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What solutions should be applied to improve the efficiency in the management for port system in Ho Chi Minh City?

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Ho Chi Minh City is the centre and focal point for developing the largest logistics service in the country. As one of the two economic leaders with the most active export-import and domestic consumption in the country, Ho Chi Minh City Logistics market is an attractive "piece of cake" for investors. Currently, the establishment of industrial parks next to seaports is becoming an inevitable trend. Not only serving the socio-economic development of the region and locality, but also one of the factors serving very well for port logistics and logistics services. These are two factors that support each other and create strengths for regions and localities that have strengths in seaports. In Vietnam, the trend of industrial parks associated with seaports has been increasingly flourishing and promoting efficiency. This article shows the real situation of the port system, infrastructure, and facilities of logics in Ho Chi Minh City. Besides the strengths and opportunities of the city's port system, the weaknesses and difficulties of the non-logical transport systems are also clarified. It is found that major constraints, strength, weakness, opportunities and risk have significant effects on seaport management. Several synchronous solutions are also proposed to improve the capacity and competitiveness of the seaport system and the logistics industry of Ho Chi Minh City.

Key words: *port development, restructuring, orientation, port economy, port system.*

Introduction

Vietnam is a country with a vast sea area, a long coastline and a maritime index of 0.01 (100 km^2 of land on average has 1 km of coastline), 6 times higher than the rest of the world (Passport, 2018). Along the coast, there are many awkward and deep bays, close to big urban centers, sea and island tourism centers, and goods production areas that need to import and export (Thai, 2007). Also, nearly 3,000 coastal islands are forming an island system "covering" most coastal and coastal areas of Vietnam to varying degrees. The international traffic route that cuts through the South China Sea is considered the second busiest trading road in the world (Roszko, 2015). Therefore, building and developing a seaport system is vital to sea transport and is an essential infrastructure that determines the development and growth of the marine economy in the coming time. So far, our country has about 90 large and small seaports and nearly 100 coastal and island locations that can build ports, including international transhipment ports. The logistics industry is currently very deeply involved in all aspects of life as well as all activities of the economy. As it plays a significant role in customers satisfaction (Hameed, Nadeem, Azeem, Aljumah, & Adeyemi, 2018; Nadeem, Alvi, & Iqbal, 2018). In terms of scale, according to the World Bank (WB) assessment, in 2017, Vietnam's logistics costs are equivalent to 20% of GDP (about 40 billion USD). Thus, it can be said that logistics plays a huge role and should be focused on to match the scale of the industry as well as reducing logistics costs and improving competitiveness in general (Kontgis et al., 2014).

Being the leading economic center, TP. HCM City has the largest market in the country in terms of import-export as well as domestic consumption. Currently, the city has 11 container ports and directly exports and imports bulk cargo with a total area of over 310ha and over 7,000m of piers (Smajgl et al., 2015). Container volume through the port system in the HCMC area in 2017 is about 6.5 million TEU (1 TEU is equivalent to 1 container of 20 feet), accounting for over 60% of the whole country (Thanh Tu & Nitivattananon, 2011). Thus, it can be said that Ho Chi Minh City is the center and the focal point for the development of logistics services with the most significance and most potential in the country. For years, logistics enterprises in the city have paid attention to investing in infrastructures such as seaports, warehouses, and logistics centers (X. P. Nguyen, 2019). Container port systems in Ho Chi Minh City are shown in Fig. 1.

Fig. 1. Container port system in Ho Chi Minh city

According to the plan of the city, in Ho Chi Minh City, Hiep Phuoc General Deep-water Port is located in Hiep Phuoc Industrial Park, along the right bank of Soai Rap River, about 16km from Tan Thuan Export Processing Zone (or Saigon Port) and about 20km from the East Coast (Sasa & Incecik, 2012). From the Hiep Phuoc area to the East Sea, the Soai Rap river basin is over 1,000m wide, straight and stable. Even on the river bed, it is possible to organize the loading and unloading of cargo through barges, and from there to transport goods throughout the Mekong Delta basin (Vietnam) (Q. T. Nguyen, 2016). Currently, goods through ports in the city area, Ho Chi Minh City mainly focuses on three major ports, namely the Saigon Port, Tan Cang, and Ben Nghe Port, with production accounting for nearly 90% of the total volume of goods through the region. The volume of goods (dry) in 2000 reached about 18.9 million tons (Lin & Tseng, 2007). According to the plan, the cargo throughput of these ports will reach 20-22 million tons/year when reaching the maximum capacity. The above figure is challenging to obtain, not because there is no source but due to the limitation of receiving goods because all of the three major ports are in the inner city (on the Saigon River) and because of the overload of vehicles on the route to and from the port. The inland

waterway transport network in the south and the Mekong Delta (Mekong Delta) has more than 100 routes, with a total length of nearly 3,200 km, which is inter-provincial and international (Smajgl et al., 2015). Of these, six routes originate from the border toward the South China Sea, allowing ships from 500 to 5,000 tons to operate smoothly; also two horizontal lines connecting Ho Chi Minh City to the provinces are capable of accommodating 300-ton vessels. Specifically, the Saigon - Kien Luong route (via Thap 10 Canal No. 2, more than 227 km long), the Saigon - Kien Luong route (via Lap Vo canal, nearly 313 km long) and the Saigon - Ca Mau route (via the canal) Xa No, more than 386 km long). Many routes and river ports have direct access to the road system, connecting directly to important seaports, making the exchange points between the modes of transport very convenient. In Ho Chi Minh City, the inland waterway transportation network is predicted to thrive; the total length is capable of transporting goods nearly 1,000 km (van Leeuwen, Dan, & Dieperink, 2016).

From this advantage, Ho Chi Minh City international seaport has become a general national port, a regional focal point, including major ports, such as a port on the Saigon River and Cat Lai port on the river. Dong Nai, the port area on Nha Be River and Hiep Phuoc port area on Soai Rap River. Currently, Ho Chi Minh City has 40 cargo ports under operation with a length of more than 17,000m (Phuong, 2018a). The city also has three river ports, cargo ports, including Phu Dinh port (district 8), with a capacity of two million tons/year, capable of receiving ships of 1,700 tons; Long Binh port (district 9), with a capacity of 1.7 million tons/year, receiving ships of 5,000 tons. According to the City's Department of Transport (MOT), the total output of goods through seaports in the year 2016 reached nearly 100 million tons (up 7% compared to 2015) and goods through ports and wharves are more than 25 million tons (up 8% compared to 2015) (Phuong, 2018b).

