

# Proposal for a Conceptual Model Learning from the Recent Liner Shipping Market

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## Abstract

The shipping industry has contributed to the world economy, especially the liner shipping industry has played important roles to carry products in global logistics and supply chains since containerization in 1950s. However, several critical incidents and dynamism have been recognized in the past 10 years. The incidents include shipping structure changes, the financial crisis in 2008, new shipping deployments and new tonnage, the horizontal integrations of shipping companies, shipping alliance reformation and possible container terminal integrations. The concerns are that European carriers dominate the global market on a tonnage basis. This paper aims to examine the incidents and seeks to discover if a causal relation can be identified between them. The conclusion indicates the dynamic had an impact on the shipping market, and a specific business model can be drawn. It is a unique cycle compared with normal supply and demand in the shipping market, and the perspective helps people in maritime business and governments understand the complexity. Future research should be expanded to integrations of container terminals. The research also should include the more practical approach to cover data collection and analysis after the spring of 2018, when operations of some new shipping company groups and alliances have started.

## 1. Introduction

The shipping industry has contributed to the world economy. The liner shipping industry has played an important role in carrying products in the global logistics and supply chains since a containerization in the 1950s. However, several critical inci-

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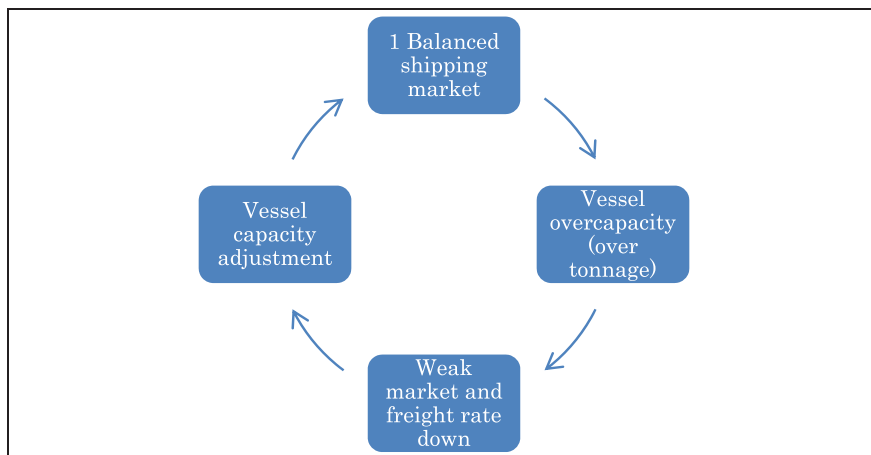
dents and the dynamics have been recognized in the past 10 years. The incidents include shipping structure changes, the financial crisis in 2008, new shipping deployments and new tonnage, the horizontal integrations of shipping companies, shipping alliance reformation and possible container terminal integrations. The concerns are that European carriers dominate the global market on a tonnage basis. This paper aims to examine the incidents and seek to discover if a causal relation can be identified between them.

## 2. Research method

### 2.1 Conceptual models and hypotheses

The competitive shipping market consists of supply and demand as other markets do. The supply is vessel capacity/tonnage and the demand is cargo freight. In the normal shipping market model, eg., in the case of overcapacity, the market moves from (1) balanced shipping market to (2) vessel overcapacity, (3) weak market and freight rate down, (4) vessel capacity adjustment (or cargo demand rise), and back to the normal market situation.

Figure 1. Normal Shipping Market Model



Source: Author's own elaboration.

In the last decade as described earlier, critical incidents, shipping market structure changes, the financial crisis, new deployment, M&A in the industry and the alliance reformation, have been recognized. The research analyzes the individual incident by referring to the practical data and also analyzes the relationships between fac-

tors consequently. Based on the investigation, the cycle will be modified and be drawn later. The hypothesis proposed and an impact on the market (freight rate) by sign (+-) are those following:

- a. Market structure changes (-) : more competition and less cooperation in the industry
- b. Financial crisis in 2008 (-) : slow world economy and weak cargo demand
- c. New deployment and new tonnage against weak market (-) : vessel overcapacity
- d. Shipping companies continued losses. Bankruptcies and mergers in the industry (+) : M&A seeking efficiency by removing duplicate investment
- e. Shipping alliance reformation (+-)

