

A Conceptual Framework of Port Cooperation

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Abstract : *Globalization of production, changing technology in ocean shipping sector, shifting bargaining power from port service provider to port users, changing distribution patterns of the containerization and new implementation for the environment and safety concerns introduced new ways of administration in port sector. In these days, port industries cannot survive alone. Port operation and management has to be proactive to cooperate and integrate with other port operators or other industries. In the 21st century, cooperation in maritime sector is more common than that in the past with several different reasons in a mixture of forms of cooperation. Cooperation among port authorities, port operators, shipping line, inland transport service providers and/or related organizations themselves becomes to exist to overcome the challenges and development of the global transport chain. This paper investigates the concept of port cooperation and the case analysis of the cooperation in the port industry.*

Key words : *port competition, port cooperation, port management, port policy, port industry*

1. Introduction

Ports had been defined in several ways according to the different point of views. Within the international transport networks, the port is defined as the key links and it is also vital chain of the global logistics and supply chain. In 21st century, ports have been facing more challenges in the competitive landscape. Technology enhancements in the shipping sector and restructuring with alliances of the shipping lines take advantage of the bargaining power and control over port management, and as a result, situation about the management and operation of port has been more dynamic than ever. Globalization of production, changing technology in ocean shipping sector, shifting bargaining power from port service provider to port users, changing distribution patterns of the containerization and new implementation for the environment and safety concerns also take the ports to more challenging situation (World Bank, 2007). These changes also present the situation for new ways of administration in port sector. These are also forces to change the administrative structure of the port behind the scene. Cooperation among port authorities, port operators, shipping line, inland transport service providers and/or related organizations themselves becomes to exist to overcome the challenges and development of the global transport chain. This paper investigates the concept of port cooperation and the case analysis of the cooperation in the port industry.

2. Concept of Port Cooperation

The strategy for affiliation of ports to secure competitiveness by sharing common resources can be noted as port alliance which is one of the strategic tools for port authorities to augment bilateral interest (Lim, Y. T., 2008). The maximizing of economic benefits by eliminating the inefficiency in port activities from both parties is the key intention of the port alliances and cooperation. Ryoo, et al.(2009) reviewed out the ultimate goal of the cooperation in port operation as to increase profits through sales enhancement for port operators and as to acquire economies of scale for the port authorities.

UNCTAD (1996) classified the cooperation in ports into three groups, namely institutional, industrial and commercial. The first type, institutional, was occurs with the common interests which create dedicated regional institutions. Most of the institutions have been formed trade and developments through activities which may include port activities. Substantial port development activities may result from the type of institutional cooperation. As a concrete example, Association of South East Asia Nations (ASEAN) has been working toward the development of port sector in ASEAN members countries based on the "Roadmap towards an Integrated and Competitive Maritime Transport System". Under the industrial cooperation types, exchange of ideas and information among cooperative parties such as port authorities, port operators and port related firms on an

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industrial basis. For this type of cooperation, there are three different groups of associations, namely international associations (e.g., the International Association of Ports and Harbours - IAPH), regional associations (e.g., ASEAN Port Association - APA), and technical associations (e.g., International Association of Cities and Ports - IACP). The third type, commercial cooperation, is inspired by profit and commercial benefits and this type of cooperation has been formalized in contracts based on business law. Concessions or type of cooperation may also be dealt in bilateral agreements especially between a port authority or terminal operator and shipping line companies. There are several cooperation ways which base on the generic terms of UNCTAD defined types of cooperation.

As the globalization in trade and transport, ports are vital links in international transport chain. The global alliances and cooperation among the various players of the maritime industry with the global operations and the emergence of logistical services by maritime transport related organizations are the evidence of the development of the integration amongst suppliers of logistics services (Heaver, et al., 2001). As the logistics and supply chain point of view, concepts such as partnerships and alliances have become one of the important components of them and indicate that the more traditional adversarial basis to business interactions has been changing (Coyle, et al., 2003).

Integration and cooperation in the maritime industry can involve a wide range of businesses, different levels and separate activities. Horizontal alliances can be between shipping companies, terminal operating companies, logistics providers, hinterland transport companies and between other inland carriers. It has occurred when these players among themselves through mergers or agreements. Vertical integrations and alliances also spread wider and wider time by time. It has occurred within the different players of the maritime industry through ownership or leasing. On one hand, shipping companies have been continuing to work towards controlling the port operation themselves as terminal operators or making joint activities with the terminal operating companies. On the other hand, terminal operating companies have been also making negotiations with the shipping companies to become like bilateral oligopolies (Meersman, et al., 2009, Talley, W. K., 2009).

