NATIONAL TECHNICAL UNIVERSITY OF ATHENS

DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING

Laboratory of Maritime Transport

THE SEAPORT CLUSTER OF SHANGHAI (CHINA)

DRAKOS KONSTANTINOS

DECEMBER 2011

ATHENS

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PREFACE

China is one of the biggest countries in the world and one of the fastest of the developing countries of the world with a growth rate average of 10% annually. Having some of the biggest rates of imports and exports China has developed one of the biggest transportation networks of the world, including freight forwarding by all possible means (road, train, sea, air transportation). Shanghai is one of the largest cities of China and for many years it has been its commercial and financial center.

The port of Shanghai is China's largest comprehensive port and one of the country's most important getaways for foreign trade.in 2009 a total of 25,8 millions TEU and 500 millions tons of cargo passed through Shanghai's port. Shanghai became world's largest container port in 2009 having overtaken Singapore and it is also world biggest cargo traffic port since 2006.

All these have led to the investigation of the mechanisms that led Shanghai to be the world's biggest port. Apart from its advantageous geographical location and China's extensive needs for imports and export, the mechanism that lies before Shanghai's success as a seaport is the existence of the seaport cluster.

The term cluster is used since 1990, when it was first introduced by Michael Porter in *The Competitive Advantage of Nations.* Clusters are defined as a population of independent organizations that operate in the same value chain and are geographically concentrated. The seaport cluster is a cluster made up of firms engaged in the transfer of goods in the port and their on ward distribution. The maritime cluster is the cluster consisting of firms occupied in the areas of ship services, brokerage, ship management etc.

In the case of Shanghai we can recognize a combined seaport and maritime cluster created around the port. Also we can recognize the existence of a third smaller cluster consisting of companies engaged in the sector of logistics.

This final paper was made at the Laboratory of Maritime Transport of the Department of Naval architecture and Marine engineering of the National Technological University of Athens from March 2011 until November 2011.

At this point I would like to thank my professor, Dr. Dimitrios V. Lyridis for his guidance and his continuous help during the development of my final paper. Also I would like to thank the PhD candidate Mr. Vassilios K. Zagkas for his valuable help.

Athens, November 2011

SUMMARY

In this final paper we focus on the existence and the construction of the seaport cluster of Shanghai (China). Through an analysis on the theory of the seaport clusters in general we focus on the construction of the seaport cluster of Shanghai defined by its political borders (municipality of Shanghai). More specifically this final paper consists of the following six chapters:

1. In the first chapter we refer to the geographical and political division of China in general. We focus on its economy with references to its annual growth rate, imports and exports statistics, global shipbuilding and ship repairing share, transportations etc. All these lead as to the conclusion that China is one of the biggest consumers and exporters in the world. This led China to create one of the biggest transportation networks in the world.
2. In the second chapter there are informations about Shanghai in general and an extensive analysis of its port. In this analysis we present the different sectors of the port of Shanghai and the companies occupied in each sector. These sectors include ports terminals and services. Also there are references about ports trade statistics. From the second chapter we come to the conclusion that Shanghai is not only the biggest port of China, but it is also the biggest port in the world.
3. In the third chapter we start with a theoretical approach on the term of clusters. We refer to the factors that lead to the cluster construction, their performance and their structure as it has already been analyzed by many researchers in the past.
4. In the fourth chapter we focus on the theory of the seaport clusters and their economical activities. We choose the factors that will lead to the definition of the clusters region and we refer to the importance of the existence of leader companies in a cluster. Finally we analyze the role of the cluster's governance. All these factors will be used to define the seaport cluster of Shanghai.
5. In the fifth chapter we analyze the construction of the seaport cluster of Shanghai, its economic activities, we define its region and we create a table of the clusters firms. Furthermore we refer individually to the leader companies of the cluster its governance and the existing research and development

centers. At last we examine the coexistence of the seaport cluster with the maritime and the logistics cluster in the same area.

6. Finally in the last chapter we have the conclusions we came through from the analysis of the seaport cluster of Shanghai.

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1 CHINA

1.1 GEOGRAPHY AND POLITICAL DIVISION

China is situated in the eastern part of Asia on the west coast of the Pacific Ocean. China is one of the biggest countries in the world having an area of about 9.6 million square kilometers that covers about 6.5 per cent of the world's total land area. It is the third largest country in the world (after Canada and Russia). Its population numbers around one billion people, almost a quarter of the world's population.

China has a land border of 22,143.34 kilometers long and neighbors with twelve countries: Korea in the east, Russian in the northeast and the northwest, Mongolia in the north, India, Pakistan, Bhutan and Nepal in part of the west and southwest, Burma, Laos and Vietnam in the south.

Except from its huge land area, China has also extensive neighboring seas and numerous islands. Its coastline extends from the East China Sea to the South China Sea covering also Japan, Philippines, Malaysia, and Indonesia and counts more than 14,500 kilometers. Coastal shipping is divided into two principal navigation zones, the northern and southern marine districts. The northern district is situated on the north from Xiamen to the North Korean border, with Shanghai as its administrative center. The southern district is situated on the south from Xiamen to the Vietnamese border, with Guangzhou as the administrative center. The majority of the ocean-going routes begins from the ports of Dalian, Qinghuangdao, Xingang, Qingdao, Shanghai, Huangpu, Zhanjiang, or Hong Kong. Shanghai is the leading port of China from the early 19th century except from a short period near 1997 when Hong Kong reincorporated into China and overtook Shanghai.

China has more than 5,000 islands with the largest of them being Taiwan and the second largest, Hainan. China is also one of the world's oldest continuous civilization. Its huge land extend, offering a lot of virgin natural landscapes, combined with its particular traditional customs made China one of top travel destinations, predicting to be the number one travel destination by the year 2020, according to World Travel Organization.

FIGURE 1.1: Political map of China

China consists of 668 cities, 13 of which having populations of more than two million people each, 24 are between one and two million, 48 are between 500,000 and one million, 205 are between 200,000 and 500,000, and 378 count less than 200,000 people.

Beijing is a municipality directly under the Central Government and the capital of the PRC (Peoples' Republic of China), having a population of 7.34 million. Beijing is not only the nation's political center, it is also its cultural, scientific and educational center, and a key transportation hub.

Tianjin, is another city directly under the Central Government. It has a population of 5,21 million people and is one of the major industrial and commercial cities in north

China. With a distance of 120 km from Beijing, Tianjin is an important port for ocean-going and offshore shipping, and foreign trade. Tianjin's traditional industries include iron and steel, machine-building, chemicals, power, textiles, construction materials, paper-making and foodstuffs, and also some new industries such as shipbuilding, automobile manufacturing, petroleum exploitation and processing, and the production of tractors, chemical fertilizers, pesticides, watches, TVs and cameras.

Chongqing, is also a city directly under the Central Government. It has a polulation of 6.14 million people and it is the largest industrial and commercial center in southwest China and also a hub of land and water transportation in the upper Yangtze valley. It is located at the juncture of the Yangtze and Jialing rivers. Chongqing is a an industrial city, with advanced iron and steel, chemicals, power, automobile manufacturing, machine building, shipbuilding, construction materials, textiles, foodstuffs and pharmaceuticals industries.

Guangzhou, the capital of Guangdong Province, spans the Pearl River. It has a population of 4.17 million people. It is the oldest trading port in China and was a foreign trade hub from 200 B.C. The Huangpu Port, where ocean-going ships can anchor, has navigation lines reaching all continents in the world. As an important entry/exit port for overseas tourists, Guangzhou has a great number of modern hotels.

Xi'an is the capital of Shaanxi Province and it is the largest city in northwest China with an urban population of 2.72 million. Originally known as Chang'an, Xi'an is a famous ancient city in China and was the starting point of the ancient Silk Road. Xi'an has a large number of historical sites. Xi'an is now a tourist destination and one of the rising industrial bases in China, known for its advanced machine-building and textiles industries.

Wuhan, the capital of Hubei Province, consists of the cities of Wuchang, Hankou and Hanyang, with a total urban population of 4.28 million. It is the largest city in the central China and the hub of land and water transportation on the middle reaches of the Yangtze River. Wuhan has advanced iron and steel, machine building, shipbuilding, textiles, chemicals and foodstuffs industries.

Shenyang, the capital of Liaoning Province, is the largest city in northeast China, with a total population of 4.24 million people. Being a heavy-industrial city, Shenyang is known for its machinery, electrical equipment and heavy-duty machines industries.

Shanghai is one of the most populous cities of the People's Republic of China, its rapid growth over the last two decades led Shanghai to be one of the most famous cities in the world, know worldwide as a finance, commerce, fashion, technology and culture center. The city is located in eastern China, at the middle of the Chinese coast, and it is situated at the estuary of the Yangtze River. Once a fishing and textiles town, Shanghai was widely known during the 19th century due to its favorable port location and was one of the cities, which opened to foreign trade by the 1842 Treaty of Nanking. The city then met great success as a center of commerce between east and west, and became a multinational hub of finance and business in the 1930s. After the Communist Party takeover of the mainland in 1949, the city's international influence declined until the 1990 when the economic reforms introduced by Deng Xiaoping resulted to an intense re-development of the city, resulting to the return of finance and foreign investment to the city. The last few years Shanghai is aiming on being a global financial hub and international shipping center, while being one of the world's major financial centers.

FIGURE 1.2: Map of Shanghai

1.2 ECONOMY OF CHINA

From its founding in 1949 until late 1978, the People's Republic of China was a Soviet style centrally planned economy, without private businesses or capitalism. To puss the country towards a modern, industrialized communist society, Mao Zedong instituted the Great Leap Forward in the early 1960s, although this had several economic results. After Mao's death in 1976 and the end of the Cultural Revolution, Deng Xiaoping leading in the new Chinese leadership began to reform the economy and move towards a more market-oriented economy. Collectivization of the agriculture was dismantled and farmlands were privatized to increase productivity. In 1978, China and Japan began normalized diplomatic relations, and China started borrowing money from Japan in soft loans. Since 1978, Japan has been China's most significant foreign donor. Nowadays China is characterized by having a market economy based on private property ownership, and is one of the leading examples of state capitalism.

Under the post-Mao market reforms, there was the start for a wide variety of small-scale private enterprises, encouraged by the government’s initiative for relaxed price controls and promoted foreign investment. Government focused to foreign trade, which led to the creation of Special Economic Zones (SEZs), starting with Shenzhen and then in other Chinese cities. Inefficient state-owned enterprises (SOEs) were restructured by making use of western-style management systems, with the unprofitable ones being closed, resulting in massive job losses. At the second half of 2010, China was trying some of its new economic initiatives, with state-owned companies buying up independent businesses in the steel, auto and energy industries.

Since the begging of the economic liberalization in 1978, the China’s investment and export led economy has known a growth of about 90 times bigger and now it is the fastest growing major economy in the world. According to IMF the PRC's annual average GDP growth for the period of 2001–2010 was 10.5 percent and predicted to grow with 9.5 percent for the period of 2011–2015. From 2007 to 2011, China's

economic growth rate was equivalent to the growth of all the G7 countries together. According to the Global Growth Generators index announced by Citigroup in February 2011, China has a very high 3G-growth rating. Since September 2011, China has the world's second largest nominal GDP, at 39.8 trillion Yuan (US$6.05 trillion), although its GDP per capita of US$4,300 is still low, and puts the PRC after a hundred countries in global GDP per capita rankings. China's primary, secondary, and tertiary industries contributed 10.6%, 46.8%, and 42.6% to its total GDP in 2009.

Region/country	1991–2003 Aveage	2007	2008	2009[b]	2010[c]
WORLD	2.8	3.9	1.7	-1.9	3.5
Developed economies	2.5	2.5	0.3	-3.4	2.2
of which:					
United States	3.3	2.1	0.4	-2.4	2.9
Japan	1.0	2.4	-1.2	-5.2	2.5
European Union (27)	2.3	2.8	0.7	-4.2	1.1
of which:					
Germany	1.7	2.5	1.3	-4.9	1.5
France	2.0	2.4	0.2	-2.6	1.2
Italy	1.6	1.4	-1.3	-5.1	0.8
United Kingdom	2.9	2.6	0.5	-4.9	1.1
Developing economies	4.6	7.8	5.4	2.4	6.9
of which:					
China	10.0	13.0	9.6	8.7	10.0
India	5.8	9.6	5.1	6.6	7.9
Brazil	2.5	6.1	5.1	-0.2	7.6
South Africa	2.4	5.5	3.7	-1.8	3.0
Least Developed Countries (LDCs)	4.2	8.4	5.4	4.7	5.7
Transition economies	..	8.5	5.4	-6.3	4.1
of which:					
Russian Federation	..	8.1	5.6	-7.9	4.3

TABLE 1.1: World economic growth 2007-2010 (annual percentage change)Source: UNCTAD (2010). Table 1.2. Export and import volumes of goods, selected regions and countries, 2006–2009. In: Trade and Development Report 2010.Data on trade volumes are derived from international merchandise trade values deflated by UNCTAD unit value indices.

China is the fourth most visited country in the world having a total of 50.9 million international visitors in 2009. China is a member of the WTO and is the world's second largest trading power behind the US, having a total international trade value of US$2.21 trillion – US$1.20 trillion in exports (#1) and US$1.01 trillion in imports (#2). Its foreign exchange reserves reached US$2.85 trillion at end of 2010, having an increase of 18.7 percent compared to the previous year, making its reserves by far the world's largest. China owns about $1.6 trillion of US securities, which means that China is holding US$1.16 trillion in US Treasury bonds. This puts China in the first position of the US public debt foreign holder. China is the world's third largest recipient of inward FDI, having in 2008 US$92.4 billion inward investments. Furthermore China increasingly invests abroad, with a total outward FDI of US$52.2 billion in 2008 China is the world's sixth largest outward investor. In 2010, China's inward FDI was $106 billion, increased by 16% since 2009.

China’s success has been primarily due to manufacturing as a low cost producer. This is the result of the combination of cheap labor, good infrastructure, relatively high productivity, favorable government policy, and a possibly undervalued exchange rate. Also the biggest advantage of China in manufacturing is its huge workforce, given though that China’s population is about 23% of the world’s population.

	Exports [a]				
	2007	2008	2009	2010[c]	2011[d]
East Asia[a]					
China	25.8	17.6	-16.1	12.7	13.5
China, Hong Kong	8.9	5.6	-11.9	13.0	6.3
Republic of Korea	14.2	14.2	-13.7	12.0	11.0
Mongolia	26.3	29.9	-24.9	-	-
China, Taiwan Province of	10.1	3.4	-20.2	19.6	8.5
Central Asia and transition economies[b]	33.1	25.5	-16.2	20.3	10.7
Armenia	16.7	-7.1	-35.0	5.2	11.8
Azerbaijan	63.4	43.8	-31.0	31.8	7.6
Georgia	25.3	16.3	-22.0	12.2	14.3
Kazakhstan	24.7	48.9	-38.9	29.9	12.8
Kyrgyzstan	47.7	38.1	-11.3	10.0	10.0
Tajikistan	10.0	-6.8	-1.4	8.8	10.4
Turkmenistan	33.8	26.8	8.0	45.6	-
Uzbekistan	42.9	44.2	1.7	18.9	18.6
South Asia[b]					
Afghanistan	1.3	18.9	-2.4	-	-
Bangladesh	15.8	17.4	10.1	5.0	11.0
Bhutan	83.7	4.4	-23.8	-	-
India	28.9	13.7	-15.0	16.0	12.0
Maldives	1.2	45.2	-50.7	-	-
Nepal	2.6	9.3	-4.7	-	-
Pakistan	4.4	18.2	-6.4	-1.4	4.2
Sri Lanka	11.0	6.5	-12.9	5.0	15.0
South-East Asia[b]					
Brunei Darussalam	0.5	37.5	-	-	-
Cambodia	10.7	15.1	-17.0	5.0	8.0
Indonesia	14.0	18.3	-14.4	10.8	9.2
Lao People's Democratic Republic	16.6	24.1	-10.0	15.0	13.0
Malaysia	9.6	13.1	-21.1	11.0	8.5
Myanmar	23.9	15.5	4.8	9.0	12.0
Philippines	6.4	-2.5	-22.3	15.2	12.7
Singapore	10.1	13.0	-20.3	19.5	14.0
Thailand	18.2	15.9	-13.9	16.0	18.0
Viet Nam	21.9	29.1	-8.9	9.0	14.0
The Pacific[b]					
Cook Islands	35.7	-3.7	-	-	-
Fiji Islands	9.0	20.4	-27.8	-	-
Kiribati	21.9	23.1	-	-	-
Marshall Islands	31.2	21.4	-	-	-

TABLE 1.2: Growth rate of merchandise exports, Asian sub regions (percentage change per year)Source: Asian Development Bank. Asian Development Outlook 2010 (statistical appendix).Data as reported in the balance of payments of each country. Exports are reported on a free-on-board basis.International Monetary Fund (2010). April.ESCAP (2010). Sub regional weighted averages. For more information, see Economic and Social Survey of Asia and the Pacific 2010 available at http://www.unescap.org.The 2009 figures are estimates and the 2010 figures are forecasts (made on 15 April 2010). The 2011 figures are forecasts (made on 15 April 2010).

The Chinese state still remains the main shareholder in the big industries (such as energy and heavy industries), but private enterprise (existing 30 million private businesses) met a great increase. Specifically in 2005, private enterprises accounted from 33% to 70% of national GDP, while the OECD estimation for that year was over 50% of China's national output, considerably higher than 1% that it was in 1978. Its stock market in Shanghai, the SSE, has raised record amounts of IPOs that doubled Shanghai Composite index since 2005. SSE's market capitalization reached US$3 trillion in 2007, making it the world's fifth largest exchange.

China now ranks 29th in the Global Competitiveness Index and ranked 135th among the 179 countries measured in the Index of Economic Freedom. 46 Chinese companies made the list in the 2010 Fortune Global 500 (Beijing alone with 30). Measured using market capitalization, four of the world's top ten most valuable companies are Chinese. Some of these include first-ranked PetroChina, third-ranked Industrial and Commercial Bank of China (the world's most valuable bank), fifth-ranked China Mobile (the world's most valuable telecommunications company) and seventh-ranked China Construction Bank.

Although a middle income country according to the Western standards, China’s rapid growth helped hundreds of millions of its people to get out of poverty since 1978. Today, about 10% of the Chinese population live below the poverty limit of US$1 per day, a percentage that has greatly been degreased from 64% in 1978, while life expectancy has been increased to 73 years. There is also a great increase in peoples education, more than 93% of the population is literate nowadays, compared to only 20% in 1950. Finally urban unemployment declined to 4% in China by the end of 2007, although true unemployment may at about 10%.

China's middle class population, considering those with an annual income of at least US$17,000, is more than 100 million nowadays, while the number of super rich individuals having more than 10 million Yuan, approximately US$1.5 million, is estimated to be about 825,000 people, according to Hurun Report. Based on the Hurun rich list, the number of US dollar billionaires in China has doubled from 130 in 2009 to 271 in 2010, putting China the world's second highest number of billionaires. China's retail market worth about RMB 8.9 trillion, approximately US$1.302 trillion in 2007, and is has been growing with a rate of 16.8% annually. China has now become the world's second largest consumer of luxury goods behind Japan, having

the 27.5% of the global share.

China's growth has been uneven, some geographic regions are growing faster than others, which leads to an income gap between the regions. Development has been mainly concentrated in the heavily urbanized eastern coastal regions, with the existence of a port in a region being a very important growth factor, resulting to the remainder of the country to grow with lower rates. To solve this problem, the government of the People's Republic of China has promoted development in the western, northeastern, and central regions of China.

The Chinese economy is highly energy intensive and inefficient compared to other countries, industrial processes in China use 20%–100% more energy than similar ones in OECD countries. China became the world's largest energy consumer in 2010, but still relies on coal to supply about 70% of its energy needs. All this energy consumption compared with the lack of basic environmental regulations has led to massive water and air pollution giving China the position of the 20est out of 30 of the world's most polluted cities.