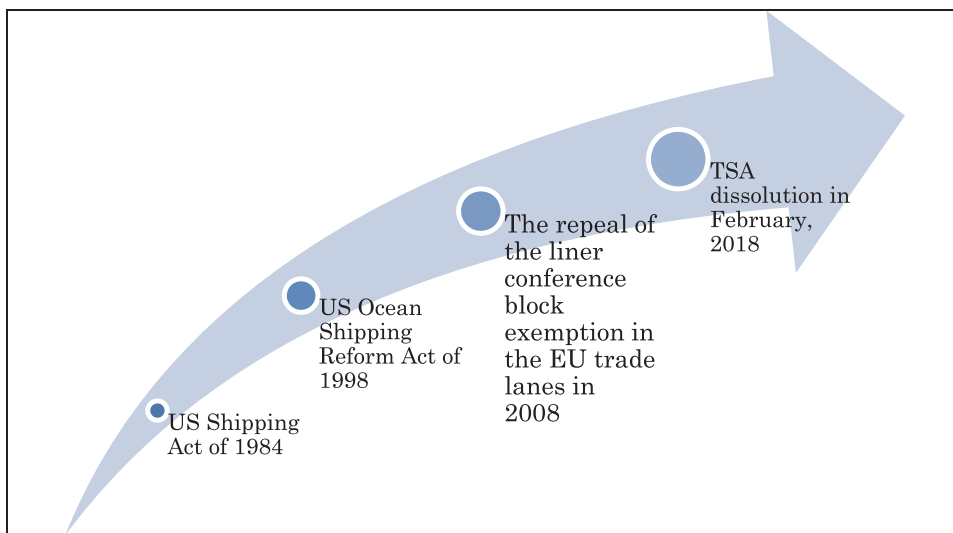
## **2.2 Shipping market structure changes in 2008**

Changes of the competitive law in the liner shipping market were made in the US Shipping Act of 1984 (Figure 2). In addition to the presence of so-called non-conference carriers, the shipping conference in the Trans-Pacific trade lane as a key in US trade, has accepted carrier's independent action (I/A) and time volume rate (TVR) against conference tariff rates. Forwarders have been also allowed as non-vessel operating common carriers (NVOCCs) to issue own bill of lading (B/Ls) on behalf of shipping carriers. The US Ocean Shipping Reform Act of 1998 has requested shipping carriers to file a confidential contract between a merchant and a carrier, which has resulted in dissolution of the shipping conference. However, the US regulatory bodies have approved the existence of discussion agreements such as Trans-Pacific Eastbound Stability Agreement (TSA) after 1998.

In the EU trades, the liner conference block exemption has been repealed. This has also applied to discussion agreements in the trades. This was conducted in 2008 when the financial crisis happened, which had an impact on the world economy as well as the shipping market. After the financial crisis, the shipping market has moved slowly and the cargo growth ratio has obviously dropped. Under such slow economic conditions, the EU authorities removed Antitrust Immunity in the liner shipping industry. Banning both of shipping conferences and discussion agreements may decrease healthy communication opportunities and international orders be-

tween carriers, which have historically worked for trade stability in the shipping market. This resulted in more competition in the market.

**Figure 2. Competitive Law in the Liner Shipping Market**



Source: Author's own elaboration.

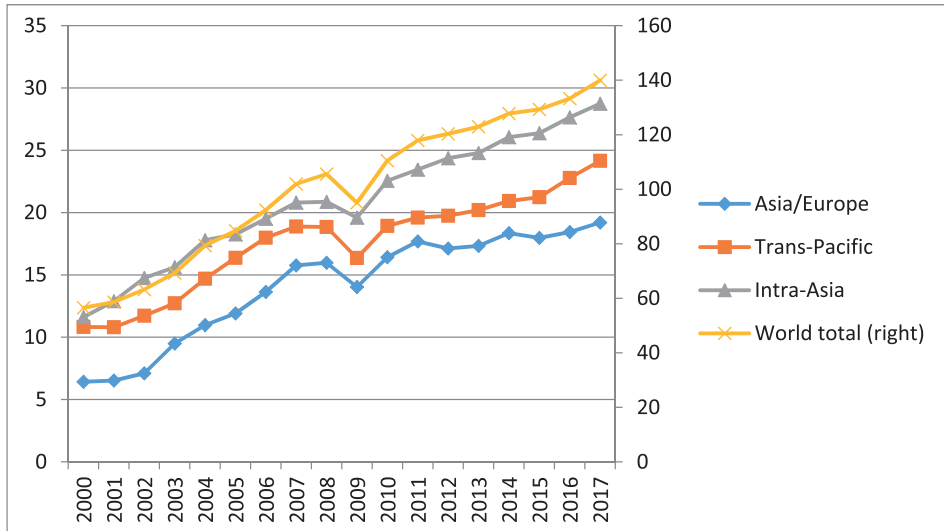
### 2.3 Slow recovery in liner shipping market after financial crisis