Regarding the form of the port alliance and cooperation, it can be classified in another way as formal port alliances and informal ones as well. Formal port alliances have a strong impact on the institutional structure of the port authorities concerned. Examples are creating of a joint-venture, equity

swaps (port authorities give a minority shareholding to each other), mergers, acquisition/ take over, the setting up of a joint holding company to invest in the hinterland or in overseas ports, etc. There are also increasing the cooperation patterns in more informal forms of coordination. As example, the sister ports scheme or/and information exchange of information are the some of the informal cooperation which is no real change in the institutional structure of the port authorities concerned.

As the concepts of the cooperation of the ports and related organizations, integration within the specific region and neighbouring ports is also taking into account with some extent. After analyzing of the annual reports of the port authorities which contains the information of the extent of cooperation between ports, Langen and Nijdam (2009) classified the cooperation for all port authorities in which vicinity according to their reviews in three categories:

- Strategic cooperation within neighbouring port authorities with joint investments, joint holding or joint acquisitions
- Cooperation within neighbouring port authorities without reaching the strategic level
- Do not have any form of cooperation within neighbouring ports or port authorities

Hwang and Chaing (2010) also pointed out that cooperation between adjacent container ports has been emerging with the ever-increasing competitive environment and enhancement of the overall competitiveness of ports in a region.

UNCTAD (1999) noticed about the cooperation and integration in the port industry and defined as the fourth generation port which are physically separated but linked through common operators or through a common administration. In the 21st century, cooperation in maritime sector is more common than that in the past with several different reasons in a mixture of forms of cooperation.

3. Why Port Cooperation is Needed

In these days, port industries cannot survive alone. Port operation and management has to be proactive to cooperate and integrate with other port operators or other industries such as shipping lines, logistics providers, manufacturing industry, local transport industries, and production industries. World Bank (2007) identified the five forces that will interact to shape the competitive landscape facing port authorities and port service providers in the 21st century, they are:

- (a) The rivalry among existing competitors
- (b) The threat of new competitors

- (c) The potential for global substitutes
- (d) The bargaining power of port users
- (e) The bargaining power of port service providers

3.1 Changes in the Port Operation Environment and Infrastructure

If the today's perceptive view of the cooperation in maritime sector has been reviewing from the beginning, containerization will be one of the vital players of that scene in various ways. Containerization was the greatest invention for the maritime based freight transport and it has been the backbone of the globalization. With the step by step development of the technical, economical and organizational factors of the containerization, the advantage of the opportunities offered by globalization have been taken in various sectors of the transport such as shipping lines, container terminal operators, logistics providers, intermodal transport suppliers, freight forwarders and so on. Containerization has been enhancing synchronization of the transport activities in space and time through the introduction of logistics chains and has been bringing the integration of the transport chain (FRÉMONT, 2010).

First of all, in the shipping sector, there has been a more than fivefold increase in containerized cargo from 1990 to 2009. In this period, the world's fleet of container ships also has been seven times increase (UNCTAD, 2010). On the facet of the size of the ships, shipping lines has been building the bigger and larger capacity vessels to get the more economic scales in the maritime container transport. As a consequence, distribution patterns of port of calls are also affected substantially. Another facet as the levels of concentration in shipping sector that has been also increased along several dimensions. The top 20 of the world's shipping lines controlled 26% of TEU-slot capacity in 1980, their share has been dramatically increasing and reached up to 81% in 2007 (Notteboom, 2008). According to the next facet of alliances and consortia in international shipping lines, container liners have resulted in the greater market power and they have more choices in calling at port. Song (2010) pointed out the needs of a certain form of competition and cooperation among ports to provide services that fit into changing trend of shipping lines' strategies.

Secondly, in logistics sectors, the containerization acts as intermodal tools that fulfill the needs of door-to-door services. Inland transport networks such as truck haulage and regional rail links have continuously developed to serve for high-volume outbound from the hub and spoke networks and extending to door-to-door services as well.

Containerization also facilitates vertical integration with all the players of the international transport chain of intermodal transport, this time, rather than economies of scale. This expandable situation for port related with both of hinterland and foreland leads the reconsideration of the port management and operations, and restructuring of the port's administration and cooperation as well.

