



Recent development of Chinese port cooperation strategies

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ABSTRACT

The Chinese governments have worked out numbers of schemes at national or provincial levels to encourage port cooperation. The new geo-economic policy the Belt and Road Initiative brings new opportunities and challenges for port cooperation and development in China and the regions along the Belt and Road. This paper analyses port collaboration strategy adopted and implemented in China. It identifies the evolution of domestic port cooperation in China and the modes of international port cooperation of China. The paper concludes the trend of domestic port cooperation is towards the provincial port group. It also draws the insightful conclusion that the majority of international port cooperation cases of China happened along the Belt and Road after the year 2013. This paper proposes the implications with regard to the dynamic port cooperation development for Chinese ports and terminal operators. In theory, the research enriches the current studies by discussing the recent development systematically on port cooperation incentives and trend in China, as well as the modes of China's international port cooperation strategy. In practice, it draws implications on the performance evaluation and risks associated with Chinese port cooperation strategies.

1. Introduction

With the Open Door Policy, China experienced a rapid, significant and sustained growth in GDP, foreign investments and international trade since the late 1980s. Demand for port services in China, therefore, has been significantly increased (Notteboom & Yang, 2017; Song, 2002; Wang, Ducruet, & Wang, 2015). In order to cope with the increased demand, numerous Chinese ports in all coastal provinces were encouraged to initiate the construction and expansion along with the decentralisation of port governance in China (Cullinane & Wang, 2007; Notteboom & Yang, 2017; Xu & Chin, 2012; Zhuang & Song, 2017). Consequently, it led to increasingly intensified competition between ports, port overcapacity and underutilisation of port facilities (Cullinane & Wang, 2007; Drewry, 2014; Notteboom & Yang, 2017). In order to reduce the potential adverse effects from port competition, the national and provincial governments have drawn their attentions to port cooperation. They have worked out a number of schemes at national or provincial levels aiming for the avoidance of facility duplication, fierce competition and overcapacity in Chinese port systems. Hence, a wide range of port cooperation cases have been observed in China over the past decade (Wang et al., 2015).

The economic environment has changed greatly since the financial and economic crisis in late 2008, with global and national economic slowdown and economic structural changes. The economic change has

led to a slowdown in growth of port freight volumes (Notteboom & Yang, 2017). Governments and port operators have attempted to initiate various strategies to enhance the sustainable growth, such as collaborating with other ports in particular competitive ports. Chinese Government's new geo-economic policy Belt and Road Initiative brings new opportunities and challenges for port cooperation and development in China and the regions along the Belt and Road.

Against the background above, this paper analyses port collaboration strategy adopted and implemented in China. It identifies the evolution of domestic port cooperation in China and the modes of international port cooperation of China. This paper is organised as follows. Following the introduction section, this paper conducts the literature review on types of port cooperation and current port cooperation in China. Section 3 discusses domestic port cooperation in China including national and provincial government policies for driving port cooperation and the recent trend in cooperation. Section 4 elaborates international cooperation of Chinese ports and terminal operators by analysing the collated cases. Section 5 draws the conclusion and the managerial implications of collaboration for Chinese ports and terminal operators.

2. Literature review

It is a growing area in academic research focusing on port cooperation. This section reviews relevant studies on types of port

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cooperation and China's port cooperation from both China's domestic perspective and its international perspective.

2.1. Types of port cooperation

According to the Oxford dictionaries, the concept of cooperation is “the action or process of working together to the same end”. Types of port cooperation are observed as being significantly diverse. They differ not only between involvement of port authorities and terminal operators but also between port functions and port locations. In addition, cooperative means vary from joint venture, merger or acquisition to strategic alliance (De Souza Junior, Beresford, & Pettit, 2003; Notteboom & Winkelmans, 2001; Wang et al., 2015).

The basic types of cooperation are horizontal cooperation and vertical cooperation. For the vertical cooperation, it can be divided into upstream and downstream cooperation (Amber Coast Logistics, 2012; Stonehouse & Campbell, 2004). Numerous ports and terminal operators have actively sought the vertical and horizontal cooperation measures for mutual benefits (Hoshino, 2010; Notteboom, 2002). Brooks, McCalla, Palla, and Van der Lugt (2010) define and elaborate the differences between horizontal and vertical strategies for ports through cooperating with each other to serve shippers and shipping lines and coordinating with other supply chain actors to provide better service respectively. In their opinion, port cooperation is the horizontal cooperation between different ports. They also present the formal and informal port cooperation, including marketing and business development, operations, administrative aspect and regulatory area. Considering the research objectives, this paper adopts the definition of port cooperation raised by Brooks et al. (2010). As such, the research focuses on the port horizontal cooperation conducted by Chinese ports and terminal operators.

From the perspective of port operators and port authorities, port cooperation includes intra-port cooperation and inter-port cooperation (Li & Oh, 2010). At the port operator level, it includes both intra-port cooperation and inter-port cooperation. The former is the co-operation of terminal operators within a port. The latter is the co-operation of terminal operators among different ports. In many cases, the intra-port co-operation and the inter-port cooperation are accomplished by the same terminal operator. For example, the cooperation of Hong Kong and Shenzhen ports is both within and among the ports accomplished by the same terminal operator (Song, 2002). Terminal operators tend to enhance the competitiveness and expand the market power through investments, such as joint venture. At the port authority level, the port cooperation refers to the inter-port cooperation which is the co-operation among port authorities. For example, Copenhagen and Malmo ports merged into Copenhagen Malmo Port (Fiedler & Flitsch, 2016).