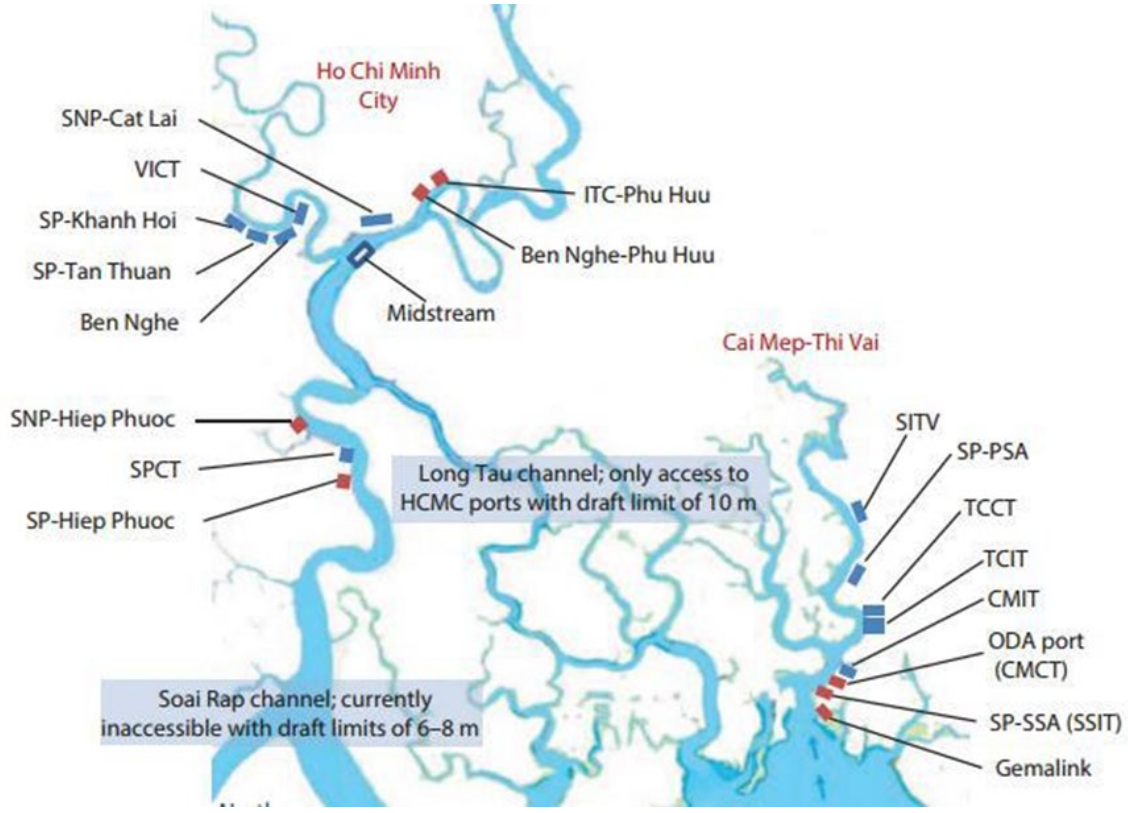
In this paper, I am using the several methods which are collection, selections, analyzing, and classifying to synthesize information, documents, and related research. In order to update the realities, receive the contribution comments for the article and gather experts' opinions (reality survey), the method of collaboration, with related authorities (Ho Chi Minh port authority) and maritime enterprises in the city, is applied. This paper uses a SWOT analysis method to analyze and review the status of management of the seaport system in Ho Chi Minh City. Some suitable solutions are proposed in the article to improve the efficiency of managing the seaport system in Ho Chi Minh City.

Major Constraints in Investment, Managing and Exploiting Ho Chi Minh City Seaport System

Ports and terminals infrastructure

In Ho Chi Minh City - Cai Mep area, there are 13 container ports in operation, 3 new ports are about to be added, and 1 port has started construction. Most of the ports in Cai Mep have an average length of only 300 meters, while the ideal length must be 350-400 meters. For seaports with 2 ports, the total length of berths must be 700-800 meters instead of the current 600 meters. The problem is that when two vessels of 350 meters in length arrive at the same port, one ship will have to anchor and wait outside the port even though the other ports are empty. Existing ports have also not been connected by continuous jetties or direct connections, thereby hindering the upgrading of ports to the transhipment hub. The current berth design may affect transhipment handling since it is not possible to effectively transport containers received from the ship to the mother vessel because the berth is inadequate for both vessels, or when the vessel is loaded, and Mother ships are located in different ports; there is no connection. The northern region also has similar problems.

Fig. 2. Port system in Ho Chi Minh City area



The system is comprised of 38 terminals (84 docks) with a length of 14 kilometres: 23 docks for cargo ships, with the capacity for 25,000 DWT vessels (5 docks are also utilized for passenger transport); 5 docks for containers and 15 docks for supplying services for container vessels (up to 50,000 DWT) and cargo vessels (up to 45,000 DWT); 10 cement docks with capacity upto 20,000 DWT; 6 others for vegetable oil, construction materials, gypsum, training, etc., with a capacity from 20,000 to 40,000 DWT; 17 petrol and liquefied natural gas terminals for 40,000 DWT vessels; 7 wharves; 4 shipyards; 4 floating docks for maintenance, repair and building of new vessels (Massard, Leuenberger, & Dong, 2018; Witkowski, 2017).

Table 1: Performance of some ports in Hô Chi Minh City

Port	**Cat Lai**	**VICT**	**Sai Gon**	**SPCT**	**Ben Nghe**	**Total**
Operator	SNP	FLDC	Tan Thuan	DP World	SAMCO	TPHCM
Number of berths	7	4	4	3	4	22
Length of berth (m)	1,413	678	713	500	816	4,120
Port area (ha)	975.7	20	na	23	32	1,051
Maximum depth along the pier (m)	12	10	11	11.5	10.5	55
STS container bridge	33	7	2	5	5	52
Loading capacity (million TEU)	4.2	0.8	0.6	0.75	0.3	6.7
Flow 2018 (million TEU)	3.8	0.6	0.3	0.24	0.2	5.1
Port usage performance	**90.5%**	**78.9%**	**54.2%**	**32.3%**	**59.3%**	**77.3%**

Source: Ho Chi Minh City Marine Port Authority, 2018

In general, ports in the area of Ho Chi Minh City are facing oversupply; Cat Lai port currently operates at more than 80% of design capacity, the remaining ports have low utilization rates (Table 1).