Third, in port sector, port has been improved the infrastructure to take care of the larger container vessels. Ports have been building up themselves with preparing deeper water draft, installing high efficient ship to shore cranes, upgrading better port community system, and setting up the agreements among related ports and transport logistics service providers. Nowadays, according to the business scope to the regional or global scale, port operators can be considered as multinational corporations (MNCs). The global operating groups such as P&O Ports, PSA Corporation and Hutchison Port Holdings, are taking the increasing proportion of port management and operation (Song, 2003).

Estache and Trujillo (2009) also pointed out the global economic changes and their impacts on the port sector that will be affected by the following six major types of changes:

- (a) increased trade levels and trade specialization
- (b) increased concern for the environment
- (c) increased concern for security
- (d) emerging business environment changes
- (e) emerging institutional changes
- (f) emerging transport operational changes

All these challenges are bound to change the level, pattern, volume and composition of the container traffic to be handled by port. As the consequences, those situations push the ports and port authorities to consider changing their administration structure, operation activities and portfolio. Port authorities become to think to allow the more flexibility and more cooperation among the related players of the trade, transport, containerization and globalization as well.

Regarding the reasons behind the port alliance as a holistic view, discussion also should be considered with two basic aspects, endogenous reasons and exogenous reasons. Under the side of endogenous reasons, driven forces and incentives are coming from within the port organization. For example, a low profitability/financial position of the port authority could be a reason to seek cooperation or even merger with other ports. On the other side, under the exogenous reasons, there are external pressures that give motivations and incentives to ports to seek cooperation. An example is the merger between Malmo port in Sweden and Copenhagen port in Denmark. A fixed link between Denmark

and Sweden (the Oresund bridge) made that these ports lost all ferry traffic between Sweden and Denmark. They thus had a joint external pressure to consider cooperation.

3.2 Port Cooperation and Competition

Cooperation and competition are likely the edges of the double-edge sword. Especially in the broad range of maritime transport and logistics sectors, a number of structural changes through a mixture of autonomous group, alliances, mergers and cooperation agreements have attempted to be price competitive and to improve and expand service offerings (Heaper, 2001). Cooperation encouraged by the various challenges and changing global environment does not mean that the eliminating of competition. Actually, cooperation may also help to strengthen competition as well (UNCTAD, 1996).

Some scholars stated the terms co-competition that has been considered a win-win strategy with the optimum mixture of the cooperation and competition (Song, 2003). With this aspect, commonly development of the containerization also create the closer substitutes condition of the ports in the same region and that is likely to expose to competition from other ports and other routes (OECD, 2009). Regional port cooperation and intra-port competition between same port are the more common than ever in this first decade of the 21st century all over the world.

4. The Case Analysis of the Cooperation in the Port Industry

4.1 Types of Port Cooperation

First and most visible type of cooperation should be noted down in the group of vertical integration and horizontal integration between port related organizations and various maritime connected market players. There are possibilities of numerous and different types of agreement between

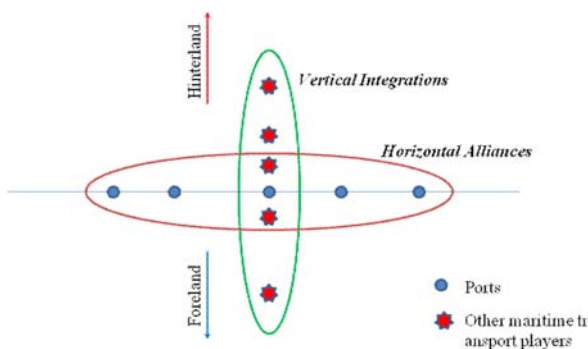
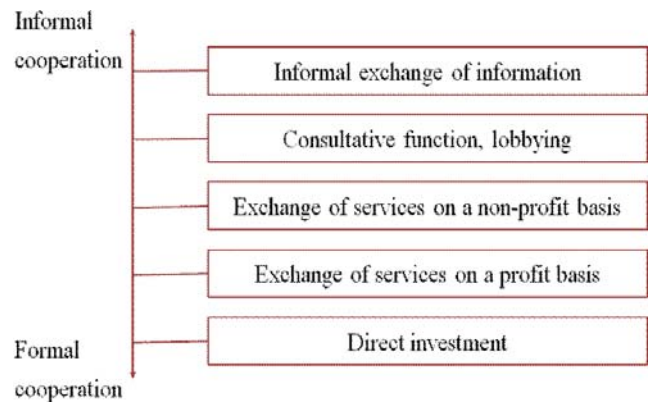


Fig. 1 Vertical Integration and Horizontal Alliances

cooperation parties. Globalization and development of the global supply chain have been highly effect on the encouragement of cooperation of the different transport sector players to have a deeper reach.