The business cycle is found in the liner shipping industry as in other industries. The world economic cycle and the ship building cycle may impact cargo demand and vessel supply, which may cause freight rates to rise or fall. The last two decades, in addition to the business nature of the shipping industry, a critical difference is identified in the cargo volume in the shipping market before and after the financial crisis in 2008 (Figure 3). Before 2008 container shipment exceeded the world GDP growth ratio. The slope of autoregression analysis of world container cargo before 2008 is 6.7. On the other hand, it has become a gentle slope at 4.6 after 2008 (Figure 4). At a similar time as this crisis, shipping structures changed in 2008 as described.

### 2.4 New deployment encouraged market imbalance

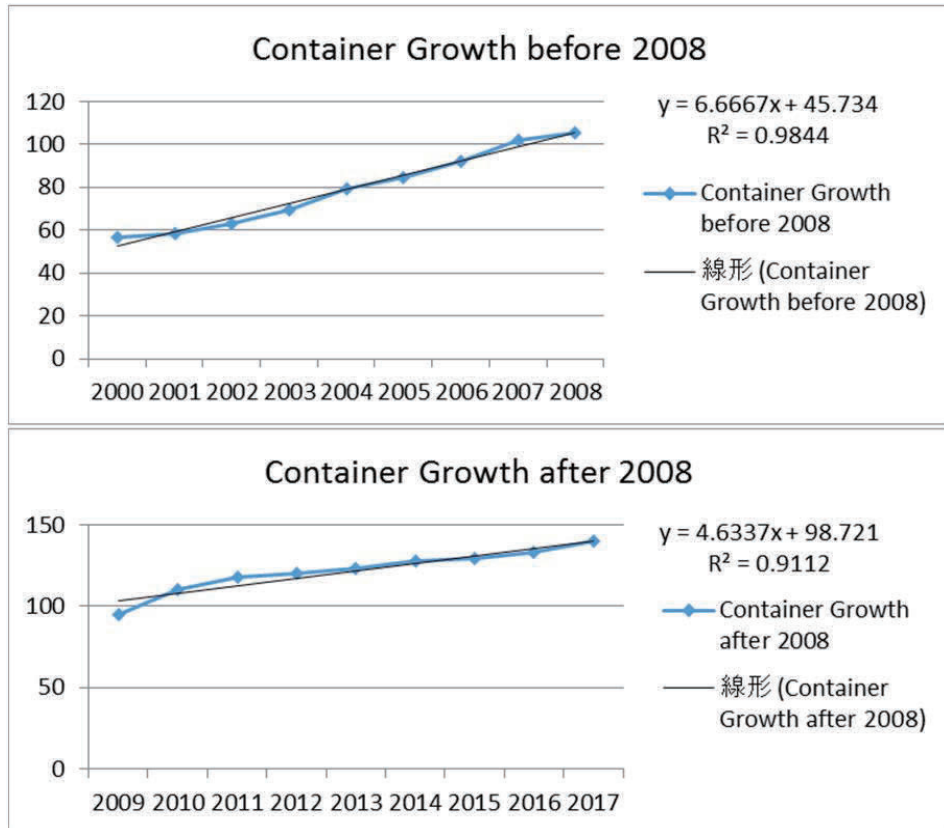
Although the economy has recovered slowly after the financial crisis with the new environment in the shipping market structure, a shipping carrier started new deployment against weak market conditions, e.g., Triple E vessels with 18000 TEU capacity in 2013 in the Asia-Europe trade lane. Due to competition other global carriers should follow the strategy and the carriers' behaviors have helped to keep the

**Figure 3. Container Cargo Moves in Key Trade Lanes (Unit/million TEU)**



Source: Japan Maritime Center (accessed on 2018 Sept 19).