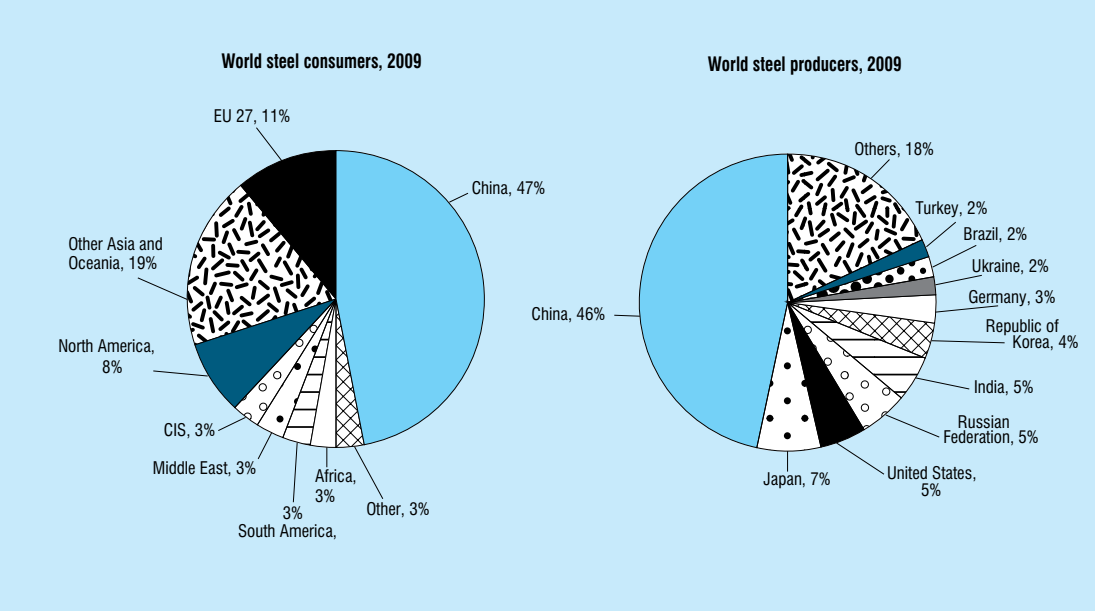


FIGURE 1.3: Steel consumers and producers in 2009 (world market share in percentages)Source: UNCTAD secretariat, on the basis of data from the World Steel Association (2010), Steel Statistical Yearbook 2010.

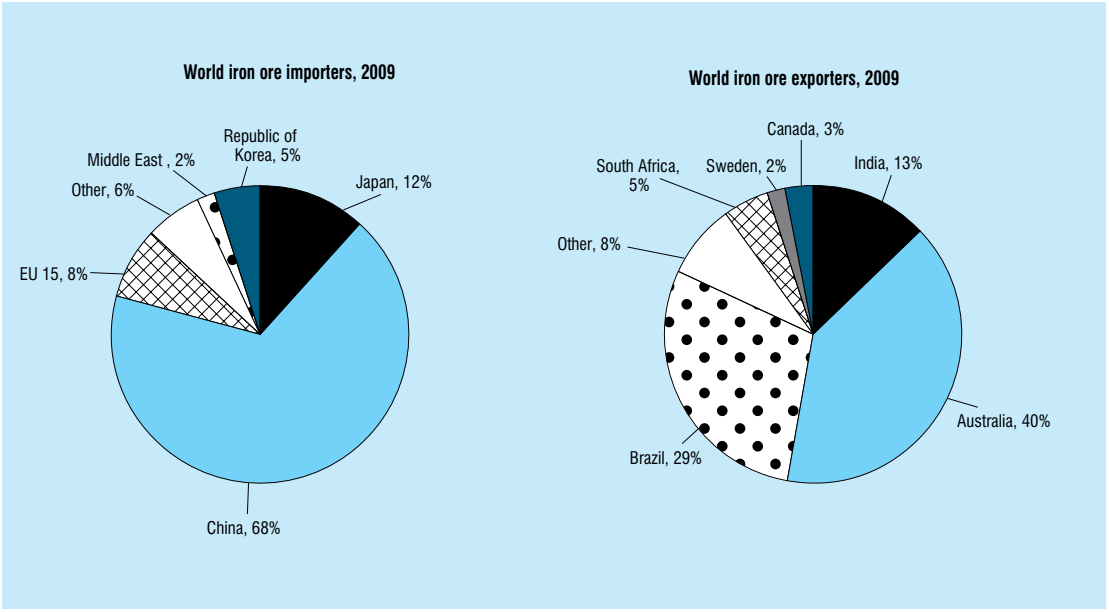


FIGURE 1.4: Major bulks: iron ore importers and exporters in 2009 (world market share in percentages)Source: UNCTAD secretariat, on the basis of data from Clarkson Research Services, published in the September 2010 issue of Dry Bulk Trade Outlook.

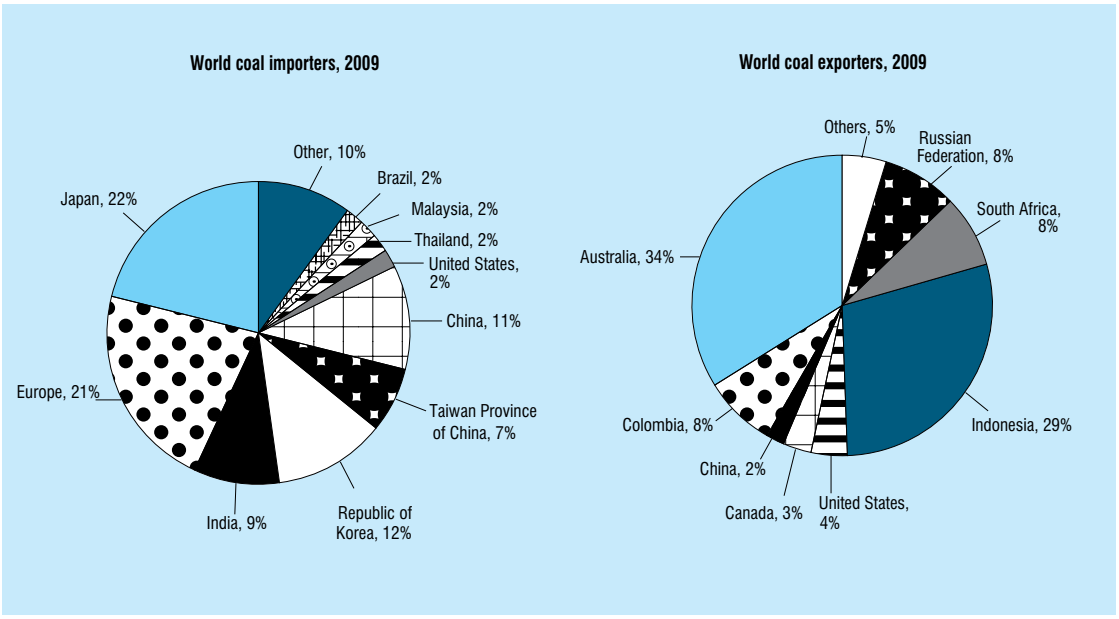


FIGURE 1.5: Major bulks: coals importers and exporters in 2009 (world market share in percentage)Source: UNCTAD secretariat, on the basis of data from Clarkson Research Services published in the September 2010 issue of Dry Bulk Trade Outlook.

Consequently, the government made the promise to turn to renewable energy, planning to make renewables constitute 30% of China's total energy production by the year 2050. In 2010, China became the largest wind energy provider in the world, with a total installed wind power capacity of 41.8 GW. In January 2011, Russia began providing oil to China through the Eastern Siberia – Pacific Ocean oil pipeline, pumping an average of 300,000 barrels of oil per day.

Transportation in Mainland China has been greatly improved by the government the last decades. The national road network has been massively expanded through the creation of a network of expressways, known as the National Trunk Highway System (NTHS). It is estimated that by the end of 2011, China's expressways will have reached a total length of 74,000 km (46,000 miles), taking the second place in the world's biggest road networks after the United States.

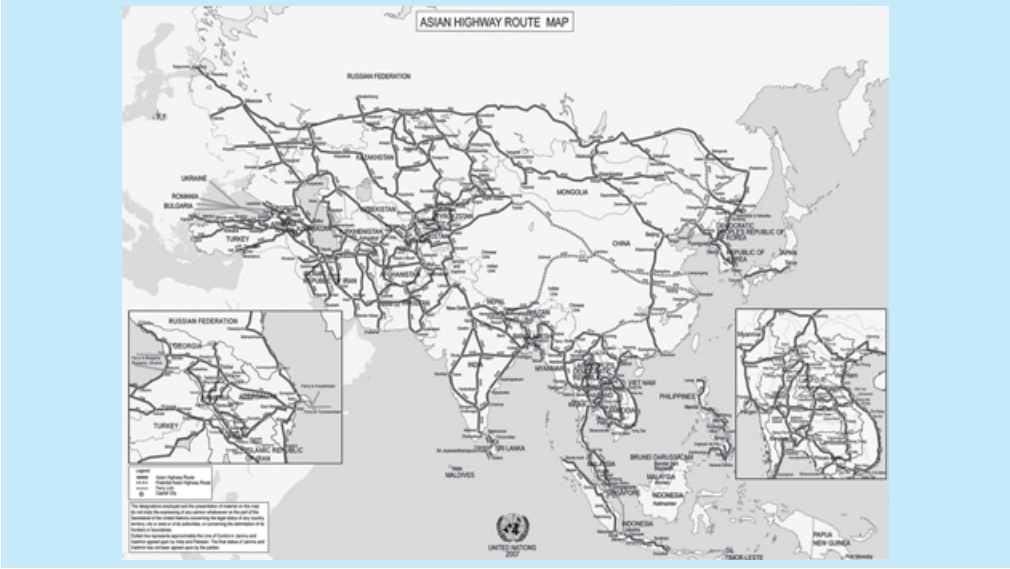


FIGURE 1.6: Map of Asian highways Source: ESCAP.

Ranked by total length of roadways	Roadways		Railways	Waterways	Pipelines	Airports
	Total (km)	Paved roads (km)	(km)	(km)	(km)	(number)
United States	6 465 799	4 209 835	226 427	41 009	793 285	5 146
India	3 316 452	1 517 077	63 327	14 500	22 773	251
China	1 930 544	1 575 571	77 834	110 000	58 082	413
Brazil	1 751 868	96 353	28 857	50 000	19 289	734
Japan	1 196 999	949 101	23 506	1 170	4 082	144
Canada	1 042 300	415 600	46 688	636	98 544	514
France	951 500	951 500	29 213	8 501	22 804	295
Russian Federation	933 000	754 984	87 157	102 000	246 855	596
Australia	812 972	341 448	37 855	2 000	30 604	462
Spain	681 224	681 224	15 288	1 000	11 743	154
Germany	644 480	644 480	41 896	7 467	31 586	331
Italy	487 700	487 700	19 729	2 400	18 785	101
Turkey	426 951	177 500	8 697	1 200	11 191	103
Sweden	425 300	139 300	11 633	2 052	786	249
Poland	423 997	295 356	22 314	3 997	15 792	126
United Kingdom	398 366	398 366	16 454	3 200	12 759	312
Indonesia	391 009	216 714	8 529	21 579	13 752	669
Mexico	356 945	178 473	17 516	2 900	40 016	243
Saudi Arabia	221 372	47 529	1 392	...	8 662	215
Belgium	152 256	119 079	3 233	2 043	2 023	42
Netherlands	135 470	113 018	2 811	6 215	4 897	27
Austria	107 262	107 262	6 399	358	3 541	55
Republic of Korea	103 029	80 642	3 381	1 608	2 250	113
Norway	92 946	72 033	4 114	1 577	95	98
Switzerland	71 298	71 298	4 888	65	1 763	66

TABLE 1.3: Extent of physical transportation systems in the world's top economies, in 2008. Source: UNCTAD secretariat, on the basis of data from the United States Department of Transportation in Freight Transportation: Global Highlights 2010 and Central Intelligence Agency in World Factbook 2009.Note: The United States has the world's most extensive freight transportation network, when measured by the number of kilometers of public-use paved roads, railways, waterways and pipelines, and also by the number of airports.

China also possesses the world's longest high-speed rail network, with over 4,618 miles (7,432 km) of service routes. 601 miles (967 km) of these routes serve trains with top speeds of 220 mph (350 km/h).

	Rail freight transport (in millions of ton-kilometres)			Total freight transport (in millions of ton-kilometres)		
	1970 to 2007	1990 to 2007	2000 to 2007	1970 to 2007	1990 to 2007	2000 to 2007
China	5.30	4.90	8.00	8.60	7.90	11.60
EU-10	-1.50	-3.40	0.80	1.10	1.10	5.50
EU-15	0.50	0.70	1.90	2.60	2.40	2.50
India	5.50	4.80	7.60	6.80	5.30	8.90
Japan	-2.60	-0.90	0.80	1.70	1.30	1.70
Russian Federation	0.60	-1.10	6.20	1.30	-1.10	6.00
United States	2.20	3.00	1.80	2.20	2.00	1.10

TABLE 1.4: Compound growth rates in transport (percentages). Source: UNCTAD secretariat, based on Thompson L (2010). A Vision for Railways in 2050. International Transport Forum

Private car ownership is growing rapidly in China surpassing the United States as the largest automobile market in the world in 2009, with total car sales of over

13.6 million.

Rank in 2008 [a]	Country	Total roadways			Paved roadways	
		Population density (number of people per square kilometre)	Kilometres per capita (1 000 persons)	Roadway kilometres per square kilometre of land area	Kilometre per capita (1 000 persons)	Kilometres of roadway per square kilometre of land area
1	United States	34	21	0.71	13.7	0.46
2	Japan	349	9.4	3.28	7.5	2.6
3	China	140	1.4	0.2	1.2	0.16
4	Germany	236	7.8	1.85	7.8	1.85
5	France	116	14.9	1.73	14.9	1.73
6	United Kingdom	253	6.5	1.65	6.5	1.65
7	Italy	198	8.4	1.66	8.4	1.66
8	Russian Federation	9	6.7	0.06	5.4	0.05
9	Spain	81	16.8	1.37	16.8	1.37
10	Brazil	23	8.8	0.21	0.5	0.01
11	Canada	4	31.1	0.11	12.4	0.05
12	India	392	2.8	1.12	1.3	0.51
13	Mexico	57	3.2	0.18	1.6	0.09
14	Australia	0.4	105.8	0.04	44.4	0.02
15	Republic of Korea	501	2.1	1.06	1.7	0.83
16	Netherlands	493	8.1	4	6.8	3.33
17	Turkey	100	5.6	0.55	2.3	0.23
18	Poland	126	11	1.39	7.7	0.97
19	Indonesia	133	1.6	0.22	0.9	0.12
20	Belgium	344	14.6	5.03	11.4	3.93
21	Switzerland	190	9.4	1.78	9.4	1.78
22	Sweden	22	46.9	1.04	15.4	0.34
23	Saudi Arabia	13	7.7	0.1	1.7	0.02
24	Norway	15	19.9	0.31	15.5	0.24
25	Austria	100	13.1	1.3	13.1	1.3

TABLE 1.5: Road transportation systems of the world's top 25 economies, 2008. Source: UNCTAD secretariat, based on United States Department of Transportation (2010). Freight transportation: Global highlights 2010.World's leading economies ranked by GDP.

Domestic air travel has also increased significantly in China, but still remains too expensive for most. Railways and charter bus systems are the most common long distance transportation. Railways are the vital carrier in China and for that reason they are monopolized by the state, divided into various railway bureaus in different regions. Because of the huge demand, the system often subjects to overcrowding problems, particularly during holiday seasons.

High-speed transit systems are also rapidly developing in China's major cities, in the form of networks of underground or light rail systems. Hong Kong has one of the most developed transport systems in the world, while Shanghai has a high-speed

maglev rail line connecting the city to its main international airport, Pudong International Airport.

In 1961 the People's Republic of China established a state-run maritime shipping company and signed shipping agreements with many countries, creating the foundation for developing the country's ocean transport. That organization is nowadays known as the China Ocean Shipping (Group) Company (COSCO). The Chinese government also invested in water transport infrastructure, constructing new ports and rebuilding and enlarging older facilities.

Country or territory of ownership [b]	Number of vessels			Deadweight tonnage				
	National flag[c]	Foreign flag	Total	National flag[c]	Foreign flag	Total	Foreign flag as a percentage of total	Total as a percentage of world total, 1 Jan. 2010
Greece	741	2 409	3 150	58 478 197	127 616 965	186 095 162	69	15.96
Japan	720	3 031	3 751	14 443 324	168 876 356	183 319 680	92	15.73
China	2 024	1 609	3 633	41 026 075	63 426 314	104 452 389	61	8.96
Germany	458	3 169	3 627	16 926 387	86 969 282	103 895 669	84	8.91
Republic of Korea	775	425	1 200	18 865 348	26 017 970	44 883 318	58	3.85
United States	920	945	1 865	21 529 559	19 761 196	41 290 755	48	3.54
Norway	820	1 148	1 968	14 102 299	26 416 491	40 518 790	65	3.48
China, Hong Kong	350	330	680	21 225 179	13 216 692	34 441 871	38	2.95
Denmark	360	580	940	12 937 381	20 261 040	33 198 421	61	2.85
Singapore	598	387	985	17 377 216	15 232 228	32 609 444	47	2.80
China, Taiwan Province of	92	545	637	3 769 436	25 721 242	29 490 678	87	2.53
United Kingdom	357	437	794	8 948 902	17 262 720	26 211 622	66	2.25
Italy	608	236	844	15 277 538	7 176 463	22 454 001	32	1.93
Russian Federation	1 472	515	1 987	5 860 326	13 571 242	19 431 568	70	1.67
Canada	210	223	433	2 303 767	15 980 908	18 284 675	87	1.57
Bermuda	0	180	180	0	17 192 696	17 192 696	100	1.47
India	443	66	509	14 280 882	2 885 687	17 166 569	17	1.47
Turkey	558	664	1 222	7 139 310	9 629 658	16 768 968	57	1.44
Iran (Islamic Republic of)	74	91	165	853 008	12 839 807	13 692 815	94	1.17
Saudi Arabia	74	98	172	1 740 908	11 464 923	13 205 831	87	1.13
Belgium	85	149	234	5 581 132	6 966 887	12 548 019	56	1.08
Malaysia	380	100	480	8 783 140	3 655 990	12 439 130	29	1.07
United Arab Emirates	63	354	417	698 818	8 525 258	9 224 076	92	0.79
Indonesia	778	90	868	7 069 985	1 868 730	8 938 715	21	0.77
Cyprus	129	206	335	3 542 642	5 339 340	8 881 982	60	0.76
Netherlands	528	272	800	4 828 515	3 989 203	8 817 718	45	0.76
Brazil	128	33	161	2 272 241	5 463 966	7 736 207	71	0.66
France	180	224	404	2 994 852	4 390 712	7 385 564	59	0.63
Sweden	136	217	353	1 453 082	5 570 298	7 023 380	79	0.60
Viet Nam	460	84	544	4 560 855	2 230 992	6 791 847	33	0.58
Kuwait	39	47	86	3 835 639	2 767 625	6 603 264	42	0.57
Spain	173	231	404	1 405 579	3 839 347	5 244 926	73	0.45
Isle of Man	2	30	32	4 968	4 817 656	4 822 624	100	0.41
Switzerland	35	122	157	1 023 109	2 925 288	3 948 397	74	0.34
Thailand	298	45	343	3 007 664	785 892	3 793 556	21	0.33
Total (35 countries)	15 068	19 292	34 360	348 147 263	764 657 064	1112 804 327	69	95.46
World total	17 279	21 133	38 412	368 251 867	797 468 296	1165 720 163	68	100.00

TABLE 1.6: The 35 countries and territories with the largest controlled fleets (dwt), as at 1 January

2010. Source: Compiled by the UNCTAD secretariat, on the basis of data supplied by IHS Fairplay Vessels of 1,000 GT and above, ranked by deadweight tonnage; excluding the United States Reserve Fleet and the United States and Canadian Great Lakes fleets (which have a combined tonnage of 5.7 million dwt). The country of ownership indicates where the true controlling interest (i.e. parent company) of the fleet is located. In several cases, determining this has required making certain judgments. Thus, for instance, Greece is shown as the country of ownership for vessels owned by a Greek national with representative offices in New York, London and Piraeus, although the owner may be domiciled in the United States. Includes vessels flying the national flag but registered in territorial dependencies or associated self-governing territories such as the Isle of Man (United Kingdom), and also second registries such as DIS (Denmark), NIS (Norway) or FIS (France). For the United Kingdom, British-flag vessels are included under the national flag, except for Bermuda.