Port cooperation activities can also be categorized between formal and informal. Formal cooperation usually leads aspect of financial, commercial and legal issues. UNCTAD (1996) denoted the generic activities of cooperation as shown in Fig. 2.



Source : UNCTAD (1996)

Fig. 2 Formal Cooperation Vs. Informal Cooperation

Nowadays, various cooperation in maritime sector have been taken as important role in the regional development activities. Security and environmental issues are also some of the driving forces to have more cooperation in maritime sector for the regional development. The intended aim of this cooperation is promoting the development of maritime industry of the involved parties, subject to their respective laws, rules and regulations encourage their competent authorities, shipping companies, ports and education and training institutions. The objective of this kind of cooperation has wider range of activities, such as to exchange views on issues related to their maritime transport activities and information on legislation and regulations concerning maritime transport, to promote efficiency of transport service for international seatriade by effective administration of the ports and vessels, to enhance maritime safety and marine environmental protection against pollution, to exchange personnel and maritime technology within the region, to promote cooperation to enhance maritime security.

4.2 Motives of Port Cooperation

Motivations behind the various port cooperation are rather complex. Some are fully derived from the economic aspects, but some are closely related to the regional development. On

one hand, some are started from enhancement of the operational and marketing aspects, and some are only focused upon strategy, management and administration issues. These motivations came from the endogenous reasons or exogenous reasons or both of them which have been already mentioned before.

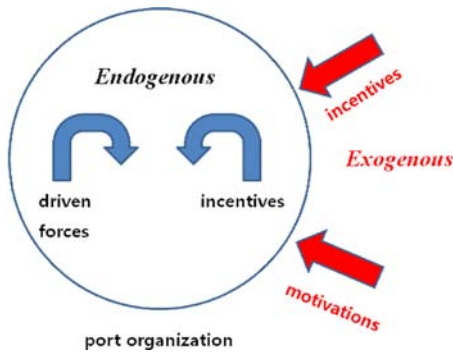


Fig. 3 Motivation behind the Port Cooperation

The cooperation and alliance literature presents that the motivation ascribes to receive more effective and retain the competitive position, efficiency improvement and cost reduction with various factors, expend the market position, maintaining the appropriate rate plans and adjustment of surcharges to get the better competitiveness, removing of the port related inefficient operations, for the transportation, implementing the barriers to prevent the new competitors for the specific markets and so on.

Many scholars have noted down a range of motivations in different articles. Cetin & Cerit (2010) pointed out that the motivation of gaining their competitive position (Social and Technical) creates the enhancement of the integration of the supply chain actors and existence of the port networking by strategic cooperation with other ports. Donselaar & Kolkman (2010) also examined the motivations from economic view points, such as efficiency improvements, cost reduction, additionality of competencies and positioning of company that could create the different level of cooperation. For example operational level cooperation helps with the daily activities. Tactical level cooperation serves for the support of organizational policy and strategic level cooperation aims at long-term competitive advantage. They also mentioned that concept of alliances between various seaports was introduced by the motivation to gain competitive advantage in negotiating with shipping companies about tariffs.

One of the concrete examples and successful integration of two ports from different countries (Copenhagen and Malmo ports into CMP) was started from the motivation of common threat of the loss of revenues for both parties due to the

Oresund Bridge (Langen & Hijdam, 2009). After the integration, they have been creating economic benefits for both parties. Lim (2008) also agreed that the motivation relating with maximizing of economic benefits by removing inefficiency in port operation could create the appropriate form of port alliances and cooperation such as joint promotion of marketing activities, sharing of port resources, joint attraction and creation of freights, joint construction of network and port infrastructure and etc.

