefit a lot by acquiring this British terminal operator.

2. Effects

If the acquisition of other terminals before 2006 pushed DPW to the global market, the dramatic acquisition of P&O only a year later established DPW as one of the big four preeminent global terminal operators. P&O was acquired totally for USD 7.2 bn, and with P&O, DPW now had access to all key regions of the world.

The acquisition of P&O was an important step in DP World's global expansion strategy and ambition, as it allowed it to increase its international presence and enter brand new markets. After the consolidation with P&O, its capacity has increased significantly in the next few years with a committed pipeline of expansion and development projects in key growing markets, including China, India, and Middle East. It helped DPW become a key player in the global transportation and logistics industry, and establish a broader geographic base, thereby enabling it to better serve its key customers. Furthermore, DPW can exploit immediate and long-term synergies and economies of scale through access to new high-growth markets.

DPW continued high and even increasing utilization throughout of most of the operator's portfolio, and a strong price environment in terms of port tariffs. Revenues should move in-line with overall throughput though, as regions that will witness the highest growth in throughput will be the regions in which tariffs are the lowest, therefore balancing the effect of higher prices throughout the portfolio. The effect of this growth should however reflect well on the margins of the operator, even before accounting for cost reductions per TEU going forward. In the following is the financial summary in the end of 2005 and 2006. The acquiring P&O occurred in the early 2006.

Figure 7-8 Summary financials of 2005 and 2006

	31-Dec-2005 ($)	31-Dec-2006($)
Total revenues	674,920	3,486,778
Net profit	239,704	191,780
Total assets	3,627,549	18,242,127
Paid-up capital	915,721	7,545,666
Shareholders' equity	911,487	8,429,188

(Source: DPW)

About the service, DPW is likely to continue to provide its customers with value enhancing port and logistics solutions to ensure a more value added approach to its product. The optimizing strategy that the company is currently implementing is one example of its attempt to increase customer utility through the provision of better connectivity, information sharing, and security, which should ultimately reflect on cost savings for customers.

Risk is another important issue that the DPW should pay great attention in the consolidation activities. Apart from some political conflictions in some country like U.S. which has been mentioned before, an unanticipated slowdown in global GDP growth and a resultant slowdown in global trade activity will impact the terminal business seriously. Like the financial crisis since 2008, it has resulted in a slowdown in growth of throughput at the operator's global terminals at a time of substantial investment in new capacity. There is also a risk that given the on-going rerating of port assets globally and the high expected competition for port privatizations and concessions among local and global operators as well as financial investors, that new concession prices become uneconomical for DPW. This would limit potential growth in operations and the global footprint of DPW to only organic growth at existing terminals including P&O Ports. Besides, other risks like cost & revenue currency mismatch and the depreciation of the USD, Concession expiry, or a slowdown of privatizations in some regions will do a lot negative impacts on the global terminal business of DPW.

7.3 Conclusion

In this chapter, the consolidation of container terminal industry is analyzed from a managerial perspective. Terminal operating companies seek specific competitive advantages by examining their particular strength in context with the industry and the trading environment. Different organizational structure choices can fit different kinds of companies when they do the consolidation activities. Each organizational structure has its own advantages and disadvantages, which make firms take great care about doing the decisions.

Then a case study of DP World acquiring P&O Ports is shown in order to put a practical example to help to understand the consolidation. Since DPW did not own a carrier, nor was it allied with any, it serviced all equally, whether they were large carrier companies, or small local ones. Thus DPW should enlarge its service capacity in order to attract more clients and customers. Acquiring P&O has made DPW significantly increase its capacity in Europe, China, India, and Middle East. The acquisition dramatically reduced the operator's homeport share of total throughput, thereby making DPW more diversified than most of its immediate peers. For the financial index, the acquisition has improved a lot for the total revenue and total assets. Though the net profit is a little lower than the previous year, it is because DPW had spent more than 7 billion on the purchasing and acquiring. In a word, acquiring P&O established DPW as one of the big four preeminent global terminal operators.

Chapter 8 Summary and Conclusion

Like many other industries, container terminal industry has been undergoing restructuring and consolidations since 1990s, which was reflected in both merger and acquisition activities and in the formation of joint venture.