A great effort has also been made to increase mechanization and containerization at major international ports, such as Shanghai and Hong Kong. China's shipping industry and container transportation have now reached international standards because of their handling efficiency and their building networks. The government's responsibility for the shipping industry has been given to the Ministry of Transport.

	Republic of Korea	China	Japan	All other countries	Total	Percentage of total gross tonnage
Bulk and ore carriers	4 115	9 386	8 107	866	22 474	28.9
Percentage	*18.3*	*41.8*	*36.1*	*3.9*	*100.0*	
Crude and crude/oil products tankers	8 153	5 567	3 792	61	17 573	22.6
Percentaget	*46.4*	*31.7*	*21.6*	*0.3*	*100.0*	
Container ships (fully cellular)	6 672	2 187	1 124	1 685	11 669	15.0
Percentage	*57.2*	*18.7*	*9.6*	*14.4*	*100.0*	
Products and chemical tankers	4 627	2 422	1 494	1 074	9 617	12.4
Percentage	*48.1*	*25.2*	*15.5*	*11.2*	*100.0*	
LNG and LPG tankers	4 351	338	1 237	47	5 974	7.7
Percentage	*72.8*	*5.7*	*20.7*	*0.8*	*100.0*	
Vehicles carriers	445	407	1 995	332	3 178	4.1
Percentage	*14.0*	*12.8*	*62.8*	*10.4*	*100.0*	
General cargo ships	10	1 171	242	412	1 835	2.4
Percentage	*0.5*	*63.8*	*13.2*	*22.4*	*100.0*	
All other vessel sub-types	584	722	1 110	2 950	5 366	6.9
Percentage	*10.9*	*13.5*	*20.7*	*55.0*	*100.0*	
Total	28 957	22 201	19 101	7 427	77 686	100.0
Percentage of total gross tonnage	*37.3*	*28.6*	*24.6*	*9.6*	*100.0*	

TABLE 1.7: Deliveries of new buildings, main shipbuilding countries (2009, thousands of gross tons)Source: Compiled by the UNCTAD secretariat, on the basis . of data from HIS Fairplay.

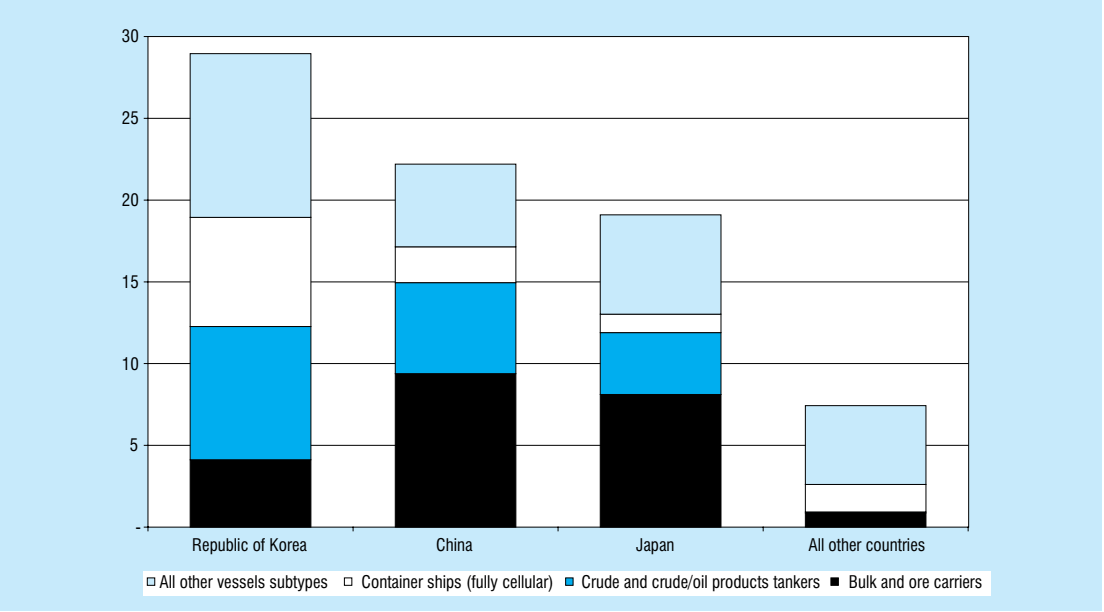


FIGURE 1.7: Deliveries of new buildings, main shipbuilding countries (2009, thousands of gross tons). Source: Compiled by the UNCTAD secretariat, on the basis of data from HIS Fairplay.

	China	India	Bangladesh	Pakistan	All other countries	Total	Percentage of total gross tonnage
Container ships (fully cellular)	2 566	2 079	201	147	112	5 104	*22.6*
Percentage	*50.3*	*40.7*	*3.9*	*2.9*	*2.2*	*100.0*	
Bulk and ore carriers	1 461	1 369	1 731	399	140	5 100	*22.6*
Percentage	*28.7*	*26.9*	*33.9*	*7.8*	*2.7*	*100.0*	
Vehicle carriers	2 407	652	270	-	75	3 404	*15.1*
Percentage	*70.7*	*19.2*	*7.9*	-	*2.2*	*100.0*	
Crude and crude/oil products tankers	227	110	2 234	287	-	2 858	*12.7*
Percentage	*7.9*	*3.9*	*78.2*	*10.1*	-	*100.0*	
General cargo ships	482	1 144	183	161	227	2 197	*9.7*
Percentage	*21.9*	*52.0*	*8.4*	*7.3*	*10.4*	*100.0*	
Products and chemical tankers	108	271	438	99	22	938	*4.2*
Percentage	*11.5*	*28.9*	*46.7*	*10.6*	*2.4*	*100.0*	
LPG tankers	1	216	211	44	7	478	*2.1*
Percentage	*0.2*	*45.1*	*44.1*	*9.2*	*1.4*	*100.0*	
All other vessel sub-types	541	1 102	335	281	243	2 501	*11.1*
Percentage	*21.6*	*44.0*	*13.4*	*11.2*	*9.7*	*100.0*	
Total gross tonnage	7 792	6 943	5 603	1 417	826	22 581	*100.0*
Percentage of total gross tonnage	*34.5*	*30.7*	*24.8*	*6.3*	*3.7*	*100.0*	

TABLE 1.8: Tonnage reported sold for demolition, main ship breaking countries, 2009 (thousands of gross tons). Sources: Compiled by the UNCTAD secretariat, on the basis of data from IHS Fairplay.

The number of container units handled by mainland Chinese ports in November 2007 reached 100 million TEU's. The country also manufactures 90% of the world's container units. The throughput of cargo and containers at China's ports has been the largest in the world for the past five years, with an annual growth rate of 35%.

Name of country or territory	2007	2008	Preliminary figures for 2009	Percentage change 2008–2007	Percentage change 2009–2008
China	103 823 024	115 934 578	108 860 631	11.67	-6.10
Singapore[a]	28 767 500	30 891 200	26 592 800	7.38	-13.91
China, Hong Kong	23 998 449	24 494 229	20 983 000	2.07	-14.33
Republic of Korea	17 086 133	17 417 723	15 749 676	1.94	-9.58
Malaysia	14 828 836	15 813 769	15 458 980	6.64	-2.24
United Arab Emirates	13 182 412	14 756 127	14 437 588	11.94	-2.16
China, Taiwan Province of	13 720 013	12 971 224	11 352 097	-5.46	-12.48
India	7 376 733	7 660 705	7 849 982	3.85	2.47
Indonesia	6 582 910	7 062 872	6 568 791	7.29	-7.00
Brazil	6 464 724	6 904 260	6 271 332	6.80	-9.17
Egypt	5 194 676	6 114 629	6 172 637	17.71	0.95
Thailand	6 339 261	6 726 237	5 981 737	6.10	-11.07
Panama	4 022 513	5 129 499	4 597 112	27.52	-10.38
Viet Nam	4 009 066	4 393 699	4 533 606	9.59	3.18
Turkey	4 678 872	5 193 730	4 491 206	11.00	-13.53
Saudi Arabia	4 208 854	4 652 022	4 430 676	10.53	-4.76
Philippines	4 338 993	4 465 582	4 170 389	2.92	-6.61
Oman	2 876 969	3 427 990	3 813 991	19.15	11.26
South Africa	3 712 090	3 900 319	3 510 240	5.07	-10.00
Sri Lanka	3 687 338	3 687 465	3 464 297	0.00	-6.05
Mexico	1 661 208	3 310 192	2 869 571	99.26	-13.31
Chile	2 725 218	3 150 020	2 776 562	15.59	-11.86
Russian Federation	2 962 385	3 371 559	2 478 136	13.81	-26.50
Iran (Islamic Republic of)	1 722 513	2 000 230	2 206 476	16.12	10.31
Colombia	2 076 760	1 955 685	2 017 924	-5.83	3.18
Pakistan	1 935 882	1 938 001	1 877 052	0.11	-3.14
Jamaica	2 016 792	1 915 943	1 689 670	-5.00	-11.81
Argentina	1 874 259	1 997 146	1 611 678	6.56	-19.30
Bahamas	1 632 000	1 702 000	1 323 000	4.29	-22.27
Peru	1 233 547	1 509 507	1 301 426	22.37	-13.78
Venezuela (Bolivarian Republic of)	1 331 711	1 325 194	1 239 508	-0.49	-6.47
Bangladesh	978 007	1 091 719	1 179 548	11.63	8.05
Ecuador	674 837	670 831	1 000 895	-0.59	49.20
Lebanon	947 625	945 105	992 559	-0.27	5.02
Guatemala	870 288	937 642	906 326	7.74	-3.34
Costa Rica	976 621	1 004 971	875 687	2.90	-12.86
Dominican Republic	883 785	1 092 430	716 078	23.61	-34.45
Côte d'Ivoire	590 306	713 625	677 029	20.89	-5.13

Name of country or territory	2007	2008	Preliminary figures for 2009	Percentage change 2008–2007	Percentage change 2009–2008
Jordan	414 000	582 515	674 525	40.70	15.80
Yemen	773 016	772 792	634 876	-0.03	-17.85
Kenya	585 367	615 733	618 816	5.19	0.50
Uruguay	596 487	675 273	588 410	13.21	-12.86
Syrian Arab Republic	538 525	610 607	575 299	13.39	-5.78
Honduras	636 435	669 802	571 756	5.24	-14.64
Trinidad and Tobago	514 557	554 093	567 183	7.68	2.36
Ghana	544 294	612 362	551 126	12.51	-10.00
Ukraine	990 201	1 123 268	522 364	13.44	-53.50
Sudan	342 152	391 139	431 232	14.32	10.25
Mauritius	412 896	454 433	420 055	10.06	-7.57
United Republic of Tanzania	350 991	363 310	343 851	3.51	-5.36
Senegal	424 457	347 483	331 076	-18.13	-4.72
Cuba	319 857	319 000	287 100	-0.27	-10.00
Papua New Guinea	282 356	254 592	262 209	-9.83	2.99
Algeria	200 050	225 140	249 073	12.54	10.63
Tunisia	420 501	424 780	243 995	1.02	-42.56
Cameroon	217 681	270 000	243 000	24.03	-10.00
Bahrain	238 624	269 331	242 398	12.87	-10.00
Cambodia	253 271	258 775	232 898	2.17	-10.00
Georgia	184 792	209 614	188 653	13.43	-10.00
Namibia	148 234	183 605	165 245	23.86	-10.00
Libyan Arab Jamahiriya	122 122	174 827	157 344	43.16	-10.00
Croatia	145 040	168 761	151 885	16.35	-10.00
Guam	165 427	167 784	151 006	1.42	-10.00
Madagascar	112 427	143 371	132 278	27.52	-7.74
El Salvador	144 458	156 323	126 369	8.21	-19.16
Subtotal	317 479 388	343 228 373	316 693 913	8.11	7.73
Other reported[b]	621 116	715 048	594 822	15.12	-17.11
Total reported[c]	316 692 444	345 345 013	317 288 735	9.05	-7.81
World total	488 916 538	515 762 923	465 597 537	5.49	-9.73

TABLE 1.9: Container port traffic for 65 developing economies: 2007, 2008 and 2009 (in TEUs) (concluded). Source: UNCTAD secretariat, derived from information contained in Containerization International Online (June 2010), from various Dynamar B.V. publications, and from information obtained by the UNCTAD secretariat directly from terminal and port authorities.. Singapore, in this table, includes the port of Jurong.. Comprises developing economies where fewer than 100,000 TEUs per year were reported or where a substantial lack of data was noted.. Certain ports did not respond to the background survey. While they were not among the largest ports, the total omissions can be estimated at 5 to 10 per cent.. While every effort is made to obtain up-to-date data, the figures for 2009 are, in some cases, estimates. Port throughput figures tend not to be disclosed by ports until a considerable time after the end of the calendar year. In some cases, this is due to the publication of annual accounts at the close of the financial year. Country totals may conceal the fact that minor ports may not be included; therefore, in some cases, the actual figures may be higher than those given. The figures for 2008 are generally regarded as more reliable, and are therefore more often quoted in the accompanying text.

Country/ territory	Port	Thousands of TEUs						Annual growth		
		2006	2007	2008	2009	% share 2007 (sample)	Rank (sample)	2006/ 2007	2007/ 2008	2008/ 2009
China		54 949	66 071	70 940	64 015	37.57%		20.24%	7.37%	-9.76%
	Shanghai	21 710	26 150	27 980	25 002	14.87%	2	20.45%	7.00%	-10.64%
	Shenzhen	18 469	21 099	21 414	18 250	12.00%	4	14.24%	1.49%	-14.77%
	Qingdao	7 702	9 462	10 320	10 260	5.38%	7	22.85%	9.07%	-0.58%
	Ningbo	7 068	9 360	11 226	10 503	5.32%	8	32.43%	19.94%	-6.44%
French Polynesia	Papeete	66	69	70	68	0.04%	21	5.96%	0.89%	-3.14%
China, Hong Kong	Hong Kong	23 539	23 998	24 248	20 983	13.65%	3	1.95%	1.04%	-13.47%
India	Mumbai	138	118	..	..	0.07%	20	-14.91%	..	..
Indonesia	Tanjung Priok	3 420	3 690	3 984	3 800	2.10%	12	7.90%	7.98%	-4.63%
Malaysia	Port Klang	6 326	7 119	7 970	7 300	4.05%	9	12.53%	11.96%	-8.41%
	Tanjung Pelepas	4 770	5 500	5 600	6 000	3.13%	10	15.30%	1.82%	7.14%
Pakistan		**1 777**	**1 936**	**..**	**..**	**1.01%**		**8.94%**	**..**	**..**
	Karachi	1 107	1 220	..	..	0.69%	17	10.14%	..	..
	Port Mohammad Bin Qasim	670	716	687	..	0.41%	18	6.96%	-4.09%	..
Philippines	Manila	2 720	2 869	2 978	..	1.63%	14	5.51%	3.77%	..
Republic of Korea	Busan	12 039	13 261	13 425	11 955	7.54%	5	10.15%	1.24%	-10.95%
Singapore	Singapore	24 792	27 936	29 918	25 866	15.88%	1	12.68%	7.10%	-13.54%
Sri Lanka	Colombo	3 079	3 382	3 687	3 464	1.92%	13	9.83%	9.04%	-6.05%
China, Taiwan Province of		13 102	13 722	..	10 727	7.80%		4.73%	..	..
	Kaohsiung	9 775	10 257	9 677	8 581	5.83%	6	4.93%	-5.66%	-11.32%
	Keelung	2 129	2 215	2 055	1 578	1.26%	15	4.07%	-7.23%	-23.23%
	Taichung	1 199	1 250	..	568	0.71%	19	4.29%	..	..
Thailand		5 574	6 200	6 586	5 844	3.53%		11.23%	6.22%	-11.27%
	Laem Chabang	4 123	4 642	5 134	4 622	2.64%	11	12.58%	10.60%	-9.98%
	Bangkok	1 451	1 559	1 452	1 222	0.89%	16	7.38%	-6.84%	-15.83%

TABLE 1.10: Container port throughput in selected countries of Asia and the Pacific. Source: UNCTAD, using data from Containerization Online.

2 SHANGHAI

2.1 GENERAR INFORMATION

Shanghai is the commercial and financial center of mainland China. It was the largest and most prosperous city in the Far East during the 1930s, and rapid re-development began in 1990s. For example we can see the Pudong District, which became the first area for integrated economic reforms.

Today, Shanghai is again one of the most prosperous cities in the world. Its cosmopolitan character, sophisticated and affluent consumers, and highly educated skilled labor force make it highly attractive to overseas investors. Shanghai has recorded double-digit growth for 15 consecutive years since 1992, when it became the center of finance and trade in new China. Shanghai is now aiming to be a global finance hub and an international shipping center in the near future.

The three largest service industries that Shanghai is worldwide known of are financial services, retail, and real estate. The manufacturing and agricultural sectors contributed to the total output with 39.9 percent and 0.7 percent of the total each. Finally the average annual disposable income of the residents of Shanghai for the first three quarters of 2009, was 21,871 RMB.

Shanghai was the leading financial center of Far East in the 1930s and as a result the city has a solid foundation in the financial services industry. In Shanghai there is a complete financial institution, including commercial banks, securities companies, insurance companies, fund management companies, trust companies, futures companies and financial leasing companies. By the end of 2009, there were 787 financial institutions 170 of which were foreign-invested. In 2009, the Shanghai Stock Exchange took the third place among worldwide stock exchanges in terms of trading volume and the sixth in terms of the total capitalization of listed companies. Also the trading volume of six key products such as rubber, copper and zinc on the Shanghai Futures Exchange took the first place in the world. Shanghai is now in the fifth place in the latest edition of the Global Financial Centers Index published by the City of London.

Shanghai has been always optimizing and upgrading its industrial structure and it is also speeding up the development of its advanced manufacture sector. Shanghai is one of the most important cities for China's heavy industries. A large number of industrial

zones, including Shanghai Hongqiao Economic and Technological Development Zone, Jinqiao Export Economic Processing Zone, Minhang Economic and Technological Development Zone, and Shanghai Caohejing High-Tech Development Zone, are the most important factors of Shanghai's secondary industry. In 2009 78% of the gross industrial output came from the heavy industries. It is not common that Baosteel Group and Jiangnan Shipyard, China’s largest steelmaker and one of China's oldest shipbuilders are both located in Shanghai. Auto manufacture industry is also important in Shanghai. Shanghai Automotive Industry Corporation (Group), “SAIC”, is in the top 3 automotive corporations in China and also has a strategic partnership with Volkswagen and General Motors.

2.2 THE PORT OF SHANGHAI

FIGURE 2.1 :Shanghai map

1) Shanghai Pudong International Container Terminals Ltd
   SIGP Zhendong Container Terminal Branch Ltd
2) Shanghai East Container Terminals Co. Ltd
   Shanghai Mingdong Container Terminals Ltd
3) Shanghai Container Terminals Co. Ltd (SCT)
4) Shanghai Shengdong International Container Terminals Co. Ltd

2.2.1 Geographical location

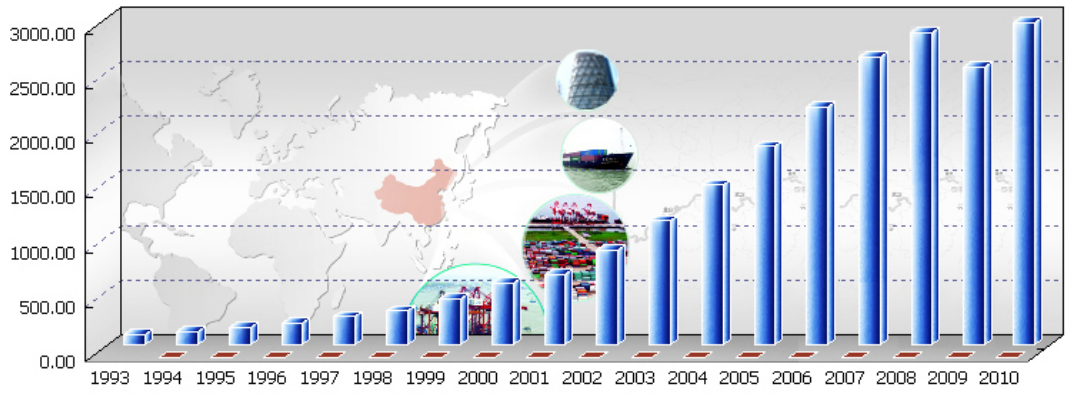
Port of Shanghai is situated at the middle of the 18,000km long Chinese coastline, where the Yangtze River, known as "the Golden Waterway", flows into the sea. It is the leading port in the T-shaped waterway network composed by the Yangtze River and the coastline, and is also China's largest port and one of the country's most important gateways for foreign trade.

