



## Strategic alliances in container liner shipping

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### ABSTRACT

The economic crisis in the years between 2008 and 2010 has demonstrated the necessity for substantial adjustments on behalf of container lines. Capacities were shifted quickly to emerging and less affected markets allowing a faster recovery of globally organized companies. This paper illustrates the dynamics in the container shipping market. Alongside the main characteristics of the Top 20 ocean shipping companies, liner services are described. These services are classified by geographic coverage and vessel deployment. In addition, this paper provides a better understanding of the collaboration among service providers. Starting from a general framework of co-operative liner services, in-depth analyses of the global alliances in liner shipping are obtained. These formations – Grand Alliance, New World Alliance and CKYH Alliance – are compared with alternative forms of collaboration in the liner shipping industry. The analysis of alliance announcements which are related to operational and strategic changes indicates that the “global alliances” cannot be regarded as closed corporate-like entities. In effect, service agreements are not only negotiated with the focal members of the specific alliance. Instead, every service is arranged individually and under specific conditions. By understanding the dynamics within alliances, we are able to develop an assessment relating to the stability of collaborations. Ultimately, these insights direct us to several paths for future research.

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### 1. Introduction

International trade proliferation depends to a very large extent on the efficient movement of cargoes from production sources to points of consumption. The proliferation of international trade is directly related to the ability of ocean liner shipping companies to maintain competitiveness whilst providing efficient and effective services. Ocean liner shipping companies play a prominent role in facilitating international trade, not just by enabling the physical transport of the cargoes but also through their involvement in the commercial and marketing aspects of global trade.

One way through which these firms have been trying to gain ownership advantages and outperform competitors has been the formation or membership of different types of alliances with competitors (Fossey, 1994; Gardiner, 1997; Midoro & Pitto, 2000). The ocean shipping industry is among the first to utilize the concept of co-operative behaviour in the quest for achieving particular business objectives. The co-operative behaviour has historic origins dating back to the 1870s when ocean shipping

companies formed the first co-operative agreement in an effort to eliminate cut-throat competition by limiting capacity and fixing prices (freight rates).

The formation of today's global alliances dates back to the end of 1995. Beside vertical integration of transport operations, the main activity comprises the horizontal agreement for sharing fleet and route services (Lu, Cheng, & Lee, 2006). Alliance agreements can be characterized as technical agreements. Each member remains responsible for marketing activities, fleet operation or issuing bills of lading.

A vast amount of single agreements between companies were established in the last years. Only a few companies repeat their collaboration on the entire shipping network. These collaborations form the big three alliances that offer coordinated service networks. Although the alliance networks are considered as global, the main focus is on East-West services.

Liner shipping alliances and co-operation continue to play a central role in the operation and long-term viability of liner shipping companies. Companies engage in the structuring and re-structuring of various formats of co-operative agreements as evidenced by their frequent announcements regarding their co-operation in new networks and service routes. On this basis, the scholarly examination of alliances in liner shipping is important for the development of further theoretical and practical implications and contributions.

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The need for further empirical research in liner shipping alliances has been reiterated by Sjöström (2010) who noted that our understanding of liner shipping alliances has not expanded to the careful testing applied to other industries. The aim of this paper is to describe the structure and conduct of strategic alliances in container liner shipping. In order to achieve this, the service characteristics of the top 20 container shipping are firstly presented. The characteristics include geographic coverage, ownership structure of used vessels or the degree of cooperation with other shipping companies. In addition, the strategic agreements of the “big three” alliances are analyzed within the last ten years in order to understand dynamics and adjustment of co-operative services. By doing so, implications are provided for further research. Only by understanding the interdependencies between companies and alliance agreements, hypotheses for further empirical research can be developed.

The paper is organized to achieve specific objectives as follows. Section 2 will provide a review and integration of the literature also presenting a taxonomy of the main issues that the liner shipping alliance literature has dealt within the past. Section 3 discusses the applied research methodology. Section 4 presents the key characteristics of the liner companies that are principally engaged in co-operative agreements and alliances. Section 5 presents an analysis of the collaborative agreements of the top 20 liner shipping companies world-wide. The analysis takes into account geographic coverage, market share and organization of offered services. The section also discusses trends and developments in the formation, structure and conduct of liner shipping alliances. Section 6 provides an analysis of the three major strategic alliances in liner shipping and discusses characteristics, identifies trends and raises issues that would develop the basis for further empirical research. Section 7 discusses the implications from the analysis of this paper and develops specific research questions and propositions considered to be of utmost importance in the current state of alliance structure in liner shipping.

## 2. Alliances in liner shipping: a review of the literature

### 2.1. Liner shipping structure

The aspect of collaboration between competing firms in liner shipping is not new. Liner shipping firms have a history of co-operation with the most prominent example being the price-fixing agreements between them in the context of the liner conference system (see Shashi Kumar, 1999). The demotion of the conference system primarily through the US OSRA (1998) and the abolition of the exemption form anti-trust rules by the EU in 2008 have led companies to seek other forms of collaboration in the effort to gain advantages (see Fusillo, 2006). During the mid to late 1990s and throughout the last decade companies have been seeking to establish various forms of alliances. The structural changes taking place in liner shipping have been recognized by Brooks (2000), Ferrari (2008), Fusillo (2006), Heaver (2010), Notteboom (2004) and Robinson (2002, 2006) among others.

Co-operation and continuous alignment of service structures have been the major characteristics of strategic alliances in liner shipping. Sjöström (2010) reviews primary models to explain the competition and collaboration in shipping. Co-operative and non-cooperative game-theoretic models describing situations of monopolizing cartels, destructive competition, etc. are presented to explain the extent of competition and price discrimination. Empirical examination of the behaviour of liner companies within strategic alliances using game-theoretic models was conducted by a variety of studies (Panayides & Gong, 2001; Song, Panayides, & Wang, 2001; Song & Panayides, in press). The theory of the core

(Telser, 1978, 1982) has been used to support the assertion that liner shipping cannot support stable systems for long and that “a core-based model effectively explains the incidence of collusion and competition in ocean shipping markets” (Pirrong, 1992, p. 129). Features of modern alliances in liner shipping were summarized by Midoro and Pitto (2000).

### 2.2. Types of alliances

Alliances in liner shipping take various forms. The most prominent type of alliance is what has been referred as the strategic or global alliances, a relatively new type of co-operative agreement in ocean shipping (Midoro & Pitto, 2000). These arrangements were formed in the mid-1990s with the aim of establishing co-operation between the members on a global scale. The agreements involve ocean carriers co-operating on certain major global routes (e.g. Europe–Asia, Asia–US, US–Europe).

Strategic (horizontal) alliances aim at co-operation in the employment and utilization of ships over particular routes including type/size of ship, sailing schedules and itineraries, use of joint terminals and container co-ordination on a global scale. Strategic alliances in ocean shipping do not cover joint sales, marketing or price fixing, joint ownership of assets, pooling of revenues or the sharing of profits/losses and joint management and executive functions. Alliance membership imposes restrictions on a member’s use of a non-member carrier (Slack et al., 2002). It also applies specific provisions with respect to withdrawal (notice and penalties) and ownership changes during what is normally a five-year agreement. Strategic alliances do not aim for price fixing but instead for full integration of the service capabilities of the parties into one whole. Marketing is undertaken on an individual firm basis and can differentiate between the parties to the alliance in terms of client relationship management from the moment the first encounter is made until final delivery of the cargoes to the destination.

Within the global alliances or in addition to them, various other types of collaborative agreements between carriers have been developed. These include vessel sharing agreements and slot sharing agreements. Slot sharing agreements require a fixed percentage of vessel capacity to be exchanged between the carriers over a given time period. This type of arrangement may be beneficial when two partner companies have vessels deployed on the same route with different departure time schedules. Vessel sharing agreements on the other hand entail that the collaborating companies work together to fulfil demand on particular trade routes through vessel sharing and performing joint optimization on their vessel departure times and shipping-order assignment to vessels. Carriers share profit, operating costs and collaborate on the basis of demand information sharing (Heaver, Meersman, & Van de Voorde, 2005).

Other shipping liners act as “soloists”, in particular a company with a large fleet and a wide service network. Due to the substantial ownership of resources, economies of scale can be achieved individually and not necessarily through the collaboration with competitors (MSC, Maersk Line).