Table 2: Performance of some ports in Cai Mep – Thi Vai

Port	SP-PSA	TCTT	TCIT	CMIT	SITV	Total
Operator	PSA	SNP	HJS/MOL/ WH/SNP	APMT	HPH	CM-TV
Number of berths	2	1	2	2	3	10
Length of berth (m)	600	600	600	600	730	2.830
Port area (ha)	27	20	40	48	34	169
Maximum depth along the pier (m)	14	15.8	15.8	16.5	14	76.1
STS container bridge	6	3	6	5	6	26
Loading capacity (million TEU)	1.1	1.0	1.0	1.18	1.2	5.4
Flow 2018 (million TEU)	0.002	0.099	0.979	0.725	0.0	1.8
Port usage performance	**0.18%**	**9.9%**	**97.9%**	**61.4%**	**0.0%**	**33.4%**

Source: Ho Chi Minh City Marine Port Authority, 2018

The Cai Mep - Thi Vai port complex is also in a state of surplus capacity due to the implications of the rapid upgrading of port capacity since 2009. Cai Mep - Thi Vai area is oriented to become an international transhipment port and receive a portion of surplus goods in the city. This is currently the only port group in Vietnam to have container ships going straight to Europe and America, but not transiting through a third country, with a loading capacity of up to 6.8 million TEU / year. However, currently only about 5% of goods through Cai Mep - Thi Vai port are transhipment using mother ships, the rest are still goods transported by feeder ships (submarines). In 2015, the use of existing container ports in Cai Mep - Thi Vai area did not reach 20% of design capacity (Table 2).

Mooring buoys, anchorage areas

There is weak management of mooring buoys and anchorage areas due to a lack of detailed planning. Particularly, mooring buoys in this system are not arranged following the capacity to receive vessels, or the types of cargo which cause a waste of resources and/or environmental damage, harmful effects to residence and the ecosystem (Sasa & Incecik,

2012). Moreover, mooring buoys are located in inappropriate areas and are unable to meet the requisitions as stated in standard specifications, not in conformity with basic principles; "the exploiting of mooring buoys and anchorage areas shall not affect the normal ports' operation, ensure the safety in marine activities, and prevent any risk of pollution"; stipulated by the Vietnamese Ministry of Transportation. Further, the mooring buoys and anchorage areas have directly competed with ports, regarding the mooring and cargo transiting fees, which reduces the efficiency of port operations. While the mooring buoys are set up to queue and to provide storm sheltering, these facilities are allowed for vessels with the limited weight and draught level in the conditions of level 6 of Beaufort wind (22-27 knots/ 10.8-13.8 meter per second measured at the 10-metre altitude above water) (Yoon & Doan, 2018).

Models of port management in Ho Chi Minh City

Ho Chi Minh City does not apply any transparent management model for its seaport system. In general, they could be categorized as follows.

Model of (not entirely) public-services port: The State has invested in constructing the port and it is then transferred to a 100-percent State owned company (one-member limited company) who directly operates such infrastructure (Lin & Tseng, 2007). This company will be granted the land-use rights, water-use rights and run the port's operation daily, including maintaining equipment and hiring human resources to provide logistic services (e.g., loading/unloading cargo, transportation, storage, and other auxiliary services within the port). This model is applied in Sai Gon Port, Ben Nghe Port, Tan Thuan Dong Port, Navioil vegetable oil terminal, Nha Be general petrol storage, VK102 Port, etc (Phuong, 2018c).

Model of the (not entirely) port owner: The State holds the land-use rights and water-use rights over already built public infrastructure, such as fairways, mooring buoys/ anchorage areas, turning basin, etc. The private entity will lease the land-use rights and invest in building port infrastructure, including berths, loading/unloading facilities, and equipment, storage, hiring labour, and provide services within the ports. The term of port exploitation will be limited with the term of land-use right lease. This model is applied in VICT Port, Cai Lan Calofic vegan oil terminal, Thang Long cement port, etc (Phuong, 2018b).

In general, the operation of Ho Chi Minh City seaport systems is driven towards the rent-seeking of enterprises that are running such terminals, with no regard for the overall benefits of the region. Even the unfair competition among its terminals has not been adequately addressed to eliminate the advantages of Ho Chi Minh City seaport system; diminishing the regional economic development and the legitimate interests of stakeholders (Witkowski,

2017). Recognizing that the supply-demand equilibrium and volume of cargo handled over these terminals are essential for evaluation of ports' operating efficiency in order for planning, boosting investment and sustainable development of this seaport system in the next stage. According to the statistics of Ho Chi Minh City Marine Port Authority, the total volume of cargo entering Ho Chi Minh City seaport is continually increasing, which will reach the targets soon (Massard et al., 2018). However, taking into account the growth rates, the volume of cargo recently and the planned capacity of this seaport system (excluding mooring buoys and anchorage areas), the expansion of port infrastructure would not be crucial in the short term. It still has room for improving the performance, particularly the control and distribution of cargo flow among its terminals.

Table 3: Volumes of cargo and passengers in Ho Chi Minh City seaport system in 2011 - 2018

Year	Total volume		
	Cargo (tonne)	TEU	Passengers
2011	68,606,911	3,565,192	72,365
2012	71,609,014	4,080,354	43,401
2013	75,631,478	4,357,725	45,366
2014	84,355,239	5,098,874	52,903
2015	93,150,706	5,400,636	41,722
2016	100,516,842	5,716,639	37,604
2017	107,229,105	5,956,810	85,032
First half of 2018	54,031,596	2,849,344	38,575

Source: Ho Chi Minh City Marine Port Authority, 2018.

Swot Evaluation of Ho Chi Minh City Seaport Management

Characteristics of port system in Ho Chi Minh city

Although the growth rate has reached 5.6%, the shipping industry in Ho Chi Minh City still has many limitations which will become a drag on the upcoming development period. Specifically, Ho Chi Minh City currently has a total of 74 large and small ports, divided into 4 port areas: the harbor area on the Saigon River; Cat Lai Newport; harbor on Nha Be river