**Figure 4. World Container Cargo Growth Before/After The Financial Crisis (Unit/million TEU)**



Source: Japan Maritime Center (accessed on 2018 Sept 19).

market imbalance.

Once the shipping carrier deployed larger ships into certain trade lanes, existing ships are bumped to other trade lanes, which is called ‘cascading effects’ in the industry. This phenomenon caused imbalance in one market after another and also harmed the balance sheet of shipping companies. According to sources, e.g., over 10,000 TEU vessels increased by 31 to 39, however, all other classes decreased and especially 3,000-4,999 TEU vessels decreased by 20 in 2015/2016 in the East Asia/Middle East, South Asia trade lane (Table 1).

**Table 1. Cascading Effects in the Liner Shipping Industry**

	Trade		Under 3000T		3000-4999T		5000-7999T		8000-9999T		10000T Over		AV Capacity I (TEU)	Incremental I (TEU)		
	NB of VSL	Incremental	NB of VSL	Incremental	NB of VSL	Incremental	NB of VSL	Incremental	NB of VSL	Incremental	NB of VSL	Incremental				
1	East Asia	Europe	320	-17	0	0	9	-11	24	1	38	-6	249	-8	12969	378
2	East Asia	North America	430	0	16	5	56	-19	121	4	179	-6	65	13	7738	415
3	Europe	North America	201	-11	37	3	77	-18	67	0	15	4	1	1	5021	195
4	East Asia	Middle East, South Asia	294	-21	60	-15	60	-20	88	-12	47	-5	39	31	5883	725
5	Europe	Middle East, South Asia	94	22	7	5	10	9	30	3	35	3	11	2	7341	-630
6	East Asia	Latin America	120	-10	0	0	12	0	22	-18	65	2	18	8	8311	360
7	East Asia	Africa	184	11	32	-12	108	19	12	-11	24	8	8	7	4946	434
8	East Asia	Oceania	141	1	40	3	56	-17	40	14	4	0	0	0	4120	104
9	Europe	Latin America	124	-10	61	-6	14	-11	11	-1	34	6	4	4	4887	585
10	Europe	Africa	150	-1	83	-7	43	3	11	-3	13	5	0	0	3246	153
11	North America	Latin America	148	0	103	-3	16	4	29	-1	0	0	0	0	2751	74
12		Others (North-South)	49	11	11	-2	20	1	7	1	10	10	0	0	5299	1816
13		Others (South-South)	66	-10	26	-5	22	-7	7	1	10	1	1	1	4364	511
14		Intra-Asia	1085	39	948	9	120	33	21	-1	0	-1	0	0	1783	113
15		Intra-Europe	477	-3	430	0	20	-6	26	2	1	1	0	0	1631	22
16		Others (Intra-)	338	22	270	10	63	11	2	1	3	0	0	0	2010	61
17		Others	897	-28	744	-19	97	-29	40	-21	11	-10	5	1	1703	-273
	Grand Total		5121	-55	2868	-36	803	-58	558	-41	489	12	401	60	3986	139

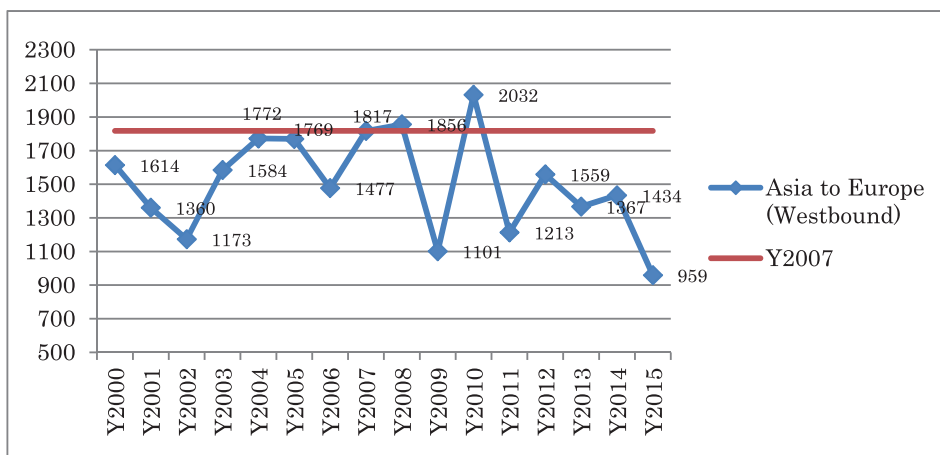
Source: NYK Line Research Group Container Annual Book 2017: p34.

