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報　告

ベトナム発着海上コンテナ貨物輸送におけるトレンド分析および港湾管理への示唆

The Recent Trend of Viet Nam Based Maritime Container Shipping and Its Implications for Ports

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Abstract: This paper aims to reveal the container shipping trends of Viet Nam focusing vessel flows and official container services to Viet Nam ports since 1995. Our approach is practical in order to obtain useful information for port operators and policy makers which play an important role for evaluating the degree of integration of Viet Nam ports with container networks. Our main findings are 1) Container shipping services to Viet Nam market have increased in both quantities (with larger vessels) and qualities (more frequent and reliable services). 2) Cai Mep ports emerge as a local hub port for cargo from South Eastern Viet Nam bounding for Transpacific and Trans Eurasian. 3) The shares of Hong Kong and Singapore decline with increase of direct shipping from/to Cai Mep ports. From our findings, we finally address two policy implications for enhancing the efficiency in container transport from/to Southern of Viet Nam: 1) shifting vessel flows to Cai Mep ports is necessary, 2) improving connectivity between Cai Mep ports and its hinterland is demanded.

Key Words: **container shipping companies, current trends, hub and spoke**

1. Introduction

Containerization in the world started in the 50's of twentieth century, ever since then the world of shipping has undergone a lot of changes. However, Viet Nam ports had not appeared in the container networks until mid-90s[1)] when all the containers from/to Viet Nam were transshipped via the port of Singapore. The year 2015 is the significant turning point for ASEAN whose members of ten territories and 608 million people (2014) will be unified to become a single market with free movement of goods, services, investment and skilled labor. Therefore the unification will synchronize domestic and regional transport and improve their connectivity. In the last paper, Tran and Takebayashi[2)] concluded that container cargo in Viet Nam was highly concentrated to a few ports while other ports were in less utilized

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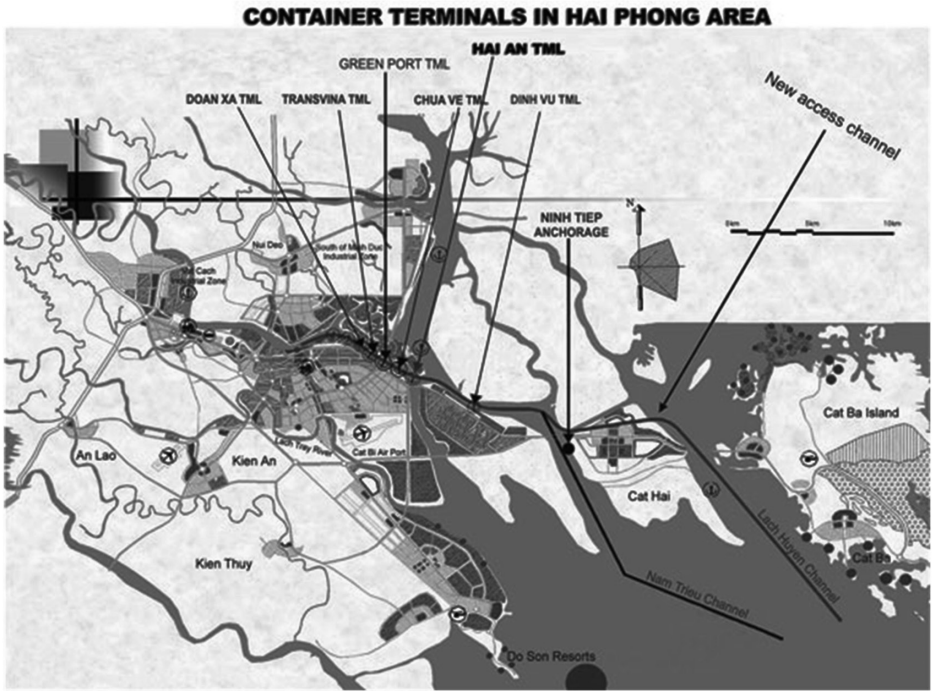
condition, and the reason was attributed to the wide gap in port development policies and the actual port performance in terms of planning, port structure of authority. Following that, we aim at studying the container carriers in Viet Nam, and the shippers' behavior for export cargo from Viet Nam. Understanding about current container shipping trends will help us to suggest strategies for container ports in Viet Nam to adapt to the new environment.