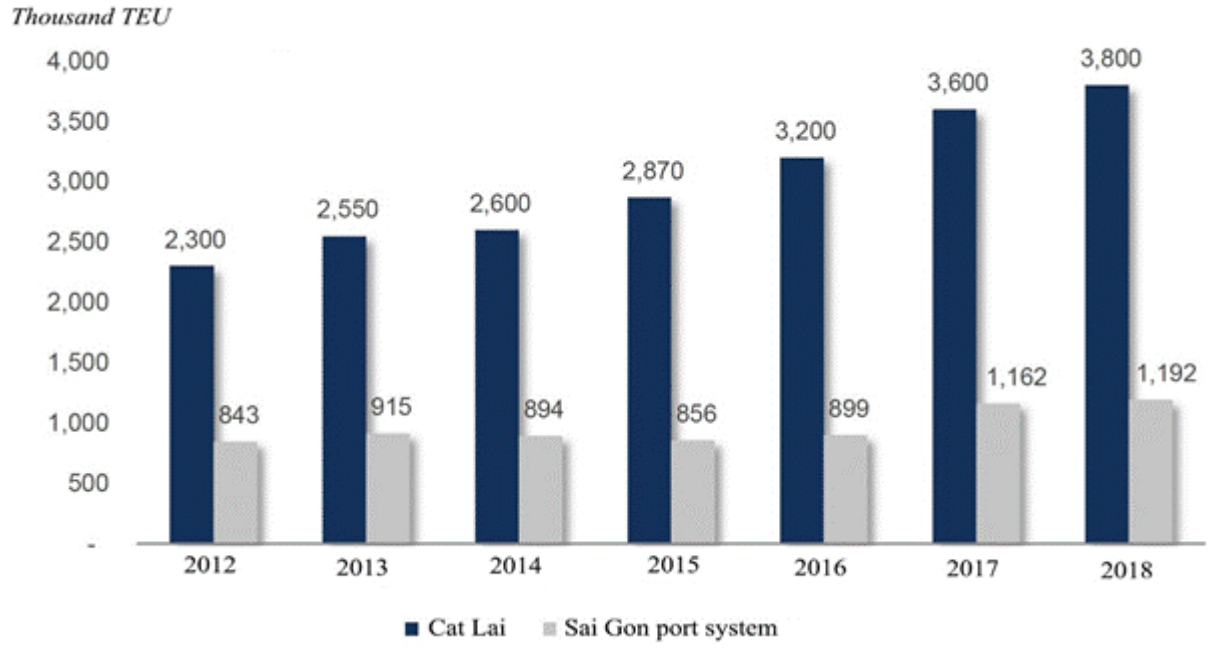
and Soai Rap river port area. Currently, these ports can only receive vessels of upto 30,000 tons. The ports are all in the city, causing traffic jams, increasing storage times of goods. Loading and unloading facilities and outdated warehouse systems, limited capacity (can only reach between 50% and 60% of capacity), limiting the speed of goods through the port. Large vessels cannot access the port systems for loading and unloading cargo due to deep port system in the estuary area affected by sedimentation and tides. In particular, port and shipping related services are lacking or incomplete, making goods destined for Western Europe and North America market have to be transhipped in Singapore and Malaysian ports, increasing transportation costs up to 20%. Characteristics of port system in Ho Chi Minh City are given in Table 3 and Fig. 3.

Table 3: Characteristics of port system in Ho Chi Minh city

Strength	*Weakness*	*Opportunity*	*Risk*
1. Owning a diversified seaport system and meeting all import and export goods and consumer goods in the world. 2. There are significant advantages of geographical location and natural conditions; connecting water transport with seaports and other economic areas. The Saigon - Vung Tau fairway operates stably, with little sedimentation. 3. The operation of seaport exploitation has a solid foundation when the	1. Seaport infrastructure lacks uniformity; most seaports are rooted in the inner city, there is no land fund to expand; Transport infrastructure connecting with the port is still limited, not ensuring timely cargo circulation. 2. Port infrastructure (wharves, warehouses, equipment) in comparison with other countries in the region is generally outdated, slow cargo speed. 3. Seaports mostly focus on loading and unloading and	1. The Global economy and the shipping industry has many signs of prosperity and stable recovery 2. The number of goods going through the port will continue to rise if the Kra canal project (Thailand) is completed. 3. Activities of seaport exploitation and infrastructure development are closely connected with the Government's concern and management levels in the current period. 4. Reforming	1. The shipping company alliance is established to dominate the source of goods and destination ports in the transport and port operation. 2. The movement of the shipping industry to larger capacity vessels and container ships puts pressure on the existing seaport system. 3. The devaluation in transport services, terminal services, and storage of goods challenging to control and overcome. If this situation is prolonged, not well

volume of cargo through the port has increased steadily for many years. 4. Ho Chi Minh is leading the country in logistics activities; logistics services are being improved positively. 5. Ho Chi Minh always leads, pioneering in administrative procedure reform in seaport industry activities.	warehousing activities, contrary to the trend of world seaport management - the port is a package distribution center, logistics distribution center. 4. The State's specialized management system in port operation is not yet streamlined; many agencies and departments participate in management, leading to overlapping. 5. Cumbersome administrative procedures, many shortcomings, especially customs services, prolong the release time.	administrative procedures is being paid attention and promoted. 5. Many policies are beneficial for seaport activities such as ASEAN Single Window and National Single Window; The WTO Trade Facilitation Agreement (TFA) has been adopted.	controlled, it will not ensure the re-investment capital and improve the port infrastructure equipment, leading to the obsolete seaport system in the future. 4. The planning of wharves and harbors still has no unified policy on the scale of bridges, warehouses, service areas there is a risk of recurring small and scattered investment situation like the last time leading to shortcomings in management.

Fig 3: Cargo output through Cat Lai port and Saigon port system



Cat Lai port complex is the only port system in Vietnam currently receiving and handling over 1 million containers per year. This is a valid port located near the center of Ho Chi Minh City and near industrial parks and warehouses of manufacturing enterprises in Dong Nai and Binh Duong. The current port cluster is directly under the Dong Nai river channel and is exploited by the Tan Cang Corporation. Container traffic through Cat Lai port in 2015 reached 3,800 thousand TEUs (+ 5.6% YoY), accounting for 33.9% of the country's total container volume. The average growth rate of container goods through ports reached 7.5% from 2012 to 2018. The system of Saigon ports including ports such as Nha Rong Khanh Hoi, Tan Thuan Dong, Ben Nghe, VICT, and Bong Sen, has a large volume of the containers through the years, averaging nearly 1,000 thousand TEUs. Although the capacity at these ports in the past years is still abundant, the volume of goods is still not growing, due to: (1) Phu My bridge has been in operation since 2012, making large ships unable to access the port. ; (2) in the future these ports will have to be relocated out of the inner city or converted into capacity under the Government's plan, which makes shipping lines tend to look to other ports for more stability.

Evidence through Statistical Analysis between Major Constraints, SWOT Evaluation and Seaport Management

This portion of the study was handled by using a survey. Primary data was collected from the seaport managers and other employees working for seaport management by using a survey questionnaire. For this purpose, two hundred questionnaires were distributed. One hundred and seventy were returned and analyzed by using Partial Least Square (PLS). PLS measurement model is shown in Figure 4. Moreover, this portion of the study examined the effect of major constraints, strength, weakness, opportunities and risk on seaport management.