## 2.5 Shipping companies continued losses

The shipping market cycle and the ship building cycle may have an impact on the financial performance of shipping carriers. The general shipping company takes this into account and has several business departments such as bulk shipping, pure car carrier (PCC), terminal operations in addition to liner shipping. The three Japanese carriers have taken this strategy. However, the container shipping companies may make a strong impact on the market. The weak market and overcapacity after the financial crisis caused the freight rate to sink, especially in the Asia-Europe trade. 2015 freight rate was only 52% of what was in 2008 (Figure 5).

Shipping carriers can survive by having lower operating costs in relation to low freight rates in a competitive market. New deployment of ultra large ships may reduce the slot cost subject to fulfilling capacity, however, it is not easy for shipping companies to reduce terminal handling costs, which require hard negotiation with the labor unions across the world. Bunker costs are out of control. The relationship

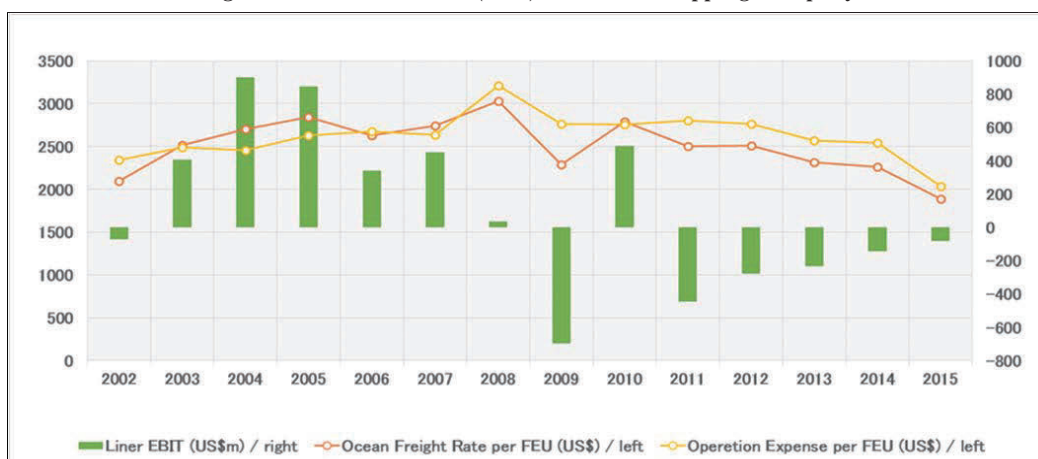
**Figure 5. Freight Rate in the Asia-Europe (Westbound) Trade (Unit USD/TEU)**



Source: Japan Maritime Center (accessed on 2017 Jan 16).

between shipping company P/L and costs, is identified in Figure 6. The sample liner shipping company has sustained losses for several years and eventually it merged with a European carrier. An industry magazine stated “carriers will probably lose at least US \$ 5 billion in 2016, on top of the \$ 50 billion lost in sales since 2014” (Port Technology; 17 August 2017). This results in more than several company mergers in the industry.

**Figure 6. Profit and Loss (P/L) of a Liner Shipping Company**



Source: published data on APL web page (accessed until 2016).

## 2.6 Horizontal integrations between with shipping companies

CMA-CGM announced to merge Singapore based NOL/APL in December, 2015.

This announcement really began a sense of great mergers and acquisitions in the liner shipping industry never seen before. Container shipping companies could not accept the continuing losses. On the other hand the European carriers have taken a strategy to survive by economic methods. A holding company can manage different brands of shipping companies with the collaboration of shipbuilding investment, terminal operations and the purchases of bunker fuel. A similar strategy is found in the cruise shipping industry such as the Royal Caribbean International and the Carnival Corporation has done. Eventually, in addition to NOL/APL, CSAV (Chile), China Shipping, OOCL (Hong Kong), Hamburg-Sud (Germany) and UASC (UAE) were merged. Once shippers and consignees lost a liner shipping company as a logistics partner, they may be an impact on freight rates, shipping routings and terminal locations. They may owe switch costs of the re-negotiation of shipping lines.