It is situated towards the northern and southern coastal seas of China and the Pacific Ocean and is linked geographically with the Yangtze River and the inland waterways of Yangtze River Valley region including Jiangsu, Zhejiang and Anhui provinces etc. Expressway and state-level highways connect the Port with the national highway network and all regions of the country.

Furthermore the Port enjoys an advantageous geographical location, favorable natural conditions, vast economically developed hinterlands, and complete inland distribution infrastructure and facilities. The port of Shanghai is connected through the Yangtze River Delta with the entire Yangtze River valley. The cities situated in the Yangtze River Delta are some of the most prosperous cities in China. The Jianghan Plain and Sichuan Basin are densely populated areas where there is great development of the agriculture and there is also a strong industrial base. These areas will prove to be the 'heart' that will lead to the sustainability of the growth of the Port of Shanghai.

2.2.2 Port's trade

The annual import and export trade through Shanghai, in terms of value, is calculated to a quarter of China's total foreign trade. The Port's container throughput in 2010 reached 29.069 million TEUs, ranking it the largest container port in the world.



Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Growth Rate		28.24	27.3	29.08	28.21	21.33	37.51	33.11	12.97	35.84	31.00	29.00	24.25	20.05	20.46	7.09	-10.72	16.26
Throughput	93.5	120	153	197	253	307	422	561	634	861	1128	1455	1808	2171	2615.2	2800.6	2500.2	2906.9

FIGURE 2.2: Shanghai port Container Throughput

Rank	Port	Country	Measure	2009 Thousands of tons	2008 Thousands of tons	2007 Thousands of tons	2006 Thousands of tons	2005 Thousands of tons	2004 Thousands of tons
1	Shanghai	People's Republic of China	MT	505,715	508,000	561,446	537,000	443,000	378,962
2	Singapore	Singapore	FT	472,300	515,415	483,616	448,500	423,267	393,418
3	Rotterdam	Netherlands	MT	386,957	421,136	401,181	378,400	376,600	352,563
4	Tianjin	People's Republic of China	MT	381,110	365,163	309,465	257,600	245,100	206,161
5	Ningbo-Zhoushan	People's Republic of China	MT	371,540	361,850	471,630	309,700	272,400	225,850
6	Guangzhou	People's Republic of China	MT	364,000	347,000	341,363	302,800	241,700	215,190

7	Qingdao	People's Republic of China	MT	274,304	278,271	265,020	224,200	184,300	161,650
8	Qinhuangdao	People's Republic of China	MT	243,850	252,000	245,964	204,900	167,500	150,320
9	Hong Kong	People's Republic of China	MT	242,967	259,402	245,433	238,200	230,139	220,879
10	Busan	South Korea	RT	226,182	241,683	243,564	217,900	217,200	219,760
11	Dalian	People's Republic of China	MT	204,000	246,000	222,859	200,500	176,800	145,162
12	South Louisiana	United States	MT	192,853	203,157	207,785	204,600	192,549	203,517
13	Houston	United States	MT	191,729	192,473	196,014	201,500	192,023	183,419
14	Shenzhen	People's Republic of China	MT	211,000	187,045	199,190	176,000	153,900	135,246
15	Port Hedland	Australia	MT	178,625	159,391	130,707	111,800	110,600	108,500
16	Gwangyang	South Korea	RT	176,564	N/A	198,190	202,400	177,500	165,875
17	Ulsan	South Korea	RT	170,314	170,279	168,652	161,100	103,50	156,500
18	Nagoya	Japan	FT	165,101	218,130	215,602	208,000	187,100	182,289
19	Antwerp	Belgium	MT	157,807	189,390	182,897	167,400	160,100	152,300
20	Chiba	Japan	MT	144,904	165,143	169,202	167,000	165,700	169,300

TABLE 2.1: List of world's busiest ports by cargo tonnage. SOURCE: AAPA World Port Rankings 2009

Rank	Port	Country	2009	2008	2007	2006	2005	2004
1	Singapore	Singapore	25,866	29,918	27,932	24,792	23,192	21,329
2	Shanghai	People's Republic of China	25,002	27,980	26,150	21,710	18,084	14,557
3	Hong Kong	People's Republic of China	20,983	24,248	23,881	23,539	22,427	21,984
4	Shenzhen	People's Republic of China	18,250	21,414	21,099	18,469	16,197	13,615
5	Busan	South Korea	11,954	13,425	13,270	12,039	11,843	11,430
6	Guangzhou	People's Republic of China	11,190	11,001	9,200	6,600	4,685	3,308
7	Dubai	United Arab Emirates	11,124	11,827	10,653	8,923	7,619	6,429
8	Ningbo	People's Republic of China	10,502	11,226	9,349	7,068	5,208	4,006
9	Qingdao	People's Republic of China	10,260	10,320	9,462	7,702	6,307	5,140
10	Rotterdam	Netherlands	9,743	10,784	10,791	9,655	9,287	8,281
11	Tianjin	People's Republic of China	8,700	8,500	7,103	5,950	4,801	3,814
12	Kaohsiung	Taiwan (Republic of China)	8,581	9,677	10,257	9,775	9,471	9,714
13	Port Klang	Malaysia	7,309	7,970	7,120	6,326	5,544	5,244
14	Antwerp	Belgium	7,309	8,663	8,176	7,019	6,482	6,064
15	Hamburg	Germany	7,007	9,737	9,890	8,862	8,088	7,003
16	Los Angeles	United States of America	6,748	7,850	8,355	8,470	7,485	7,321
17	Tanjung Pelepas	Malaysia	6,000	5,600	5,500	4,770	4,177	4,020

18	Long Beach	 United States of America	5,067	6,350	7,316	7,289	6,710	5,780
19	Xiamen	 People's Republic of China	4,680	5,035	4,627	4,019	3,342	2,872
20	Bremen/Bremerhaven	 Germany	4,578	5,529	4,912	4,450	3,736	3,469
21	New York/New Jersey	 United States of America	4,561	5,265	5,299	5,093	4,785	4,478
22	Dalian	 People's Republic of China	4,552	4,503	4,574	3,212	2,665	2,211
23	Laem Chabang	 Thailand	4,538	5,134	4,642	4,123	3,834	3,529
24	Jawaharlal Nehru (Mumbai)	 India	4,061	3,953	4,060	3,298	2,667	2,361
25	Tokyo	 Japan	3,810	4,271	3,818	3,969	3,593	3,358
26	Jakarta	 Indonesia	3,800	3,984	3,900	3,280	3,282	3,170
27	Valencia	 Spain	3,653	3,593	3,043	2,612	2,410	2,145
28	Ho Chi Minh City (Saigon)	 Vietnam	3,563	3,100	2,532	2,532	2,122	1,868
29	Salalah	 Oman	3,490	3,068	2,600	2,390	2,492	2,229
30	Colombo	 Sri Lanka	3,464	3,687	3,380	3,079	2,455	2,221
31	Port Said	 Egypt	3,300	3,202	2,127	2,127	1,522	869
32	Felixstowe	 United Kingdom	3,100	3,200	3,300	3,000	2,700	2,717
33	Jeddah	 Saudi Arabia	3,091	3,326	3,068	2,964	2,836	2,426
34	Algeciras	 Spain	3,042	3,324	3,152	3,257	3,180	2,937
35	Lianyungang	 People's Republic of China	3,021	3,001	2,001	1,302	1,005	N/A
36	Gioia Tauro	 Italy	2,857	3,468	3,445	2,900	3,161	3,261

37	Manila	Philippines	2,815	2,977	2,800	2,638	2,625	2,698
38	Khor Fakkan	United Arab Emirates	2,750	2,112	1,850	1,730	1,929	1,819
39	Yokohama	Japan	2,555	3,490	3,400	3,200	2,873	2,718
40	Yingkou	People's Republic of China	2,537	2,030	1,371	838	634	N/A
40	Durban	South Africa	2,395	2,560	2,511	2,334	1,955	1,717
41	Savannah	United States of America	2,356	2,616	2,604	2,160	1,902	1,662
42	Zeebrugge	Belgium	2,328	2,209	2,020	1,653	1,407	N/A
43	Marsaxlokk	Malta	2,260	2,300	1,887	1,458	1,321	N/A
44	Santos	Brazil	2,252	2,675	2,533	2,208	2,240	1,883
45	Kobe	Japan	2,247	2,432	2,432	2,413	2,250	2,177
46	Le Havre	France	2,240	2,500	2,656	2,138	2,118	2,145
47	Melbourne	Australia	2,237	2,323	2,139	1,925	1,910	1,721
48	Bandar-Abbas	Iran	2,206	2,000	1,723	1,408	1,293	N/A
49	Vancouver	Canada	2,152	2,492	2,307	2,208	1,767	1,665
50	Nagoya	Japan	2,113	2,817	2,890	2,740	2,470	2,304

TABLE 2.2: Container Traffic (in thousands TEU). SOURCE: AAPA World Port Rankings 2009

According to “THE STRAITS TIMES” Shanghai overtook Singapore for the first time in 2010 and became the world's busiest container port, due to the boost of the cargo traffic through China's business center. Shanghai's port handled 29.05 million 20-foot equivalent units, or TEUs, in 2010 having a total of 500,000 TEUs more than Singapore, as the Shanghai government said in a statement. Officials said that the container and cargo traffic travelling through the port benefited because of the

economic recovery and Shanghai's six-month long World Expo. Shanghai's cargo throughput rose to about 650 million tones in 2010, remaining the world's largest, up from 590 million tones in 2009.

Container liner services from the Port of Shanghai cover all major ports around the world. More than 2,000 container ships depart from the Port every month, heading to North America, Europe, the Mediterranean, Persian Gulf, Red Sea, Black Sea, Africa, Australia, Southeast Asia, Northeast Asia, and other regions.

2.2.3 Terminals

In the following pages there are some information about the terminals and the services of the port of Shanghai as they are given by their official website.

2.2.3.1 Container terminals

Container terminal operation is a core business of SIPG. There are three major container port areas, named Wusongkou, Waigaoqiao and Yangshan in the Port. In the past five years, the container throughput of the Port of Shanghai increased from the 6.43 million TEUs recorded in 2001 to 21.71 million TEUs in 2006.

WUSONG AREA

Shanghai Container Terminals Co., Ltd. (SCT)

'Shanghai Container Co., Ltd. and Hutchison Port Holdings Limited (HPH) founded SCT. The total investment is RMB5.6 billion, the registered capital is RMB2.0 billion, and each party holds 50% of the share with joint operation period of 50 years. SCT has three container terminals, i.e., the Zhanghuabang Terminal, Jungong Road Terminal and Baoshan Terminal altogether with 10 berths and a total of 2,281m quay length. It is equipped with 20 quay cranes and the area of container yards put together amounts to 550, 000m^2. SCT offers its extensive dock services to its customers. Its main business scope includes: container handling, storage, transport, container washing, shipping and freight agency, electronic data interchange, storage of inland goods in Shanghai and the operation of freight transfer station.' (www.portshanghai.com , accessed on 25/08/2011).

WAIGAOQIAO AREA

Shanghai Pudong International Container Terminals Ltd

'Shanghai Pudong International Container Terminals Limited is a joint-venture established on March 1, 2003 and invested by Shanghai Waigaoqiao Free Trade Zone Stevedoring Co., Hutchison Ports Pudong Limited, COSCO Pacific (China) Investments Limited and COSCO Ports (Pudong) Limited. Shanghai Pudong International Container Terminals Limited is located on the south bank of the Yangtze River, in Area A of the Waigaoqiao Free Trade Zone, and adjacent to the Outer Ring Road, Yanggao Road and the Hu-Chong-Su (Shanghai-Chongming-Jiangsu) Cross-River Project which is under preparation for construction. The Terminal has a total quay length of 900 meters, and its three container berths are able to accommodate the

fifth and sixth generation container ships. Its land area is 500,000m^2 with a container yard of 8,200 flat container slots capable to stack 30,000 TEUs at the same time. Furthermore, special purpose areas for reefer containers and dangerous cargo containers and a container stuffing and stripping shed have been set up. It is a modernized container terminal with perfect facilities and functions. Shanghai Pudong International Container Terminals Limited has 147 machinery and equipment of various kinds, including 10 quay cranes, 36 RTGs, 73 container trucks and 11 forklifts. It is one of the modernized container terminals with high-tech content in China, through technological development and innovation, it employs advanced systems in the operation of containers such as CTMS real-time production, marshaling and controlling of the container trucks of the whole yard, handling of containers with the same multiples and the intelligent container yard.' ' (www.portshanghai.com , accessed on 25/08/2011).

SIPG Zhendong Container Terminal Branch Ltd

'SIPG Zhendong Container Terminal Branch, a SIPG wholly owned subsidiary company, is situated on the west bank of the Yangtze River at the north side of Waigaoqiao, Pudong New Area, Shanghai. It is at a distance of 6km from Wusongkou in the west, and about 85km from the mouth of the Yangtze River in the east. The terminal has a quay length of 1,566m with 5 large container berths and is equipped with 13 quay cranes. The land area is 1,659,000m^2. The port area is equipped with world-class advanced technical equipment and facilities. The internal computer network system developed by the Company itself is a state of the art production system with a complete set of scientific and reasonable handling processes. The Port Area provides the shipping lines and customers with efficient, convenient and safe service. Furthermore, telephone enquiry system and enterprise network enquiry system are free for customers to obtain information concerning ships and containers.' ' (www.portshanghai.com , accessed on 25/08/2011).

Shanghai East Container Terminals Co., Ltd

‘Shanghai East Container Terminals Co., Ltd is a joint-venture company invested and established by Shanghai International Port Group Co., Ltd and APMT Terminals. The Company was set up on September 12, 2002 with a registered capital of RMB 1.10 billion. It has a total quay length of 1,250 meters, four container berths for the main services and other two for the inland feeder services. It covers a land area of 1,550,000m^2 and is equipped with 13 quay cranes and 48 RTGs. The Company handled 1.05million TEUs in the first year of its opening, setting a new global record. Nowadays, the annual container throughput of the Company has come up to 3.63million TEUs and is striding steadily towards the target of 4 million TEUs. Since its establishment, the Company has been listed among the top ten due to its handling capability and efficiency for two consecutive years. It was evaluated by China Port Association as the “Top Ten Container Terminals in China”, the “Outstanding Terminal of China’s Ports for High-Efficient Operation of Container Quay Crane” and the “Container Terminal of the Best Composite Key Performance Indicators”. ’ (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Mingdong Container Terminals Limited

‘Shanghai Mingdong Container Terminals Limited (SMCT) is established to meet the demands associated with the rapid development of Shanghai as an international shipping center. The Company is a 50/50 joint venture between Shanghai International Port (Group) Company Limited (abbreviated as SIPG) and Hutchison Port Holdings Limited (abbreviated as HPH). SMCT provides a comprehensive range of services for container and bulk cargoes for both international and domestic shipping routes, including loading/discharging, transshipment, warehousing, distribution, container cleaning/repair, cargo consolidation and deconsolidation, storage, safekeeping, freight station and transportation within the port area, and related technical consultation and information services. ’ (www.portshanghai.com , accessed on 25/08/2011).

YANGSHAN DEEPWATER PORT

Shanghai Shengdong International Container Terminals Co., Ltd

‘Shanghai Shengdong International Container Terminals Co., Ltd was invested by SIPG on May 31, 2005 with a registered capital of RMB 5 billion. The major responsibility of the Company is to operate and manage the Phase-1 and Phase-2 terminals of the Yangshan Deepwater Port Area as well as to fund and run the auxiliary and supporting project, the International Logistics Park in the Port Area. The Phase-1 terminal of the Yangshan Deepwater Port was officially launched on December 12, 2005. The Yangshan Phase-1 terminal is second to none in terms of operation with its annual designed capacity of 2.2 million TEUs at the first year of its launching. On December 10, 2006, Yangshan Phase-2 terminal was successfully opened, and began the operation of the Phase- 1 and Phase-2 terminals. Currently, the Port boasts a 3,000m-long deepwater quay length, 34 world most up-to-date container quay cranes, 120 RTGs and other handling and transportation facilities. ’ (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Guandong International Container Terminal Co., Ltd.

‘Shanghai Guandong International Container Terminal Co., Ltd. (SGICT), wholly owned by SIPG, is specialized in container terminal operation. SGICT is committed to providing high quality, efficient and professional container handling and related supporting services to all the clients. SGICT runs terminals phase 3 and 4 of Yangshan Deepwater Port, which are located in the center of the Port’s northern area. The terminal has modern container terminal facilities and equipment and also professional and quality management, which is capable to handle all kinds of large container vessels and provide a full range of terminal services. SGICT boasts a quay

length of 2,600 meters and 7 berths for 70,000 to 150,000-ton container ships. The waterfront depth is -17.5m and land depth 913m. Total land area is 2.3813 million m^2 and the designed capacity of annual terminal throughput is more than 5 million TEU. ' (www.portshanghai.com , accessed on 25/08/2011).

2.2.3.2 Non-container terminals

Non-container Terminals are important and indispensable to the Port of Shanghai, which serves the economic development of the Yangtze River Valley. These terminals, mainly situated on the banks of the Huangpu River, at Wusongkou, Luojing and Waigaoqiao, work as regional distribution centers.

SIPG Coal Branch Ltd

'Located near the Lujiazui Financial and Trade Zone in Pudong New Area, the Coal Branch is specialized in handling coals, sands and gravels, and also acts as a shipping agency. It covers an area of 573,500m^2 with a total quay length of 2,008.34m. It has set up four terminal management offices at Zhangjiabang, Tangqiao, Beipiao and Zhujiamen and possesses 17 berths scattered along the Huangpu River, eight of which are of 10,000-tonnage. The storage yards totals 204,000m^2, and the annual throughput exceeds 30 million tons. The electronic belt weigher developed with its own efforts with accuracy up to 99.5% passed the state assessment, and won the Award for New Products of Shanghai. Now it has been widely used in measuring coals. ' (www.portshanghai.com , accessed on 25/08/2011).

SIPG Zhanghuabang Company Ltd

‘The SIGP Zhanghuabang Company has its location on the lower reaches of the Huangpu River and is four kilometers away from the mouth of the Yangtze River. It covers a land area of 200,000m^2, has a total of 540 meters quay length and three 10,000-tonnage berths, and its annual capacity is 1.80 million tons. The Company owns over 90 handling machines of various types, and the maximum lifting capacity of the crane is 40 tons. It is one of the modern port enterprises in Shanghai characterized with its complete handling facilities, high efficiency and throughput capacity. The Company is specialized in handling bulk and heavy items, containers and steel products, and is the top terminal skilled in handling gigantic and colossal equipment and installations. It has taken up the arduous tasks for tackling huge and heavy equipment and installations used in a great number of the state priority projects, such as Shanghai Jinshan Petrochemical Works, Bao Steel Group, Qinshan Nuclear Power Station, Gezhouba Water Conservancy Project, the Three Gorge Project, Pudong International Airport, Caohejing Chemical Industry Park, Shanghai Rail Transit and Tunnel Projects, Nanjing BASF Project, etc. ’ (www.portshanghai.com , accessed on 25/08/2011).

SIPG Jungong Road Branch Ltd

‘The Company is located on the lower reaches of the Huangpu River on its west bank at a distance of 7km from Wusongkou. It is within the deep-draft channel area of the Huangpu River, covers an area of 251,000m^2 with a quay length of 743m and has four 10,000-tonnage multipurpose berths. It is equipped with eight gantry cranes and 154 handling machines of various types, has 6,304-meter-long exclusive railroad directly extending to the terminal berth. The total area of warehouses and storage yards amounts to 143,000m^2. The Company is specialized in handling bulk and break-bulk cargoes of foreign trade. The principal cargo it handles includes iron, steel, pulp, vehicles, bulk items and equipment, containers, etc. With freight handling business as its main activity, the Company has developed a diversified economy and extended its

activities to container inspection, shipping agency, storage, motor transportation, tool and rigging manufacture, lease and export of management technology. ' (www.portshanghai.com , accessed on 25/08/2011).