Figure 4. Measurement Model

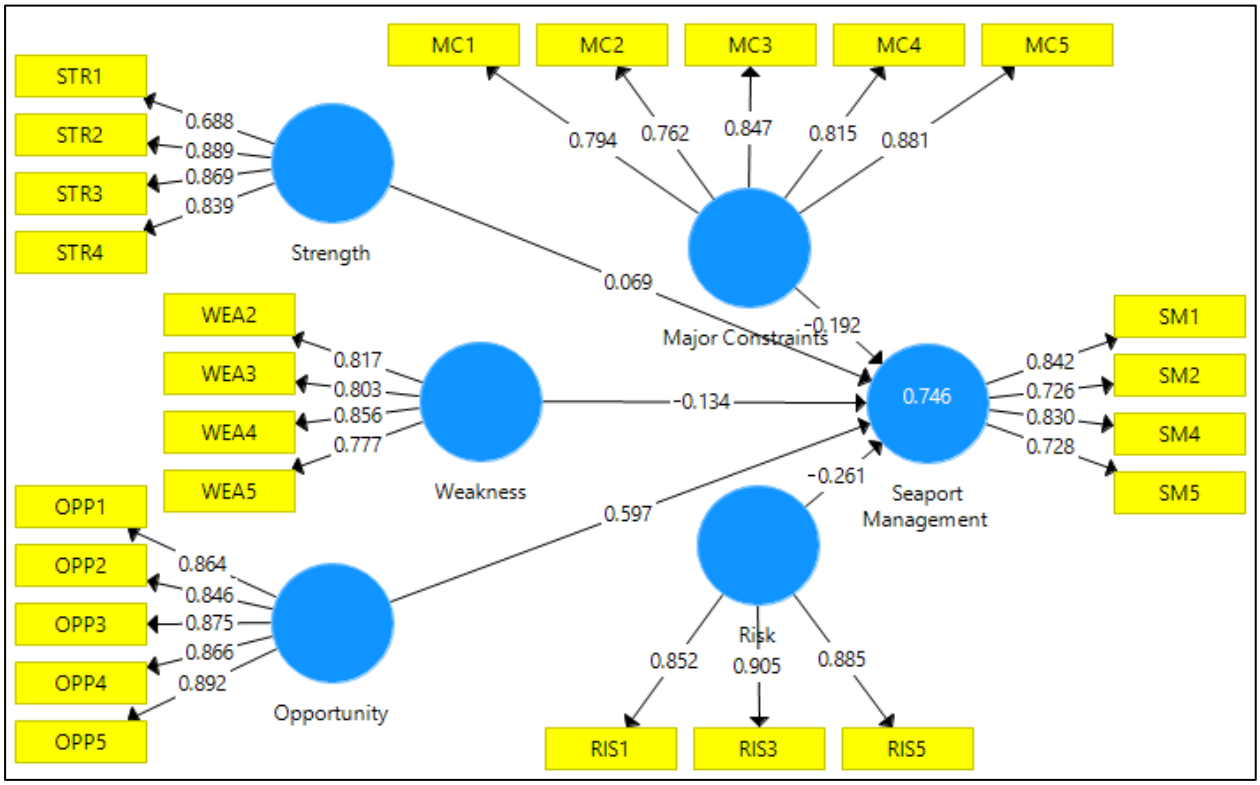


Table 4: Construct Reliability and Validity

	Alpha	rho_A	CR	AVE
Major Constraints	0.879	0.893	0.912	0.674
Opportunity	0.919	0.92	0.939	0.754
Risk	0.856	0.863	0.912	0.776
Seaport Management	0.789	0.804	0.864	0.614

Strength	0.84	0.848	0.894	0.681
Weakness	0.83	0.835	0.887	0.662

Table 5: Square Root of AVE

	Major Constraints	**Opportunity**	**Risk**	**Seaport Management**	**Strength**	**Weakness**
Major Constraints	0.821					
Opportunity	0.431	0.868				
Risk	0.442	0.898	0.881			
Seaport Management	0.543	0.828	0.805	0.784		
Strength	0.739	0.443	0.456	0.521	0.825	
Weakness	0.538	0.874	0.81	0.741	0.547	0.814

Figure 4 demonstrated that the measurement model in which factor loading is highlighted. All the items have factor loading above 0.5 which is the minimum level to achieve success in this study. Moreover, Alpha, composite reliability (CR) and average variance extracted (AVE) is shown in Table 4 which is above 0.7, 0.7 and 0.5, respectively (Hair, Hollingsworth, Randolph, & Chong, 2017). Furthermore, discriminant validity was examined by using the square root of AVE. This is highlighted in Table 5.

Figure 5 shows the effect of major constraints, strength, weakness, opportunities and risk on seaport management. T-value was considered to examine the effect of various factors on seaport management. A T-value above 1.96 shows that various factors, such as major constraints, strength, weakness, opportunities and risks, have a significant effect on seaport management. Beta value (β) was considered to examine the direct of relationship. Results are shown in Table 6. It is found that all these factors have t-value above 1.96. Therefore, major constraints, strength, weakness, opportunities and risks have a significant effect on seaport management. Moreover, strength and opportunities have positive beta value (β), which shows a direct relationship. Increase in strength and opportunities increases the seaports management ability. However, major constraints, weaknesses and risks have a negative beta value (β) which indicates a negative relationship. Increase in major constraints, weaknesses and risk decreases the seaport management ability.

Figure 5. Effect of major constraints, strength, weakness, opportunities and risk on seaport management.