### **2.7 Discussion and concern: European carriers dominate the market**

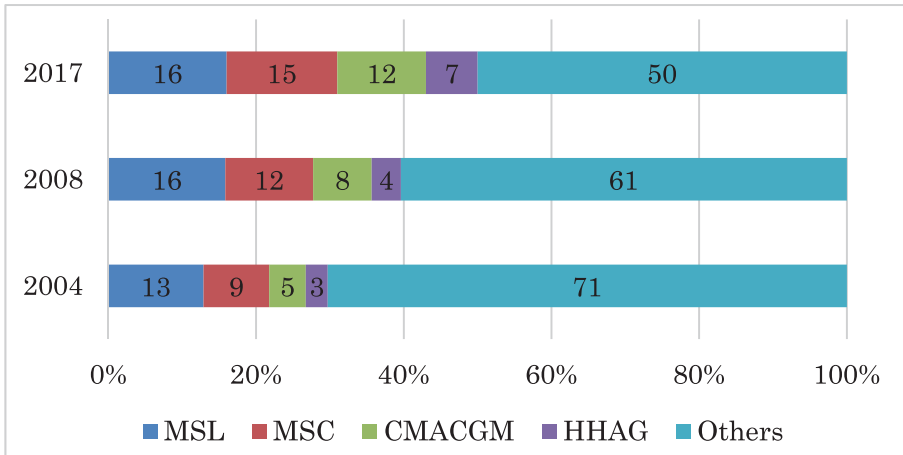
We discussed the great mergers in the industry. Mergers and acquisitions are not new to the industry, those have been occurring in the last three decades. The Japanese NYK merged with Nippon Liner System, the liner department of the Navix Line in 1991, the Taiwanese EMC merged with Italian Lloyd Triestino in 1993, the Korean Hanjing Shipping who went bankruptcy in 2016 merged with the German Senator Lines in 1997 and the Singapore NOL merged with the APL in 1998. However, mergers in the last decade featured European carriers, which have played a very positive role in the market. In this paper the European carriers are defined as MSL, MSC, CMA CGM and HapagLloyd (HHAG), who have deployed in the global shipping market. The four carriers shared 29% in the liner shipping market by vessel capacity basis in 2004, however, it increased to 40% in 2004 and 50% in 2017 (Figure 7). Now the European carriers dominate the market and the HHI (Herfindahl-Hirschman Index) also increased from 284 in 2004, to 500 in 2008 and 674 in 2017 accordingly.

In the case of the Danish Maersk Line, the size of vessel capacity in 2017 has increased 13.5 folds of 1998, when was just before they merged with American Sealand in 1999. MSC, CMA CGM and HLAG also increased tonnage (Figure 8).

The market domination is opposite to what the liner shipping industry tracked after containerization, especially when keeping in line with the US shipping act of 1984