Hwang and Chiang (2010) present two types of port cooperation, i.e. complementary cooperation (Yap & Lam, 2006) and co-competition (Song, 2003), based on game theory. Fiedler and Flitsch (2016) classify port cooperation into five categories, i.e. Memorandum of Understanding (MoU), co-competition of ports in proximity, port integration, cooperation between seaports and inland ports and hub port cooperation. The most popular and basic cooperative commitment between individual ports is a signed MoU. Cooperation between competing ports in proximity is referred as co-competition (Song, 2003). Port integration is the closest cooperation form, coming along with the establishment of joint venture companies between port authorities and terminal operators. Cooperation between seaports and inland ports enlarges the hinterland region of the seaport to and from the customer. Hub port cooperation accommodates close business relationships between liner carriers and terminal operators, commonly in container transport.

2.2. Research of port cooperation in China

Port integration and cooperation has become a hot topic in China in the background of slower economic growth, increased competition,

port overcapacity and growing international opportunities (Notteboom & Yang, 2017). There is a trend in increasing academic research focusing on port integration and cooperation in China. Currently, most research focuses on the regional port cooperation between ports in proximity. Song (2002) examines the competition and co-operation of the container ports in proximity from a strategic perspective in Hong Kong and South China. The competition and cooperation between Shanghai port and Ningbo-Zhoushan port has attracted the most attention in academia (Cullinane, Teng, & Wang, 2005; Fu & Chen, 2012; Li & Oh, 2010; Wang, 2007; Zhuang, 2005; Zhuang & Song, 2017). However, there are very few systematic studies on the nationwide port cooperation in China. The limited existing literature is reviewed and analysed in this section from the perspectives of both the China's domestic level and the international level.

At the domestic level, Wang et al. (2015) conduct the detailed analysis on the temporal pathways of port integration in China, considering the time and modes of the port integration among 44 seaports and river ports. Then it emphasises the characteristics, modes and factors of port integration. Based on the port integration mechanism, a port integration is divided into four categories, i.e. government-driven, market-driven, government/market-driven and strategic alliance. Based on spatial categories, a port integration is divided into five categories, namely integration of ports internal, jurisdictional ports, ports across neighbouring region, regional ports and hub-feeder ports. They also identify several driving factors for port integration in China, such as governmental regulation and spatial planning, optimisation of shoreline resources and port function, and port competition for the same hinterland. Notteboom and Yang (2017) refer to key policy documents that advocate port cooperation and integration. The raised issues are largely consist with the driving factors of port integration identified by Wang et al. (2015).

At the international level, Notteboom and Yang (2017) claim that the international expansion of Chinese terminal operators is strongly embedded within the Chinese geo-political and geo-economic policies. They provide some cases about the international expansion of Chinese port-related companies, such as China Merchants Holdings International (CMHI), COSCO Pacific and several individual ports. Zhao, Wang, and Zhou (2016) conduct studies on the port cooperation mechanism in the context of the Maritime Silk Road initiative. They put forward the current situation and existing problems in the process of port cooperation along the Maritime Silk Road through analysing the content and modes of port cooperation. They also propose the associated policy suggestions for establishing the port cooperation mechanism.

To summarise, very limited existing studies focus on empirical cases of international port cooperation, especially from the timeline or spatio-temporal path perspective. In addition, there is insufficient research focusing on nationwide port cooperation activities in China, particularly in the context of emerging port mergers and investments promoted by the Belt and Road Initiative. As such, this paper discusses both the trend and strategies of port cooperation in China and the international port cooperation of China. It especially focuses on the cooperation modes and entities from the timeline and spatio-temporal path perspectives. Theoretically, this research enriches the current literature on port cooperation. Practically, it highlights the involved managerial implications in terms of the domestic and international port cooperation strategies, which provide references to policy makers and industrial practitioners both in China and around the world.

3. Domestic port cooperation in China

This section discusses the status of port competition of Chinese ports and its current trend of domestic port cooperation. Prior to the discussion, this section addresses the evolution of port governance in China from 1979, since port governance has significant impact on port competition and strategies.

Table 1

Key characteristics of three phases focusing on the port governance evolution in China.
Source: Authors' compilation based on references in Section 3.1.

Phase	1	2	3
Period	1979–1984	1984–2001 (or 2004)	2001 (or 2004)–present
National port planning	MOT	MOT	MOT
Local port planning	MOT	MOT, local government	Local government
Infrastructure investment	MOT	MOT, local government	MOT, local government, local port group
Operation	Local port authority under MOT	Local port authority under MOT and local government	Local port group
Regulation	MOT	MOT, local government	Local Port Administration Bureau

Table 2

Port cooperation schemes launched by the national government of China.
Source: Authors' compilation based on a wide range of sources.