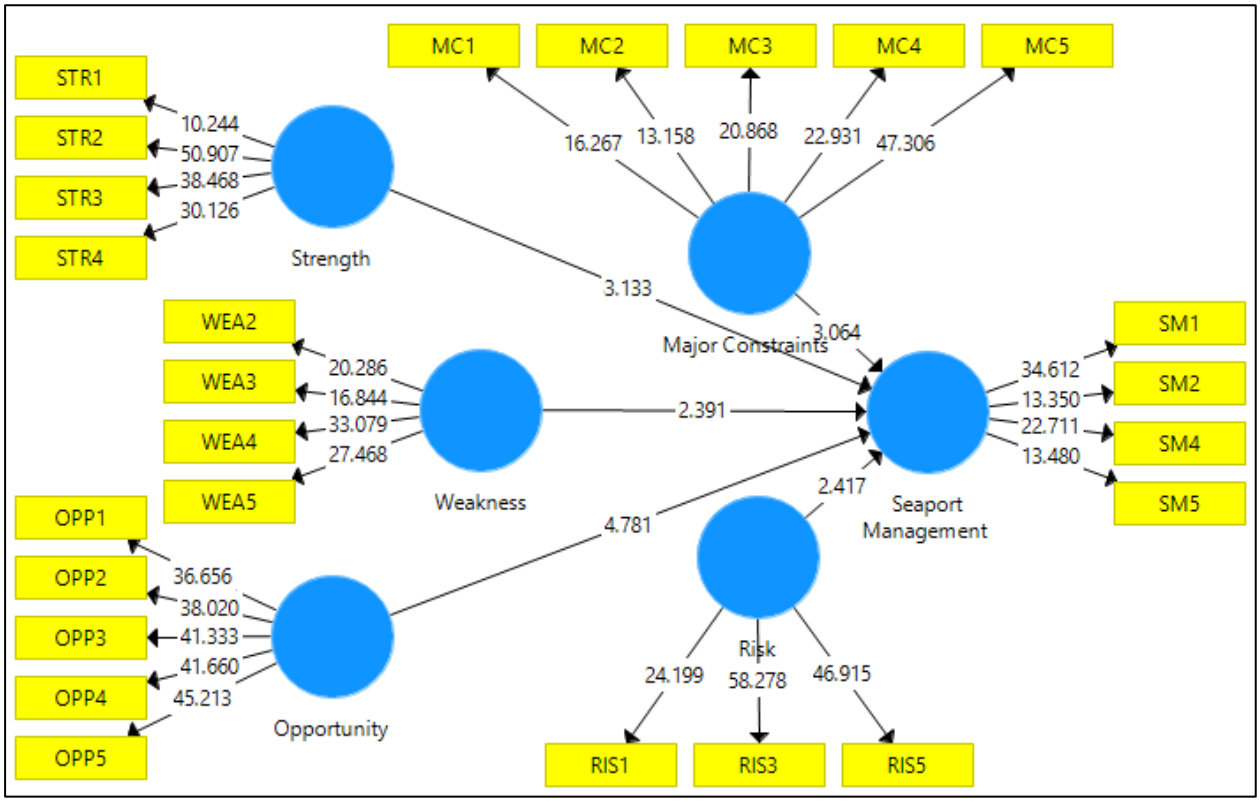


Table 6: Effect of major constraints, strength, weakness, opportunities and risk on seaport management.

	β	M	SD	T Statistics	P Values
Major Constraints -> Seaport Management	-0.192	-0.192	0.063	3.064	0.002
Opportunity -> Seaport Management	0.597	0.592	0.125	4.781	0
Risk -> Seaport Management	-0.261	-0.26	0.108	2.417	0.016
Strength -> Seaport Management	0.069	0.07	0.023	3.133	0.001
Weakness -> Seaport Management	-0.134	-0.128	0.057	2.391	0.018

Recommendations for Enhancing Operation Efficiency

Policy in port construction

This article reveals the significant constraints in the current mechanism of planning, investment, maintenance, maintaining the technical standards of terminals in Ho Chi Minh City seaport system. Therefore, it calls for short-term solutions as follows:

a) To provide the prerequisites for seaport business, i.e., the requirements of minimum scale, the length of docks, acreage of storage facilities. To set the framework of renovation and upgrading the existing seaports, which are aimed to avoid any break of the strategic plan, to ensure the efficiency of port operation as a whole. To set the timeline for self-upgrading programmers, or force them to participate in a joint venture or merge into others to replace the outdated facilities. To guarantee the comprehensive of scale, the capacity of seaport system in association with logistic services (e.g., storages, connecting infrastructure of the local and regional area);

b) To guarantee the coordination between the Ministry of Transportation and local governments in the process of planning, developing seaport; to unify the model of port operation/ management;

c) Local governments are required to reserve the proper land lots for dredge disposal which should be within the planned area to develop a seaport (strip of land or lowland to use dredging products for levelling); the government, the Ministry of Natural Resources and Environment are urged to issue and enforce the regulations in regards to periodic dredging, maintenance of seaport fairways, water zones and water areas. Independent contractors shall perform the inspection of sludge;

d) To ensure that the planning of residential and urban areas shall not break the existing planning of seaport. For example, in the case of Cat Lai terminal, the damages were estimated to be in the thousands of billions of Vietnam Dong; however, it did not work effectively. The law on planning and relevant regulations do not detail any provisions about the arrangement of industrial zones, export processing zones: regarding the nature of industrial zones, export processing zones, the minimum distant from the fence of such areas to the resident is 50 metre.

Recommendations for management models

In the period to 2023, the following actions should be performed:

a) Issuing and implementing the electronic process at seaports in the light of administrative procedure reform, public services transparency, leading to time and cost-saving for businesses;

b) Enhancing oversight activities regarding marine activities, particularly at seaports, to guarantee the management, exploitation of ports, health-safety-environment protection, fire fighting, preventing the risk of pollution, controlling services price table;

c) Building the institutional capacity, land-use rights, and water-use rights management, launching the comprehensive development program for seaports as a whole system, in line with other economic sectors, long-term sea planning, and boosting logistic, inland container depot (ICD) respectively.

Further, towards 2025, the model of "Management Board of port investment and operation" should be completed and implemented, which is legalized in Article 87, 88 and 89 of Maritime Law No. 95/2015/QH13 (dated 25 November 2015) and "Port Owners" management model. The benefits include ensuring the development of port infrastructure following the strategic plan (comprised of the appropriate time and focusing point of investment), in line with the connecting infrastructure (roads, highways), logistic services centres and urban development. Governing the port exploitation properly in accordance with the market supply-demand rules; incentivizing the engagement of other economic sectors (private firms, foreign investors) in building ports and terminals; taking advantage of geographic location; selecting competent port operators; price optimization.