In addition to horizontal collaboration between them, liner shipping companies have also sought to gain operational performance advantages through the development of the so-called liner shipping networks. According to Lun, Lai, and Cheng (2009) a liner shipping network is a form of collaboration in the liner shipping industry where players such as intermodal service providers, container management services providers and container terminal operators share resources and develop mutually beneficial strategies. The development of liner shipping networks can lead to reduction of costs in areas such as container handling and intermodal feeder services (Midoro & Pitto, 2000) as well as

improvement in destination coverage (Bergantino & Veenstra, 2002), lower operating costs and economies of scale (Heaver, Meersman, & Van De Voorde, 2001).

### 2.3. Objectives for alliance formation in liner shipping

Porter (1985) introduced the value chain concept, which distinguishes between co-operative strategies according to the type of resources pooled by the partners (Lorange & Roos, 1992; Porter & Fuller, 1986; Root, 1988). This concept distinguishes between alliances according to the type of resources contributed by the partners. Alliance parties may contribute similar resources in order to generate economies of scope, rationalize capacity or share risk. On the other hand they may form the alliance and contribute complementary resources in order to build on their respective strengths and achieve competitive advantages.

The objectives of modern liner shipping companies include risk and investment sharing, the reaping of economies of scale, cost-control and a capability to increase service frequencies in a dynamic environment of growing containerized trade. Against a background of the globalization of world markets and poor profitability and financial performance in the 1990s, these objectives have prompted the formation of strategic alliances and the scientific examination of the alliance concept (e.g. Evangelista & Morvillo, 1999; 2000; Meersman, Moglia, & Van de Voorde, 1999; Ryoo & Thanopoulou, 1999). It can be claimed that the formation of, or even defection from, strategic alliances as well as the implementation of other strategies (such as M&A) are all driven by the need to accomplish corporate objectives (see Panayides, 2001). Hence, various writers (e.g. Fossey, 1994; Gardiner, 1997; Midoro & Pitto, 2000) have credited the formation of global strategic alliances in shipping to achieving various objectives. The objectives include financial (profit maximization, increase in shareholder wealth, capital investment sharing and financial risk reduction), economic (cost reduction, economies of scale), strategic (entry in new markets, wider geographical scope, increase in purchasing power), marketing (satisfy customer requirements better, e.g. higher frequency, flexibility, reliability, network expansion i.e. offering a greater variety of routes and destinations) and operational objectives (increase in frequency of services, vessel planning and coordination on a global scale).

Economic action (undertaken by firms) does not take place in a vacuum but rather is embedded on a web of social relationships (networks). The existence of firms in particular networks allows firms to accumulate network resources (Gulati, Nohria, & Zaheer, 2000; Madhavan, Koka, & Prescott, 1998). These are resources that reside outside the firm's boundaries and are embedded in the interfirm networks in which firms are located. According to Gulati (1999) network resources can influence the strategic behaviour of firms and are a significant predictor of new alliance formation by the firms as well as the frequency of entering new alliances. No organisation is self-sustained, but depends on other organisations in its environment in order to acquire resources. In order to cope with uncertainty and establish a form of stability in resource input, organisations make "adaptations" in the sense that they establish relationships with other organisations in their environment (Pfeffer & Salancik, 1978).

Market power is concerned with the ability of firms to secure stronger positions in their market as a means of achieving competitive advantage. The market power argument provides a possible theoretical explanation for the formation of strategic alliances in liner shipping. Shepherd (1970, p. 3) defined market power as: "the ability of a market participant or group of participants to influence price, quality, and the nature of the product in the market place". The sources of market power may be classified into product

differentiation, barriers to entry and market share. The market power theory was used to assess the strategic intent of organisations that sought to implement a co-operative strategy (Kim and Singal, 1993). Offensive coalitions are formed to develop the partners' competitive advantages and strengthen their position by diminishing other competitors' market share or by raising their production and/or distribution costs. Defensive coalitions (principally sought by weaker firms) are formed to construct entry barriers, which are intended to secure the partners' position and stabilize the industry so as to increase their profits.

In addition, the formation of liner alliances does not only confer advantages to the alliance parties but also to their clients. Various authors theoretically and empirically supported the relevance of the transaction cost theory (Williamson, 1981) to inter-organisational relationships (e.g. Badaracco, 1991). Transaction costs arise as a result of a transactor's need to acquire and process information, negotiate and design contracts, and monitor and enforce the exchange relationship. The aim is to minimise transaction costs using the comparative advantages of the alliance partner (in information acquisition, lower capital investment etc). Hladik (1988) provided empirical support for cost reduction as a strategic alliance antecedent.

### 2.4. Liner alliance stability and alliance success

Despite the fact that there have been obvious advantages in the formation of strategic alliances, it might be claimed that in certain circumstances those advantages have not been achieved in practice. In consequence, some liner shipping companies have experienced instability and changes in strategic direction. Hence, companies have given great consideration in recent years to whether alliance or acquisition would be the most effective avenue for achieving organisational objectives and growth (e.g. Alix, Slack, & Comtois, 1999).

The reasons for the instability characterising liner shipping strategic alliances may be traced back to the behaviour of the member companies in the alliance. Such behaviour may arise from the need to achieve individual organisational objectives that may have an impact on the cooperation of the partners. In addition, other factors such as the number of partners in an alliance, the nature of their role and contribution to the alliance, the level of mutual trust and the complexity of the task itself may play a significant role in alliance instability (e.g. Killing, 1988).

Midoro and Pitto (2000) provide a conceptual examination of the above factors and found them to be valid in a liner shipping context. In addition, they point to the existence of intra-alliance competition as another key force driving alliance instability. Hence, an in-depth study of the co-operative behaviour of alliance partners would be of great practical relevance and importance.

Further drawbacks refer to the rigidity of alliance since changes have to be approved by all alliance partners. Consequently, short-term alignments of services especially in an economically unstable world are not possible.

Midoro and Pitto (2000) suggest that alliance stability and efficiency may be achieved by focusing on one or more of the following three measures:

- reduction in the number of partners,
- differentiation in their roles and contributions, and
- co-ordination of sales and marketing activities.

The problems associated with strategic alliances and their consequent relative instability prompted a strategic shift in recent years towards closer integration between companies in the form of mergers and acquisitions. The reasons for closer integration in the form of mergers and acquisitions (M&A) as well as their consequences have been given some attention by various authors (Meersman et al.,

1999; Oliver, 1990; Panayides, 2001; Panayides & Gong, 2001; 2002). According to Lei, Fan, Boile, and Theofanis (2008) a significant amount of potential cost saving can be expected if the partner carriers are willing to work out a full collaboration – one step beyond the slot-sharing a practice. Nevertheless, the M&A wave within the last 15 years of alliance history has jeopardised many collaborations since a number of readjustments were necessary.

As mentioned empirical research into liner shipping strategic alliances has been limited and, as a result, current understanding is not empirically grounded. Table 1 provides a classification of the liner shipping alliance literature that includes the objectives of the investigation and the research methodology adopted. Although not exhaustive the table provides a good understanding of the work undertaken in the context of liner shipping strategic alliances and can be used to identify literature gaps and areas for empirical contributions.

### 3. Research methodology

This section describes the research methodology that was applied to achieve the aims of the paper. The first step has been to undertake a thorough review of the literature as presented in Section 2. From the review it is obvious that the current literature in the container shipping industry is rich in qualitative assessments but is lacking quantitative evaluations of horizontal alliances.

The focal point of this study is to understand motives for creating strategic alliances with competitors. Such interdependencies between a company's profile and reasons for alliance creation can be found by considering (1) the characteristics of liner companies, (2) the offered services and (3) the formed alliances between the container liners. Data is collected regarding these three areas.

By doing so the study explores potential interrelations between the service network's size or a company's size and the desire to create strategic alliance agreements. The existing literature does not provide such quantitative evidence, hence the contribution of this study to hypothesis development.

Data related to liner shipping companies and related to offered services were retrieved from companies' websites and from "alphaliner.com". The latter source especially provides detailed information about liner services. Specific data collected include vessels deployed, frequency, shared capacities with other shipping companies, fleet age and speed and the geographic coverage.

In-depth alliance information, especially data over time, is not provided by the participating companies. The database "alphaliner.com" provides service characteristics as well as news related to changes in the container liner industry. Service characteristics comprise port of calls, frequency, number of vessels deployed and their ownership. News related to service changes is provided which is used to identify the main reason for an adjustment. The study distinguishes between positive and negative and between operational and strategic adjustments which indicate the stability of horizontal alliances. The ownership structure of deployed vessels in liner services describes the "alliance-intensity", which indicates whether a liner service is offered independently or co-operatively. Other indicators that reflect service and liner alliance characteristics represent a major contribution of this study. Furthermore, important alliance data over a time frame of ten years were derived. Preliminary evidence for important interrelations is presented that can be used in further regression models.