SIPG Baoshan Terminal Branch Ltd

'The terminal of the SIPG Baoshan Terminal Branch, completed and put into operation in 1990, was one of the state key construction projects of the Seventh Five Year Plan. Its designed capacity is 2.90 million tons/year. Its main business scope includes handling, storage, transport and agency service for containers, bulk and break-bulk cargoes of home and foreign trade, steel products and massive items. The various services mainly include acting as an agent for container freights, container inspection, and motor vehicle transportation. The Company is located in the northeast part of the city close to Bao Steels Group and is four kilometers away from Wusongkou. The total length of terminals is 780m, the port area is 525,000m^2, and the land area is 270,000m^2. At present, there are three berths of 10,000-tonnage and two berths of 1,000-tonnage. The area of the container yard inside the port is 104,000m^2 while that of the container yard outside the port is 100,000m^2. The storage area is 34,000m^2. There are more than 100 portal cranes, container forklifts and other cranes, pallet forklifts, container trailers and lorries of different loading capacities, including two 40t portal cranes, one 90t cross-country crane and one 45t type crane. ' (www.portshanghai.com , accessed on 25/08/2011).

SIPG Longwu Branch Ltd

'The SIPG Longwu Branch is located in the strategic passage of water transport on the upper reaches of the Huangpu River. Hangzhou-Jiaxing-Huzhou region is within its radiation range and serves as its economic hinterland. It has nine berths of 10,000 tonnage (of which five are container berths) and twenty 500-tonnage inland barge berths. The land area approximates to 740,000m^2. It is mainly engaged in handling,

storage, distribution, transfer, freight agency service and water and land transport of various goods and containers of internal and external trade, as well as maintenance and manufacture of machines and other business. ' (www.portshanghai.com , accessed on 25/08/2011).

SIPG Luojing Subsidiary Company Ltd

'The SIPG Luojing Terminal which is specialized in handling bulk cargoes was officially put into use in 1997. Its port area is located on the south bank of the Yangtze River at a distance of 38km from the city center by land route and 17km from Wusongkou. It is a new and modern high-tech port area covering a land area of 500,000m^2 and is equipped with eleven large-sized machines, fifty mobile machines and nearly 9.0km-long belt conveyer systems. The unloading quay has a water depth of –11.0m, which can accommodate giant oceangoing vessels up to 180,000dwt (after reduction of loads), while the loading quay has a water depth of –8.0m and can accommodate ships on both of its sides. The Company mainly serves the big steelworks along the Yangtze River and the iron ore merchants through handling of imported iron ores. Its average continuous handling capacity is 35,000t in 24 hours and its warehouse and storage yard can hold 1.15 million tons of cargoes. ' (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Luojing Ore Terminals. Co., Ltd.

'Shanghai Luojing Ore Terminals. Co., Ltd. is co-invested by Hong Kong Ruijue Investment Company, Bao Steel and Ma Steel, which was set up on November 1st, 2007. The company is specialized in ore handling and Pu-steel logistics services. As a modern high-tech ore terminal, the company is a pioneer in dealing with industrial logistics transportation between big steel factories and terminals. ' (www.portshanghai.com , accessed on 25/08/2011).

2.2.3.3 Port logistics

SIPG Logistics Co., Ltd.

‘The SIPG Logistics Co., Ltd. was incorporated through consolidation and merger of more than twenty enterprises, including the former Shanghai International Container Freight Co., Ltd., Shanghai Jixiang Freight Co., Ltd., Shanghai Pudong Container Logistics Co., Ltd. and Shanghai Port Technology & Engineering Service Co., Ltd., forming a complete logistic service chain specialized in port logistics. It is a logistics enterprise wholly owned by Shanghai International Port Group Co., Ltd. (SIPG) with a registered capital of RMB 2.5 billion. The business scope covers all aspects of logistics industry, including the international freight agency service, shipping agency service, shipping agency service for inland feeder lines, storage and stock piling, road transport, handling of bulk and break-bulk cargoes, domestic multimodal transport, container stuffing and stripping, storage and transport of hazardous goods, transportation of heavy lift, washing and repairing of containers and development of logistics management software. ’ (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Jihai Shipping Co., Ltd.

‘Shanghai Jihai Shipping Co., Ltd was established on September 21, 2001 with the approval of the Ministry of Communications. It is jointly invested by Shanghai International Port Group Co., Ltd, Shanghai Haihua Ship Co., Ltd. and China Shanghai Ocean Shipping Agency. It is a domestic joint-venture shipping enterprise with a registered capital of RMB250 million. The Company mainly deals with liner service related to international container shipping on inland feeder routes along the Yangtze River and coasts, the inter-province transport of general cargoes (including container and large-sized equipment) on inland waters and along the coasts, and acts as an agency for water transport of cargoes, shipping service and international cargo

transport by sea or by land. The Company is in possession of 80 ships with a total container-carrying capacity of 11,503TEUs, ranking sixth on the list of China's container fleets published by the Ministry of Communication. The Company has more than 130 customers. It has entered into long-term cooperative partnerships with such world-known liner companies as Maersk Lines, Hanjin, Zim, Evergreen, NYK, Happag-lloyd, MOSK, K-Line, OOCL, MSC, PIL and CMA-CGM, etc. Also, cooperative ties have been formed between the Company and some inland freight forwarding companies and other feeder routes operators. ' (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Puyuan Shipping Co., Ltd

'The major business of Shanghai Puyuan Shipping Co., Ltd. is the reduction of loads on the sea. It also carries on coastal and offshore shipping service. Currently it possesses a load-reducing platform known as "Xin Shuang Feng Hai" and three ships named as "Yunling", "Wanling" and "Baoshan" respectively. The business scope includes the load-reduction of large quantity of bulk cargo on the Luhuashan Sea Area; international transportation, freight transport along the coasts and the middle and lower reaches of the Yangtze River. The Company has a registered capital of RMB100million. It implements the system of general manager responsibility under the leadership of the board of directors. Since its formal commencement of business on June 1, 1999, the Company has carefully organized and done a good job of the load-reducing production of the "Xin Shuang Feng Hai" and as a result it has kept a record of 1,855 successive days of safe production free from any accident. The Company has attained the SMC, ISPS and other certificates recognized internationally. ' (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Haihua Shipping Co., Ltd.

‘Shanghai Haihua Shipping Co., Ltd.（Hereafter abbreviated as HASCO) was founded in May 1989 under the approval of the Ministry of Communications. In July 2000, Shanghai Port Container Co., Ltd. purchased 88.5% shares of HASCO. In June 2006, Shanghai Port Container Co. Ltd. increased its share in HASCO to 100%. When SIPG listed as a whole company in September 2006, HASCO became a holding company of SIPG. HASCO covers a business range of shipping agency, freight forwarding agency, Yangtze River and coastal feeder service, container leasing and seaman’s labor service etc. ’ (www.portshanghai.com , accessed on 25/08/2011).

SIPG Yangtze Ports Logistics Co., Ltd.

‘SIPGYL, which is wholly owned by SIPG, is specialized in logistics services, especially in Yangtze River Region. Assets of SIPGYL include shipping fleet, terminals, logistics parks, warehouses and shipping agencies, totaling RMB 10 billion. The company owns 100 ships, with total shipping capacity ranks China’s No. 5, and shipping network covers the whole Yangtze River region. Affiliated terminals include facilities in Yibing, Chongqing, Changsha, Wuhan, Jiujiang, Nanjing and Jiangyin, etc. SIPGYL also sets up big logistics parks to provide quality services for clients. ’ (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Haitong International Automotive Terminal Co., Ltd.

‘Shanghai Haitong International Automotive Terminal Co., Ltd. is a joint venture company invested by SIPG, Anji Automotive Logistics Co., Ltd, Nippon Yusen Kabushiki Kaisha, NYK HOLDING (EUROPE) B.V., Wallenius Wilhelmsen Terminals Central AB and SAIC HK LIMITED. Major business includes foreign and

domestic trade of vehicles Ro-Ro operation, H&H Ro-Ro operation, storage services and PDI value-added services. The company has acquired internationally advanced management system of Ro-Ro terminal marks. Shanghai Haitong International Automotive Logistics Co., Ltd. is a joint venture company invested by Anji Automotive Logistics Co., Ltd. and SIPG. The company acquires "Non-Vessel Carrier" and "Class-A International Forwarding" certificates. Company boasts a professional logistics project design and operation team, organizing all resources including customs, terminal, highways and railroads, etc. The company has strength in integrated domestic and foreign port services, international shipping, imports and exports customs clearance, domestic water transportation, traffic transportation and railroad transportation, packing and unpacking of components, storage and foreign trades customs transfer. Integrated logistics information services platform and listed services are provided to make tailor-made solutions to customers. KPI index is used to make continuous improvements and management of daily quality operation.' (www.portshanghai.com , accessed on 25/08/2011).

2.2.3.4 Port services

Shanghai Port Pilot Administration Station

'Shanghai Port Pilot Administration Station is a professional sector providing pilotage service. It exercises the rights of pilot on behalf of the state and is responsible to apply mandatory pilot to any foreign vessels accessing to the Port of Shanghai, and to provide pilot service upon the application of any ocean or coastal shipping company. Pilot plays a crucial role in safe navigation, enhancement of port operating efficiency and maintenance of navigation order. At present, it is the largest pilot station fully equipped and of greatest technological capability in China. Among its 500 employees, over 210 are pilots, and senior and Grade-1 and Grade-2 all-round pilots account for 42.2%. There are 23 different auxiliary boats and ships to serve the pilotage, among which the pilot ship "Hugangyin-1" (length: 108m, gross tonnage: 4,641t) has a

helicopter platform and is presently the largest and best equipped pilot ship in China. The Station is renowned for its “Safety, Quality and Efficiency” by virtue of its high-calibred professional teams, advanced management and first-rate pilot technology. Over recent years, it has successfully led the largest Asian luxury ocean liner “Superstar Leo” over the Yangpu Bridge and made it berth alongside the Gongping Road Terminal and turned around in the port. Besides, it has conducted the 500,000dwt super tanker “World on the Sea” coming in and out of the estuary of the Yangtse River and the sixth-generation ultra large containership “Shanghai Express” etc., giving a forceful support to the production of the port area. ’ (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Harbour Fuxing Shipping Company Ltd

‘Shanghai Harbour Fuxing Shipping Company, a subsidy company of SIPG, is the largest port tugboat service provider in China. The business scope includes tugboat service; hoisting and shipping of heavy lifts; transport of general cargoes along domesitc coasts and in the middle and lower reaches of the Yangtse River; transport of general cargoes of international vessels; shipbuilding and ship repairing; cargo handling, storage and transport, etc. This well-equipped company has the most advanced full swing towboats, 20t-1200t derrick barges and 3000-5000dwt sea-going barges of infinite navigation areas. It can provide customers home and abroad with such unique services as harbor hydraulic structures construction, hoisting and installing harbor machines, subcontracting of the transportation of nuclear power station equipment, docking and undocking of mammoth ships. The towboat service and hoisting and installation of heavy lifts are concentrated in Shanghai but are extended to domesitc coastal ports and to the ports of middle and lower reaches of the Yangtse River. Tugboat service, hoisting and installing of heavy lifts and offshore transport by lighters comprise the three pillar services of the Company. ’ (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Harbour Engineering Company Ltd

‘Founded in 1993, Shanghai Harbour Engineering Company is qualified for many specialized trades and has obtained many relevant qualification certificates. It is also qualified as a general contractor for the house construction, municipal works, highway building, concrete prefabricated structures, installation of electromechanical plants, renovation and decoration of buildings, construction of communication project, etc. Now, the Company’s technicians and technologists at work make up more than 90% of all the managerial staff members. The Company owns three floating pile drivers with a pile-driving frame height of 88m, 64m and 49m respectively, as well as a 120m3/hr and a 40m3/hr floating concrete mixer respectively. Moreover, it has other floating and land construction facilities, including pontoon crane, towboat, sea-going lighter, imported type crane, hydraulic vibrating road roller. The annual production capacity of concrete prefabricated structures and spiral steel pipes exceeds 50,000m3 and 60,000t respectively. ’ (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Ocean Shipping Tally Co., Ltd

‘Shanghai Ocean Shipping Tally Co., Ltd. was set up on October 8, 2003 after institutional reform. It is the largest regional tally company jointly formed by Shanghai International Port Group Co., Ltd (SIPG) and the Head Office of China Foreign Ship Tally Company on the basis of the latter’s original Shanghai Branch after the approval of the Ministry of Communications. The Company has a registered capital of RMB50 million and more than 1,300 workers and staff members. Under the Company there are 8 tally divisions, 2 container stuffing and stripping divisions and an office. Its business involves the tally of ships and containers in all the public and owners’ terminals, as well as the tally, vanning and devanning of the goods of the containers coming in and going out of the Port of Shanghai. Business scope: To tally the cargoes carried by domestic and international ships; to list and check off cargoes; stripping and stuffing of containers; to take measurements and dimensions of the

cargo; to supervise over loading and unloading; to survey the damage to goods and containers. ' (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Harbor E-Logistics Software Co., Ltd

'Being a high-tech enterprise, Shanghai Harbor E-Logistics Software Co., Ltd. provides the logistics industry with application system service and integrated solutions. Its registered capital is RMB10 million. The Company develops flexible and suitable software systems for customers and constantly furnishes them with optimized auxiliary programs to uplift their scientific and automatic management level. The Company has brought together all its superiority in regard to the modern logistics management modes, advanced theory and computer application technology. It developed the ERP and MIS software which are used by logistics enterprises related to transportation, port and storage business. Beside, it has built the wireless data transfer system and offers the integrated service of the miniature computer network system. And on this basis, the Company introduces the e-commerce platform for the on-line data and information trading. ' (www.portshanghai.com , accessed on 25/08/2011).

Shanghai Port International Cruise Terminal Development Co., Ltd

'Shanghai International Cruise Terminals is situated at the center of Huangpu River district, adjacent to the famous Bund with universal architectural essence exhibition and opposite to the Pudong Lujiazui Financial Area. The terminal, melting its splendid buildings and beautiful surroundings into the background of the Shanghai, has become a new attraction of the city. The terminal was put into service in 2008, covering an area of 165,000 m^2 with -10m water draft and 1197quay length. With annual capacity of 1 million passengers, the terminal has the ability to accommodate three 70,000 tons class cruises at a time. ' (www.portshanghai.com , accessed on 25/08/2011).

3 CLUSTERS

3.1 CLUSTER THEORY

Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region.

Clusters arise because of their ability of increasing the competition productivity between the companies. The development and upgrading of clusters is job of great importance and can only be done from governments, companies, and other institutions. Cluster development initiatives create a new direction in economic policy, building on earlier efforts in macroeconomic stabilization, privatization, market opening, and reducing the costs of doing business. This term cluster, also known as Porterian cluster, was first introduced and popularized by Michael Porter in *The Competitive Advantage of Nations* (1990). The importance of economic geography, or more correctly geographical economics, was also brought to attention by Paul Krugman in *Geography and Trade* (1991). Cluster development has since become a focus for many government programs. The underlying concept, which economists have referred to as agglomeration economies, dates back to 1890, and the work of Alfred Marshall.

The first reflection on the cluster issue was published by Marshall in his "Principles of Economics" (1890) where he wrote about "manufacturing towns or thickly peopled industrial districts". His area of interest was mainly the aspect of knowledge spillover as the main benefit of agglomeration. According to Marshall "When an industry has thus chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighborhood to one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously, good work is rightly appreciated, inventions and improvements in machinery, in processes and the general organization of the business have their merits properly discussed, if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas". Marshall's interest for these cluster examples is because of the uneven distribution of economic activities over space, and more specifically about the tendency for related firms to concentrate in those certain

places over significant periods of time. Firms are linked directly by their business relations and indirectly through the market were they are situated and through their private or public services. Local economies or, as they are called, ‘spillovers’ are the successful outcomes of a connection between firms' location requirements and the supply of location factors.

Michael Porter claims that clusters affect competition in three different ways: first each company increases its productivity in the cluster, second by searching for new innovative ideas in the field, and third by establishing new businesses in the field. According to Porter, in the modern global economy, comparative advantage, how certain locations have certain benefits, compared to others (i.e., harbor, cheap labor), to overcome heavy input costs, is the least relevant. (Porter, 1990)

A good example for describing clusters could be the case of Silicon Valley in California several successful computer technology related companies emerged there. This led anyone who wished to create a startup company to do so in Silicon Valley. The surge in the number of Silicon Valley startups led to a number of venture capital firms relocating to or expanding their Valley offices. This in turn encouraged more entrepreneurs to locate their startups there.

In other words, venture capitalists (sellers of finance) and dot-com startups (buyers of finance) "clustered" in and around this geographical area.

The cluster effect (as this effect is described) in the capital market also led to a cluster effect in the labor market. As an increasing number of companies started up in Silicon Valley, the working force of this domain, programmers, engineers etc. realized that they would find greater job opportunities by moving to Silicon Valley. This concentration of technically skilled people in the valley meant that new computer companies around the country knew that they had more chances of finding skilled candidates for their job in the valley and this gave them an added incentive to move there and also led more high-tech workers to move there.

The cluster effect can be more easily found in urban agglomeration in the way of commercial establishments that tend to spontaneously group themselves based on the products they sell. Shoe shops (or Cloth shops), for instance, are rarely isolated from their competition. In fact, it is common to find whole streets of them.

Governments and companies often try to exploit the cluster effect in order to manipulate some firms to move to a particular place as good for a certain type of business. For example the city of Bangalore in India has utilized the cluster effect in order to convince a number of high-tech companies to setup shop there. Similarly, Las Vegas metropolitan area has benefited through the cluster effect of the gambling industry.

The cluster effect does not continue its influence forever. Its relative influence is also depended on other market factors like expected income, demand, taxes, competition and politics. In the case of Silicon Valley as stated above for example, increased crowding in the valley led to severe shortage of office and residential space which in turn forced many companies to move to alternative locations such as Austin, Texas and Raleigh-Durham, North Carolina even though liked to stay in the valley.

According to Porter successful international industries tend to locate their offices at certain cities and regions. Geographic concentration is the most important factor for firms in order to access each other's resources and capabilities and benefit from a common culture and learning experience, supply capabilities and local infrastructure. Industry clusters are geographical concentrations of interconnected businesses, suppliers, and associated institutions in a particular field. Clusters increase productivity and innovation rates and contribute to faster creation of new business developments. Porter (1990) argued that 'productivity is the main factor for international competitiveness and that the standard of living of a country's population can be improved as a direct result of increases in that factor. Clusters may take different forms between firms producing different products across value-added chains or between firms producing similar products at different stages of the same chain.'

Porter's Diamond of competitive advantage model of nations consists of four main categories that create the national environment in which local, connected firms can compete:

1. FACTOR CONDITIONS

The nation's relative position in vital industrial production factors such as skilled labor or infrastructure, are factors that determine national competiveness. The level of individual factors, which are divided in country specific and industry specific, and the overall composition of the resource mix are being considered.

2. DEMAND CONDITIONS

The nature of local demand for an industry's products and services is being considered in both its quantity and its quality of the demand.

3. RELATED AND SUPPORTING INDUSTRIES

The presence or absence in the nation of other internationally competitive suppliers and related industries is of great importance.

4. FIRM STRATEGY, STRUCTURE, AND RIVALRY

The national conditions that determine the way of companies creation, organization and management, and also the extend of domestic rivalry. Furthermore, domestic rivalry motivates companies to launch new products, to improve quality, to reduce costs and to invest in new, more advanced technologies. Porter has stated two additional variables that indirectly influence the diamond.

5. CHANCE EVENTS

Developments outside the control of firms and governments that give the opportunity to new firms to arise into the industry structure. For example, radical innovations, unexpected oil prize rises, revolutions, wars, and etc.

6. GOVERNMENT

Government's policies can influence all of the four determinants. Government can raise the possibility of gaining competitive advantage but cannot create advantages on its own.

These six determinants promote or impede the creation of competitive advantages of firms, clusters, and nations. All these conditions need to exist and benefit an industry/company within a country in order to gain international recognition.