Recommendations on the strategic planning of seaports and connecting infrastructure

a) Strategic planning of seaport infrastructure

Ports/terminals in Dong Nai river will not allow construction of any new port/terminal in this area because of the overloaded capacity. After 2030, it plans to move Sao Mai (Hocilm) cement and Ha Tien cement terminals to Hiep Phuoc port; to move Saigon Shipyard and Saigon Petro terminal from Dong Nai river to Nha Be Port. The existing ports/terminals in Dong Nai river will focus on container shipment and consolidated inland container depots (by current strategy) connected to Belt Road No. 2 and inland water facilities. Ports/Terminals in the Saigon river will foster the move of cargo ports to Hiep Phuoc, and shipyards, petrol terminals to Nha Be; at the same time, they will not allow upgrading the existing facilities. After 2030, activities in Tan Thuan II upstream port will be terminated or converted from their current functions with the expiry of land-use rights (comprised of VICT, Tan Thuan Dong Port, Ben Nghe Port, Saigon Port, ELF GAS). Moreover, when the prerequisites of port-related businesses are provided, the government shall boost the merge of small-scale facilities to others in order to create the comprehensive system of ports/terminals, storages, equipment, and human resources, etc. For example, Lotus port will be merged with Vegetable port; Bien Dong port will be merged with Tan Thuan II port. The Nha Be river will allow for investment, the upgrade and expansion of terminals, storage serving the oil tankers and LNG

tankers while also concentrate on land reserved for ports moved from other locations to this area. The target is that such an area will focus on the development of petrol terminals, shipyard and auxiliary services, dry docks, and ship disposal. Hiep Phuoc Port should continually improve the facilities and convert the function of Hiep Phuoc Power Plant's terminal (closed since 2009) to syndicated services port for serving activities within Hiep Phuoc Industrial Zone.

In order to govern marine safety, prevent any risk of pollution, recommendations are provided as follows.

In the period to 2025, it will not issue any new construction permits in the area of Sai Gon, Nha Be, and Dong Nai rivers. The mooring buoys and anchorage will be gradually re-arranged by the strategic plan; to terminate the operation of any substandard mooring and anchorage facilities, or not in conformity with the plan, or expiry of exploitation term (10 years). The relocation of the mooring and anchorage facilities in Sai Gon, Nha Be and Dong Nai river to the Soai Rap area should reduce the traffic density of ships and inland waterway vessels through the canal, while also decreasing the transport costs (due to vessels from the southwest would not have to take a long distant to ports inside Saigon). The re-locating plan is also needed to prioritize the current mooring/anchorage operators (through bids or public-private partnership programs) who can launch the facilities in the new area before 2030.

The location of mooring/anchorage should be categorized by the vessel tonnage and types of cargo to prevent any risk of pollution, environmental damage, to be consistent with the seaport system (including the connecting infrastructure: roads/highways, railroad, inland water routes). There needs more insight into the role of mooring and anchorage facilities in further stages (post-2030): being determined to implement the policy "proactive strategic plan for seaports to foster the regional socio-economic development", "mooring/ anchorage buoys shall be the integral part of the seaport system rather than the short-term, temporary solutions as usual".

b) Connecting infrastructure and logistic services centers

Navigation channels, sea zones, water zones should be installed to improve the capacity of navigation channels by renovating the sharp-curve areas, or sand strips in the middle of the rivers (Ganh Rai bay, Dan Xay, Kervella, L'est cape, Propontis, Da Han). In the period of 2018-2020, Soai Rap channel will be dredged to maintain the minimum depth of -8.5-meter CD, the same as the Saigon – Vung Tau channel to increase the volume of vessels passing over this area. In the next stage (post-2025), dredging to the level of -9.5-meter CD should be implemented. Moreover, it should establish the mooring/anchorage for storm sheltering and

emergency cases: the survey, construction, and operation should be commenced before 2020 and terminate the operation of the Thieng Lieng mooring location, and relocate to Go Gia mooring and Hiep Phuoc port for safety and efficiency.

The Ministry of Transportation and Ho Chi Minh City People's Committee should prioritize investment towards road/highway projects which directly impact the seaport operation, particularly in the period between 2020 and 2025; The belt road 2 and 3; The road connecting Cat Lai and Phu Huu terminals to the belt road 2 and reduce the traffic jams on Nguyen Thi Dinh Street; Upgrading the North-South axis routes connecting from the Hiep Phuoc Port to belt road 2 and 3; Building Cat Lai Bridge (as approved by the Prime Minister to replace the former ferry terminal); furthermore, broaden the 25B Provincial Road link Ha Noi highway to Cat Lai terminal; Upgrading bridges in Saigon River, Dong Nai river, Kenh Te channel, Phu Xuan River, Muong Chuoi River to maintain the minimum clearance of 7.5 meters for 54 TEU barges to operate, to reduce the pressure on existing facilities.

The railway routes and cargo stations from 2025 to 2030 should be completed as follows. The high-speed railway from Ho Chi Minh City to My Tho – Can Tho (planned to Ca Mau province in the next stage), connecting to existing North-South railway at An Binh Station, with the estimated length of 174 kilometers; Specialised railway connecting to Hiep Phuoc Port, with a length of 38 kilometers; Combination of passenger and cargo transportation at Tan Kien Station, loading/unloading cargo arrived to/depart from Ho Chi Minh City; Long Dinh cargo station connecting to Hiep Phuoc Port and loading/unloading cargo for industrial zone cluster in Ben Luc District, Long An Province (around 15 ha).

In order to strengthen the connection, reduce the traffic jams and optimize the freight movement and logistic services costs, there is a need to launch the upgrading program for inland water traffic routes (from 2018 to 2025). A project of inland water routes connecting Saigon River and Dong Nai River through Rach Chiec canal, Ong Nhieu canal; Project of renovation and exploitation of inland water routes linking ports from Hiep Phuoc to Nha be; rach Dia– rach Doi – Phu Xuan River – Nha Be River; Ong Lon 2 – Phuoc Kien River – Muong Chuoi River; rach Tom – Muong Chuoi River; rach Doi – Kinh River (Dong Dien River) and rach Dua – Going River – Kinh Lo River; Projects of inland water connecting ports, fairways to ICDs, including Sai Gon – Ben Suc route linked to An Son ICD (Binh Duong Province); Sai Gon – Moc Hoa route link to Ben Luc ICD (Long An Province).

The development of ICD shall be inconsistent with the seaport system as a whole, and requires collaboration between the Ministry of Transportation, other Ministries, and local governments.

The following recommendations have been provided. To build the legal framework regarding investment and exploitation of ICD, including significant issues: minimum scale, capacity, storage, service prices, management model, incentivizing mechanism, land-use rights lease for ICD businesses; Local governments where there are planned ICD should accelerate the investment and building of ICD, mainly through the model of public-private partnership (PPP); the State invests in building the connecting infrastructure while the ICD entity constructs the ICD, logistic services center; or the State invests in the whole system and the enterprises lease such facilities for operation.