Year	Policy document	Government agency
2003	Coastal Ports to Speed up the Integration of Resources, beyond Administrative Divisions, Give Full Play to Advantages of the Port Group	MOT
2004	Construction Planning of Seaports in the Yangtze River Delta, Pearl River Delta and Bohai Rim (2004–2010)	State Council of China
2006	National Coastal Port Distribution Planning	MOT
2009	The Coastal Development Planning of Jiangsu Province	State Council of China
2009	The Development Plan of Liaoning Coastal Economic Belt	State Council of China
2011	The Development Plan of Taiwan Strait Western Side Economic Zone	National Development and Reform Commission
2013	The Silk Road Economic Belt and the 21st-Century Maritime Silk Road, the Belt and Road Initiative	President Xi Jinping
2014	A Number of Views on Promoting the Healthy Development of the Maritime Industry by State Council (National Development [2014] No. 32)	State Council of China
2017	Work Plan for Accelerating the Coordinated Development of the Ports of Jin-ji Region (2017–2020)	MOT, Tianjin Municipal People's Government, People's Government of Hebei Province

3.1. Evolution of port governance in China

According to the extant literature on the Chinese port governance, there are three distinctive phases in the port governance evolution in China (Cullinane & Wang, 2007; Notteboom & Yang, 2017; Xu & Chin, 2012; Zhuang & Song, 2017). As shown in Table 1, ports in China were subject to strongly-centralised control by the Ministry of Transport (MOT) in the first phase (1979–1984). In the second phase, main ports were under the joint control of both the MOT and local port authorities. A port management shift was mainly involved to local port authorities via the establishment of Port Administration Bureaus and port business groups or port companies in the third phase. However, there were arguments about the periods covered by the three phases. The Port Law of the People's Republic of China went effect in 2004. It was regarded as the pivotal point in the transition from the second phase to the third phase (Cullinane & Wang, 2007; Notteboom & Yang, 2017). However, the process towards the third phase of the port governance already started in 2001 after China's accession to the World Trade Organization (WTO) in November 2001 (Xu & Chin, 2012; Zhuang and song, 2017). Notteboom and Yang (2017) presented the fourth phase of the port governance in China. They stated that the 'Institutional plasticity' was embraced by the Chinese government and other port-related actors without necessarily breaking out of the existing governance path. It referred to the degree of flexibility and dynamism in the port governance framework to enable the port-related actors to fit the changing social and economic environment. They also identified four driving forces of the processes of institutional layering in the Chinese port governance framework.

3.2. Port competition in China

The port governance evolution in China discussed in the previous section has brought in the localisation of the ports and ports' economic benefits. Individual ports in China are in the more business-oriented competitive environment. They have been strongly encouraged to increase the construction and expand by their local governments due to

the key fiscal resource represented within their operational areas (Airriess, 2001; Wang et al., 2015). Numerous plans of the port construction and expansion have been introduced, including the optimisation of land resources and the expansion of handling facilities, supporting policy and infrastructure investment (Pallis, Notteboom, & De Langen, 2008). As such, port expansion programmes have led to the increasingly-intensified competition among ports. Zhuang and Song (2017) conducted the case study of the competition of Ningbo-Zhoushan Port and Shanghai Port. Ports in proximity have been competing fiercely for shoreline resource, hinterland, hubs and feeders and favourite economic policies. As such, the cooperation among competing ports, especially the ports in proximity, is often regarded a practical strategy to avoid the destructive inter-port competition and the disorderly or extravagant planning and construction (Ng, 2013; Notteboom, Ducruet, & De Langen, 2009; Wang et al., 2015).

3.3. Port cooperation schemes in China

Ports in China are characterised by the highly-decentralised governance structure in the port devolution process. The national and provincial governmental agencies have worked out a number of schemes pertaining to avoiding duplication of facilities, fierce competition and overcapacity in Chinese port system. The schemes are from both the national government level and the provincial government level, as in Tables 2 and 3.

In 2003, the MOT of China issued the Coastal Ports to Speed up the Integration of Resources, beyond Administrative Divisions, Give Full Play to Advantages of the Port Group. It promoted the port cooperation as it is an effective way for the optimisation of coastline resources. The year 2003 was regarded as the milestone of the port cooperation in China as about 40 port integration cases happened after year 2003 (Wang et al., 2015). In 2006, the MOT promulgated the National Coastal Port Distribution Planning, which motivated a subsequent port integration boom (Wang et al., 2015). The national coastal ports were divided into five coastal port clusters, locating at the regions of the Bohai Rim, the Yangtze River Delta, the Southeast coast, the Pearl River

Table 3

Port cooperation schemes launched by provincial governments of China.
Source: Authors' compilation based on a wide range of sources.

Province	Year	Policy document
Liaoning	2008	Liaoning Coastal Port Layout Planning
	2014	Liaoning Coastal Port Layout Planning (2010–2030)
	2017	The Port Cooperation Framework Agreement
Hebei	2017	Work Plan for Accelerating the Coordinated Development of the Ports of Jin-ji Region (2017–2020)
Shandong	2016	The Implementation Views on Carrying Out the National Development [2014] No. 32 about Promoting the Healthy Development of the Maritime Industry
Jiangsu	2017	Port Layout Planning (2015–2030) of Ports along the Yangtze River and Coastal Ports in Jiangsu Province
Zhejiang	2006	Zhejiang Coastal Port Layout Planning
	2015	Study on the Layout Planning of Coastal Port Resources in Zhejiang Province
Fujian	2004	Outline for the Construction of Taiwan Strait Western Side Economic Zone
	2009	Fujian Coastal Port Layout Planning (2008–2020)
Guangdong	2016	East of Guangdong Port Group Planning (2016–2030)
Guangxi	2014	Some Views on Deepening Reform to Accelerate the Development of Beibu Gulf Port
	2015	Pilot Implementation Plan of the Development Integration Reform of Beibu Gulf Coastal Port
Hainan	2016	Hainan Port Resources Integration Plan
Anhui	2015	The Implementation Views on Strengthening the Opening of the Port to Promote the Transformation and Upgrading of Foreign Trade

Delta and the Southwest coast respectively. It was the first time that China put forward the development planning of port clusters officially. This was also an important indicator of the port cooperation promotion in China. Accordingly, during the early period of port integration in China, governments made an active and significant effort on the port cooperation, particularly port mergers. Following the governments' promotion, the market mechanisms have boosted the increasing influence on port cooperation, particularly conducted by terminal operators (Wang et al., 2015). In recent years, governments have strongly promoted the port cooperation again, particularly after the Belt and Road Initiative in 2013. The implementation of port cooperation strategies has given the priority for port authority mergers at the provincial level. The recent port integration activities in the coastal provinces of China have shown the differences of implementation of port integration schemes among regions (Notteboom & Yang, 2017). This significant integration concept has been applied into the cooperation among provincial ports as discussed in the following section.