The diamond model can be used from manager during their internationalization efforts to determine if the home market can support and sustain a successful internationalization effort or to choose in which country to invest next. The model helps entrepreneurs to decide where their next venture will be. Government officials can use the model for guidance to help them ho build a supporting policy framework for a given industry.

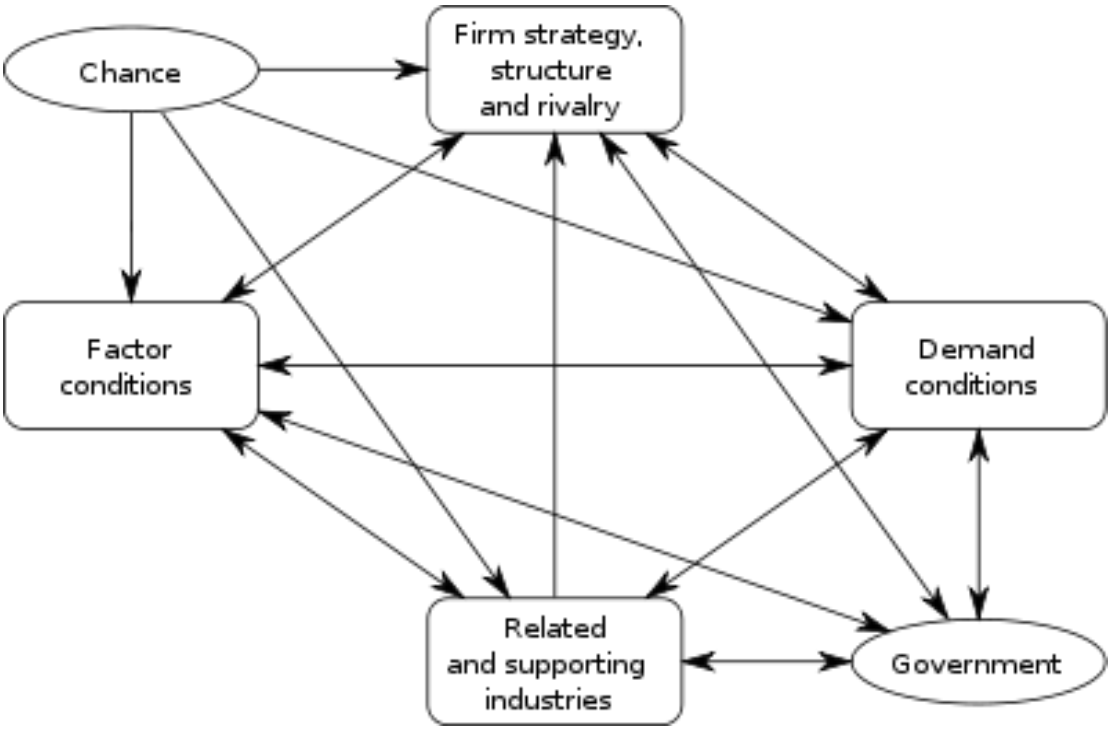


Figure 3.1: Porter's Diamond

3.2 CLUSTER CONSTRUCTION

3.2.1 Economic specialization

The economic specialization of the cluster in its analysis can be defined from the main course of occupation of the cluster companies. This economic specialization should be very general in order to include all the possible aspects of occupations for the cluster companies. Furthermore it is important to choose an economic specialization that is of great importance for the region we examine. For example, Singapore is known as an international maritime center. Thus, the creation of a maritime cluster there is of great importance.

3.2.2 Economic activities

The economic activities of the cluster companies are all the activities that take place between the companies and concern the cluster. This specialization is needed in order to separate the activities of a company specialized in sectors outside the cluster.

3.2.3 Cluster region

All clusters have geographical borders but in many cases those borders are not well defined. In order to avoid any problems from the cluster definition we will define the borders using the political divisions of each region (municipalities etc.).

3.2.4 Cluster population

This population consists of all companies active in economic activities included in the cluster and located in the relevant cluster area.

3.3 CLUSTER PERFORMANCE

Through the years a lot of research has been made in order to find some indicators that will help us measure the performance of a cluster. Average profitability is one performance indicator but it is not reliable because clustering does not always lead to biggest profits for firms in the cluster. According to Maillat (1998) productivity,being another cluster's performance indicator, is no more than a partial measure of its

performance, because its not connected with changes of the cluster population. Porter (1990) suggests two more indicators, the first, the share of exports is not suitable because declining export shares can also be a consequence of the cluster's location of downstream activities and the second is the outward foreign direct investment which is not suitable because it can be interpreted by an outflow of capital, value added and employment. Finally according to De Langen 2003 the most accurate measure for the performance of a cluster is the value added generated in the cluster. The value added generated in the cluster is the sum of the value added generated by the cluster's population. The value added is mainly consisting of labor expenses, depreciation and profit (before tax).

3.4 CLUSTER STRUCTURE

3.4.1 Internal competition

The existence of internal competition improves the efficiency of its companies and pusses them into growing and changing. As far as clusters concern, the differences between internal and external competition are minor. According to Porter internal competition leads to dynamism in the cluster, for three reasons. First, the positive effect of internal competition can be seen at the lowering of the switching costs for the customers. Internal competition also allows firms to change suppliers inside the same cluster. Second reason, internal competition leads to specialization of the products and services given by the firms. In a competitive environment, such as the cluster, specialization of products and services develops easier than when operate in a different environment, because specialization reduces competition and as a result we have higher profitability. Third, internal competition improves cluster performance by providing the firms with a more stable environment. Internal competition benefits the performance of firms because domestic rivalry is highly visible and therefore it fosters innovation. (De Langen, 2003)

3.4.2 Cluster barriers

Cluster barriers can be acknowledged as the barriers to enter or exit the cluster or to start a new venture in the cluster. These barriers are location specific barriers for firms that want to leave or enter the cluster or start up in the cluster, but face cluster specific barriers that complicate entry or exit. Cluster barriers can divided in three categories; entry barriers, start up barriers and exit barriers. The entry barriers are for firms outside a cluster that want to join cluster. Regarding start up barriers, two barriers are widely recognized: administrative barriers and the availability of venture capital. Finally the higher the exit barriers are the more difficult is for a firm to leave the cluster. The presence of firms strongly attached to the cluster increases the durability of the cluster and reduces the uncertainty about the development of a cluster.

3.4.3 Cluster heterogeneity

In this section we can see that the existence of variety of firms in a cluster is good for its performance. Given that each firm has different capabilities than other firms we can say that the cluster population can be regarded as a collection of capabilities and relative cognitive frames. The diversity of capabilities promotes the opportunities for cooperation inside the cluster. The biggest the diversity we have inside the cluster the more fertile environment for new alliances it is. In a homogeneous cluster, firms will be led to alliances with other firms outside the cluster and such a linkage will not benefit the cluster. Furthermore clusters with population diversity are more resistant to external shocks. Changes that affect some firms can be beneficial for others. Also an other positive effect of the cluster's variety on performance is that diversity promotes opportunities for innovation. More diversity inside the cluster results to amore complete knowledge base, which promotes innovation.

Firm heterogeneity can be acknowledged with many different types. The three more common are, economic activity, size and international scope.

Finally according to Porter (1990) another important argue to the performance of the cluster regarding heterogeneity is the variety of the resources that has as result to reduce the vulnerability of the cluster to the external shocks. A cluster that is

dependent on one and only resource is more likely to be affected when the importance of that resource will reduce or its availability will deteriorate.

3.4.4 Cluster governance

Cluster governance can be defined as the coordination of activities in a cluster. Clusters are characterized for their frequent interaction and coordination. Market coordination is one among the different coordination mechanisms that are used.

According to De Langen the following figure can be used to analyze the quality of cluster governance.

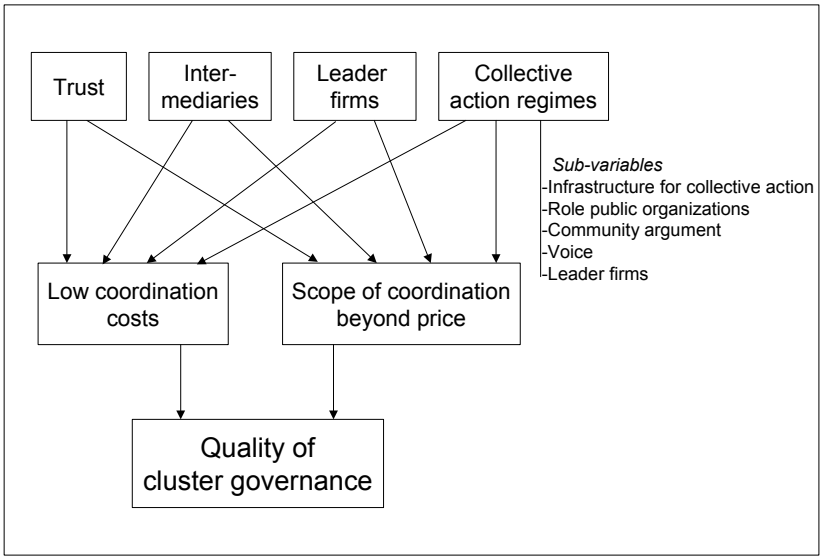


FIGURE 3.2: Analysis of the quality of the cluster governance

There are two factors here that determine the quality of a cluster's governance. First, the amount of coordination costs, or as they are called 'transaction costs'. In these we include the costs of searching for partners, the costs of specifying contracts, the costs of monitoring performance, and the interaction costs such as time and travel expenses. The second factor can be identified as the quality of coordination in a cluster and depends on the scope of coordination beyond price. Coordination beyond price includes activities such as setting of standards, investing in the labor pool, cooperation in innovation projects and information sharing. (De Langen, 2003)

The level of trust has great influence in the transaction costs. In clusters the bigger the level of trust the lower the transaction costs. The level of trust in a cluster can be determined by the importance of reputation effects in a cluster. If reputation effects are strong, abusing trust has negative effects and therefore it is worthwhile for firms to build a trustworthy reputation.

The existence or not of intermediaries influences the quality of coordination in the cluster. Intermediaries reduce the coordination costs. Also intermediaries reduce the search costs for firms looking for exchange partners, and help in creating potential exchange partnerships.

According to De Langen ‘ leader firms are firms that have due to their size, their market position, their knowledge and their entrepreneurial skills, the ability and incentive to make investments with positive effects for other firms in the cluster. Leader firms have such a strong market position that gives them the motives to create positive external effects for other firms in the cluster, because a large part of the profits due to a more competitive cluster ends up in their hands. Small firms can also behave as leader firms and also multinational companies do not necessarily belong into clusters. The behavior of the leader firms also depends on the location of their head office and their management philosophy. Leader firms have motives to enlarge the scope of coordination beyond price and to reduce coordination costs. Leader firms also usually invest in innovation and internationalization. The benefits of both innovation and internationalization can be received from all the members of the cluster. Leader firms can also help in internationalization of other firms in the clusters.’ (De Langen, 2003)

4 CLUSTERING IN SEAPORTS

4.1 SEAPORT CLUSTER THEORY

According to Porter (1990) ‘clusters are defined as a population of interdependent organization that operate in the same value chain and are geographically concentrated. This approach has been recently applied by a few researchers to seaports. The seaport cluster is made up of firms engaged in the transfer of goods in the port and their onward distribution. It also includes logistics activities as well as processing firms and administrative bodies.’

A very good approach to port clustering has been made from Peter W. De Langen to his study ‘the performance of seaport clusters’ (2003). According to Langen, among the various topics that can be identified in port economics there are three that are more related to port clustering. First, the competitiveness of ports as part of a transport chain and not only the cargo. Second, the economic impact of ports and third, the spatial dynamics of port related economic activities.(De Langen, 2003)

4.2 THE ECONOMIC ACTIVITIES OF SEAPORT CLUSTERS

The identification of the economic specialization of the cluster is the first step to its construction. In the case of seaport clusters the main specialization is defined in the arrival of goods and ships. Every activity related to the arrival of goods and ships is included in the port cluster.

The geographical conditions of the cluster’s location have great importance, such as the presence of a navigable river and deep water shelters and the structure of the seabed, combined with economies of scale of port facilities. These factors explain the concentration of the arrival of ships and goods in a limited number of ports. In other words we can see that the creation of a port is limited by many factors and only a few geographical location can be suitable for ports. All economic activities that are required to enable the loading and unloading of cargo and ships are included in the

port cluster. These activities include terminal handling, pilotage and towage. The arrival of ships and goods attracts related economic activities.

The port cluster includes all the economic activities related to the arrival of goods and ships. The first step for identifying a port cluster is the analyzing of the cluster's associations. The existence of a seaport cluster association is the most important indicator for the cluster's existence.

The majority of the cargoes are transported further by means of inland modes, such as road, rail and inland waterway. This led all transport firms that are related to the arrival of goods and services, to locate their office to the ports so that they are included in the port cluster. This applies to all firms involved in freight transport. The storage and all the other logistics activities done for the goods in ports has led to the inclusion of all these to the seaport cluster. The differences in the size of ships and inland modes has make storage in the port or other warehouses necessary. This necessity of storage is the main reason for the existence of logistics activities such as blending and re-packing near the primary port area. Furthermore by locating in a port transport costs can be reduced. Both factors explain the presence of logistics activities in ports and show why these activities are strongly related to the arrival of goods and ships in seaports. Thus, all logistics activities must be included in a port cluster.

Furthermore all activities in cargo handling, transport and logistics, that are located in the primary port area, are a part of the port cluster. This excludes all activities in manufacturing and trade. The manufacturing firms that can be related to the arrival of goods and ships in seaports are those that get their raw materials from the port and are located in the port in order to reduce transport and logistics costs. (De Langen, 2003)

4.3 SEAPORT CLUSTER REGION

According to De Langen cargo handling is located in the primary port area (quays and terminals). Other cluster activities may not be necessarily located in the primary port area. The size and structure of the port region differs between ports. The concept of a

relevant region implies that beyond a certain distance, municipalities are not included in the relevant port region. The relevant region includes municipalities that meet two conditions:

1) in the proximity of the seaport, and

2) a high concentration of port related activities. The relevant region generally includes:

a) The primary port area.

b) The business district of the port city.

c) Secondary nodes in the proximity of the primary seaport.

d) Municipalities in the vicinity of the port with a concentration of port service activities. (De Langen, 2003)

4.4 LEADER COMPANIES

According to Langen ‘ leader firms are firms that have due to their size, market position, knowledge and entrepreneurial skills, the ability and incentive to make investments with positive externalities for other firms in the cluster. Leader firms have such a strong market position that they have motives to create positive external effects for other firms in the cluster, because a large part of the profits of a more competitive cluster end up in their hands.

According to Michiel Nijdam (Leader firms 2010) identifying leader firms requires the selection of firms that posses characteristics that could predict leader firm behavior. Such characteristics are the following.

1 Size

The size mainly indicates a firm's ability to make investments with benefits for other companies. It can show the motives a company has in order to make these investments. The size of a leader firm can be measured financially and physically. Financial size can be seen in turnover, and in total equity. On the other hand physical size is measured in the number of employees, and the number of different locations each company has. In our case we will determine the size of the leader firms by the number of its employees.

The number of employees is an important measure for leader firm potential. First, because it shows the size of a company in terms of personnel. Second, because a large number of employees gives a greater motive to invest in collective action. A large employer is more likely to invest in the education of its personnel, because he will benefit from this investment.

2 Market position

The market position of a firm is of great importance because it determines the relations a firm has that can promote leader firm effects. A leader firm should have a large number of suppliers and a large number of customers. A leader firm should have a leading position in its market in order to be in an important position against its suppliers, customers and competitors.

3 Knowledge

Innovation is one of the most recognized fields in which leader firms are known off. Innovation comes from the knowledge a firm has and the ability to use this knowledge.

Firms with big R&D programs and a large number of patents are probably more likely to be leader firms in the field of innovation, but this is not the only condition in the selection of leader firms.

4 Entrepreneurial skills

The entrepreneurial skills of a company are probably the most general characteristic and therefore hard to measure. It refers to the skills of the general management and its ability to run a company efficiently.

5 Location

Location of the firm is of great importance. The influence a leader firm has is stronger when the firms are located in the same region, district or cluster. The location of a firm is important in order to identify the extend of the effects of a leader firm.

6 Being and behavior

As described above leader firms are companies with distinct features that have a leading position in the cluster they belong. In order to identify the leader firms it is not only important to consider these features, but also behave as a leader firm. Finally being a leader firm with many employees does give the motive to invest in education, but a firm can still choose not to make this investment.

4.5 SEAPORT CLUSTER GOVERNANCE

Except from the physical factors of the cluster's performance such as the location, maritime accessibility and hinterland infrastructure, the governance of seaports is also a great determinant of their performance. Usually the governance of seaports is limited to the role of the port authority but its is also important to consider the role of the private firms.

According to De Langen cluster governance is defined as the mix of and the relations between various mechanisms of coordination used in a cluster. The quality of the governance is different between clusters. The quality depends on the level of coordination costs and the scope of coordination beyond price. Low coordination

costs and much coordination beyond price improve the quality of governance. (De Langen, 2003)

Even though a variety of firms (Leader firms) play a role in the governance of a seaport cluster, the port authority has the main role. The term 'cluster manager', as given by De Langen, can be used to describe the role of the port authority. We refer to the role of a cluster manager in general, the key position of the port authorities and their sources of revenue and investment decisions.

According to De Langen a 'perfect' cluster manager would be an organization with the following four characteristics.

a) A cluster manager has motives to invest in the cluster, because its incomes will help to increase the performance of the cluster. A good cluster manager would receive a share of the value added generated in the cluster as income, for instance through a 'cluster tax'.

b) A cluster manager invests in activities with cluster benefits (instead of firm specific benefits). Furthermore, the cluster manager aims to invest when 'cluster benefits' exceed costs.

c) A cluster manager aims to distribute investment costs for investments to those firms that benefit. This involves co-finance arrangements with a specific group of beneficiary firms.

d) A cluster manager operates self-sustaining: over time investments equal revenues. (De Langen, 2003)

The port authority is an organization that meets all four criteria: they have motives and resources to invest in the cluster. The port dues and lease incomes are resources to invest in the port cluster. They are self-sustaining and invest in the performance of the cluster as a whole. Port authorities invest in activities beneficial for the cluster, such as port expansion, safety and dredging. Given their critical position, port authorities usually do not have profit.

The port authority owns and exploits the port area and benefits when the port cluster is an attractive location because they can lease more land and charge higher prices. Also, port authorities collect 'port dues'. This has as a result that, the more ships

come to a port the higher the port dues. For these two reasons, port authorities have a clear motive to invest in the performance of the port cluster and be recognized as cluster managers.

Analyzing the various sources of income of the port authorities we can see that the charges for the port services differ from port to port. The main sources of income of the port authorities are according to De Langen:

a) Charges to ship owners/ ship operators

b) Charges to tenants in the port, including terminal operators

c) Charges to cargo-owners.

Charges for ship owners/ship operators are usually port dues related to the size of vessels. The generated income from these port dues is used in order to invest in dredging, safety systems, and investments in port basins, generally services provided from the port for better navigation of the ships inside the port. Charges for tenants are lease charges to firms such as terminal operators and warehousing and production firms. Charges for cargo owners are usually termed wharfage and are mostly related to cargo volume or to the value of goods. Some port authorities do not have wharfage charges, because cargo owners indirectly pay both other charges as well.

Investments that benefit the cargo owners, are usually investments in hinterland infrastructure, hinterland access or warehousing facilities and can be justified because the cargo owners as users of the port pay the port charges at the end. This is the reason that investments with benefits for these cargo owners are always justified, even if port charges are paid only by tenants and shipping firms.

All these port charges must be used as investments of the port authority. Peter de Langen in his paper ‘Governance in Seaport Clusters’ provides in the following table a basis for analyzing to what extend, in which way and with which financial arrangements port authorities engage in cluster management.