### 4. The structure of liner shipping companies

This section provides an analysis of the characteristics of liner shipping companies. It is important to have a thorough understanding of structural characteristics including size, number of owned and chartered vessels, number of TEUs operated, containership types, fleet age and fleet average speed because these characteristics may play an important role in the formation or otherwise of alliances and co-operative agreements. The data collected refers to the top twenty liner shipping companies for 2010. From an analysis of the liner shipping companies two general trends were observed. First, due to a process of concentration and vertical integration many shipping lines are subsidiaries of bigger

**Table 1**  
A taxonomy of liner alliance literature.

paper	Objective of investigation/outcome	Research methodology
Alix et al. (1999)	Case study of Canadian Pacific shipping as a niche player; comparison of niche vs. global strategies	Analysis of growth strategies
Bergantino and Veenstra (2002)	Optimal network size, co-ordination costs and the frequency of restructuring define success of alliances in liner shipping	Network theory
Czerny and Mitusch (2005)	The effect of conferences; the proposal for an anonymized exchange of information in liner industry	Analysis of EU regulation and policy making
Evangelista and Morvillo (1999)	Key driving factors influencing shipping line alliances	Empirical investigation
Ferrari (2008)	Analysis of alliance impact on geographical wideness and serviceability as well as the role of an alliance's origin	
Fussillo (2006)	Impact of OSRA and EU regulation in the liner shipping market	Impact analysis of regulation
Heaver, Meersman, Moglia, and Van de Voorde (2000)	Effects of alliances, M&A and joint ventures in the ocean shipping industry on seaports and their position in negotiations with liner shipping companies	Assessment of competition in liner shipping industry
Heaver, Meersman and van de Voorde (2001)	Analyses of port authorities' responses to a changing market environment due to concentration, investigation of conflicts among industry partners	Structure-conduct performance (SCP) Delphi method Econometric analysis Literature study, Empirical estimation Survey methodology
Lam, Yap and Cullinane (2007)	Study finds that concentration process in liner shipping industry does not necessarily lead to improved financial performance	
Lu et al. (2006)	Evaluation of CKYH alliances with success factors, possible disadvantages and future development	
Luo, Fan, and Liu (2009)	Analysis of the container freight rate fluctuations	
Midoro and Pitto (2000)	Assessment of features, driving factors and stability of modern alliances in liner shipping	
Pierre (2000)	Understanding operational synergies by estimating horizontal effects using an allocation model	Game-theoretic approach
Ryoo and Thanopoulou (1999)	Analysis of the increasing role of alliances in Asia, maximization of operational synergy is identified as the most important co-operation motive	
Sjostrom (2010)	Development of models for the explanation of cooperations systems in liner shipping	Game-theoretic approach
Song and Panayides (in press)	Analysis of co-operative behaviour among alliance partners; finding that individual and joint capabilities must be identified for alliance success	
United Nations (1998)	Causes and impacts of the concentration process in liner shipping for developing regions	

(source: authors)



**Table 2**

Ownership and container fleet characteristics of Top 20 liner shipping companies, ranking is based on total TEU capacity.

Total			Owned		Chartered			Orderbook			Vessels in alli		Characteristics		
	Operator	TEU	Ships	TEU	Ships	TEU	Ships	% Char	TEU	Ships	% Exst	#	%alli	Fleet age [a]	Avg speed [knots]
1	APM-Maersk	2,078,507	556	1,119,757	207	958,750	349	62.8%	400,815	61	11.0%			6.90	21.67
2	MSC	1,683,723	421	870,898	202	812,825	219	52.0%	494,819	41	9.7%			11.70	21.79
3	CMA CGM	1,096,622	384	342,024	84	754,598	300	78.1%	422,442	43	11.2%			6.97	21.37
4	APL	591,306	148	170,373	45	420,933	103	69.6%	108,480	12	8.1%	93	62.8%	6.27	23.24
5	Hapag-Lloyd	582,520	133	292,613	60	289,907	73	54.9%	61,250	7	5.3%	88	66.2%	7.77	23.05
6	Evergreen	567,636	156	332,352	90	235,284	66	42.3%						10.04	22.12
7	COSCO	512,060	134	295,135	91	216,925	43	32.1%	345,224	43	32.1%	48	35.8%	6.93	20.28
8	CSAV	502,619	135	41,410	8	461,209	127	94.1%	80,782	13	9.6%			4.33	23.28
9	Hanjin	461,087	100	114,022	20	347,065	80	80.0%	235,766	24	24.0%	60	60.0%	6.01	21.80
10	CSCL	455,328	127	256,071	73	199,257	54	42.5%	150,400	16	12.6%			6.89	19.29
11	MOL	383,042	99	171,422	30	211,620	69	69.7%	102,997	18	18.2%	54	54.5%	5.29	22.52
12	NYK	365,304	95	283,731	55	81,573	40	42.1%	38,800	6	6.3%	38	40.0%	7.93	20.85
13	OOCL	347,988	77	268,502	45	79,486	32	41.6%	51,600	6	7.8%	41	53.2%	6.23	21.15
14	Hambrg. Süd	336,811	108	142,326	38	194,485	70	64.8%	75,600	11	10.2%			5.87	21.98
15	K Line	324,441	80	217,196	39	107,245	41	51.3%	109,160	18	22.5%	35	43.8%	5.23	22.47
16	Zim	322,989	97	168,035	36	154,954	61	62.9%	182,771	18	18.6%			6.19	20.94
17	Yang Ming	315,798	77	187,201	45	128,597	32	41.6%	115,374	18	23.4%	33	42.9%	5.46	22.55
18	Hyundai M.M.	279,446	54	83,781	14	195,665	40	74.1%	71,810	6	11.1%	40	74.1%	6.27	24.35
19	PIL	231,941	127	147,790	84	84,151	43	33.9%	51,259	13	10.2%			7.77	18.71
20	UASC	206,940	52	113,596	27	93,344	25	48.1%	117,900	9	17.3%			7.98	20.27
	Sum/Avg	11,646,108	3,160	5,618,235	1,293	6,027,873	1,867	56.9%	3,217,249	383	14.2%			6.90	21.68

Source: Alphaliner.com, as of 28/06/2010.

Abbreviation: #: number of vessels that are dedicated to an alliance service (data are only available for shipping companies that are organized in the big three alliances CKYH, Grand Alliance and New World Alliance); % alli: percentage of fleet that is deployed in an alliance service; %char: proportion chartered vessels based on total number of operated ships.

parent companies. These groups offer integrated services along the entire supply chain (door to door services). Second, shipping lines are organized into subdivisions; each one specializing in specific logistics services.

Table 2 provides an overview of the fleet size and characteristics of the companies. The companies are ranked according to their size based on TEU volumes. The majority of all vessels are owned and operated by the shipping companies. A smaller part of the fleet is chartered. The last two columns of the table abbreviated as “# in all” and “ratio” refer to the number of vessels that are dedicated to an alliance service (data collected only for the members of the three ‘big’ alliances and the percentage of the fleet that is deployed in an alliance service).

Based on the analyzed data a number of observations can be made. The top three shipping companies by size of operated fleets (i.e. APM-Maersk, MSC and CMA-CGM) control over 40% of all vessels that are operated among the top 20. The ratio of chartered and owned vessels is similar among almost of all top 20 companies and ranges from 32% to over 90% chartered. This suggests that there are significant differences between the companies in terms of their owned versus chartered strategies. The companies choose different models to alleviate risks of ship owning in the liner shipping industry.

Beside the disparities in the ownership structure there seem to be differences between the companies in terms of how they perceive the future as evidenced by the number of ships they have on order. In particular, the top three have more than 140 vessels on order followed by COSCO and Hanjin with 43 and 24 vessels respectively. However, it is more relevant to view the number of ships on order as a percentage of their current fleet since companies order ships with a view to replacing or enhancing current service routes. Most companies have on order an average of 10% of their current fleets with the notable exceptions of Cosco (32.1%), Hanjin (24%), Yang Ming (23.4%) and K Line (22.5%).

The next two columns (“Vessels in alli”) present information on the contribution of ships by each of the companies that make-up the three big strategic alliances to the alliance. The ratio of ships that are contributed to the alliance in relation to the owned fleet

ranges between 35% and 75%. These values (column %alli) can be interpreted as a measure for “alliance intensity” and are higher for Hapag-Lloyd, Hyundai M.M. and APL.