3.4. Recent trend in port cooperation: the provincial port group

This section discusses the recent trend in port cooperation across China, i.e. the main ports within a province are merged and restructured to form a provincial port group. The analysis of this section is based on a large amount of recent policy documents, port websites, press releases and publications. Some provinces have completed the merger of the provincial ports, such as the provinces of Guangxi, Hebei, Zhejiang and Jiangsu (see Table 4). The past two years have seen the rapid growing of the trend. Other provinces without a provincial port group have been in the process of conducting provincial merger or restructuring, such as the provinces of Liaoning, Hainan, Fujian and Anhui. The main objectives of the merger are to optimise coastline resources and the port management structure, decrease the internal competition, reduce the duplicated infrastructure investment and achieve the profit maximisation. The following section analyses the

Table 4

Provincial port groups in China.

Source: Authors' compilation based on a wide range of sources.

Province	Date of establishment	Name of the port group	Ports included
Guangxi	14th February 2007	Guangxi Beibu Gulf International Port Group Co., Ltd.	Qinzhou port, Beihai port and Fangchenggang port
Hebei	8th July 2009	Hebei Port Group Co., Ltd.	Qinhuangdao port, Caofeidian Port and Huanghua port
Zhejiang	28th August 2015	Zhejiang Province Seaport Investment & Operation Group Co., Ltd.	Ningbo- Zhoushan port, Wenzhou port, Taizhou port, Jiaying port, Yiwu International Dry Port
Jiangsu	22nd May 2017	Jiangsu Port Group Co., Ltd.	Nanjing port, Lianyungang port, Suzhou port, Nantong port, Zhenjiang port, Changzhou port, Taizhou port, Yangzhou port

recent development of port mergers in some provinces of China and illustrates the Table 4 in details.

3.4.1. Guangxi Province

The Qinzhou port, Beihai port and Fangchenggang port carried out the asset restructuring in February 2007 and the Guangxi Beibu Gulf International Port Group Co., Ltd. (thereafter referred as 'Beibu Gulf Port Group') was established on 14th February 2007. It is a large state-owned enterprise directly affiliated to Guangxi Autonomous Region. One year after the establishment of the group, the State Council of China launched the development plan for the Guangxi Beibu Gulf Economic Zone. In December 2009, the MOT of China announced that the Qinzhou port, Beihai port and Fangchenggang port in Guangxi were integrated under the unified name, i.e. Guangxi Beibu Gulf Port. The integrated group company conducted China's first integration of port assets across the administrative areas. In 2014, the listed company Beihai Port Share was renamed as Beibu Gulf Port Share. The main berths and other assets of the previous three port areas were integrated and listed as one group. The Beibu Gulf Port Group achieved the unified planning, construction and operation in Guangxi province (Beibu Gulf Port Group, 2017).

3.4.2. Hebei Province

Hebei Port Group Co., Ltd. was established on 8th July 2009, owned by Hebei province. It is the largest bulk cargo handling port company in the world, including Qinhuangdao port, Caofeidian port and Huanghua port (Hebei Port Group, 2017).

3.4.3. Zhejiang Province

Ningbo-Zhoushan Port Administration Committee was set up in January 2007 with the name of Ningbo-Zhoushan Port. The ports of Ningbo and Zhoushan experienced a long history of the coordination and cooperation (Fu & Chen, 2012; Zhuang and Song, 2017). In September 2015, the port authority merged Zhoushan and Ningbo and

formed the largest port group in the world, namely the Ningbo-Zhoushan Port Group, with the registered capital of RMB 6 billion. The Ningbo-Zhoushan Port Group Co., Ltd. was controlled by Ningbo State-owned Assets Supervision and Administration Commission of the State Council (Ningbo SASAC) with the 94.47% share and Zhoushan SASAC with 5.53% share. Zhejiang Province Seaport Investment & Operation Group Co. (ZSIOP) was established on 28th August 2015, which was devoted to integrate all the five seaports and the main inland ports and dry ports in Zhejiang province. In February 2016, Zhejiang Seaport Development Committee (ZSDC) was set up as a new provincial organisation. The objective of the committee is to form the regional port structure of the “one body two wings and interactive development”. It is interpreted as the main body of Ningbo-Zhoushan Port, two wings of the south-eastern seaports and northern ports of Zhejiang province respectively and the interactive development with Yiwu International Dry Port and other inland ports. ZSDC is also in charge of the ZSIOP. According to the decision of ZSDC, Ningbo-Zhoushan Port Group is the subordinate of ZSIOP, which is the provincial state-owned enterprise. In the future, ZSDC will control all the ports in Zhejiang province (Ningbo-Zhoushan Port Co., Ltd., 2017; Notteboom & Yang, 2017; Zhuang & Song, 2017).