Type of investments	Cluster Investments	Financial arrangements
Basis physical infrastructure	Dredging	Through port dues
	Quay construction	Through land lease
	Land reclamation and development	Through land lease
	Rail and barge service centres	specific charges /port dues
	Safety infrastructure	Through port dues
	Inter terminal transport infrastructure	Through specific charges?
	Port re-development	Land lease
Advanced physical infrastructure	Hinterland terminals (dry ports)	Specific charges
	Industrial pipeline infrastructure	Specific charges
	Warehousing facilities	Specific charges
	Distribution zones	Land lease charges
	Cargo handling equipment	Specific charges
	Dedicated freight transport systems	Specific charges
	Dedicated cargo handling facilities (including all weather facilities and project cargo facilities)	Specific charges
	Facilities to intensify land use	Land lease charges
	Facilities that enable co-siting and equipment sharing	No charges?
Port services	Energy and water supply	Port dues
	Waste collection	Port dues /specific charges
	Towage services	Port dues /specific charges
	Security	Port dues /specific charges
ICT infrastructure	Web-based port community system	Specific charges?
	Port information system	Port dues /specific charges
	ICT system for commodity trade	Port dues /specific charges
Attract economic activities	Venture capital provision	Specific charges
	Office space provision for SMSF's	Specific charges
	Real estate investments in port area	Specific charges
	Marketing and promotion of the port	Port dues, Land lease
	Acquisition of firms	Land lease
Promote innovation	Innovation platforms	Port dues?
	Co-finance joint research projects	Port dues?
Improve quality of workforce	Labour pool	Specific charges
	Training and education infrastructure	Port dues, Land lease
	Recruiting youngsters to port related schools	Port dues, Land lease

TABLE 4.1 A basis for analyzing to what extend, in which way and with which financial arrangements port authorities engage in cluster management.

Finally in the same paper Langen refers to the institutional position of port authorities dividing them into three categories:

a) Public national port authorities
b) Public regional/municipal port authorities
c) Private port authorities

And given the international regulatory framework, the regional/municipal port authority is the most efficient, because it has the incentives and resources to act as a cluster manager. (De Langen, 2003)

5 SHANGHAI SEAPORT CLUSTER

5.1 CLUSTER CONSTRUCTION

5.1.1 Economic activities

The economic specialization for which the cluster analysis is made can be defined from the main domain of occupation of the cluster participants. This economic specialization should be very general in order to include all the possible aspects of occupations for the cluster companies. Furthermore it is advisable to take an economic specialization that is relatively important in the region.

In our case the economic specialization is about the seaport cluster of Shanghai. In this economic specialization are included all the economic activities that are involved with Shanghai's port operation. These activities include, apart from the logistics (cargo handling and forwarding via every possible way), all the activities that take part for the ships good operation such as ship repairs (also including ship construction), agents (also including spare parts suppliers), marine consulting etc. We also include in the cluster research and development maritime centers and universities.

5.1.2 Cluster region

According to our previous analysis we apply the cluster region criteria for the case of the Shanghai seaport cluster. The relevant region includes the municipality of Shanghai as its political borders divide it.

We apply the following criteria:

1)The proximity of the seaport

The port of Shanghai is divided in four (4) regions all of them situated in the area determined by the borders of Shanghai municipality

2) High concentration of port related activities. The relevant region generally includes:

a) The primary port area.

As analyzed in a previous chapter, in the port of Shanghai there is a great concentration of companies in the fields of:

- Container terminals
- Non container terminals
- Port logistics
- Port services

b) The business district of the port city.

All the companies studied for the construction of the seaport cluster of Shanghai are situated in the municipality of Shanghai.

c) Secondary nodes in the proximity of the primary seaport.

In our case as a node we can consider the existence of a maritime and a logistics cluster both in the border of the municipality.

d) Municipalities in the vicinity of the port with a concentration of port service activities.

This criterion does not apply to our case as we investigate only the region of the Shanghai municipality.

In the following maps we can see the cluster region with reference to the location of the cluster companies. Categorized according to their business scope.

FIGURE 5.1 Shanghai logistics companies

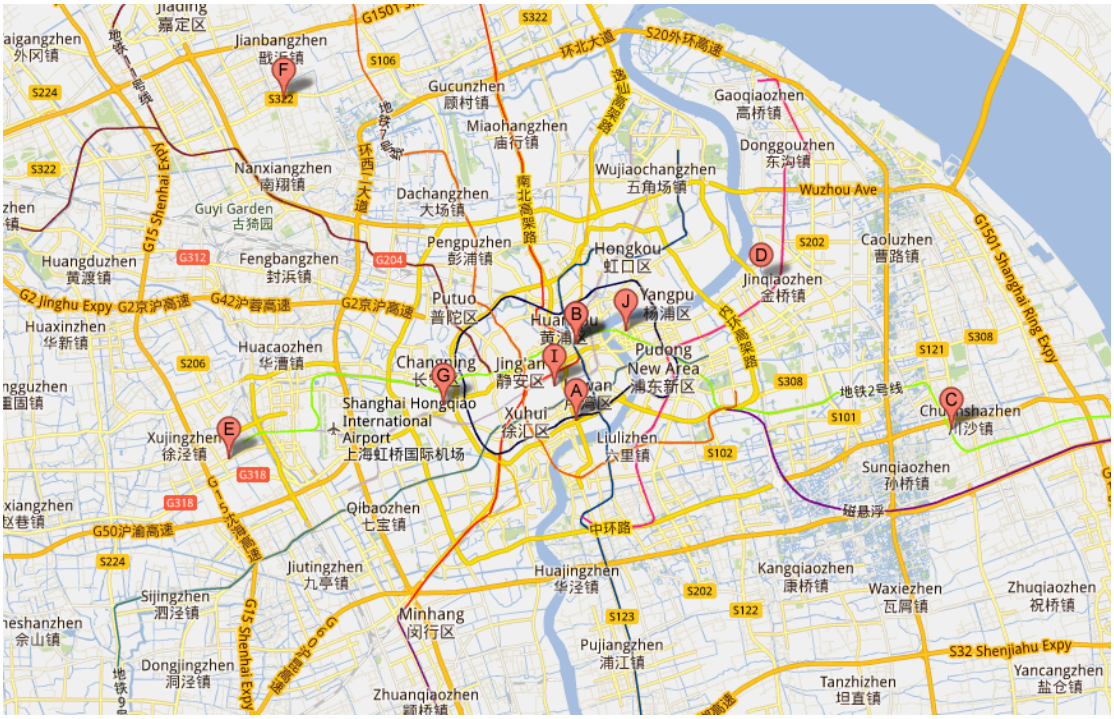


FIGURE 5.2 Shanghai heavy industry

FIGURE 5.3 Shanghai economic & technological zones

5.1.3 Cluster population

This population consists of all companies active in economic activities included in the cluster and located in the relevant cluster area. All categories of the cluster's population are being analyzed as follows.

5.1.3.1 Shanghai port

The most important sector of a seaport cluster population is the port itself. In our case in the port of Shanghai there are several active companies that have been analyzed extensively in the previous chapter. The port includes:

- 7 companies for the container terminals management (one for each terminal),
- 7 companies for the non container terminals (one for each terminal),
- 6 port related logistics companies and
- a variety of companies (6 total) which provide services for the port and the ships operation such as pilots, engineering, cruise terminal etc.

5.1.3.2 Cluster companies

In the following tables we can see the cluster companies categorized by their sector and the number of companies in each sector.

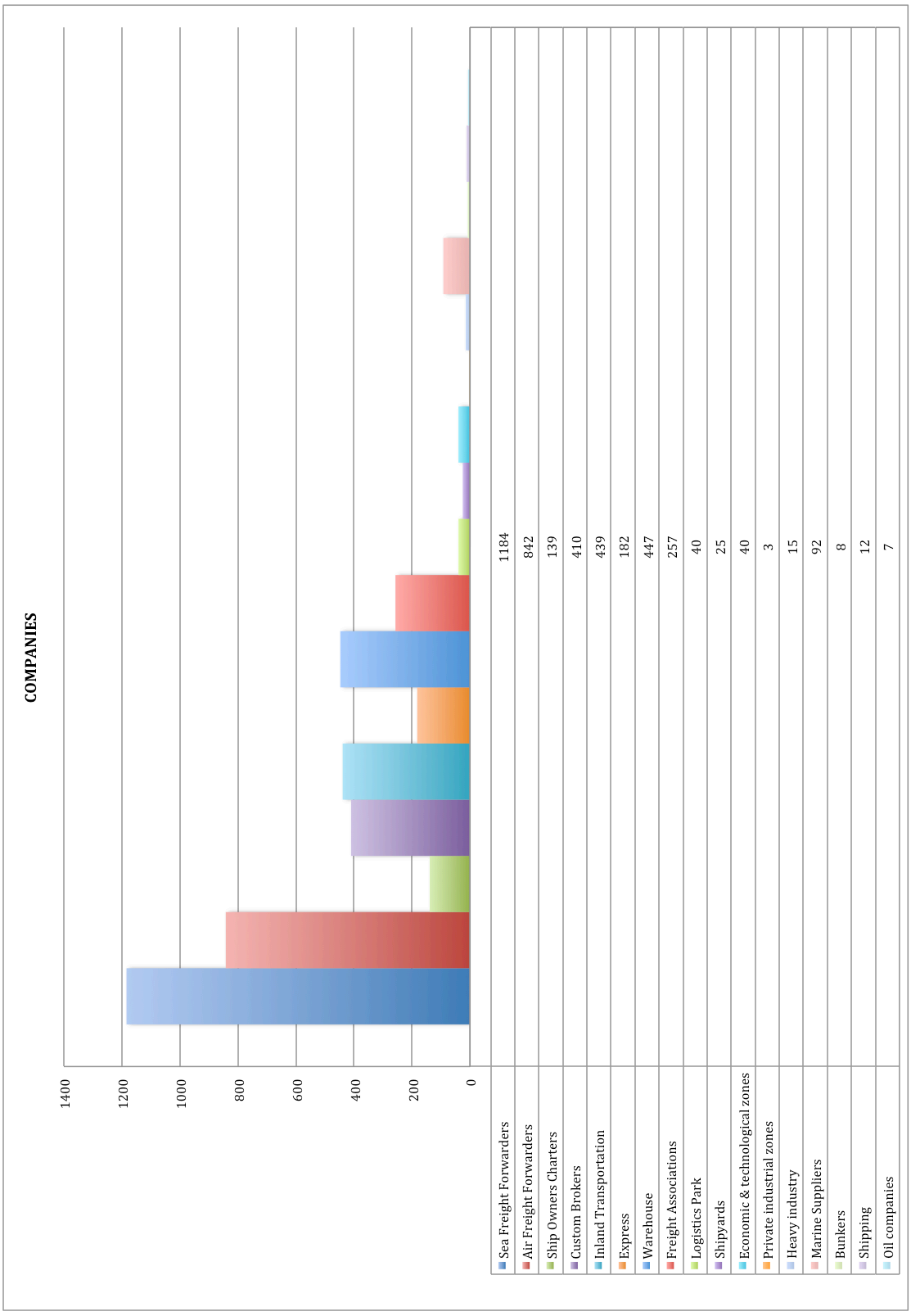


TABLE 5.1: Cluster companies

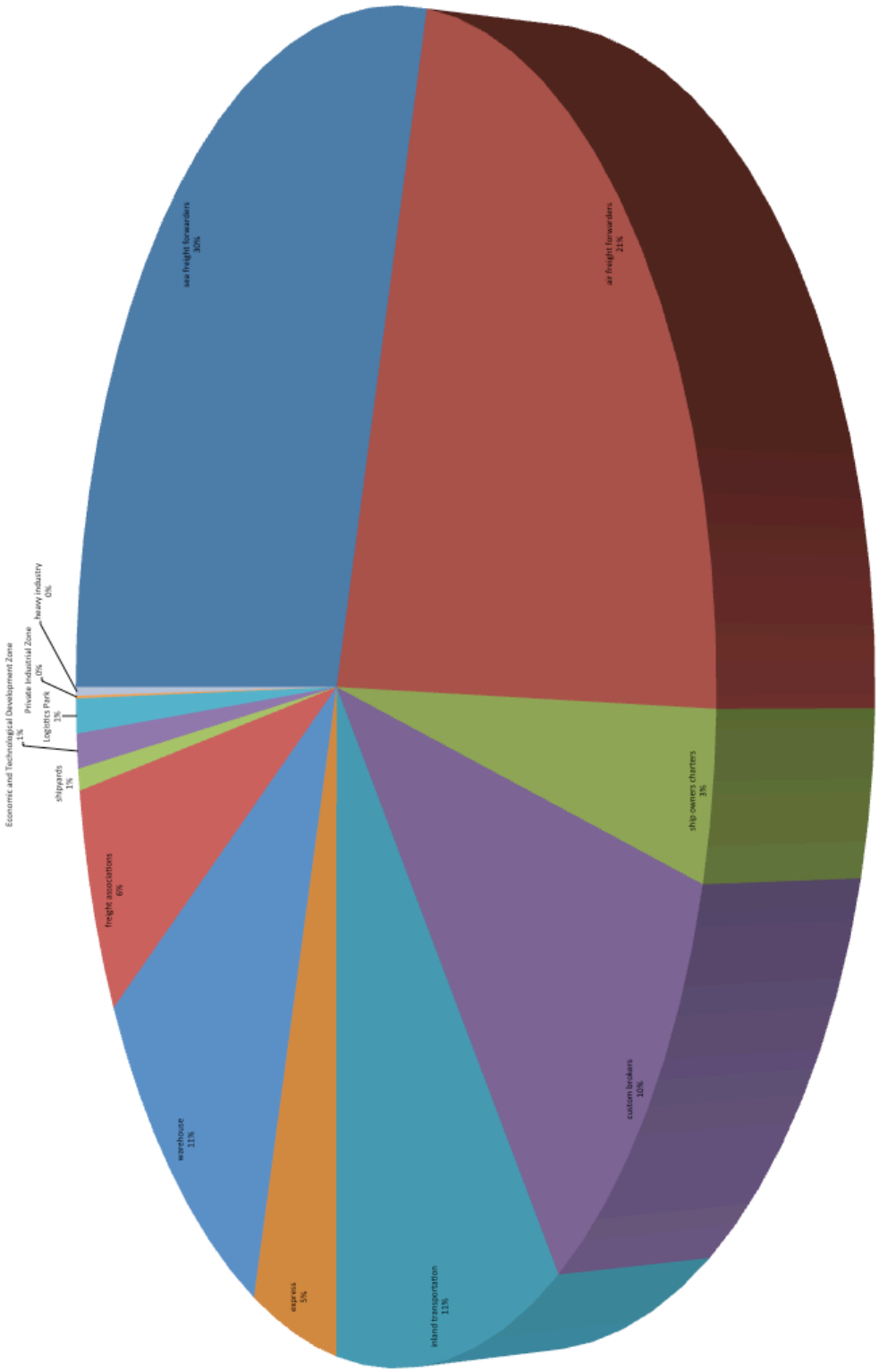


TABLE 5.2: Cluster companies

In the cluster companies we have the sea freight forwarders, air freight forwarders, ship owners charters, custom brokers, inland transportation, warehouses, logistics parks, express and freight associations, in these categories we include all the companies occupied in freight forwarding by the means of sea, air, road and express and in some cases including custom clearances. These companies can be seen in the previous map of the logistic companies of Shanghai.

The economic and technological zones, the heavy industries and the private industrial zones can be indentified as subclusters because of their size and their organization.

As we can see there is a large amount of companies in the area of freight forwarding. This is because all the companies are categorized in each sector regardless their other activities. For example a company occupied in the area of sea freight forwarding could also be occupied in the area of air freight forwarding and warehousing. This company will be counted as an individual for each sector.

5.1.4 Leader companies

The criteria that we will follow for the identification of the leader firms of the Shanghai seaport cluster will be the following (as analyzed in the previous chapter):

1) Size of the firm in terms of number of employees. In our case a leader firm should have more than 500 employees.
2) Market position. The leader firms should have a large number of suppliers and customers.
3) Knowledge. Leader firms should invest in research and development.
4) Entrepreneurial skills.
5) Location. The firms must have a core business located in the geographical area of the cluster.
6) Being and behavior. Except from the criteria listed above a leader firm should behave as one and being recognized from the other firms as a leader firm.

	AREA OF OCCUPATION	SIZE	MARKET POSITION	KNOWLEDGE	ENTEPRENEURIAL SKILLS	LOCATION	BEING AND BEHAVIOR
COSCO	SHIPPING	OK	OK	OK	OK	OK	OK
CSCL	SHIPPING	OK	OK	OK	OK	OK	OK
SINOTRANS	SHIPPING	OK	OK	OK	OK	OK	OK
EVERGREEN	SHIPBUILDING-REPAIR	OK	OK	OK	OK	OK	OK
SWS	SHIPBUILDING-REPAIR	OK	OK	OK	OK	OK	OK
HUDONG	SHIPBUILDING-REPAIR	OK	OK	OK	OK	OK	OK
BLOGIS PARK	LOGISTICS	OK	OK	OK	OK	OK	OK
PETROCHINA	OIL &GAS	OK	OK	OK	OK	OK	OK
SDARI	DESIGN& RESEARCH	OK	OK	OK	OK	OK	OK

TABLE 5.3 List of Shanghai seaport cluster leader firms according to the criteria.

‘China Ocean Shipping (Group) Company, known as COSCO or COSCO Group, is one of the largest liner shipping companies worldwide. It is a government owned company of the People's Republic of China. Its headquarters is in Ocean Plaza in Xicheng District, Beijing. According to the company, it owns over 130 vessels (with a capacity of 600,000 Twenty-foot equivalent units (TEU)) and calls on over 1,000 ports worldwide. It ranks sixth largest in number of container ships and ninth largest in aggregate container volume in the world. The Group contains six listed companies and has more than 300 subsidiaries locally and abroad, providing services in freight forwarding, ship building, ship repair, terminal operation, container manufacturing, trade, financing, real estate, and information technology. The Group owns and operates a fleet of around 550 vessels, with total carrying capacity of up to 30 million metric tons deadweight (DWT). They are the largest dry bulk carrier in China and one of the largest dry bulk shipping operators worldwide. In addition, the Group is the largest liner carrier in China.’(*http://en.wikipedia.org/wiki/COSCO,* accessed on 20/09/11)

‘China Shipping Container Lines (CSCL), a division of China Shipping Group (China Shipping), is a containerized marine shipping company, based in Shanghai, China. CSCL, established in 1997, provides fully containerized marine and intermodal freight transport, storage, and electronic data interchange services worldwide. The company has grown rapidly: it is now the eighth largest container shipping company having recently acquired a minority interest in Asia Pacific Marine Container Lines of Canada. With a modern fleet that comprises 123 vessels, and a total operating capacity of 290,460 Twenty-foot equivalent units (TEU). The company calls on ports all over the world, and more than 30 ports from South China to North China in its domestic coastal business. It also operates container yards and trucks, international cargo agencies and terminal facilities in many countries. North America freight services include refrigerated cargo carriage in the line's own reefer container fleet, as well as other specialized cargo container services.’(*http://en.wikipedia.org/wiki/China_Shipping_Container_Lines,* accessed on 20/09/11)

‘Sinotrans (HK) Shipping Limited (commonly referred to as Sinotrans) is one of the largest liner shipping companies in Asia. It is based in Hong Kong, People's Republic of China. In terms of liner shipping operations Sinotrans is primarily an intra-Asian

carrier linking China with Korea and Japan, although the company also offers full range of logistics services covering not just the maritime transportation of containerized and bulk cargo but also road, rail, pipeline and air transport. The company is currently ranked as the 41st largest container carrier in the world in terms of slot capacity.'(*http://en.wikipedia.org/wiki/Sinotrans,* accessed on 20/09/11)

'BLOGIS Park (Shanghai), with a total area of 390,000 square meters, is the first logistics park invested by Shenzhen Chiwan Petroleum Supply Base Co., Ltd. The park has 17 high-standard steel structural warehouses with a total area of 200,000 square meters. In addition, it includes office building, packing zones, container yards and parking zones. Established in early 2004, BLOGIS Park (Shanghai) was the first domestic logistics park adopting the management system of Health, Safety and Environment (HSE). Having a reasonable layout and perfect functional services, BLOGIS Park (Shanghai) is one of the top logistics parks in China.' (*http://rightsite.asia/en/industrial-zone/blogis-park-shanghai* ,accessed on 05/05/11)