The last two columns of Table 2 illustrate fleet characteristics of the top 20 liner shipping companies. All the big ocean liners choose on average a lower speed for the container fleet than (technically) possible (due to significant energy savings). There are no significant differences between the average age, speed and average capacity of the different fleets. Only PIL is characterized by a low average vessel speed as well as small vessel capacities. In terms of the ship types in the fleet of the top 20 companies an analysis shows a clear trend towards neo-panamax vessels (capacity > 7500 TEU and Breath < 49 m) compatible with the new Panama Canal locks and over-panamax container vessels (with capacity < 7500 TEU and Breadth > 32.31 m).

Besides the trend of increasing fleet and vessel sizes, the concentration process among the biggest companies continues.

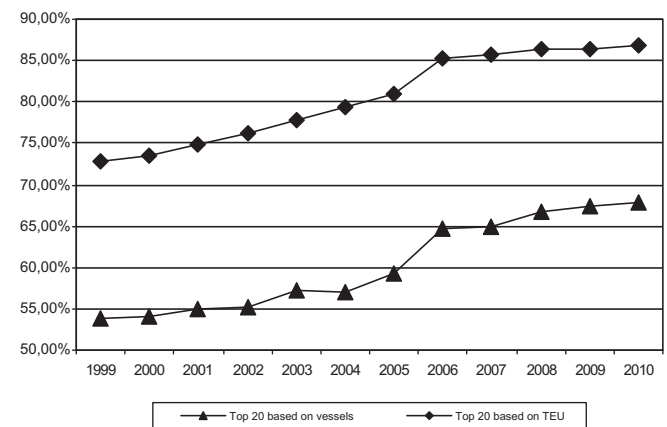


Fig. 1. Proportion of the cumulated capacity for Top 20 ocean liner shipping companies among the Top 100 based on TEU and on the number of vessels (source: data from alphaliner.com, own analysis).

**Table 3**  
Geographic coverage of liner services (market share calculated based on number of different services).

	MT	TA	TP	ME	AF	SA	AUS	IA	IE	Services	Service %
APL	1	5	18	23	0	10	8	15	3	83	4.82%
CMA CGM		8	9	36	39	30	14	32	30	198	11.50%
COSCO		2	17	14	7	0	3	30	5	78	4.53%
CSAV		3	2	7	2	28	0	1	3	46	2.67%
CSCL		1	8	14	2	3	5	21	1	55	3.19%
EG		1	13	14	2	8	4	34	10	86	4.99%
HJ		3	18	21	1	1	4	15	0	63	3.66%
HL	1	14	12	14	6	15	12	2	4	80	4.65%
HMM	1	2	17	16	1	0	6	9	1	53	3.08%
HS		3	0	4	2	27	10	0	5	53	3.08%
KL		2	13	17	3	4	4	14	3	60	3.48%
AP Maersk		5	12	53	58	42	16	35	43	264	15.33%
MOL	1	1	15	11	13	16	10	16	0	83	4.82%
MSC		9	6	23	28	29	8	12	58	173	10.05%
NYK	1	5	10	23	0	0	10	13	1	63	3.66%
OOCL	1	7	10	15	0	0	7	24	4	68	3.95%
PIL		0	2	13	8	1	12	26	0	62	3.60%
UASC		0	0	20	1	0	0	0	0	21	1.22%
YM		2	16	19	0	0	1	21	1	60	3.48%
ZIM	1	3	5	12	10	17	2	11	12	73	4.24%
SUM	7	76	203	369	183	231	136	331	184	1722	

Note: The information is based on [Alphaliner.com](#) (August 2010) container service database. Abbreviations: MT Multitrade; TA Transatlantic; TP Transpacific; ME Middle East, South Asia, Indian Ocean; AF Africa; SA South America, Caribbean; AUS Australia, New Zealand, South Pacific Islands; IA Intra Asia; IE Intra Europe, Intra Mediterranean. (Source: authors, based on [Alphaliner.com](#), as of 28/06/2010).

Fig. 1 illustrates the concentration process in the shipping industry during the last ten years. This relates to the market power theory presented in section 2. The concentration observed can be explained from the increased M&A efforts as well as disproportionate fleet size growth among the biggest liner shipping companies as evidenced by the orderbook in Table 2.

### 5. Liner shipping services

Alliances in liner shipping may be distinguished and separated into the smaller group of global strategic alliances and other forms of collaborative agreements (route specific ventures, vessels sharing and slot sharing agreements). This section presents an analysis of the collaborative agreements of the top 20 liner shipping

companies world-wide. The analysis takes into account geographic coverage, market share and organization of offered services.

Table 3 illustrates the geographic coverage of liner services offered by the top 20 liner shipping companies. The services are listed on geographical order. A single service (route) is only assigned to one geographic area although a service might connect two or more regions. The analysis provides an indication of the services offered by each company as a percentage of total services offered. The top companies in terms of geographic market coverage of services are AP Maersk (15.33%), CMA-CGM (11.50%) and MSC (10.05%). The service coverage of the remaining companies is below 5%.

Table 4 shows the calculated market share of the top 20 operators based on the number of vessels deployed in each geographic

**Table 4**  
Market Share (%) in different geographic regions based on number of vessels deployed in each region.

Geo	AF	ANZ	AS	CA	FE	ME	MiE	NA	NE	SA	TOTAL	MS	Delta
APL	0.0%	2.8%	9.4%	5.2%	6.9%	2.2%	11.0%	8.1%	5.4%	1.0%	5.4%	4.00%	1.38%
CMACGM	25.2%	9.4%	3.1%	26.2%	9.7%	18.6%	7.6%	8.4%	19.6%	11.2%	13.2%	7.60%	5.61%
COSCO	0.6%	3.5%	8.0%	0.4%	3.6%	1.6%	4.5%	2.8%	2.4%	0.9%	3.0%	3.30%	−0.31%
CSAV	6.1%	0.0%	0.0%	7.4%	8.1%	7.2%	0.0%	3.0%	3.1%	18.8%	6.1%	2.40%	3.75%
CSCL	1.9%	3.1%	9.2%	3.7%	3.7%	1.5%	1.5%	2.1%	1.3%	1.5%	3.1%	3.30%	−0.17%
EG	1.4%	0.4%	11.6%	4.3%	5.6%	3.4%	8.0%	5.7%	3.2%	1.9%	4.9%	4.10%	0.83%
HJ	0.8%	2.4%	5.1%	0.0%	5.3%	3.0%	1.5%	4.7%	1.7%	0.3%	3.3%	3.20%	0.11%
HL	1.6%	8.3%	2.0%	9.5%	3.5%	3.2%	0.0%	9.8%	8.9%	6.4%	5.1%	3.40%	1.72%
HMM	0.0%	1.2%	3.8%	0.0%	3.5%	0.9%	0.0%	2.4%	1.5%	0.5%	1.9%	2.00%	−0.07%
HS	0.9%	13.4%	0.0%	2.2%	2.1%	1.7%	4.9%	4.9%	2.9%	16.2%	3.7%	2.30%	1.42%
KL	2.2%	2.4%	5.8%	0.0%	3.1%	0.9%	0.4%	2.0%	1.0%	2.2%	2.4%	2.50%	−0.14%
ML	26.5%	20.1%	3.5%	19.5%	12.9%	22.3%	18.2%	16.1%	15.4%	13.1%	15.6%	15.00%	0.57%
MOL	6.1%	4.3%	4.6%	1.3%	4.6%	0.3%	0.0%	3.3%	3.5%	4.8%	3.6%	2.50%	1.09%
MSC	12.7%	15.4%	5.8%	17.1%	8.0%	20.7%	23.1%	11.9%	20.6%	14.1%	13.3%	10.90%	2.39%
NYK	0.4%	4.3%	5.6%	1.3%	3.8%	0.2%	0.0%	4.1%	1.1%	4.1%	2.8%	3.00%	−0.20%
OOCL	0.0%	2.8%	10.6%	0.0%	1.8%	0.9%	0.0%	1.8%	2.7%	0.0%	2.3%	2.40%	−0.06%
PIL	12.1%	5.5%	5.9%	0.0%	5.8%	1.2%	6.1%	1.7%	0.4%	0.3%	3.9%	1.40%	2.46%
UASC	0.5%	0.0%	0.2%	0.0%	2.2%	4.7%	5.7%	1.1%	2.6%	0.0%	1.8%	1.40%	0.42%
YM	0.0%	0.8%	5.8%	0.0%	3.2%	1.7%	3.0%	2.8%	1.0%	0.0%	2.3%	2.30%	−0.04%
ZIM	1.1%	0.0%	0.0%		2.5%	3.7%	4.5%	3.4%	1.6%	2.5%	2.3%	2.20%	0.05%
Leader	ML	ML	EG	CMA CGM	ML	ML	ML	ML	MSC	CSAV			

Abbreviations: AF Africa; ANZ Australia, New Zealand, South Pacific; AS Asia; CA Central America; FE Far East; ME Mediterranean; MiE Middle East; NANorth America; NE North Europe; SA South America; MS Market Share; DELTA difference between company's share of world-fleet (%) minus actual market share (%) 27. (Source: authors, based on [Alphaliner.com](#), as of 28/06/2010).

region. In this analysis one vessel can be assigned to more than one geographic region since ships serve in one or more regions.