3.4.4. Jiangsu Province

In 2009, the State Council of China released the policy document The Coastal Development Planning of Jiangsu Province. The Jiangsu government accelerated the port integration within the province. On 20th April 2017, the Jiangsu province government announced Port Layout Planning (2015–2030) of Ports along the Yangtze River and Coastal Ports in Jiangsu Province. In this document, Jiangsu province will adopt the hierarchical port layout planning, with the Lianyungang port, Nanjing port, Zhenjiang port, Nantong port and Suzhou port as the main national ports and Yangzhou, Wuxi (Jiangyin), Taizhou port, Changzhou and Yancheng port as the important regional ports. It forms the hierarchical development pattern of port functional division in terms of the cooperation and coordinated development. On 22nd May 2017, the Jiangsu Port Group Co., Ltd. was formally founded in Nanjing. The provincial port-and-shipping enterprises and the 8 state-owned port enterprises in the coastal cities, i.e. Nanjing, Lianyungang, Suzhou, Changzhou, Taizhou, Nantong, Zhenjiang, Yangzhou, were integrated into the provincial port group (State-owned Assets Supervision and Administration Commission of Jiangsu Provincial Government, 2017).

3.4.5. Liaoning Province

The People's Government of Liaoning Province and China Merchants Group signed the Port Cooperation Framework Agreement on 10th June 2017 in Shenyang. Based on the Cooperation Agreement, the People's Government of Liaoning Province and China Merchants Group will work together to establish the unified operational platform among Liaoning ports. The Liaoning Port Group, which is based upon Dalian Port Group and Yingkou Port Group, will be set up in a market-oriented way to realise the operational integration of coastal ports of Liaoning. The People's Government of Liaoning Province supports China Merchants Group to further integrate the other port operators of the province in the condition of the investment holding in the Liaoning Port Group. It strives to complete the establishment of Liaoning Port Group and the mixed-ownership reform by the end of 2017. It also aims to complete the integration of other port operators of the province by the end of 2018 (Eastmoney, 2017).

3.4.6. Hainan Province

The People's Government of Hainan Province issued the Hainan Port Resources Integration Plan on 22nd December 2016. In the document, it adopts the mode of government incentives and market decisions for port resource integration in Hainan province which relies mainly on various market means. This promotes the port enterprise asset

restructuring in the province through the government. It also forms the unified port enterprise group. Further, it integrates the port natural resources and management resources in the province (The People's Government of Hainan Province, 2016).

3.4.7. Fujian Province

Fujian Provincial Communication Transportation Group (FJCT) was established in 2008 and aim to be a big corporate group specialised at port management, transportation, warehousing and logistics management in Fujian province. FJCT has recently been accelerating the port integration in Fujian province with its advantage as Fujian's largest public port terminal operator. It aims to become the large modern port enterprise group with the port being the group leader, replying on the Fujian province, considering the layout of both sides of the Taiwan Strait and expanding along the Belt and Road (China Water Transport, 2017).

4. International cooperation of Chinese ports and terminal operators

The Open Door Policy initiated by Deng Xiaoping in 1978 and the Belt and Road Initiative proposed by Xi Jinping in 2013 have impacted on port management and strategies in China. On one hand, the policy attracts foreign investments in Chinese ports. On the other hand, it encourages Chinese-port-related companies to go abroad. However, there are no cases in the former in which a foreign investor has a majority shareholding in a Chinese container terminal by analysing the shareholding structures of main container terminals in mainland China and Hong Kong (Notteboom & Yang, 2017). As such, this paper focuses on the latter, i.e. the internationalisation of Chinese ports and terminal operators.

The modes of international port cooperation can be divided into four categories based on the objectives of the cooperation, i.e. overseas investment in port construction, investment holding or merger and acquisition, sister ports agreements and port cooperative networks (Zhao et al., 2016). By analysing all the collated cases of China's overseas port cooperation in the past decade, the paper observes that the mode of overseas investment in port construction is mainly conducted by port engineering companies, such as China Harbour Engineering Company and China Communications Construction Company. Considering the research purpose, the overseas investment in port construction is not included in the field of the port cooperation in this paper. Current studies on comprehensive port cooperative networks remain theoretical. Therefore, this paper develops two modes of port cooperation, i.e. investment holding or acquisition and strategic alliance. Further details and characteristics are analysed and discussed in this section.

4.1. Investment holding or acquisition

The investment holding or acquisition is observed as the capital penetration. It refers to the joint development of port cooperation via the application of joint investments, bidding for operation rights, franchising or licensing and share acquisition or the stock exchange (De Souza Junior et al., 2003; Wang et al., 2015; Zhao et al., 2016). Thereinto, the joint venture is currently a common way with partners, typically comprising the relevant port or terminal operator companies (De Souza Junior et al., 2003; Wang et al., 2015). Through the investment holding or acquisition of other ports or terminals, a company can get the access to the resources, services, competences and knowledge of the acquired ports or terminals. In addition, the company gets the chance to access and utilise their market and increases its own market share. Further, it gains the access to the distribution channels and suppliers of the acquired ports or terminals. As such, the investment holding or acquisition enhances the competitive advantages of a company through the acquired competences, market, services,

Table 5

Cases with the mode of investment holding or acquisition.

Source: Authors' compilation based on a wide range of sources.