In this paper, we are going to verify major trends of Viet Nam based container shipping. Larger container ships have been continuously put into operation, economies of scale, resulting from the urge for lower unit cost and energy efficiency[3, 4, 5]. Along with the increase in size of vessel fleet, linership companies face the problems of higher ship purchase and maintenance cost, as well as keeping the service frequency level. Therefore this motivated companies to enter alliances, in order to utilize total slot capacities and to enter new markets[6]. Trying to confirm whether this trend appears in the Viet Nam based market is our first objective. Second, optimizing the network geometry for a service is regarded as an important factor for deciding the efficiency of container operations[6]. Currently there are several types of popular service namely hub-and-spoke, pendulum (Trans-Eurasian, and transpacific trades), end-to-end (for North-South connections, intra-regional services such as China-Korea-Japan-Taiwan and among South East Asian nations). The container traffic was highly concentrated in the port of Hong Kong and Singapore, because they are regarded as the first-order transshipment ports for containers from Asia to the United Stated, U.K, and European mainland continents destinations[1].

During the first period of containerization (1990s – 2000) in Viet Nam, Rimmer and Robinson classified Viet Nam ports as the lowest rung of the hierarchy relying mainly on feeder services[1,7]. However, Robinson predicted that after Laem Chabang, Port Kelang, Yantian, Tanjung Priok, etc. Viet Nam ports will be integrated into direct call in due course[1]. When the United Stated normalized the diplomatic and trading relationships with Viet Nam in 1995, and Viet Nam became ASEAN member in the same year. As a result of international trade activities' increase, container port throughput growth rate has been increased at a rate of 17%/year[2]. As time went by, Viet Nam has become a more attractive hinterland market with container carriers, confirming the level of services and the integration of Viet Nam ports to direct call is our second objective.

The results of research paper will be meaningful for port operators and policy makers in Viet Nam to evaluate the basic criteria that carriers base on for their port choices, and to compare with other ports. Constructing a new terminal infrastructure requires a certain period of time, let's say five year length, and huge capital investment, consequently, choosing on the right type and scale of port for each area requires port policy makers to consider shipping market trend ,as well as strategies of international carriers to different ports in Viet Nam.

This paper has three parts. In section 1, we highlighted some trends in container shipping. In section 2, through empirical researches we observe the container shipping trend in Viet Nam and comment on the differences. In the last section, we discuss the possible port reactions to the changing environment of container shipping, in particular the case of newly developed ports of Viet Nam.



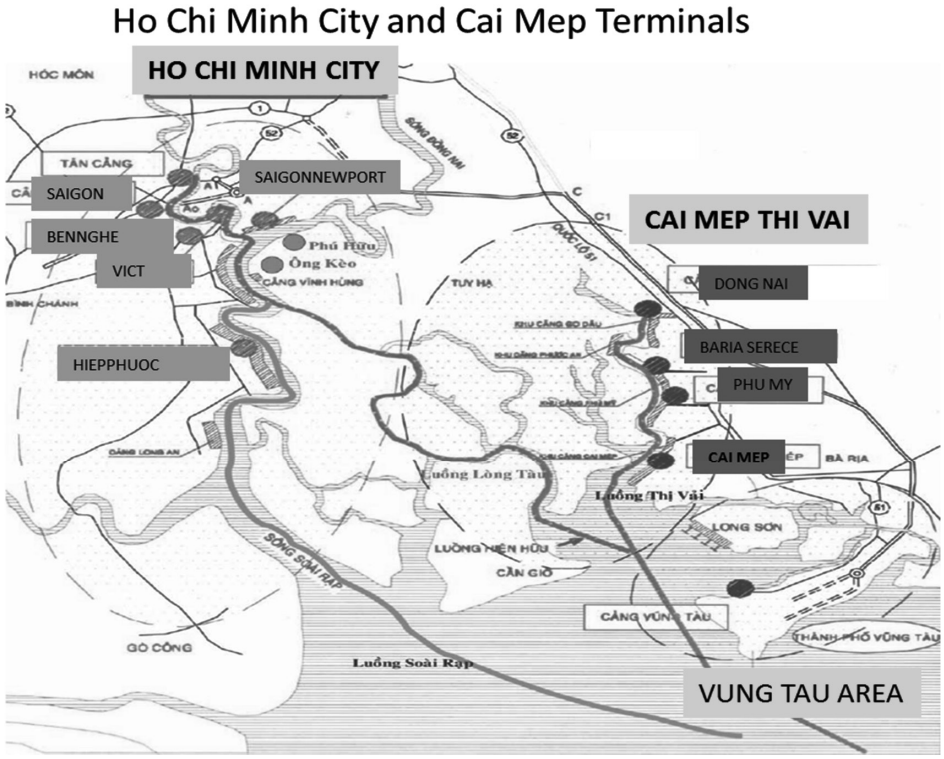


Figure 1 Maps of some container terminals in Viet Nam
Source: www.camnanghaiphong.vn; www.portcoast.com.vn

Table 1 Summary on total berth length (meters), draft (meters) of major container ports in Viet Nam