Column “MS” represents the actual market share (alphaliner.com, as of 1.1.2010, based on worldwide, total existing TEU capacity). Delta determines the difference between the TOTAL share of deployed vessels worldwide and the actual market share (MS).

A positive difference (Delta) can imply that:

- an operator needs more vessels (that are deployed to more regions) to gain the actual market share than competitors of the peer group (*ceteris paribus*)
- an operator's fleet is less utilized than a competitor's fleet of the peer group (*ceteris paribus*)
- an operator's fleet has on average less capacity per vessel than a competitor's fleet of the peer group (*ceteris paribus*).

According to the market share analysis it seems that certain companies need to improve their fleet allocation in relation to achieved market share and include CMA CGM, CSAV, HL, HS, MSC and PIL. Moreover, Table 4 shows that maritime shipping companies can be characterized by core markets (e.g. Pirrong, 1992). Thus, operators don't have similar strengths in terms of equally distributed market power in all geographic regions. For example North Europe is dominated by MSC, and South America by CSAV.

Furthermore, specific markets/geographic regions are less dominated by one specific company than other markets. For example, Asia seems to be a more diversified market than Africa where the top 3 operators divide the market among themselves. A similar situation arises in Central America and the Mediterranean.

Table 5 compares how different services are organized. Below, services that are operated based on alliance arrangements/agreements between different operators are compared with independent services. Services that are operated by subsidiaries are considered as independently operated routes.

The rank in Alphaliner's Top 20 list (based on existing fleet and orderbook) is presented in the second column. By comparing these two rankings we can conclude that “smaller” operators tend to engage more in horizontal alliances. This is a very interesting characteristic of alliance formation in liner shipping and could be the initiative for shedding light on the relationship between firm size and the number of alliance agreements or alliance intensity by any given firm. Table 5 indicates that among the top five firms

most frequently organized into alliances, there is only one top five company in terms of size and another four outside the top ten whereas among the bottom five there are three top five companies and two top ten companies in terms of size. It would also seem that most medium-sized operators are more inclined to be organized into alliance (Rank 8–15) in Table 5. Possible explanations for this behaviour and the resulting variation that may be attributed to firm size is that bigger companies are capable of covering bigger geographic areas with their own fleet or that big and small companies are better equipped compared to medium-sized companies to deal with demand uncertainty (see also Burgers, Hill, & Kim, 1993; Ferrari, 2008).

## 6. Global strategic alliances: structure and conduct

This section will provide an analysis of the three major global strategic alliances in liner shipping. The global strategic alliances are CKYH Alliance whose member companies include COSCO, K Line, Yang Ming and Hanjin Shipping, the Grand Alliance (Hapag Lloyd, NYK, OOCL and P&O Nedlloyd) and the New World Alliance (APL, HMM and MOL). The scope of this analysis is to identify general trends, characteristics, similarities and differences in the format of the alliances as well as between the comprising partners of the alliance. Knowledge of these issues will be instrumental in developing hypotheses and empirical research implications.

Table 6 gives an overview of the development of strategic alliances. Historically the strategic alliances agreed on collaboration for east-west trades. Within the last ten years the joint activities were extended to north-south services.

Among the big three collaborations the Grand Alliance has shown the most stable configuration, whereas the other formations underwent substantial changes in the member configuration. Beside the organizational changes, all alliances increased both in the number of operated vessels and in the overall capacity. However, this development was supported by the individual growth of each alliance member (Slack et al., 2002, p. 72).

**Table 5**  
Operators ranked by degree of alliance organized services.

#	Rank 2010	Operator	Alliance
1	18	HMM	98.04%
2	15	KL	94.74%
3	12	NYK	94.64%
4	3	CMA CGM	92.09%
5	17	YM	91.53%
6	9	HJ	91.53%
7	5	HL	91.43%
8	13	OOCL	85.25%
9	11	MOL	82.72%
10	20	UASC	80.00%
11	14	HS	79.59%
12	6	EG	78.05%
13	10	CSCL	77.36%
14	16	ZIM	76.12%
15	19	PIL	73.68%
16	4	APL	71.43%
17	8	CSAV	68.29%
18	7	COSCO	67.53%
19	1	ML	44.40%
20	2	MSC	20.37%

(Source: authors, based on Alphaliner.com, as of 28/06/2010).

**Table 6**  
Development of the big three strategic alliances.

1996			
Main partners	Global Alliance APL, Nedlloyd, MOL, OOCL, MISC	Grand Alliance Hapag-Lloyd, NYK, NOL, P&OCL	Hanjin/Tricon Cho Yang, DSR/ Senator, Hanjin
Capacity (TEU)	209.645	255.705	199.404
No. of vessels	65	72	72
2000			
Main partners	New World Alliance APL-NOL, MOL, HMM,	Grand Alliance Hapag-Lloyd, P&O, Nedlloyd, OOCL, MISC	United Alliance Cho Yang, DSR/ Senator, Hanjin
Capacity (TEU)	325.487	350.197	277.000
No. of vessels	90	93	85
2006			
Main partners	New World Alliance APL, MOL, HMM	Grand Alliance Hapag-Lloyd, OOCL, MISC Berhad, NYK Line	CKYH Hanjin, Yang Ming, K Line, COSCO
Capacity (TEU)	712.082	966.570	1.046.991
No. of vessels	223	Approx. 350	354
2010			
Main partners	New World Alliance APL, MOL, HMM	Grand Alliance NYK, Hapag-Lloyd, OOCL	CKYH Hanjin, Yang Ming, K Line, COSCO
Capacity (TEU)	1.161.468	1.187.607	1.548.508
No. of vessels	282	288	400

(sources: Midoro and Pitto (2000), Ferrari (2008), Slack et al. (2002), alphaliner.com (30.08.2010).

**Table 7**  
CKYH Alliance characteristics.

CKYH	Region				Summary	
	Europe Asia	Far East – USEC	Transatlantic	Transpacific	Sum	Average
# of Services	8	5	2	12	27	
Avg. Age [a]	0.499	3918	2707	3917		2732
Frequency of Service Average [days]	7	7	7	7		7
Duration Average [days]	61.25	63.00	35.00	37.33		49
Average Number of Alliance Members	4.8	4.8	3.0	4.6		4.6
Average Number of Vessels	8.8	9.0	5.0	5.4	190.0	7.0
Average Weekly Capacity [TEU]	7529	4542	3710	5667	158364	5865
Average Number of Ports	13	9	9	8		10
COSCO (# of vessels deployed)	21	11	1	15	48	
COSCO (# of alliance agreements)	8	5	1	12	26	
COSCO (# of slots only agreements)	5	4	0	8	17	
KL (# of vessels deployed)	8	7	0	13	28	
KL (# of alliance agreements)	8	5	1	9	23	
KL (# of slots only agreements)	4	4	0	6	14	
YM (# of vessels deployed)	9	13	0	11	33	
YM (# of alliance agreements)	8	5	1	11	25	
YM (# of slots only agreements)	4	3	0	9	16	
HJ (# of vessels deployed)	24	13	1	22	60	
HJ (# of alliance agreements)	8	5	1	12	26	
HJ (# of slots only agreements)	1	3	0	6	10	

(Source: authors, based on [Alphaliner.com](http://Alphaliner.com), as of 28/06/2010).

Finally, Table 6 shows the disproportionate growth of capacity in comparison to the number of vessels operated. Here, we can confirm the above stated observation of bigger vessels deployed in liner shipping.

#### 6.1. Alliance characteristics

Table 7 presents the characteristics of the CKYH Alliance. The dominant partner in terms of vessel deployment is Hanjin shipping (60) vessels followed by COSCO (48 vessels). The alliance manages eight services on the Europe-Asia route which has the largest TEU capacity followed by the Transpacific which is served by 12 service routes.