Chinese company	Year	Content of port cooperation	Area
Dalian port	2016	Signed the Djibouti Free Trade Zone Investment Agreement. The project was operated by a joint venture invested by Chinese enterprises including CMPort, Dalian port as well as the Djibouti government.	East Africa
Guangxi Beibu Gulf port	2017	On February 21, 2017, the joint venture company- Muara Port Co., Ltd. (51% stake in the hands of Guangxi Beibu Gulf Port Group) took over the operation of the container terminal of Muara port in Brunei.	Southeast Asia
Hebei port	2016	Set up a subsidiary, Qin Hai Port Company in Jakarta, Indonesia, to run a local port project in Jambi industrial park in Indonesia, which is the first overseas port project for Hebei port group.	Southeast Asia
Qingdao port	2015	Signed a Memorandum of Understanding (MOU) for the APM Terminals Vado, Italy port project. The detailed terms and investment amount were not released. The MOU will create a new joint venture to invest in and work with other potential partners.	Europe
Shanghai port	2015	Shanghai International Port Group (SIPG) won the bid for concession of Bayport terminal, port of Haifa, Israel operations for 25 years from 2021.	Middle East
	2010	Acquired 25% stake of APM Terminals Zeebrugge NV (APMTZ) in Belgium and became the company's second largest shareholder.	Europe
China Merchants Port (used to be CMHI)	2017	Agreed to acquire 90% stake of Terminal de Contêineres de Paranaguá (TCP) in Brazil for about US\$920 million to get the terminal operation for CMPort's first investment in Latin America.	South America
	2017	Got 85% stake of Hambantota port in Sri Lanka with a 99-year lease paying US\$1.12 billion.	South Asia
	2014	Acquired Newcastle port in Australia, the world's biggest coal ports, paying AU\$ 1.75 billion jointly with Hastings Funds Management	Oceania
	2013	Acquired 23.5% of Port De Djibouti S.A. (PDSA) in February 2013. The core assets of PDSA included the Port of Djibouti, Doraleh Container Terminal, off dock depot and Doraleh Multi-Purpose Port.	East Africa
	2012	Acquired 50% stake of Thesar Maritime Limited (TML) to take over the development and operation of the Lome Container Terminal (LCT) in Togo for 35 years, which was owned by TML before.	West Africa
	2010	Established the joint venture company with China-Africa Development Fund to acquire 47.5% stake of Tin can Island Container Terminal (TICT) in Lagos, Nigeria paying US\$ 154 million. CMPort held 28.5% stake.	Africa
COSCO Shipping Ports (used to be COSCO Pacific)	2017	COSCO shipping port (Spain) company took a 51% shareholding paying US\$ 224 million in JP Morgan-controlled Noatum Ports in Spain, which operates a facility in Bilbao and Valencia and includes two inland terminals in Zaragoza and Madrid.	Europe
	2016	Signed a cooperation agreement on co-investment a new container berths in Singapore with PSA Corporation (PSA) in Shanghai through the joint venture company COSCO-PSA Terminal (CPT) in March 2016.	Southeast Asia
	2016	Acquired 51% stake of Piraeus port paying EUR 280.5 million. Another EUR 88 million will be paid within five years for the remaining 16% stake.	Europe
	2016	Acquired another 35% stake of Euromax Terminal Rotterdam owned by Europe Container Terminals (ECT) in May 2016, paying EUR 125 million.	Europe
	2007	Acquired 20% stake of Suez Canal Container Terminal owned by Egyptian International Container Terminal, which is a subsidiary of A.P. Moller-Maersk Group in November 2007.	Asia, Europe, Africa
	2004	Acquired 25% stake of Antwerp port in Belgium from P&O Ports (acquired by A.P. Moller-Maersk Group) and obtained the port operation rights.	Europe
CMHI, COSCO Pacific, CIC Capital	2015	Formed a consortium to acquire 65% stake of Kumport terminal in Istanbul, Turkey paying US\$ 940 million in September 2015. CMHI, COSCO Pacific, CIC Capital Corporation (CIC Capital) had equity stakes of 40%, 40% and 20% respectively in the consortium.	Asia, Europe

knowledge and resources. As an aggressive expanding strategy, it is featured with sharing both the financial gains and investment risks through acquiring the existing terminals or constructing the new terminals. It also indicates that it is necessary to analyse the potential risk and compare the cost and benefit of the investment activities which will be discussed in Section 5.2.

Aside from the features discussed above, this mode is also characterised by the decreased governmental effect and increased factors of the market mechanism as implemented by the port-related enterprises (Wang et al., 2015; Zhao et al., 2016). Practical cases with this mode are presented in Table 5. By analysing the collated cases in Table 5, the paper finds out that the mode of investment holding or acquisition performs well in the cases of overseas ports with a sound port operating system but suffering the business crisis. For example, the Chinese port company COSCO Shipping Ports acquired 51% stake of the Piraeus Port in Greece in 2016 as in Table 5. The main enterprises applying this mode are the port and terminal operators, such as China Merchants Port (CMPort) and COSCO Shipping Ports. It is noted that CMHI and COSCO Pacific were renamed as CMPort and COSCO Shipping Ports in 2016. Majorities of investment activities have been conducted since the year 2013, and interestingly the ports invested are along the Belt and Road. The Chinese government is reluctant to encourage port groups to invest and take shareholdings in foreign ports (Notteboom & Yang, 2017). As such, only six cases of this mode are initiated by Chinese port groups with five port groups are involved, i.e. Dalian port, Hebei port, Guangxi

Beibu Gulf port, Qingdao port and Shanghai port in Table 5. Five out of total six cases with the investment holding or acquisition mode conducted by Chinese port groups have been observed since the year 2015. It indicates that Chinese port groups are starting to go abroad.