Area	Port	Berth	Avg draft	Vessel capacity (TEU)	Operation since	Throughput share 2014
Ho Chi Minh City (HCMC)	Sai Gon New Port (SGNP)	1500	12	~3500	1992	43%
	Sai Gon	2523	8-10	~800	1860	4%
	Ben Nghe	816	7.5-13	~1000	1988	2%
	Vietnam International Container Terminals (VICT)	678	11	~1000	1998	7%
	Sai Gon Premier Container Terminal (SPCT)	500	11	~2500	2008	4%
Ba Ria Vung Tau (Cai Mep)	Sai Gon Port- PSA International Port (SP-PSA)	740	14	~7000	2009	0.05%
	Tan Cang –Cai Mep International Terminal (TCIT)	1200	15.8	~12500	2011	11%
	Cai Mep International Terminal (CMIT)	600	14.5	~8000	2011	2%
Hai Phong	Chua Ve	764	8	~800	1874	12%
	Dinh Vu	425	10.2	~2500	2007	3%
	Doan Xa	220	8.4	~800	2003	6%
	Transvina	169	7.8	~500	2005	1%

Source: authors composed from Viet Nam Port Association website
Vessel capacity: authors estimated from provided technical information, in particular, HCMC area, except for SGNP, SPCT, other ports are limited to accommodate vessels larger than 1000 TEU due to the height limit of Phu My Bridge.
Total container throughput in 2014 is 8,485,533 TEU (from Viet Nam Port Association).

2. Shipping trends and container services for Viet Nam based cargoes

2.1 Overview

Viet Nam ports are separated into six groups from North to South geographically from 2009. But container cargoes had mainly been handled at Ho Chi Minh City (HCMC)- Ba Ria Vung Tau (Cai Mep) (68%) and Hai Phong-Quang Ninh (18%) for 1995-2014[2)]. Above- mentioned port facilities' information is summarized in Table 1.

In this paper we focus on analyzing container vessels movements from ports in the South of Viet Nam, HCMC and Cai Mep. Port of Hai Phong is the Northern Viet Nam port cluster, mainly used to compare with the scale of development with Southern ports. We use major indicators to describe the trend: the number of calls, dead weight tonnage (DWT), and length overall (LOA). The period of time series data lasts from 1995 to 2014, however, further analysis will be provided for the most recent years. As we believe that the new findings will be more critical for port operators and policy makers in management and decision making.

Table 2 summarized all container vessel sizes calling three most dynamic port clusters in Hai Phong, HCMC, and Cai Mep in December 2014. We find that the current trend of ship's specifications and quantities vary by regions clearly. Hai Phong ports received most of ship calls (444 calls per month), but the average ship size (Mean) is smaller than other two port clusters; the half of number of vessels DWT are less than 10,000 DWT (715 TEU) due to draft restriction (7-8 meters) which prevents Hai Phong ports from accommodating bigger ships. Half of vessels calling HCMC ports, Cai Mep ports are smaller 20,116 DWT (1,500 TEU), and 90,647 DWT (6,500 TEU), respectively. But Cai Mep ports receive only 31 vessel calls per month, equivalent to one ship per day, while HCMC ports are much more congested with 439 calls per month, equivalent to 15 ships per day.

Table 2 Container vessel calls to Hai Phong, HCMC, and Cai Mep in terms of LOA (meters) - December 2014

	LOA			DWT		
	Hai Phong	**HCMC**	**Cai Mep**	**Hai Phong**	**HCMC**	**Cai Mep**
Calls	444	439	31			
Mean	129	153	318	11308	17890	90826
Max	205	222	366	38123	39598	118835
Min	51	60	260	864	1416	50188
Std.dev	32	43	32	6928	10471	22107
50%	132	168	320	10000	20116	90647

Source: authors composed from ship schedules of Hai Phong, Ho Chi Minh City Port Authority websites

2.2 Increase in vessel size trend in Ho Chi Minh City container ports

Ho Chi Minh city acts as the important economic center of Viet Nam, where there are many Special Export Processing Zones located which serve as major plants for manufacturing products for export activities, such as, textile garment, footwear, and furniture manufacturing, and food processing. In 2014, total import-export value of Ho Chi Minh City reached up to 62 million USD, accounting for the half of total country import-export value[8]. This development opens up a lot of business chances for container shipping industry and may affect the container vessels call at HCMC.

Table 3 lists the container vessels calling at HCMC ports on December in 1998, 2002, 2006, 2011 and 2014. Over the period of seventeen years, HCMC ports have experienced 4.5 times of increase in number of vessel calls per month: 96 ships in December 1998 and 439 ships in December 2014. Vessels recorded in this area have been getting bigger and longer in terms of DWT and LOA, from 127 meters LOA and 9,696 DWT in 1998 to 153 meters LOA and 17,812 DWT in 2014. When converting container ship size from DWT to TEU, the average size (Mean) of vessels calling HCMC ports range from 808 TEU (1998) to 1,484 TEU (2014). If we compare that size with container vessel class classification[9], we find that vessel calling HCMC ports have changed from Early Containerships Class to Fully Cellular Class, also called Class A. Despite the fact that larger vessels have been put into operation over time, and some terminal, e.g. Sai Gon New Port, can receive up to 3,500 TEU vessel (also called Panamax Class), 50% of vessels recorded in HCMC ports are smaller than 23,690 DWT (equivalent to 1,974 TEU). These Class A containerships are mainly used for Intra-Asia port scale, or for serving the connection among hub-and spokes.