The competitiveness of the domestic logistics industry against the rivals should be enhanced. Continuing the administrative procedure reform to level the playing field, to facilitate logistics services suppliers with more transparent policies; Establishing two logistic services center by Prime Minister's Decision No. 1012/QD-TTd dated 3 July 2015 approving a strategic plan for logistics services nationwide to 2020, with a vision towards 2030. Performing the plan of equitization of State-owned enterprises, jointing venture, collaborating international and domestic services suppliers in order to broaden the network and business opportunities; Completing the full supply chain of the logistic industry.

Conclusion

The ICD port system in the southern region is located near the port of Ho Chi Minh City, which tends to develop in the area of Binh Duong and Dong Nai. There are 11 dry ports connecting with Vung Tau seaports and Ho Chi Minh City, including 6 dry ports in the city area. Ho Chi Minh City (Phuoc Long, Phuc Long, Transimex, Tay Nam, Tan Tao, Sotrans), 3 dry ports in Dong Nai (Bien Hoa, Tan Long, Binh Duong, and Nhon Trach) and 2 dry ports in Binh Duong (Tan Cang Song God, TBS Tan Van). Also, several provinces have been building or have approved new construction projects for dry ports, such as in Ba Ria-Vung Tau and Binh Thuan. The volume of container cargo through southern ports accounts for over 70% of the country's container volume. This is one of the essential factors promoting the formation and development of shallow ports. The shallow ports in the South are considered to be more efficient than the North because they are located near the seaport (distance from 20-70 km), well-supporting seaports in the export of goods. Imports by container, reduce congestion at seaports and urban transport in the city areas of Ho Chi Minh, where the total area of dry ports is about 300 ha. The smallest is 1.3 ha (Tan Tao dry port), the largest is 105 ha and can expand up to 300 ha (Long Binh dry new port). Activities of ICD ports in the South are very active and there is fierce competition, about 35-40% of container goods get their customs clearance at dry ports.

After reviewing the situation of Ho Chi Minh City seaport system and the on-going development trend of the international marine industry, given that such a system has reached remarkable milestones over the years, the efficiency of managing and exploiting activities of such port, however, could not meet the demands of quick-growing transportation of goods by sea within this area. The constraints which the seaport system is facing are compounded with illogical distribution among ports/terminals with no regard for the scale, capacity, and geographic locations; ineffective and insecure mooring and anchorage buoys; undeveloped logistic service centers and a lack of connecting infrastructure. In order to enhance the operational efficiency of such ports, in particular for Group 5 ports (southeast ports), systematic solutions in the perspective of a longer-term and comprehensive vision is required. To achieve the optimal result of such recommendations, the interdisciplinary actions are required, and the timeline of such actions is the critical factor of success that requires the tight collaboration among State authorities, port businesses, vessels, and relevant stakeholders. The prosperity of the state will warrant the strict implementation of strategic plans which make Ho Chi Minh City seaport systems more competitive and efficient.

REFERENCES

Hair, J., Hollingsworth, C. L., Randolph, A. B., & Chong, A. Y. L. (2017). An updated and expanded assessment of PLS-SEM in information systems research. *Industrial Management & Data Systems, 117*(3), 442-458.

Hameed, W.-U., Nadeem, S., Azeem, M., Aljumah, A. I., & Adeyemi, R. A. (2018). Determinants of E-Logistic Customer Satisfaction: A Mediating Role of Information and Communication Technology (ICT). *International Journal of Supply Chain Management, 7*(1), 105-111.

Kontgis, C., Schneider, A., Fox, J., Saksena, S., Spencer, J. H., & Castrence, M. (2014). Monitoring peri-urbanization in the greater Ho Chi Minh City metropolitan area. *Applied Geography, 53*, 377-388.

Lin, L., & Tseng, C. (2007). Operational performance evaluation of major container ports in the Asia-Pacific region. *Maritime Policy & Management, 34*(6), 535-551.

Massard, G., Leuenberger, H., & Dong, T. D. (2018). Standards requirements and a roadmap for developing eco-industrial parks in Vietnam. *Journal of Cleaner Production, 188*, 80-91.

Nadeem, S., Alvi, A. K., & Iqbal, J. (2018). Performance Indicators of E-Logistic System with mediating role of Information and Communication Technology (ICT). *Journal of Applied Economics & Business Research, 8*(4).

Nguyen, Q. T. (2016). The main causes of land subsidence in Ho Chi Minh City. *Procedia engineering, 142*, 334-341.

Nguyen, X. P. (2019). The Bus Transportation Issue And People Satisfaction With Public Transport In Ho Chi Minh City. *Journal of Mechanical Engineering Research & Developments (JMERD), 42*(1), 10-16.

Passport. (2018). Vietnam : Country Profile.

Phuong. (2018a). Developing tourism in the Mekong Delta in the context of globalization and international integration. *Monogr. Publ. Print. house Ho Chi Minh City Univ. Econ*, 131-136.

Phuong. (2018b). Situation and solution of tourism human resources in the Mekong Delta. *Econ. - Tech. Mag.*, 63-69.

Phuong. (2018c). Solution to develop tourism products in the Mekong Delta. *J. Polit. Sci.*, 75-79.

Roszko, E. (2015). Maritime territorialisation as performance of sovereignty and nationhood in the S outh C hina S ea. *Nations and Nationalism, 21*(2), 230-249.

Sasa, K., & Incecik, A. (2012). Numerical simulation of anchored ship motions due to wave and wind forces for enhanced safety in offshore harbor refuge. *Ocean Engineering, 44*, 68-78.

Smajgl, A., Toan, T. Q., Nhan, D. K., Ward, J., Trung, N. H., Trí, L. Q., . . . Vu, P. (2015). Responding to rising sea levels in the Mekong Delta. *Nature Climate Change, 5*(2), 167.

Thai, V. V. (2007). Impacts of security improvements on service quality in maritime transport: An empirical study of Vietnam. *Maritime Economics & Logistics, 9*(4), 335-356.

Thanh Tu, T., & Nitivattananon, V. (2011). Adaptation to flood risks in Ho Chi Minh City, Vietnam. *International Journal of Climate Change Strategies and Management, 3*(1), 61-73.

van Leeuwen, C. J., Dan, N. P., & Dieperink, C. (2016). The challenges of water governance in Ho Chi Minh City. *Integrated Environmental Assessment and Management, 12*(2), 345-352.

Witkowski, K. (2017). Internet of things, big data, industry 4.0–innovative solutions in logistics and supply chains management. *Procedia engineering, 182*, 763-769.

Yoon, D.-G., & Doan, T. B. T. (2018). A Study of the Logistics Development in Hai Phong Port. *Journal of Korean Navigation and Port Reserch, 42*(2), 137-142.