4.2. Strategic alliance

Strategic alliance is a popular mode of port cooperation. It is the multifaceted, goal-oriented and long-term partnership between port companies. Both the risks and rewards are shared. In the current fast-changing environment, one port company is unable to possess all the resources, knowledge, information technology and markets. However, the port company can add value to its services, improve market access, strengthen operations, add technological strength, enhance strategic growth, enhance organisational skills and build financial strength through cooperating with other ports. Such close relationship enables a port company to learn quickly from the partners and transfer the partners' knowledge to its internal development (Amber Coast Logistics, 2012).

Port cooperation facilitates and intensifies the trade links to enlarge the port's hinterland regions and increase the port's throughput. The cooperative relationships can be fostered through regular delegation visits of political and private representatives. It is common to enhance the bilateral or multilateral cooperation between two or more port authorities through regular delegation visits. These strategic statements

Table 6

Cases with the mode of strategic alliance.

Source: Authors' compilation based on a wide range of sources.

Chinese port group	Year	Content of port cooperation	Area
12 Chinese ports	2015–2017	In November 2015, signed the Memorandum of Understanding between Malaysia Port Alliance and China Port Alliance for the Establishment of a Port Alliance. Six Malaysian ports – Port Klang, Malacca, Penang, Johor, Kuantan and Bintulu, are included in the alliance. In 2017, three more Malaysian ports - Kemaman, Kuching and Sabah, joined the China-Malaysia Port Alliance (CMPA). The total number of Chinese ports in the alliance are ports of Dalian, Shanghai, Ningbo-Zhoushan, Beibuwan, Guangzhou, Fuzhou, Xiamen, Shenzhen, Haikou, Taicang, Tianjin and Qingdao.	Southeast Asia
Qingdao Port	2016	Signed a strategic cooperation memorandum with China-Africa Development Fund and the National Development Bank Qingdao Branch to further implement the National Strategy of the Belt and Road Initiative and to share information and resources in view of African ports and related infrastructure.	Africa
	2015 1984–2017	Signed a cooperation memorandum with DP world to deepen the comprehensive strategic partnership. Signed sister port agreements with 21 ports, such as the port of Gwadar in Pakistan, Sihanouk in Cambodia, Kuantan in Malaysia, Antwerp in Belgium, Incheon and Pusan in South Korea, Said in Egypt, Djibouti port in Djibouti, Shimizu port, Shimotsu port, Kochi port in Japan, Miami, Long beach, Seattle in USA, Saint Petersburg Port in Russia, Barcelona in Spain. Thereinto, the cooperation with 12 ports happened after the year 2013.	Africa Around the world
Shenzhen Port	2007–2015	Signed sister port agreements with 18 ports around the world, such as Indonesian International Port Group, Rotterdam port, Hamburg port.	Around the world
Shanghai Port	1992–2015	Signed sister port agreements with 23 ports, such as the port of Marseille, Le Havre and Dunkirk in France.	Around the world
	2014	Signed MoU with Antwerp port in Belgium.	Europe
Guangzhou Port	2015	Signed MoU with Los Angeles port in USA and Auckland port in New Zealand.	North America, Oceania
	1982–2017	Signed sister port agreements with 40 ports around the world. Within three years since 2015, the number of ports in the friendship with the Guangzhou port was 20, equivalent to the total number of that more than 30 years before 2015.	Around the world
Guangxi Beibu Gulf Port	2013	Formed a cooperative network of China-ASEAN port cities with the total of 47 ports in ASEAN countries.	ASEAN
	2014	Signed sister port agreements with the port of Sihanouk in Cambodia and Kuantan in Malaysia during the 11th China-ASEAN Expo. The cooperation were in terms of navigation, port construction, port-vicinity industry, international trade, cultural tourism and friendship cities.	Southeast Asia

include, but not restricted to, the facilitation of importing, exporting and transshipment of goods, speeding-up the customs clearance, sharing the hinterland information and joint marketing actions, environmental and security issues and the personnel trainings (Fiedler & Flitsch, 2016).

The strategic alliance between ports is characterised by the independence of port administration and operation (Lam & Yap, 2011; Veenstra & Notteboom, 2011; Wang et al., 2015), such as the recent China-Malaysia Port Alliance (CMPA). The forms of strategic alliance can be informal networks, Memorandum of Understanding (MoU), sister port agreement or consortia. The most popular cooperative commitment between port authorities is to sign MoUs or sister port agreement during delegation visits of port representatives, as indicated and concluded in Table 6. For example, in November 2015, MOT of China and the MOT of Malaysia signed the Memorandum of Understanding between Malaysia Port Alliance and China Port Alliance for the Establishment of a Port Alliance (CMPA, 2015) between the two countries in Malaysia. Under the port alliance, ten Chinese port authorities of Dalian, Shanghai, Ningbo-Zhoushan, Beibuwan, Guangzhou, Fuzhou, Xiamen, Shenzhen, Haikou and Taicang, will collaborate initially with six Malaysian port authorities of Klang, Malacca, Penang, Johor, Kuantan and Bintulu. Later on, the CMPA extend the membership to other port authorities of both Malaysia and China, such as the Kemaman Port Authority, the Kuching Port Authority and the Sabah Ports Authority from the Malaysia side and the Tianjin Municipal Babour & Channel Bureau and Qingdao Port Group from the China side (CMPA, 2017). The CMPA aims to work together in many areas, such as the information exchange in terms of feasibility studies of port-related projects, the technological assistance, human capacity building, freight forwarding, container transfers, manpower training, port promotion campaigns (CMPA, 2015).