Table 3 Statistics of vessels calling HCMC Ports in LOA and DWT

	LOA					DWT				
	1998	2002	2006	2011	2014	1998	2002	2006	2011	2014
Calls	96	181	284	340	439					
Mean	127	137	140	147	153	9696	12131	13402	15690	17812
Max	164	205	209	207	222	17821	32380	28152	34133	39598
Min	84	49	40	49	60	1181	995	650	995	1416
50%	130	140	147	161	168	12552	15315	18061	21644	23690

Source authors composed from ship schedules of Ho Chi Minh City Port Authority website

2.3 Container service network from Viet Nam

Change in vessel size is supposed to act on the route structure such as frequency and number of services. Then, we also study on available container services which were published publicly on International Transportation Handbook from 1995 to 2014. There are two service areas, i.e. Intra-Asia and Transpacific.

2.3.1 Intra-Asia service network

Table 4 shows the overview of the development in the last twenty years for shipping lines calling Viet Nam (HCMC, Cai Mep and Hai Phong ports) for Intra-Asia services. From empirical results about vessel movements in Table 2 of Section 2.1, we assume that that sailing areas of vessels from HCMC, and Hai Phong are intra-Asia ports, with vessels size about 715 -2000 TEU, which is the fully cellular container vessel. Then, we investigate available container services in Viet Nam from 1995 to 2014, in order to understand how shipping services have evolved in this region.

Carriers listed in Table 4 can be separated into three main sets. First, Viet Nam carriers (namely Kien Hung, Bien Dong, Germartrans), second, mega carriers from European (Maersk, and Hapag), and the rest are carriers from Asian countries such as China, Korea, Japan and Taiwan. From 1995 to 2000, most of carriers controlled their services individually. Until 2006 a lot of changes have taken place for HCMC route services, for example, ten out of twenty five services are joint services, more frequent services (25-33 services 2012-2014) by larger ships -which can carry 1,000 TEU in average. By 2012, major carriers, e.g. Cosco, Hapag, and Maersk withdrew from this market, while some carriers increased the number of services to Viet Nam, such as Chieng Lie and SITC.

Comparing with HCMC, container ports in Hai Phong during 1995-2006 was not as busy (4-6 services/week). Noticeably, Hai Phong ports in recent five years had gained more linkages with intra-Asia nations quickly from 4 services (1995-2006) to 21-23 services (2012-2014).

As for Cai Mep ports, they are most recent container ports operators, and two intra-Asia container services are provided. MOL stopped its vessel calling HCMC port, and uses the dedicated terminal (TCIT) in Cai Mep in 2014. From the actual events in recent years we suppose that carriers want to use Cai Mep ports for Transpacific and Trans Eurasian container services.