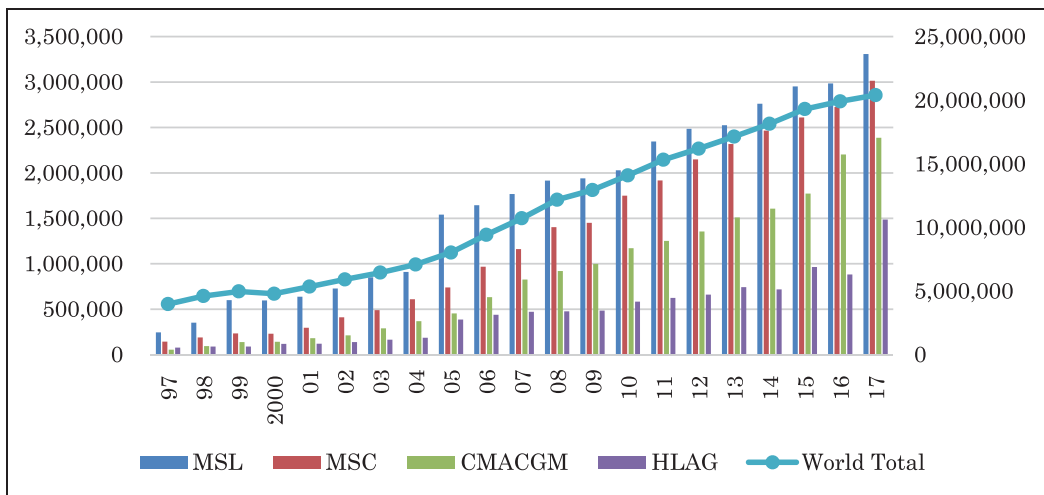


**Figure 7. European Carriers' Increased Capacities**



Source: NYK Line Research Group Container Annual Book 2005, 2009 and 2017.

**Figure 8. MSL Increased Tonnage:  
2.3 times (1999), 6.2 times (2005) and 13.5 times (2017) Unit/TEU**



Source: NYK Line Research Group Container Annual Book every year.

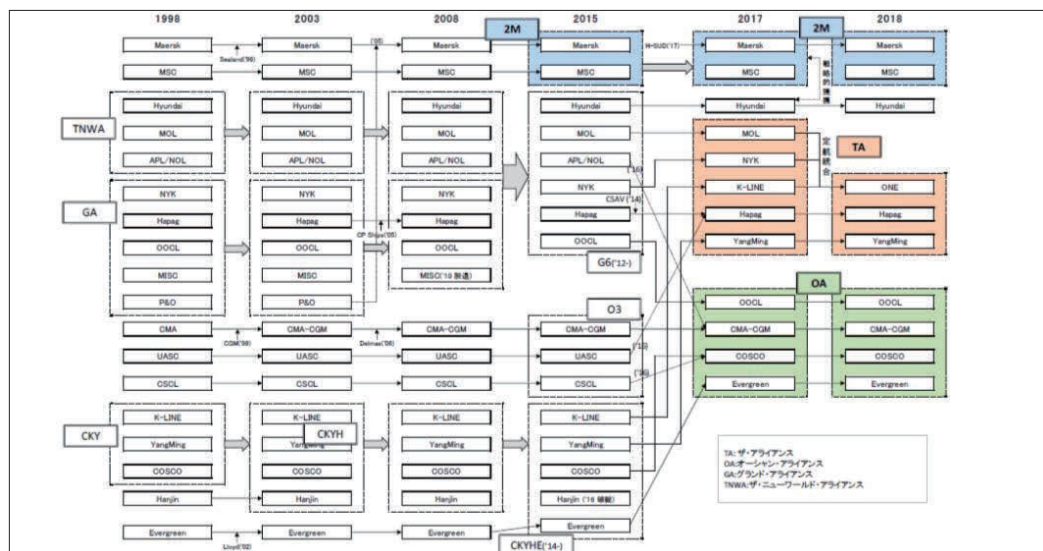
and the US Ocean Reform Shipping Act of 1998. The US deregulation has provided opportunities to carriers in developing countries, which contributed to more competitive world shipping markets. Concerns have been whether the recent mergers would jeopardize the balance of regions and the maritime economies.

### 2.8 Shipping alliance reformation

Shipping alliances and consortiums started in the single trade lane by slot exchange

and space chartering between carriers in earlier days. It expanded to multiple trade lanes in 1990s and it was called a global alliance. The mergers and acquisitions in the liner shipping industry had an impact on the formation of the shipping alliances. In the spring of 2018, nine liner shipping companies have formed into three global alliances (Figure 9). The European carriers take the lead between alliance carriers by the delivery of tonnage, deployments and terminals/operations.