From the early 1990s to early 2000s, there is a serious amount of consolidation activities in the container terminal industry. Most of top operators were involved in these activities. It has changed the competition environment of the terminal industry. It has shown to what extent economies of scale occur, how these depend on container terminal conditions, and how the consolidation in particular may generate economies of scale in this industry. Port terminals were always regarded as the bottleneck in the maritime sector, imposing many conventional constraints in terms of capacity, efficiency and reliability. But the transport terminals no longer remain a passive element after half a century of evolvement containerization.

Container terminal industry is quite sensitive to the world economy, and its growth is much related to the growth of world trade with the volatile profitability. Thus consolidation is often used as a defensive strategy in case of stagnation or bad revenue. Increased competition forces many executives to give up autonomy and to strengthen market power with others to defend themselves. Greater resources and increased market share can give operators a stronger market position and an increased external efficiency.

As to network building, it is noted that more limited companies are started up abroad than domestically, which shows that network building and entering new markets or reinforcing one’s position is an important motive for expansion. With respect to network building, diversification and integration, limited liability companies and contractual agreements are the most used forms of cooperation by the major container-handling companies HPH, PSA, APM Terminals, DP World and Eurogate. Global terminal operators have shifted their focus from a local port level to a port network level, and right now the effects of terminal networks have not been exploited to the full. In the future, it is expected that the terminal business can meet many opportunities as long as the combination strategy can be chosen among common parties of port-related business such as terminal operators, shipping companies and local governments or port authorities.

The supply chain industry is thought to increase vertical and horizontal concentration. Vertical integration can be applied to deal with the trend towards integrated logistics, but this does not necessarily imply that terminal operators have to set up all kinds of logistics and transport companies. In many cases, a better structural co-ordination

and co-operation with other market players will suffice efficiently integrate the terminal function in comprehensive logistics networks. But the concentration will also bring the risk of abuse of market power.

The relationship between ports activities and container terminal operations is mainly driven by the increasing differentiation of various supply chains and their changing network structures. In response, terminal operators and other logistics service providers have to rethink their roles they play in the chain and revise their strategies in order to gain more revenue and profits while keeping providing value-added services to their customers through optimizing those terminal facilities.

Port privatization, market concentration in liner shipping, and the fact that investors have regarded the port industry as a more mature business than before, are all elements that can explain the present consolidation in container terminal business. However, the present status in container terminal industry has put more pressure on terminal operators as well as port authority in finding the balance between competition and co-operation, so that shippers or shipping lines can get high level of services, while terminal operators are also able to deploy resources in a good position for further improvements in service and infrastructure. Considering the fast-growing competition among supply chains as well as global logistics centers, most ports have been actively taking measures to attract more regional distribution centers of those multinational logistics or manufacturing companies to expand their markets.

In chapter 6, a model is to set up to explore the motivations and structures factors for consolidation activity in terminal industry. In particular, the result appear to show that operators are prone to seek combinations when demand conditions are unfavorable, as indicated by the positive sign on container handling charges, and he negative sign on technique progress.

Container terminals or their owners can be subject to a wide variety of activity goals, ranging from profit maximization, cash-flow maximization or shareholder value maximization, over managerial objectives to equity goals, and they always seek firm-specific competitive advantages by examining their particular strength in context with the industry and the trading environment. The key connection between strategic planning and consolidation is in the current managerial and organizational structure relatives to capabilities required to reach objectives. The process of value creation in consolidation requires strategic fitness between parties involved.

To conclude, the thesis has matched the objective of the study. It presented detailed history of consolidation in cargo handling industry, and analyzed the reasons of consolidation and impacts on markets and the players. We also took the terminal

networks and the whole maritime supply chain into consideration. Furthermore, we have dug into the structure factors underlying those consolidation activities by using a regression model. In the end, the case study of DP World acquiring P&O Ports gave a comparable transactions analysis that can be a reference to future consolidation activities in container terminal industry. We can say that this consolidation will continue in the future with the world economy growth, the motivation for more market power, the extending of networks, and the integration of the maritime supply chain.

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