Table 4 Asia container services via HCMC, Hai Phong, and Cai Mep 1995-2014

	1995				2000				2006				2012				2014			
	Services		Freq[b]	Size[c]	Services		Freq	Size	Services		Freq	Size	Services		Freq	Size	Services		Freq	Size
	Joint	Ind.[a]			Joint	Ind.			Joint	Ind.			Joint	Ind.			Joint	Ind.		
HO CHI MINH CITY																				
ACL		1	1/7	476						1	1/7	624		1	1/7	1065		1	1/7	2478
APL		1	1/7			1	1/7	920		1	1/7			1	1/7	1651				
CK LINE																	2		1/7	1827
COSCO		1	1/7	725						1	1/7	725								
CSCL																	1		1/7	1479
CHIENG LIE						1	1/7	700					3		1/7	1602	5		1/7	2561
DONGNAMA	1		1/14	1129	1		1/7	746	2		1/7	1156								
ECL		1	1/7			1	1/30			1	1/14									
EVERGREEN									1		1/7	1184	2		1/7	1635	2		1/7	1621
GCS													1		1/7	1114				
GOLDSTAR		1	1/7	1585					1	1	1/7	1307	1	1	1/7	1445	2	1	1/7	1431
HANJIN	1		1/7	1032					1		1/7	1032	2		1/7	1580	1	1	1/7	1989
HAPAG	1		1/7	1208					1		1/7	1208								
HEUNG-A	1		1/7	834		2	1/7	595	1		1/7	834		1	1/7	1385		1	1/7	1032
HUB LINE														1	1/7	714				
HYUNDAI	1		1/7	1032					1		1/7	1032	2		1/7	1203		1	1/7	1960
INTERASIA																	1		1/7	1713
JUTHA						1	1/10	302												
KIEN HUNG						1	1/7	532												
KL		2	1/7	1064						2	1/7	825	1		1/7	1681	1	1	1/7	1385
KMTC																		2	1/7	1311
MAERSK		1	1/7	698		1	1/7	607	1		1/7	757								
MISC						1	1/7	736												
MOL	1		1/7	1199					1		1/7	1199								
NYK						1	1/7	1181						1	1/7	1189		1	1/7	1613
OOCL													1		1/7	1386	1		1/7	1143
RCL						1	1/2	824						1	1/7	1248		1	1/7	1018
SITC														2	1/7	1132		3	1/7	1207
SYMS		2	1/7	815						2	1/7	816								
TS LINES		1	1/7	1076						1	1/7	1076		1	1/7	1574		1	1/7	1572
TOKO		1	1/14			1	1/14			1	1/14									
TSK		2	1/7	1160						2	1/7	1160								
UNITHAI						1	1/14	191												
WAN HAI		2	1/7	1100		1	1/7	1062		2	1/7	1100		2	1/7	1057	1	2	1/7	1439
No. vessels	69				71				70				78				107			
No. services	22				15				25				25				33			
HAI PHONG																				
BIEN DONG														2	1/7	691		2	1/7	772
CK LINE																		1	1/7	985
DONGNAMA						1	1/7	200												
EVERGREEN														1	1/5	1038		1	1/5	1038
GERMARTRANS		3	1/7	235	1		1/7	402												
GOLDSTAR														1	1/7	650		1	1/7	1253
HANJIN													1		1/7	981				
HEUNG-A		1	1/7	252										2	1/7	884		2	1/7	800
HUB LINE														1	1/7	714				
KL										2	1/7	533		1	1/7	588		1	1/7	836
KMTC													2		1/7	1067	1	1	1/7	958
MAERSK		1	1/7	325		1	1/7	278												
MOL																		1	1/7	1016
NAM SUNG														1	1/7	706		1	1/7	706
NYK																	1	1	1/7	1120
RCL														2	1/7	778		1	1/7	927
SITC														5	1/7	992		6	1/7	1143
TOKO						1	1/10	191		1	1/10									
WAN HAI						2	1/7	566		1	1/7	602		1	1/7	642		1	1/7	1008
YANG MING														1	1/7	1012		1	1/7	1060
No. vessels	8				13				4				43				53			
No. services	5				6				4				21				23			
CAI MEP																				
MOL																		2	1/7	3656
NYK													1		1/7	6564				
No. vessels	0				0				0				8				7			
No. services	0				0				0				1				2			

[a] Individual service; [b] service frequency (ship calling/days); [c] average ship size (TEU). Source Authors composed data from International Transportation Handbook

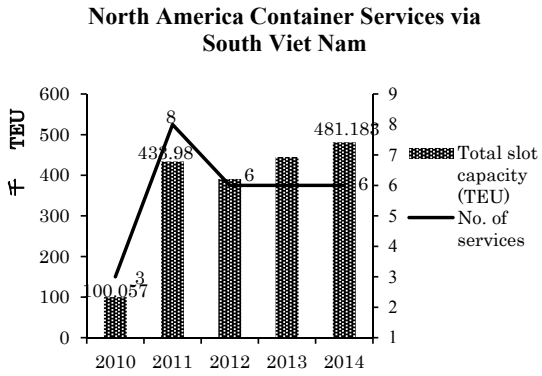


Figure 2 North America Container Services calling South Viet Nam 2010 -2014
Source: authors composed from International Transportation Handbook

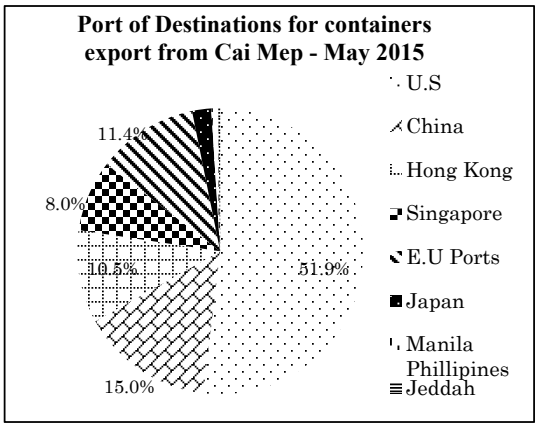


Figure 3 Percentage of containers export from Cai Mep to port of destinations, May 2015
Source: Authors composed from data statistics of Tan Cang Cai Mep International Terminal and Cai Mep International Terminal