Figure 9. Liner Shipping Alliances



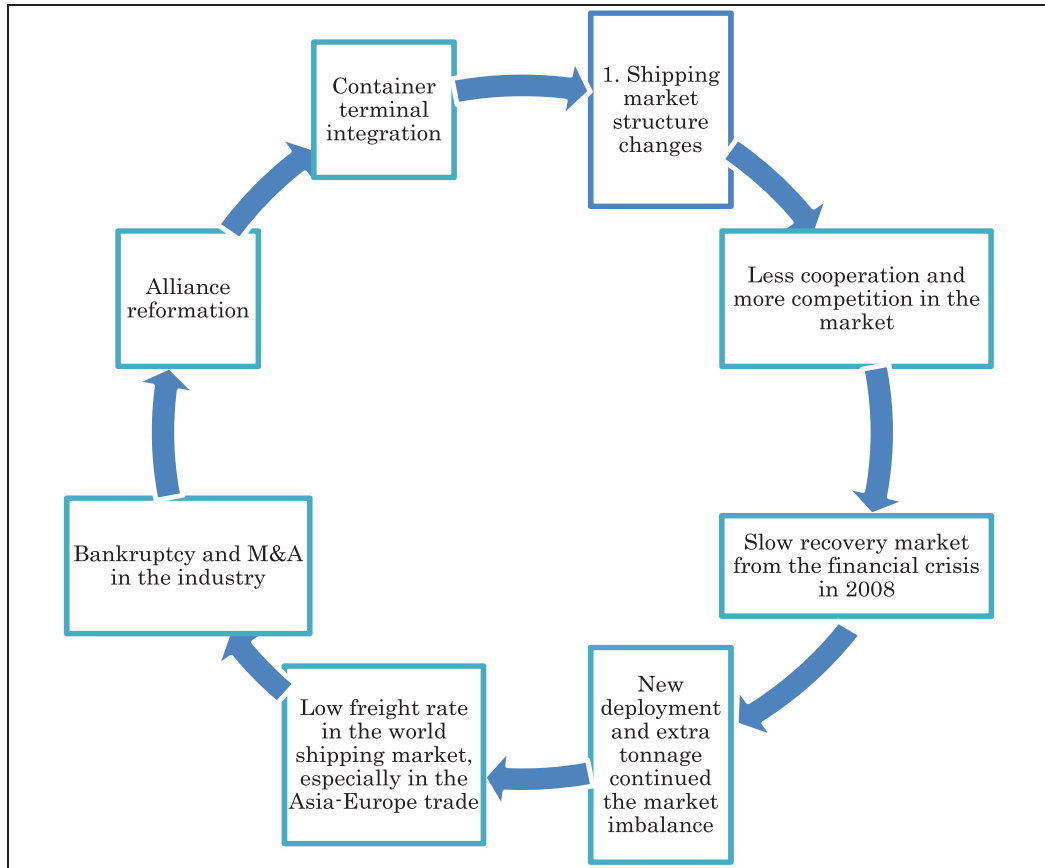
Source: Ministry of Land, Infrastructure, Transport and Tourism.

### 3. Results/Conclusions

This research focuses on the dynamism of the liner shipping industry in the last decade. Shipping structure changes, the market impact of the financial crisis, mergers and acquisitions of shipping companies and the shipping alliance reformation have been individually discussed. The results indicated that there were casual relations between them. The structure changes limit opportunities for having a healthy consensus between carriers. New deployment and extra tonnage against the weak shipping market helped market imbalance in the Asia-Europe trade first, and transferred to one after another by cascading effects. Low ocean freight rates caused carriers to keep losses and then some of them went bankruptcy, and several carriers merged. The mergers resulted in the alliance reformation. To compare supply and demand in the normal shipping market model and its business cycle, the dynamism

is illustrated in the unique business model, which is useful in understanding the causal relations and the linkage between factors (Figure 10).

**Figure 10. The Business Model in the Liner Shipping Industry 2008/2018**



Source: Author's own elaboration.

The main contribution of this paper to the literature is providing a clear perspective on the shipping industry and the shipping market by creating a conceptual model. The dynamic contained complexity. The perspective helps public managers and maritime business managers form future plans and strategies.

The mergers and alliance reformation may have an impact on container terminals. For example, in the case of the Rotterdam World Gateway, container terminals in Maasvlakte2 has been developed by former alliance members of the TNWA, CMACGM and DPW (DP World) since 2007. It is a concession agreement for 25 years with the local Port Authority. The port governance and the terminal management in the US west coast ports and Japan main ports are different from the North-

west European countries. Shipping carriers have traditionally exclusively used container terminals in those countries under long term concession agreements. These terminals may more directly impact on the dynamism in the industry. APL, currently a part of CMACGM, operated the Kobe terminal over 40 years but has already closed in June, 2017 and the CMACGM sold the Global Gate South terminal (Los Angeles) to an insurance company in December, 2017, however, we need more time to examine terminal integrations.

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