'The Evergreen Group is one of the main shareholders of the Sinopacific Shipbuilding Group. The shipbuilding sector covers ship design and engineering, shipbuilding, supporting manufacturing for ship construction, procurement, international trade and shipping. By focusing on two main business philosophies; "simple but perfect' & 'leader in niche market segments', Sinopacific Shipbuilding Group has introduced innovative business models into the industry and by using the world's most advanced shipbuilding techniques, has constructed modern, well-equipped ship manufacturing bases both in the Yangtze River delta region of Ningbo (Zhejiang Shipbuilding Co., Ltd) and in Yangzhou (Dayang Shipbuilding Co., Ltd). The Group's product range is focused on general cargo ships such as bulk carriers and container vessels as well as specialized vessels for the oil & gas industry, such as offshore supply boats and gas carriers. By incorporating specific technological advantages and improving vessel efficiency, the Group has become a market segment leader in bulk carriers and offshore vessels. The Group commenced its design capabilities through partnerships with leading international ship design houses such as Ulstein, GPA, Shanghai Design Associates and Shanghai GreenSeas Technology Co. Ltd. At the start, the cooperation covered all aspects of design but the Group has since invested heavily in shipbuilding research and design and now has in-house capabilities for conceptual design, basic

design and detailed design. At the present time, the Group has introduced 8 different new ship designs to the international market, each with new technologies fully integrated from the design stage and has successfully delivered these new designs for 4250 TEU container vessels, 58 000DWT bulk carriers and 16 500cbm LPG carriers with market approval from leading international ship owners. The Group's two subsidiaries, Sinopacific Shanghai International Trade Co Ltd and Crown Ship Co Ltd (Hong Kong) maintain close links between the ship construction and the ship trading markets, enabling the company to develop a comprehensive trading platform in China. To date, the Group has successfully delivered more than 100 units of bulk carriers and offshore supply vessels respectively to the global market.' (*http://www.cneig.cn/en/about_us.jsp* , accessed on 22/08/11)

'PetroChina Company Limited ("PetroChina") is the largest oil and gas producer and distributor, playing a dominant role in the oil and gas industry in China. It is not only one of the companies with the biggest sales revenue in China, but also one of the largest oil companies in the world. PetroChina was established as a joint stock company with limited liabilities by China National Petroleum Corporation under the Company Law and the Special Regulations on the Overseas Offering and Listing of Shares by Joint Stock Limited Companies on November 5th, 1999. PetroChina commits itself to becoming an international energy company with strong competitiveness and one of the major producers and distributors of petroleum and petrochemical products in the world. It engages in wide range of activities related to oil and natural gas, including: exploration, development, production and marketing of crude oil and natural gas; refining, transportation, storage and marketing of crude oil and oil products; the production and marketing of primary petrochemical products, derivative chemicals and other chemicals; transportation of natural gas, crude oil and refined oil, and marketing of natural gas.' (*http://www.petrochina.com.cn/Ptr/About_PetroChina/Company_Profile/,*accessed on 14/09/11)

'Established in 1964, Shanghai Merchant Ship Design & Research Institute (SDARI) is a ship design consultant under China State Shipbuilding Corporation (CSSC). SDARI has the extensive experience in designing various types of ships, e.g. bulkers, container ships, tankers, multi-purpose vessel, RoRo, offshore engineering vessel and etc., and has accumulated more than 800 as-built designs in the past four

decades. SDARI provides the entire range of service from the conceptual development to the workshop drawings and is the market leader in respect of ship design and development in China. SDARI is the first customer after QT Create became Ship Weight's agent in China.' (*http://www.shipweight.com/index.php?option=com_content&view=article&id=141:shipweight-in-china&catid=22:shipweight.,* accessed on 25/08/11)

'Shanghai Waigaoqiao Shipbuilding Co., Ltd. (SWS) was founded in 1999, which is a full-invested subsidiary company of a listed company, China CSSC Holdings Ltd. SWS covers a total area of 5 million square meters, of which the annual shipbuilding capacity is over 7 million deadweight tonnage. SWS has become the No. 1 Shipyard in China, of which both the annual shipbuilding capacity and economic benefit have continuously reached the top place among the domestic shipbuilding enterprises in the recent years. SWS boasts Shanghai Jiangnan Changxing Shipbuilding Co., Ltd., Shanghai Lingang Offshore & Maine Co., Ltd. and Shanghai Xinye Marine & Engineering Design Co., Ltd., as her full-invested subsidiary companies or holding subsidiary company. As a shipbuilding enterprise which focusing on both the marine and offshore engineering, SWS has fully guaranteed the construction duration and the products quality by utilizing advanced facilities, scientific operational process, effective management and computerized CIMS system. So far, SWS has manufactured over 100 vessels, all of which were delivered ahead of the time, and earned the trust and respect from owners all over the world. SWS has successfully passed approvals and certifications of three management systems which include ISO9001 Quality Management System, ISO14001 Environmental Health and Safety Assessment System. SWS was approved as State Enterprise Technology Centre and New High-Tech Enterprise, and the Physical Chemistry Lab of SWS was certificated as the "State Laboratory".' (*http://www.chinasws.com/english/,* accessed on 25/08/11)

'Hudong Shipyard is one of the largest key enterprises of China State Shipbuilding Corporation (CSSC). Situated at the Pudong Developing Zone and on the eastern bank of the Huangpu River in Shanghai, Hudong Shipyard is well known for building and repairing various types of military and merchant ships up to 120,000dwt and marine diesel engines of low and medium speed up to 23,000kw. As of mid-2000 Hudong Shipyard and Zhonghua Shipyard, two major ship builders in Shanghai, were negotiating a merger. Hudong Shipyard was founded in 1928 and renamed as the

present in 1952. It has been developing since the foundation of the People's Republic of China. Hudong Shipbuilding Group was organized in 1996 as Hudong Shipyard as its core enterprise. Today, Hudong Shipyard covers an area of 870,000 m2 and the Group has more than 11,000 staff members, among who are over 2800 technicians, marine engineers and naval architects. Important and large-scale reconstruction and expansion have been taken four times in the history of Hudong Shipyard. Especially in the last time beginning from 1985, a new large slipway, a new ball spraying and painting workshop and a new hull cutting and welding workshop had been completed. Equipped with two large slipways, eight medium horizontal berths and more than 4,100 sets of different kinds of machinery, Hudong Shipyard has the productive capability of 500,000dwt ships and 250,000kw diesel engines per year with the steel consumption of 80,000 tons. In the respect of shipbuilding, Hudong Shipyard has completed different types of ships, such as 2,500 ton passenger-cargo vessel; 27,000 ton, 36,000 ton, 47,500 ton, 70,000 ton, 73,000 ton and 74,500 ton bulk carriers; 62,200 ton, 68,000 ton, 68,600 ton and 71,000 ton crude oil tankers; 4,999 ton product oil tanker; 2,700 TEU reefer container; 1,714 TEU container; 29,750 ton full-formed coal carrier with ultra-shallow-draft; 2942/6178kw anchor handling tug supply vessels; 52,000 ton floating production storage unit, for the customers both at home and abroad, such as Hong Kong, Australia, Germany, Chile, Thailand, Singapore, Norway. In respect to diesel engine making, Hudong Shipyard has successively introduced the technical licenses from B & W, Denmark, SEMT, France, New Sulzer Diesel Ltd. Switzerland, and manufactured a great number of medium and low speed marine diesel engines of different types under the licenses. Meanwhile, the shipyard itself has also developed 390E, 34/82, 43/82 types of medium and low speed diesel engines. In 1998, the marine diesel engine sector was merged with the same sector of Shanghai Shipyard into Hudong Heavy Engine Co. Ltd., whose shares are publicly listed in Shanghai Stock Exchange.' (http://www.globalsecurity.org/military/world/china/hudong.htm , accessed on 22/08/11)

5.1.5 Cluster governance

Shanghai International Port (Group) Co., Ltd. is the exclusive operator of all the public terminals in the Port of Shanghai. Incorporated in January 2003 by reorganizing the former Shanghai Port Authority, SIPG is a large-scale business conglomerate specialized in the operation of port and related businesses. In June 2005, SIPG was turned into a share holding limited company. In October 2006, SIPG listed in Shanghai Stock Exchange and became the first whole-listed company of China's port industry.

FIGURE 5.4 Shanghai port management organization.

'The business scope of SIPG includes: the cargo handling (including transloading), transshipping, and marine and overland transportation of domestic and international cargo (including containers), the de-stuffing, consolidation, cleaning, repair, manufacturing and lease of containers, international and domestic shipping service, warehousing, custody, processing, distribution, and logistics information management, provision of waiting, ship embarkation and disembarkation facilities and services for international passengers, ship pilotage, towage, ship agency, and

freight forwarding, the provision of in-port services such as bunkering and ship-handling, lease of port equipment and facilities, port information and technical consultancy service, port and terminal construction, management and operation. In total, SIPG operates 125 berths on a total quay length of around 20 kilometers, among which, 82 of these berths can accommodate vessels of 10,000dwt class or above. Except the container terminal, SIPG also owns public bulk, break-bulk, specialized Ro/Ro terminal and cruise terminal. SIPG operates warehouses with a total area of 293,000m^2, storage yards with a total area of 4,721,000 m^2, and owns 5,143 units of cargo handling equipment.' (*http://www.portshanghai.com.cn/en/channel2/channel24.html,* accessed on 25/08/11)

According to Langen a 'perfect' cluster manager would be an organization with the following four characteristics.

a) A cluster manager has motives to invest in the cluster, because its incomes will help to increase the performance of the cluster. A good cluster manager would receive a share of the value added generated in the cluster as income, for instance through a 'cluster tax'.

b) A cluster manager invests in activities with cluster benefits (instead of firm specific benefits). Furthermore, the cluster manager aims to invest when 'cluster benefits' exceed costs.

c) A cluster manager aims to distribute investment costs for investments to those firms that benefit. This involves co-finance arrangements with a specific group of beneficiary firms.

d) A cluster manager operates self-sustaining: over time investments equal revenues. (De Langen, 2003)

In our case there is no cluster manager to do only the management of the seaport cluster, but according to the previous statements we can recognize as cluster manager the Shanghai International Port (Group) Co., Ltd which is the reorganization of the former Shanghai Port Authority. This organization is responsible for the management and the development of the port of Shanghai that is the "heart" of the seaport cluster so subsequently SIGP manages the whole cluster.

5.1.6 Research and development

'Shanghai Maritime University is a public university in Shanghai, People's Republic of China. Shanghai Maritime University (SMU) is a multi-discipline university with 6 fields of study: Engineering, Management, Economics, Literature, Science and Law, which is one of the best Chinese universities committed to maritime higher education. The Ministry of Communications established SMU in 1959. Since 2000, SMU has been mainly administered by Shanghai Municipality and has been co-constructed by Shanghai Municipality and the Ministry of Communications. The courses of "Communications & Transport Planning and Management", "Industrial Economics", and "Power Electronics & Electrical Drive", "International Law", "Mechanical Design & Theory", "Logistics Management & Engineering", "Delivery Means Utilization Engineering" and "Port Machinery Electronics Engineering" have been designated as key specialties by the Ministry of Communications and Shanghai Municipality. The specialties of "Customs Logistics", "International Trade & Economics" and "Maritime Law" are classified as Shanghai's key bachelor-degree disciplines for further development. In 2004, SMU got an "A" in the Undergraduate Teaching Evaluation by the Ministry of Education. Currently, SMU has a full-time student population of near 15,000, of who over 10,000 are studying for a Bachelor's degree and over 2000 for a Master's degree. For decades of years, SMU is devoted to fostering qualified talents for shipping industry. SMU has provided the shipping enterprises, public institutions and government departments with over 40,000 graduates. SMU is therefore honored as "Cradle of qualified shipping personnel". SMU prides itself on the quality of its staff. It has a teaching and research staff of more than 800, of who over 100 are full professors. By 2010, to be a teaching-research university with shipping as its special feature and with many disciplines developing harmoniously. By 2020, to grow into a world-class maritime university.'

(*http://en.wikipedia.org/wiki/Shanghai_Maritime_University,* accessed on 05/09/11)

5.1.6.1 Shanghai research institutes

1) The Shanghai International Shipping Research Center
2) Research Institute for Science of Water Transport Economy
3) The Research Institute of Social Development
4) The Research Institute of Electronic Automation
5) The Higher Education Research Institute
6) The Simulation Center of Navigation in SMU
7) The Network Calculation Research Institute
8) The Simulation Technology Research Institute
9) The Mechanical Engineering Design Research Institute
10) The Maritime Law Research Center
11) The China-Holland Economic Research Center
12) The Nautical Science Research Institute
13) The Center of Supervision, Inspection and Test on Mechanical Quality of Shanghai Harbor
14) The Applied Mathematical & Physical Research Institute

We can see that the number of research institutes is rather limited compared to other clusters. The reason for this is that a great amount of knowledge used inside the cluster comes from Europe or USA.

The existence of the Maritime University combined with all these research institutes ensures the continuation of the seaport cluster of Shanghai. This is mainly because the people that will occupy the cluster on the upcoming years will have the knowledge to expand it and increase its quality as a cluster.

5.2 COEXISTING CLUSTERS

5.2.1 Shanghai maritime cluster

Except from the existence of the seaport cluster we can also identify the maritime cluster and the logistics cluster, given the importance of maritime industry in the modern economy and trade, and the competitive nature of its services. According to Sotiris Thedoropoulos (Cluster formation and the case of maritime cluster) 'the existence of the maritime cluster in the new economic environment of globalization and of the continuously merging markets is very important. A great range of relevant production activities, for equipment and services, is required in order to carry out the enormous and constantly growing task of maritime transports within an internationally competitive market. Except from the requirements of high standards for the construction and the maintenance of the ship the same standards should also be applied for its equipment, and its operation. Also apart from the particular sector and the maritime transportation market, the commercial and competitive character applies also, to the same or a smaller extent, to the productive activity of the shipping sector. The international trend for the merging of these respective markets creates the necessity for the existence of this competitive aspect, in order for those businesses to survive. For that reason, their operation under the protection of a cluster is vital, whereas the competitive operation of the later emerges now as a very critical factor for their own competitiveness. Within a business environment and the conditions that prevail in a cluster, the businesses can promote their competitive advantage, which, apart from any comparative advantages, requires a favorable national business basis. All these reasons lead to the conclusion that each country's maritime cluster will be different in size, in composition and appears to be independent of the size and the rate of growth of a country's shipping or maritime industry. Maritime cluster includes all those sectors or sub-sectors, all the economic activities that are directly or indirectly linked to the shipping industry and the maritime transports.' (Thedoropoulos S. (2006), *cluster formation and the case of maritime cluster*)

These sectors are the following:

1 Shipping

2 Shipbuilding

3 Marine equipment

4 Port

5 Inland navigation

6 Maritime services

7 Offshore

8 Dredging

9 Fishing

10 Yachting

In our case the maritime cluster mainly consists of the first six (6) sectors. The region of the maritime cluster is the same of the seaport cluster (the political borders of the municipality of Shanghai) and also the leader firms in each sector are these that we referred to above.

As we can see the most important sector of the maritime cluster is the shipbuilding sector which has the same role in the maritime cluster as the seaport in the seaport cluster of Shanghai.

According to the statistics released on the official Web site of the China Association of the National Shipbuilding Industry. In the first half of 2010, China's shipbuilding capacity, the number of new orders and the volume of backlog orders accounted for about 41 percent, 46 percent and 38 percent of the world market, respectively.

The accomplishments of China's shipbuilding industry had drawn worldwide attention. In the first half of 2010, China's shipbuilding enterprises completed and exported 24.3 million deadweight tons, accounting for 82 percent of the total shipbuilding capacity, and the volume of new overseas orders reached about 16.4 million deadweight tons, accounting for 69 percent of the total volume of new orders.

By the end of June, the volume of holding ships for export had reached 160.3 million deadweight tons, accounting for 87 percent of the total volume of holding ships. The shipbuilding enterprises above designated size had accomplished a total export delivery value of 139.6 billion yuan, up by nearly 18 percent compared to the same period of the previous year.

China is an emerging shipbuilder that briefly overtook South Korea during the 2008-2010 global financial crisis as they won new orders for medium and small-sized container ships based on their cheap prices, although its current production is limited mainly to basic vessels.

5.2.2 Shanghai logistics cluster

The logistics cluster is a cluster that consists of companies that their main occupation is the forwarding of goods by all possible means, such as inland, air, sea transportation and all the relative sectors such as storage etc.

China possesses the world's longest high-speed rail network and according to the TABLE 2.4 is the biggest rail freight transporter in the world. Also possesses one of the biggest roadways in the world (TABLE 2.5). Given that Shanghai's port is the biggest port in the world in cargo and container traffic the existence of a logistics cluster in Shanghai was inevitable. The sectors included in Shanghai logistics cluster are the following:

1. Sea freight forwarders.
2. Air freight forwarders.
3. Ship owners charters.
4. Custom brokers.
5. Inland transportation.
6. Express.
7. Warehouse.
8. Freight associations.

9. Logistics parks.
10. Economic and technological zones.
11. Port.

5.3 CONCLUSIONS

As we can see the construction of the maritime and the logistics cluster of Shanghai is in many ways the same with the construction of the seaport cluster. Many of the sectors of these two clusters coincide with the sectors of the seaport cluster. As a result we can see that these three clusters owe their existence and subsequently their success to a strategic factor that has led them to this point. This factor is the port.

The great geographical position of the port of Shanghai has led it to the world's biggest cargo and container traffic port. This had as a result the creation of an enormous industry around the port in order to serve the needs of the coming vessels (terminals, bunkers, ship repairs etc.). Furthermore the existence of a great railway and roadway network led to the creation of the logistics cluster in order to forward all the freights that came in the port.

Finally we can see that the seaport cluster of Shanghai is the "leader cluster" around of which created the maritime and the logistics cluster.

6 CONCLUSIONS

Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region.

In this final paper we investigated the seaport cluster of Shanghai (China). China is one of the world's largest economies, having last year an average growth rate of 10%. Also being the world's biggest consumer in steel and ore, its transportation network is one of the biggest of the world. Shanghai is indubitably the biggest port of China. Consequently Shanghai is not only the biggest port of China but also one of the biggest ports in the world in cargo and container traffic. According to the 2009 statistics it has undertaken Singapore and it is now the largest port in the world in cargo and container traffic.

The seaport cluster of Shanghai includes all the type of companies that can lead it to one of the world's biggest seaport and maritime clusters. There is a great amount of companies that are being occupied in cargo handling through hinterland China and worldwide via all possible means (air transportation, land transportation, sea transportation). Furthermore there are many shipping support companies such as suppliers of all kinds, bunkers, agents etc. Finally Shanghai has a significant heavy industry that can support ship repairs and new building constructions as well. Its new building sector had its peak during the 2008-2010 global financial crisis as they won new orders for medium and small-sized container ships based on their cheap prices and managed to overtake South Korea, although its current production is limited mainly to basic vessels.

As we can see the beneficial situation of the port of Shanghai combined with the existence of all these companies that can equip a seaport and furthermore a maritime and a logistics cluster is ideal. Also the existence of all these world operating leader companies is an advantage. These companies because of their range provide work to the "smaller" companies of the cluster, do research in order to improve their productivity and create innovations to their sectors. The most important thing of the

leader companies is that in a way they control the cluster, by managing the amount of work they are giving to the "smaller" companies.

The existence of the seaport cluster of Shanghai led to the creation of two more significant clusters in the same cluster region (the municipality of Shanghai). All these clusters have been created around the port of Shanghai in order to benefit from the world's biggest port. The seaport cluster is recognized as the "leader cluster" which manages the maritime and the logistics cluster. The maritime cluster has its core in the shipbuilding industry of Shanghai that is only a part of the heavy industry. The logistics cluster ought its existence to the port of Shanghai.

The only problem of the seaport cluster of Shanghai is that it is still at its first steps compared with other functional and more profitable seaport clusters around the world.

A reason for this is that China is still a developing country, apart from its high growth rates, and its major disadvantage is the lack of educated human resources to equip the cluster. The existence of the Maritime University and all these research centers in Shanghai is a good sign that in the up coming years Shanghai will have a functional seaport cluster. Another reason could be the lack of a management corporation only for the cluster, which in many cases (Singapore, Holland) has proven to be vital for the cluster existence. Such a corporation could be for example the "Shanghai seaport cluster" which will manage funds gathered from the cluster members and invest them for the cluster's benefit. Finally the most important thing is a more cluster beneficial politic from the government.

Despite the disadvantages we can see that the operation of the port can be characterized as a small seaport cluster providing everything that a recognized cluster can provide (all types of terminals, logistics, services for the ships).

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