2.3.2. North America container services from Cai Mep

Cai Mep ports since 2005 have been planned and invested in to be the international gateway and deep sea ports for vessels calling to South Eastern Viet Nam. They have big advantage deep draft (14-15 meters) and new land for expansion. From the analysis, we find that the average DWT of current vessels calling to Cai Mep is 90,826 tons and its LOA is 319 meters, which is equivalent to 8,000-10,000 TEU. From Cai Mep ports, six services to North America are operated, one-two sailing(s) per week for container services to European and Mediterranean ports. Viet Nam Custom Bureau (2014) reported that the United States is the second largest international trade partner of Viet Nam, and U.S market accounts for 19% for total exports of Viet Nam. With the increasing demand for shipping cargoes to US market, in 2011 deep-draft ports in Cai Mep Thi Vai river of Baria Vung Tau province started operations which attract Super-Post panamax container ships bound for West Coast and East Coast in US. Fig. 2 illustrates total slot capacities in TEU and the number of weekly container services from/to Viet Nam 2010 -2014. The number of slot capacity quadrupled over two years, from 100,057 TEU in 2010 to 433,980 TEU in 2011. In 2010, only three available services (Pacific South 1, Pacific South Express and SJX), the next year other five services were added, namely AWE4, ASIAM, South China Sea Express, Asia East Coast Express, and TP-6. Before 2011, all direct containers bound for North America had departed from HCMC ports with draft restrictions of 10-12 meters (see Table 1); this restriction prevented larger and more vessels from calling, e.g. only three sailings per week. Therefore, most of the containers cargoes were transshipped via Singapore or Hong Kong port. However, when Cai Mep ports started their operation, the draft restrictions disappeared and more direct container services to North America became available. Statistics information in Fig. 3 shows, on average Cai Mep ports export about 25,000 containers a month, in which 51.9% of containers from Cai Mep ports are bound for

US ports, particularly Long Beach and Los Angeles (14,535 containers/month). Other common ports of destination are China (Yantian, Shekou, Shanghai, Nansha, and Ningbo) Singapore Hong Kong, European ports (Hamburg, Rotterdam, Southampton, and Le Harve), and Japanese ports (Osaka, Yokkaichi, Yokohama, and Tokyo).

2.4 Structural changes in transshipment market for container exports from South Viet Nam

The development of container shipping from Viet Nam for both regional intra-Asia, and long-haul route such as North America acted as a trigger to make us believe that container shipping companies have changed their business strategies for Viet Nam market, especially the South Viet Nam. The ports in here have transformed themselves from satellite ports, which had fed cargoes for traditional hub ports to the local hub port, a new destination for latest container vessels.

Table 5 lists the share of containers lifted-off at oversea ports from Cat Lai terminal- the largest terminal of SGNP in HCMC (including transshipment and direct ports) in December 2012, 2013, and 2014. Top 10 ports of loading are, Singapore, Tanjung Pelapas, Hong Kong, Kaohsiung, Shanghai, Laem Changbang, Kelang, Busan, Shekou, and Incheon. Combining Table 5 with Fig 4 panel (a), most ports in Table 5 are transshipment ports except Laem Chabang, Busan, Shekou, and Incheon. For these three years, market share of big transshipment ports such as Singapore, Hong Kong has continuously declined. Kaohsiung has dropped its rank from 4th (2012, 2013) to 7th (2014). These ports have been working as transshipment ports for container from/to HCMC since 1990s, but the fact suggests that this long time relation is going to change.

Table 5 Share of ports of loading for container exports from Cat Lai terminal (SGNP), HCMC