Related to the improvement of the operation, Talley (2009) indicated the motivations behind the forming of a joint chassis pool in United States between Ports of Charleston and Savannah are to be freeing up space in container yard and to increase the speed flow of containers moving in and out, and to reduce the time incurred by trucker and the number of chassis needed. Moreover, motivations which related to increase the availability of empty containers to truckers in port area and to reduce the port air pollution by truckers exchanging empty containers at locations away from ports, derived the creating of virtual container yards that have been organized by the Ports of Los Angeles and Long Beach on the West Coast and the Port of New York-New Jersey on the East Coast in United States as well.

Motivations behind some of the cooperation have mixture of economic enhancement and operational improvement. Wang (2007) stretched the combination of the motivations that has been aiming to maintaining appropriate rates, adjusting surcharges for the transportation and to get the effective move of import and export cargo, made cooperating within main ports in Korea, Japan and China from the perspective of Asia/ North America trunk line service. The principal players (shipping companies, terminal operators, forwarders) also evolved into large logistical organizations through a mixture of autonomous growth, alliances, and mergers according to the mixture of motivations such as to be price competitive, to improve and expand service offering, towards cost-savings through expansion and the emergence of the concepts of global and total logistics (Heaver et al., 2001).

To increase the container terminal capacity shortage is the major motivation behind the horizontal integration between DP World, through the acquisition of the terminal portfolios of CSX World Terminals (2005) and P&O Ports (2006). To get better control of costs and operational performance and to solve the schedule integrity problem are the major motivations behind the vertical integration between the substantial number of container terminals around the world

and a shipping line among their shareholders (Notteboom & Rodrigue, 2010). Meersman (2009) concluded the reasons behind the horizontal integration and cooperation between terminal operating companies of five major groups; HPH, PSA, DP World, APM Terminals and Eurogate, is to get more concentration on the financial flows between shipping lines and terminal operators. He also discussed the issue that could create a package of terminals and ports within the frame of one or more loops can be more negotiable, which was the main motivation to happen the vertical integration between terminal operating companies and shipping companies.

For the regional development and expansion of international trade aspects, Ying & Weida (2008) conferred about the development of domestic and international macro-economic and promoting the Bohai region's rapid development as the motivations behind the enhanced the feasibility of logistics integration of the port cooperation in the Tianjin and Hebei areas in China. Establishing an alliance of cooperation between Panama Canal Authority and the Port of Long Beach on 7th Dec, 2010 was also intention to generate new business and economic growth and promoting international trade (Canal de Panama, 2010).

Song (2004) listed widely about the assorted of motivations such as strategic motivation, financial motivation, economic motivation, operational motivation and marketing motivation, for the combination of cooperation and competition (port co-opetition) between Hong Kong terminal operators, Shenzhen terminal operators, and Hong Kong and Shenzhen terminal operators in his article.

There have been several different reasons, motivations and background driven forces behind the scene of cooperation. Additionally, UNCTAD (1999) summarized some of common advantages that can be drawn from the cooperation and alliances in port sectors as follow;

- (a) Port cooperation can enhance the smoothness of the operations within the transport chain
- (b) Cooperation allows to share the resources, cost and to reduce the uncertainty and risks
- (c) Cooperation can improve the relationship between parties involved and can obtain the first-hand information at low cost
- (d) Cooperation between ports encourages self-regulatory behavior by port professionals
- (e) Cooperation can diminish the negative impact of competition
- (f) Intra-port cooperation can create more productive situation among operators and the administration of a port.

4.3 Cases of Port Cooperation

According to the different motivations, diverse background situation and specific factors involvement, there are various possibility of the cooperation that have been discussed in the early part of this paper. In this part, similar cases of port operation will be organized in term of horizontal alliances between port operations themselves and vertical integrations between ports and other related market players in the maritime industry and global transport supply chains.

1) Horizontal cooperation

Among the port to port cooperation, some cases of cooperation are between port authorities. Langen and Nijdam (2009) made analysis upon the annual reports of the port authorities from different regions and listed the cooperation cases of them which are from United States of America, China, Netherlands and Sweden. Highest level of categories of cooperation between ports is defined as the development of strategic cooperation within port authorities such as joint investments, a joint holding and joint acquisitions. Under this condition, there is the case of merger of ports of Copenhagen and Malmo which has been formed Copenhagen Malmo Port - CMP (Denmark/ Sweden). Being the merger of these two vicinity ports from different counties, CMP could receive the advantages of cooperation such as more effective utilization of the resources from both parties, well sharing of the port infrastructure, achievement of the scale economies in management and administration, reduce the redundant investment for the accommodation of all major commodities and improvement of the professionalization of port management.