Table 8 provides similar information for the Grand Alliance. Hapag Lloyd (HL) is by far the dominant partner in the alliance with a deployment of 87 vessels compared to 39 and 37 vessels contributed by OOCL and NYK respectively. The highest capacity occurs on the Europe-Asia service route.

Table 9 provides a description of the characteristics of the third major strategic alliance, viz. the New World Alliance. The dominant partner is APL with 73 ships followed by MOL and HMM with 37

and 29 vessels respectively. The dominant service route in terms of TEU capacity is Europe-Asia and most service routes are operated on the Transpacific trade (12).

In addition to the above alliance characteristics, the following observations and trends can be identified from the above tables. The main markets and biggest TEU capacities occur in the Europe-Asia and Transpacific service routes for all three strategic alliances.

Companies can be classified by their geographic activity as well as by the “intensity” they are involved in a specific agreement (partnership agreement as well as vessel deployed in a service, partner agreement only, slots agreement only). The “intensity” depends mainly on a company’s home market. The closer a service is to the home market, the more a company contributes to a service agreement (by e.g. deploying vessels).

As shown in Table 10, on a company level the characteristics (ports, capacity, # of vessels deployed) seem to be very similar. Nevertheless, CKYH offers slightly different service characteristics than GA/NWA. In this manner, we can state CKYH’s lower average number of vessels and calls for a single service. Since the average service’s capacity is (almost) the same among all three alliances, the average loop

**Table 8**  
Grand Alliance characteristics.

Grand Alliance	Region				Summary	
	Europe Asia	Far East – USEC	Transatlantic	Transpacific	Sum	Average
# of Services	7	4	5	6	22	
Avg. Age [a]	3.08	5.23	7.03	3.50		4.48
Frequency Average [days]	7.43	7.00	7.00	7.00		7.14
Duration Average [days]	69.00	71.75	54.60	65.33		65.23
Average Number of Alliance Members	6.00	3.50	4.00	4.00		4.55
Average Number of Vessels	10	10	8	9	205	9.32
Average Weekly Capacity [TEU]	7099	4993	4224	6973	132628	6028.55
Average Number of Ports	16	14	14	18		15.64
NYK (# of vessels deployed)	13	12	0	12	37	
NYK (# of alliance agreements)	7	4	5	6	22	
NYK (# of slots only agreements)	3	0	1	0	4	
HL (# of vessels deployed)	3	19	29	36	87	
HL (# of alliance agreements)	7	4	5	6	22	
HL (# of slots only agreements)	3	0	1	0	4	
OOCL (# of vessels deployed)	15	8	8	8	39	
OOCL (# of alliance agreements)	7	4	5	6	22	
OOCL (# of slots only agreements)	3	0	1	0	4	

(source: authors, based on [Alphaliner.com](http://Alphaliner.com), as of 28/06/2010).



**Table 9**  
New World Alliance characteristics.

NWA	Region				Summary	
	Europe Asia	Far East – USEC	Transatlantic	Transpacific	Sum	Average
# of Services	5	3	2	12	22	
Avg. Age [a]	7.90	6.64	9.88	3.78		5.93
Frequency Average [days]	8.20	7.00	7.00	7.00		7.27
Duration Average [days]	71.40	72.33	63.00	41.36		56.64
Average Number of Alliance Members	6.20	4.33	5.00	4.09		4.77
Average Number of Vessels	10	10	9	6	177	8
Average Weekly Capacity [TEU]	7976.4	4539.7	4548.0	5509.5	127937	5815
Average Number of Ports	15	16	18	10		13
APL (# of vessels deployed)	11	20	8	34	73	
APL (# of alliance agreements)	5	3	2	11	21	
APL (# of slots only agreements)	1	0	2	5	8	
MOL (# of vessels deployed)	15	6	6	10	37	
MOL (# of alliance agreements)	5	3	1	11	20	
MOL (# of slots only agreements)	1	1	2	8	12	
HMM (# of vessels deployed)	10	5	0	14	29	
HMM (# of alliance agreements)	5	3	2	11	21	
HMM (# of slots only agreements)	1	1	3	8	13	

(Source: authors, based on [Alphaliner.com](http://Alphaliner.com), as of 28/06/2010).

duration must be lower. This can be confirmed by the average loop duration of an alliance's service. (GA = 65,2 days, NWA = 56,63 days, CKYH = 49 days). In total, eight services were started in collaboration between GA and NWA. This linkage explains the similar service characteristics between the two alliances as shown in [Table 10](#). The similarities between GA and NWA show the strategic cooperation on some of their loops. The average age of service agreements is the lowest for CKYH. This observation can be due to:

- Quick adjustments to changing environments. CKYH is capable to react to changes in the market by introducing new loops. (and suspending loops that are not demanded)
- NWA and GA loops are more established
- CKYH agreements were just arranged later.

The average age comprises the time in years since the initiation of a service agreement. The Europe Asia (EA)/Transpacific (TP) are the most active regions for agreements, whereas TP is still dominating in quantity (although a shift in capacity could be observed from TP to Europe Asia in the last three years). Europe-Asia services generally show a higher average capacity, more included ports and more deployed vessels than TP agreements. The average duration of services is for TP services on average 44 days, EA on average 67 days. Due to the shorter duration, companies offer more transpacific services with less ports and vessels included. These services can be seen as more "specialized" than EA services with broader geographic coverage.

## 6.2. Motives for entering into alliance agreements

As it can be deduced from the literature review, the motives for entering a strategic alliance represent one of the most researched topics in the alliance literature. It is also one of the topics high in the

**Table 10**  
Comparison of the big strategic alliances in terms of operational parameters.

Alliance	Port of calls		Capacity [TEU]		# of vessels		# Partners		Age [a]		Duration [d]	
	#	Avg	Sum	Avg	Sum	Avg	Avg	Avg	Avg	Avg	Avg	Avg
CKYH	27	10	158364	5865.3	190	7	4.6	2.8	49.0			
GA	22	16	132628	6028.5	205	9	4.5	4.5	65.2			
NWA	22	13	127937	5815.3	177	8	4.8	5.9	56.6			
Total	71	13	418929	5900.4	572	8	4.6	4.3	56.4			

(Source: authors, based on [Alphaliner.com](http://Alphaliner.com), as of 28/06/2010).

research agenda because different companies have diverse alliance entry and alliance formation strategies and may enter alliances in order to fulfil their own specific and idiosyncratic objectives. Therefore, understanding the motives and linking them empirically to underlying factors and parameters indicating propensity or otherwise for joining or forming a specific alliance type is of high importance.

In order to provide some evidence as to the motives for strategic alliance formation, we examined the announcements of all companies that make up the three big alliances in liner shipping, viz. CKYH Alliance, the Grand Alliance (GA) and the New World Alliance (NWA) for the 10 year period 2000–2010. The announcements were analyzed using the electronic resource [Alphaliner.com](http://Alphaliner.com).<sup>2</sup> Based on the observations made from all the announcements the reasons for entering or leaving an alliance were classified into 12 specific motives. They include, strategic reasons, operational reasons, to increase or decrease connectivity to increase or decrease capacity, to introduce a new service, to suspend a service, to merge services, to demerge services, to offer slots for charter and to offer slots. This analysis based on reports from the companies' announcements provides important time series data in addition to cross-sectional information as to the motives.

The analysis is presented in [Table 11](#) and includes data for all three alliances except CKYH for the period 2000–2005 where announcements were unavailable in the aforementioned database. The announcements refer to specific alliance services/alliance service routes and not the entire strategic alliance.

Strategic reasons include long-term decisions affecting all alliance members. Such changes include the entry or the departure of alliance partners, a shift of main geographic regions for liner services, reduction of the average fleet speed due to environmental/economic reasons or a collaboration announcement with others than the main alliance partners. Operational reasons incorporate non-strategic decisions that cannot be allocated to the main reason presented in the tables above.

In order to shed further light into this time series of information, we classified the announcements into either positive news (increase of capacity, introduction of new services,...) or negative

<sup>2</sup> The dataset is subject to the limitations of [Alphaliner.com](http://Alphaliner.com). The analysis has shown that more announcements were published in the recent years. This can be due to more events related to liner shipping or because of changes in the release policy of news on [Alphaliner.com](http://Alphaliner.com).