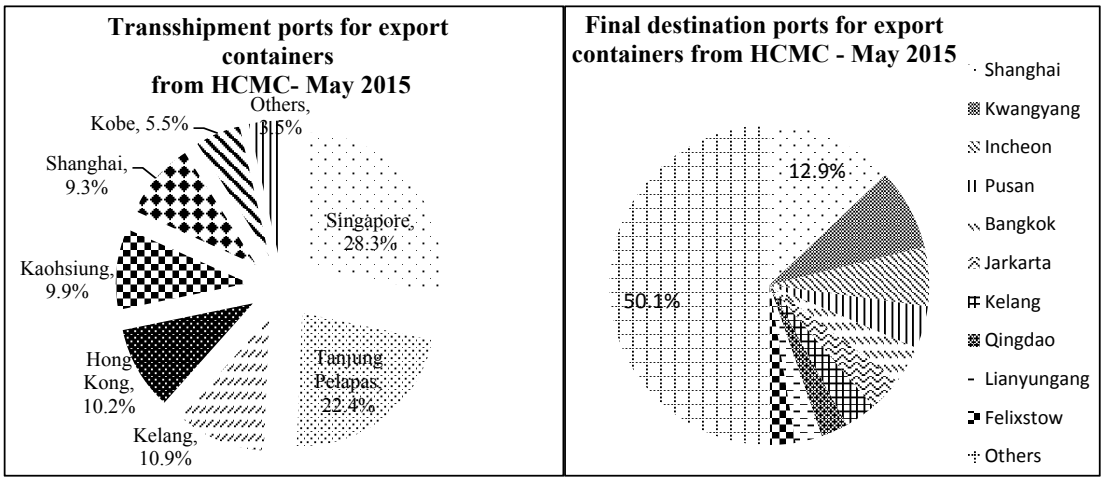
	2012	2013	2014
Singapore	*19.6%*	*16.7%*	*15.4%*
Tanjung Pelapas	12.8%	11.5%	12.2%
Hong Kong	*12.1%*	*11.4%*	*7.7%*
Kaohsiung	7.0%	7.5%	5.5%
Shanghai	*4.5%*	*4.3%*	*7.0%*
Laem Chabang	4.8%	4.5%	5.6%
Port Klang	*4.3%*	*4.6%*	*6.1%*
Busan	4.4%	3.7%	3.6%
Shekou	3.4%	3.2%	4.3%
Incheon	*2.9%*	*3.3%*	*3.7%*
Others	*24.3%*	*29.3%*	*29.0%*

Source authors composed from statistics data of Sai Gon New Port

The possible reasons are as follows:

① The emergence of new transshipment ports from Malaysia since 2000s: Tanjung Pelapas might be called the youngest entrant, since year 2000, in this Top-10 list, but it has held second largest market share over three years. And, Kelang port share gained new share each year, 0.3% (2013) and 1.5% (2014). Both two ports are widely known to be home-base ports for mega container carriers in the world: Maersk, MSC, Evergreen (Tanjung Pelapas), CMA-CGM, CSCL, OOCL (Port Klang). When these carriers restructure their service networks, transshipment cargo share from Viet Nam and other countries with no direct call will be shifted to utilize their home-base.

② The direct connections from HCMC to final ports of destination have grown up over time, e.g. Shanghai port (largest importer see Fig. 4 panel (b)) has expanded their cargo share from 4.5% per month (2012) to 7% per month (2014).



(a) (b)

Figure 4 O-D data statistics from Cat Lai terminal (SGNP) in HCMC in May 2015.
Source: authors composed from statistics data of Sai Gon New Port

The number of containers from HCMC to "others" ports have increased by 5% since 2012, the same movements can be seen for port of Laem Chabang, and Incheon. Instead of using transshipment ports, carriers have introduced more direct services from HCMC to other ports in Asia region; this trend could be noticed in Table 4, with more than official thirty sailings per week, not to mention unpublished services.

③ Starting operation of direct container services from Cai Mep ports to US ports and EU ports in 2011 contributed to moving cargo share of South Viet Nam from transshipment to direct service. Comparing two pie charts Fig 2 and Fig.3 (panel b), Cai Mep ports are mainly used to serve containers to U.S ports (51.9%), while 78.2% cargoes from SPNP terminal in HCMC are delivered to intra-Asia ports (statistics of SGNP in May 2015).

Considering why this declining trend occurs is meaningful for improving the port management in Viet Nam. HCMC, Hai Phong, and Cai Mep ports are relatively newly developed in the container stevedoring industry. Therefore, understanding about carriers' business strategies and updating the regional container stevedoring market information will improve the efficiency in port planning and management. Particularly, Viet Nam market have high growth rate of container cargo, and the main ports are regarded as the eastern gateways in South East Asia mainland. When the ASEAN Economic Community is realized by the end of 2015, the border transit rules for cargoes for ASEAN will be relaxed. At that time, neighboring countries, such as Laos and Cambodia are more likely to choose Viet Nam as their gateway port and a higher growth rate of transshipment cargo through Viet Nam ports can be projected. Deep-draft Cai Mep ports will have chance to strive for becoming a local hub port of South East Asia

3. Discussions of implications for port management

Looking back to container ports in Viet Nam, they are forecasted to have on-going high growth rate of traffic. In particular, the South container port traffic are predicted to be 6-7.8 million TEUs/year in the next five years[11]. SGNP, the leading container port with largest market share, has evolved themselves to achieve higher efficiency through learning the port development experiences of developed economies. However, SGNP is the only terminal operator that outperforms other port partners in the area. For the long time-established ports locating in the inner city along Sai Gon River, namely, Sai Gon, Ben Nghe, VICT, are found to be struggling with the shrunk market share [11].

By 2020, when the ASEAN Economic Community (AEC) will be realized, port operators in Viet Nam will have the opportunity to accommodate a larger volume of cargo flows. At the same time, they might also face competitive situation against new foreign-owned terminal operators as well. Under these situations, the ports located in Southern of Viet Nam should be refined in some points.