Additionally, a few studies about port cooperation have been also identified by Sim, et. al (2006) in several regions around the world. In their studies, Port of Tauranga (New Zealand) and Brisbane Port (Australia) have had an agreement for building network and raising port competitiveness in the area of port technology and marketing, and information system. For the collaboration of joint cargo handling, Port of Hamburg and Bremen in Germany, and Port of Antwerp and Zeebrugge in Belgium have created the mutually agreements. Port of Rotterdam and Flushing in Netherland, and Port of Le Harve and Rouen in France have also made cooperation in the area of port sector joint development, such as port technology and EDI, hinterland transport connection and pilotage, etc. To offer integrated services and sharing terminal resources, cooperation have been produced between Port of Nimbo and Zhousha in China, between Port of Vancouver and River Port of Fraser in

Canada, and between Port of Hong Kong and Shen Zhen in China as well.

Nowadays, global port operators can be put in the lists of horizontal cooperation. The core business of the various global port operators, namely DPW (Dubai Ports World), HHLA (Hamburger Hafen und Logistik AG), PSA (Port of Singapore Authority), APM Terminals, Eurogate, HPH (Hutchison Port Holdings), ICTSI (International Container Terminal Services, Inc.) and SSA terminals are port operations. They made investment in container terminals and cooperation between terminal operating companies for expansion and to get more concentration on the financial flows between shipping lines and terminal operators (Notteboom & Rodrigue, 2010 and Meersman, 2009).

2) Vertical cooperation

Substantial number of container terminals around the world has been invested by the shipping line among their shareholders as a support function. By making these kind of vertical integration between port operation and shipping operation, the benefits of getting better control costs and operational performance, and eliminating of the schedule integrity problem (Notteboom & Rodrigue, 2010).

In the global transport chain, vertical integration could enhance the gaining comparative advantages over other players through the development of logistics services. In these days, shipping lines have been cooperating not only with port terminal handling sectors but also other transport related services and inland transport as well.

Furthermore, most of the regional development communities consider that the maritime cooperation and development issues are very important and related with all the sectors. ASEAN (Association of South East Asia Nations) has been established the ASEAN Economic Community (AEC) with the goal of regional economic integration by 2015. In that AEC blue print, implementing of the "Roadmap towards an Integrated and Competitive Maritime Transport" has been considered as one of the imperative cooperation issues for the regional development. Another example case about the maritime cooperation is that ASEAN countries and Government of China signed the maritime transport agreement in 2007 and maritime cooperation is one of the articles of that agreement with the aim of promoting the development of their maritime industry.

5. Conclusion

In the 21st century, cooperation in maritime sector is more

common than that in the past with several different reasons in a mixture of forms of cooperation. In these days, port industries cannot survive alone. Port operation and management has to be proactive to cooperate and integrate with other port operators or other industries such as shipping lines, logistics providers, manufacturing industry, local transport industries, and production industries.

This paper identified several different reasons, motivations and background driven forces behind the scene of port cooperation. Port cooperation can enhance the smoothness of the operations within the transport chain and allows to share the resources, cost and to reduce the uncertainty and risks. In addition, cooperation can diminish the negative impact of competition and create more productive situation among operators and the administration of a port.

In this paper different types of port cooperation were presented. First and most visible types of cooperation include horizontal integration and vertical integration between port related organizations and various maritime connected market players.

Nowadays, global port operators such as namely DPW, HHLA, PSA, APM Terminals, Eurogate, HPH, ICTSI and SSA terminals can be put in the lists of horizontal cooperation. Substantial number of container terminals around the world has been invested by the shipping line among their shareholders as a support function. By making these kind of vertical integration between port operation and shipping operation, they could enhance the gaining comparative advantages over other players through the development of logistics services. In these days, shipping lines have been cooperating not only with port terminal handling sectors but also other transport related services and inland transport as well.

Port cooperation activities can also be categorized between formal and informal. Formal cooperation usually leads aspect of financial, commercial and legal issues. Informal cooperation includes exchange of information between port organizations, consultative function and lobbying, and exchange of services on a non-profit basis.

This paper investigated the motivations and types of port cooperation. The paper would contribute to theory of port cooperation and also container terminal operators would gain benefits of choosing right cooperation forms as their business strategy. In the future study it is important to examine the relationship between port cooperation and port performance to develop a theory of port cooperation.

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