**Table 11**  
Announcements over time categorized by different content.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
<b>CKYH</b>												
Strategic						1	3			3		7
Operational							4	9	6	2	4	25
Connectivity +							1	5	2	2		10
Connectivity -									1			1
Capacity +							3	7	3	1		14
Capacity -								2	10	1		13
Introduction							1	5	3	1	3	13
Suspension							4	3	6			13
Merge							1	2	4			7
Demerge										1		1
Slots charter							1		1			2
Slots offered								1				1
Sum CKYH	0	0	0	0	0	1	18	34	36	11	7	
<b>GA</b>												
Strategic	1		1			4	3	1	1		2	13
Operational	1		4		4	3	3	2	3	1		21
Connectivity +						2	2			1		5
Connectivity -												
Capacity +				1		2	1	2	3			9
Capacity -		3	1				2				1	7
Introduction	1	1	1	3	1	3	1	2	1	1	2	17
Suspension				2	1	3	1	3	1	2	1	14
Merge		1						1	3	1	1	7
De-merge			1					1			1	3
Slots charter/undo			1						1	1		3
Slots offered	1						3		2	3		9
Sum GA	4	5	9	6	6	17	16	12	15	10	8	
<b>NWA</b>												
Strategic		1				2					1	4
Operational			1				8	2	2	1	1	15
Connectivity +		2	1					2	3	1		9
Connectivity -				2								2
Capacity +				2				4	2			8
Capacity -							1	1				2
Introduction		1	2	2	2	1	3	2	1	3	4	21
Suspension			3	1			1	1	2	2		10
Merge		1							4	3		8
Demerge									2	1	1	4
Slots charter/undo			1				3		1			5
Slots offered					1		3	1	1			6
Sum NWA	0	5	8	7	3	3	19	13	18	11	7	
Total	4	10	17	13	9	21	53	59	69	32	22	309

(Source: own analysis, based on [Alphaliner.com](http://Alphaliner.com), as of 28/06/2010).

news that are related to a decrease of capacity, decrease in connectivity or decrease in number of services/lines. The results can be visualized in Figs. 2–4 with positive news announcements represented in blue and negative news announcements in red.

The observations that can be made from this analysis are that the positive and negative announcements tend to form a series of cycles that may correspond to the general trends and business cycles in the economy. For example during 2008, we can observe the highest number of negative-related announcements by companies in all three alliances, a year that corresponds to the beginning of the world financial and economic crisis. Positive announcements are more pronounced in the few years before the economic crisis and correspond to the unprecedented growth in the world economy and the most prosperous period for the shipping industry (Figs. 2, 4). NWA and CYKH alliances seem to have more positive than negative related announcements where the Grand Alliance (Fig. 3) seems to have equal proportions of positive and negative announcements (Fig. 3).

In order to provide more in-depth analysis we analyzed the announcements made by companies in the strategic alliances by geographic region (Europe-Asia, Transpacific and Transatlantic).

During the 10 year period the strategic alliance CKYH has performed more operational changes compared to the other alliances in the Europe-Asia region (Fig. 5). In the transpacific region the New World Alliance seems to have performed most operational changes coinciding with the highest (by far) introduction of new services during the last decade compared to the other two alliances (Fig. 6). Operations in the Transatlantic region (Fig. 7) seem to have been more stable over the last decade as indicated by the evidence. This suggests that service routes and company and alliance strategy have been well established in the specific region.

## 7. Discussion

Authors in transportation and maritime economics have recognized the need for further research and empirical analysis in the context of co-operative behaviour and liner shipping alliances (Panayides, 2006; Sjostrom, 2010). The importance of alliances has become all the more relevant in the last 10–15 years due to the abolition of the Conference system and the understanding that co-operation is a viable route for success and better performance for liner companies.

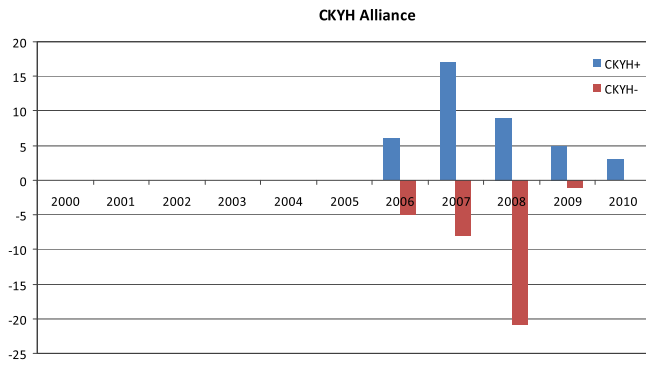


Fig. 2. Alliance news announcements by CKYH (Source: authors data from [alphaliner.com](http://alphaliner.com)).

The analysis in this paper provides key implications for empirical research. The differences in characteristics between the alliances in terms of composition of the respective partners begs the question of whether alliance formation, partner conduct and alliance stability are related to the characteristics of the alliance partners. The characteristics include the structural characteristics of the organisations (e.g. size will be the most significant factor to examine) as well as the behavioural characteristics of the partner organisations (e.g. orderbook strategy, number of alliance contracts, intensity of alliance membership).

Another key issue concerns the relationship between number of alliance agreements and firm performance. Are liner companies engaged in more alliance agreements with partners, better performers? Although this question has not been answered in this study, a number of motives have been raised that would render alliances a very attractive proposition in liner shipping. However, alliances are not without problems that could render them prone to failure. A specific hypothesis could test whether the number of long-term alliance agreements a firm enters into will be positively associated to the firm's performance. If there is a positive relationship, one may delve further into understanding the underlying reasons which may vary from operational-related advantages to the development of specific capabilities as members in the alliance (Kale & Singh, 2007).

Through an analysis over time, this paper sought to identify the motives for the formation of alliances in liner shipping by examining over a ten year period the announcements of companies forming or agreeing the alliance partnership and the reasons that the companies themselves provide as motive for its formation. This type of analysis is done for the first time and was successful in identifying a series of possible motives including general strategic and operational motives as well as specific motives that aim at increasing capacity and/or connectivity, introducing new services

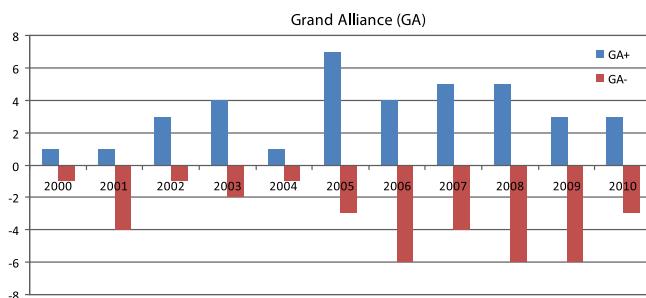


Fig. 3. Alliance news announcements by GA (Source: authors, data from [alphaliner.com](http://alphaliner.com)).

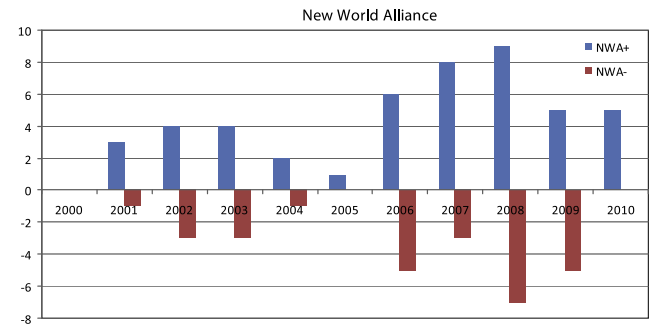


Fig. 4. Alliance news announcements by NWA (Source: authors, data from [alphaliner.com](http://alphaliner.com)).

or influencing the number of slots offered. The importance and significance placed by companies on each and every motive requires further empirical investigation and should form the basis of further research. For instance, the current analysis indicates that alliance membership is influenced more by operational motives rather than strategic motives. This is a research proposition that requires further empirical investigation. The motives that relate to entry and exit of alliance agreements may also be tested in the context of alliance instability. The literature has identified that liner shipping alliance agreements undergo a frequent process of re-structuring as evidence in the analysis undertaken in this paper which enumerates the announcements made by the companies regarding alliance re-structuring over a ten year period. Hence, the reasons presented in this paper may form the basis for empirically testing the reasons for alliance instability.