From our analysis, the following policy implications for port management can be derived:

① Shifting vessel flows to Cai Mep ports

The empirical results from section 2.2 and 2.3 show that over twenty year period container vessel calling Ho Chi Minh City has consecutively grown up in size and service level. In 2014, HCMC ports receive on average 15 container vessels Fully Cellular Class, i.e. 2,000 TEU per day. Combining with theory about cascade effect produced by the growth in size of ships[12], in all likelihood the next container generation calling HCMC ports for Intra-Asia service might be Panamax Class. Nevertheless, due to restriction of draft for inner city ports in Table 1, until now only Sai Gon New Port can accommodate this type of vessel.

The Port Master Plan in 2005 mentions that the south ports of Viet Nam adopt the urban planning model for sea port planning, for example, relocating them (e.g. Sai Gon port) far away from the inner city. As of now, SGNP is the main gateway for containers to/from Ho Chi Minh City, with shortage of land for expansion, SGNP will be more likely to be congested with the increase in size and number of vessels in short time.

JICA estimates the port capacity of Cai Mep is 6,400,000 TEUs[13], comparing with their total throughput (2014) 1.1 million TEUs. After four years in operation, Cai Mep ports only achieve 17% of their capacity. Consequently, to solve the potential congestion in SGNP and the low utilization of Cai Mep ports, instead of expanding new container terminals for HCMC, we suggest shifting the on-going vessel flows from established port in HCMC to Cai Mep terminals.

② Improving connectivity between Cai Mep ports and its hinterland

The recent reduction in transshipment container share from HCMC via port of Hong Kong, Kaohsiung (see Table 5), which have been turntables for hub-and-spokes network of Transpacific network since 1990s, and the increase in total slot capacity of services from Cai Mep (see Fig. 2) might be a good sign for Cai Mep ports. With this current growth rate of cargo, carriers might introduce more direct services from Cai Mep to provide Vietnamese shippers service with shorter transit time.

Still, from port authority's perspective, how to attract more vessel calls into Cai Mep the biggest issue, because currently, the port cluster only receives one vessel per day. It is necessary to notify that lack of

seamless interconnection among surface transport with ports is the long-time-ago but biggest weakness for Cai Mep ports. Our O-D data also reveals that more than 90% of cargo is carried to Cai Mep from HCMC by barges. Container trucks are still sharing the same road with passenger, and this situation causes high congestion along with high monetary cost. Reducing the connecting time from Cai Mep Vung Tau to hinterland should be achieved by constructing interconnection expressways between Cai Mep ports and Inland Container Depots, Industrial Zones in South Viet Nam.

4. Concluding remarks and future researches

In this paper, we summarize recent four years container trends through researching ports in Viet Nam, especially HCMC and Cai Mep in the South Viet Nam. Our main findings are as follows:

① The major class of container vessels through HCMC ports is the Fully Cellular containership, and larger and longer vessels have been put into operation. Vessels from HCMC mainly serve cargoes in intra-Asia area, and they still use Singapore as the main port for transshipment. But the shares of Singapore and Hong Kong are decreasing, which have been playing as the transshipment ports for SGNP.

② Deep-draft Cai Mep ports act for attracting the Super-Post Panamax Plus containerships calling for transpacific and trans-Eurasian service. In the future, when port connectivity is improved, thereby the number of direct container services might increase, and then we might see a more obvious change in the structural change in transshipment market.

③ We suggest policy implications for ports: first, shifting the vessel flows from established ports in HCMC to Cai Mep ports. Second, constructing interconnection expressways between Cai Mep ports and the hinterland

Container shipping in Viet Nam, as we can see, follows common trend of the world, at the same time it has its own characteristics. Viet Nam is developing its economy, which will experience a lot of changes in the future. Container ports in Viet Nam should keep updating to the latest development trend of container shipping, and be more responsive to these changes.

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ベトナム発着海上コンテナ貨物輸送におけるトレンド分析および港湾管理への示唆

Thi Anh Tam TRAN・竹林幹雄

本稿ではベトナム発着海上コンテナ貨物輸送市場の傾向を 1995 年以降のデータを用いて分析を行った．特に本稿では輸送ルート構成に着目して分析を行った．その結果，近年ではホーチミン発着のフィーダーサービス船が大型化する一方，本船が寄港するカイメップ港ではカンボジア発着を含む南ベトナムのローカルハブとしての機能が強化されていること，さらには香港，およびシンガポールのシェアがカイメップからの直行サービスの増加に従い減少傾向にあることがわかった． 最後に政策への示唆として効率的な輸送実現のためにはカイメップへの機能移転が必須であり，またカイメップと後背地との接続性の強化が望まれることを示した．

キーワード：コンテナ輸送会社，トレンド，ハブアンドスポーク