From all the collated cases in Table 6, the main enterprises applying this mode are the individual port groups. For example, the total number of ports in the friendship with the Guangzhou port has accumulated up to 20 since the year 2015. This number equals to the total number of ports in the friendship with the Guangzhou port in the past three

decades before 2015. In addition, 12 out of total 21 ports in the friendship with the Qingdao port have signed the sister port agreements since the year 2013. Furthermore, it can be found that the majority of sister ports of Chinese ports are in the regions along the Belt and Road, as indicated in Table 6.

5. Conclusions and implications

The Chinese ports have experienced a long-term high-volume growth since the 'Open Door Policy' initiated by Deng Xiaoping in 1978. The rapid port construction and expansion with the evolution of port governance in China resulted in the fierce competition and port overcapacity. After the financial and economic crisis in late 2008, the global and China's domestic economy has suffered the slowdown as well as economic structure has changed. The ports have been experiencing a new normal of the lower volume growth. The governments have worked out numbers of schemes at national or provincial levels to encourage the port cooperation. Hence, a wide range of port cooperation cases have been observed in China over the past decade. The Belt and Road Initiative as the new geo-economic policy brings new opportunities and challenges for port cooperation and development in China and the regions along the Belt and Road. By discussing the recent development of port cooperation cases in the provinces of China, the paper concludes the trend of China's domestic port cooperation is towards forming provincial port groups. The trend has accelerated in the last three years after the Belt and Road Initiative. This paper also elaborates two modes, namely the investment holding or acquisition and strategic alliance, of international port cooperation of Chinese ports and terminal operators. Based on the recent trend of China's domestic port cooperation and the internationalisation of ports and terminal operators analysed above, this paper draws some managerial implications in terms of the domestic and international cooperative strategies as discussed below.

5.1. Implication of forming the provincial port groups

With the merger between COSCO and China Shipping in 2016, the newly-formed national champion China COSCO Shipping is supported by the Chinese government to decrease the domestic competition and initiate the international expansion. Similarly, in the port industry, the Chinese government requires main ports within a province to be merged and restructured as a provincial port group. The potential synergies and advantages of such port cooperation are expected to increase the cargo throughput and strengthen the negotiation power with customers, investors and governments. In addition, the provincial port group has more capacity and capability for investing abroad.

This cooperative strategy has implications from the managerial perspective. Firstly, the managerial implication is about the competition. One of the objectives of implementing this cooperative strategy is to reduce the competition between ports within the same province. However, after the merger, competitions may be extended from inter-port to intra-port from the provincial port group perspective. Secondly, the cooperative strategy has been planned or implemented in the major coastal provinces and has brought changes in the managerial structures of the merged ports. However, it is not clear so far how the daily operations have been changed or whether this strategy brings the synergy. From the managerial perspective, port operations and management must change in order to achieve the objectives of the cooperative strategy, as mentioned in Section 3.4. It is necessary to monitor the outcomes of the merger. The basic evaluation benchmarks are the objectives to be achieved by the cooperation. For example, is there a better financial performance or higher utilisation of a port's facilities? In academic research, there is a scarcity of research focusing on evaluating a port cooperation performance. It provides a meaningful direction for future research.

5.2. Implication of internationalisation of ports and terminal operators

In recent years, more and more Chinese ports and terminal operators invest abroad to seek the international cooperation with foreign ports. There are significant differences with foreign countries and regions in terms of politics, economy, history and culture. These differences may result in risks associated with the international cooperation.

In the cooperation mode of investment holding or acquisition mentioned in Section 4.1, it is costly to invest and acquire another ports or terminals. Meanwhile, the internal rate of return on investment is also considerable for a long-time period. As such, it is necessary to analyse the potential risks and compare the cost and benefit of the investment activities. Furthermore, the expected synergy can be influenced by the languages barriers, cultural differences and the different managerial types and mindsets of the invested ports or terminals. The differences in culture, economy and politics can lead to the interference or collapse of the acquisition. Take the agreement between the Chinese investor - China Merchants Port and the Sri Lankan government for an example. The Chinese and Sri Lankan governments have already signed the framework agreement for the China Merchants Port to lease the Hambantota port. Sri Lanka government also planned to set up a new industrial zone in the area to attract Chinese companies in the hopes of generating more jobs. However, the cooperation on the port and the industrial park has encountered considerable resistances in Sri Lanka. Sri Lankans held a protest as they are afraid of losing lands and threatening their national security. As a result, the China Merchants Port has agreed to reduce its stake in the joint venture from the previously-agreed 85% to the minimum 65% within a decade (South China Moring Post, 2017). In the case of Piraeus Port in Greece, the Greek government ever called off the Piraeus Port acquisition program with COSCO in 2015. Though the above two projects succeeded in the share acquisition at the end (Table 5), the international path of port cooperation faces a huge challenge with high risks.

In the cooperation mode of strategic alliance, the forms and

activities of port cooperation are diverse. The forms of cooperation vary from informal to formal. The relationships between the alliance members can be loose or close. There are also bilateral or multilateral cooperation between two or more ports. The port companies are suggested to focus on the stability of strategic alliances and the operability of the cooperation activities to achieve the cooperation goals. It is also vital for Chinese ports to establish the port cooperation mechanism to guide and guarantee the successful implementation of cooperative activities.

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