Another issue that has arisen is that companies tend to form co-operative agreements with a number of different competitors on various service routes. Hence, in addition to the above research propositions once could postulate whether firm performance would affect the number of competitors linked to the firm, or if firm size also would affect the number of alliance agreements entered into by the firm. The paper provide preliminary evidence to link firm size and the number of alliance agreements and as explained the tendency of for medium size companies to be more active in the formation of strategic alliance in liner shipping. A possible explanation is that medium-sized firms are those most threatened by demand uncertainty and, therefore, have greater incentive to enter

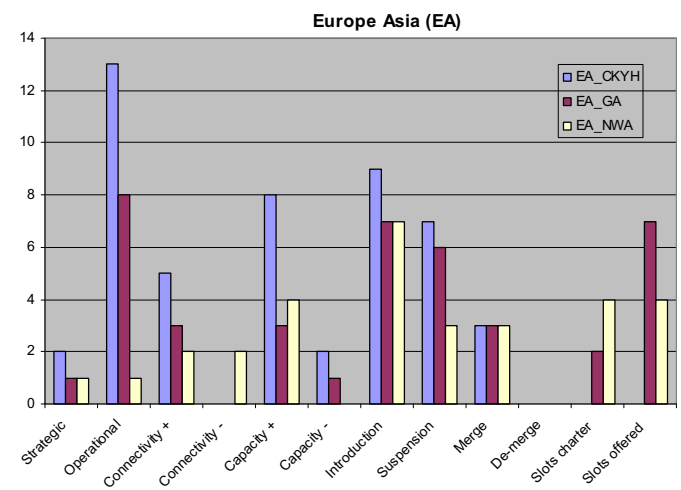
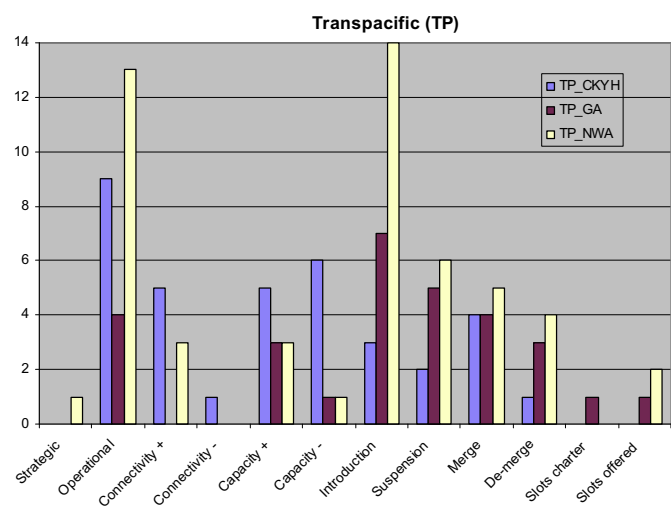


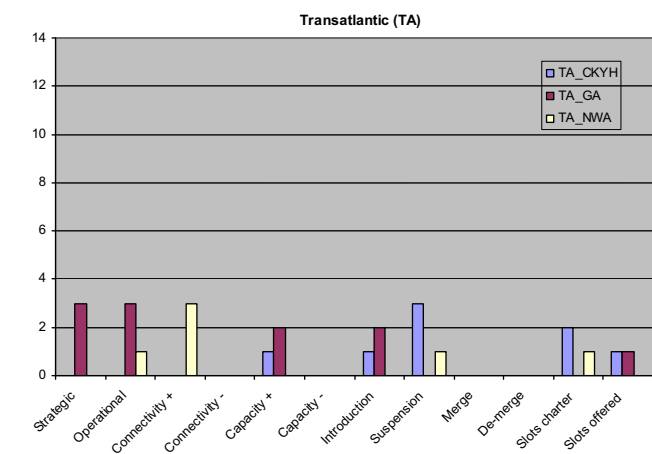
Fig. 5. Motives for alliance restructuring in Europe-Asia (Source: authors, data from [alphaliner.com](http://alphaliner.com)).



**Fig. 6.** Motives for alliance restructuring in Transpacific region (Source: authors, data from [alphaliner.com](#)).

into alliance than either large or small firms. Large firms have more resources and can therefore develop the strategic capabilities to deal with demand uncertainty internally. This result was shown in [Ferrari \(2008\)](#). Smaller firms serve niche markets and are specialized hence unlikely to acquire or need specific capabilities of the larger firms.

In the analysis we have identified that the composition of liner shipping strategic alliances is usually made up of one partner that takes a more dominant position as evidenced by the number of ships contributed to the alliance. Based on the number of deployed vessels, the dominant partners in the global strategic alliances examined are APL (New World Alliance), Hapag-Lloyd (Grand Alliance) and Hanjin (CKYH Alliance). With the exception of the CKYH where two major players contribute resources, the dominant partner provides more than 50 percent of all vessels in an alliance. The question which arises is why these firms choose to contribute more vessels (on some occasions in significantly higher numbers) than other partners in the alliance. The literature may provide some explanations upon which one can base further empirical investigation. According to [Harrigan \(1985; 1988\)](#) firms may prefer to take a central position in an alliance in order to (1) maximize their influence within the alliance, thereby reducing competitive



**Fig. 7.** Motives for alliance restructuring in Transatlantic (source: authors, data from [alphaliner.com](#)).

uncertainty and (2) hedge their bets by maximizing access to strategic capabilities thereby reducing demand uncertainty.

## 8. Conclusions

The liner shipping industry has experienced an extensive wave of changes. The elimination of conferences enhanced the competition within the industry. High service expectations as well as lower profit margins led to structural changes in the market. Alongside M&As, shipping lines started collaborations regarding capacity and slot sharing.

The empirical analyses of the big three alliances conducted in this paper have shown the main characteristics of these collaborative agreements. As mentioned in Section 6.1 service characteristics like the number of port calls, average number of deployed vessels and the average duration differ slightly among the major alliances. Besides the major shift of vessel capacity to the Asian region, we demonstrated the continuous adjustment of services due to strategic or operative reasons. Furthermore, the management of alliances implies substantial effort because activities are negotiated and changed on a single service/line basis. In this way the so-called “global alliances” can hardly be seen as closed “entities”. In fact, the focal members of an alliance maintain preferred relationships for service agreements that are adjusted on a continuous basis. Based on the global demand, services are introduced (suspended), merged (de-merged) or increased (decreased) by capacity. In this manner, within the last ten years the three big alliances announced 309 service changes while only 71 service agreements were in effect in June 2010. Although the high number of adjustments requires close collaboration between the liner companies, operational activities remain the responsibility of each member. The analysis of announcements related to changes in alliance services has shown that the alliance members do not undertake further attempts for closer or even joint operational activities.

Due to the dynamics in the shipping industry, no pattern could be identified as to the service adjustment in the liner industry. Some services are changed due to seasonality. Mainly, parallel lines are merged in order to reduce overall capacity in the market. By taking advantage of slot sharing agreements, the serviceability of the companies remains the same. In addition, major changes of services in container shipping indicate a global shift of economic activity in the world. It turns out that global networks allow ocean liner companies to easily postpone capacities from one area with slower activity to more prospering regions. This aspect can be seen as “geographic diversification”. Moreover, our data analysis has confirmed that the container shipping industry was severely affected in an early stage of the recent economic downturn 2008–2010. In this manner, at the beginning of the recent crisis in 2008 most negative adjustments of liner agreements took place. A significant amount of capacity was shifted from Transpacific or Transatlantic routes to the services between Europe and Asia. Generally speaking, Asia related service agreements (transpacific, Asia-Europe) showed most adjustments within the last ten years whereas transatlantic services experienced less changes due to well established relationships between the two markets. This observation reflects the high dynamics in the emerging markets in Asia as well as their close connection to the economies in Europe and North America.

The flexibility to shift capacities in global networks explains the high number of vessels in order books. In this context, size matters and contributes to additional flexibility within a company. Niche players ([Alix et al., 1999](#)) must be considered as an exception to the rule in the field of liner shipping. Another outcome of our analysis relates to service differences among alliance members. The alliance



members have a different understanding in organizing collaborative services. The reasons are the proportion of vessels deployed in alliance services and the different service characteristics – such as the number of ports of call or a lower number of vessels on a service line. Nonetheless, these issues require further investigation.

Moreover, further research needs to be conducted in the area of alliance performance measurement. Event study methodology (Song & Panayides, in press) and other studies previously carried out in the context of related industries (Burgers et al., 1993) can help to develop more advanced models for performance measurement. These models need to consider the special characteristics of the liner shipping industry. Our data evaluation has shown that flexible agreements and compatible service networks play an important role in liner shipping. Further research is necessary to verify the interrelation between service parameters and the firm performance of participating liner companies. Only in this way, frameworks for more effective alliance control can be established.

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