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SHIPPING  
MANAGEMENT

THE COMPARISON OF DEVELOPMENT  
BETWEEN PIRAEUS PORT AND HAIKOU  
PORT

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requirements for the Master of Science degree in Shipping Management

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This Diploma Thesis was unanimously approved and graded as follows by this MSc in Shipping Management' Thesis Defense committee as typically appointed by the relevant authorities of the Department of Maritime Studies, University of Piraeus.

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The approval of this Thesis by the Department of Maritime Studies, University of Piraeus does not imply in any way endorsement of the author's opinions.

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## ABSTRACT

Greece and China are both ancient civilizations and major shipping countries. Cooperation between the two countries has grown closer and closer in recent years, particularly in the maritime sector. In this thesis, I select two typical ports of those two countries: Piraeus port of Greece and Haikou port of China. This thesis aims to present the comparison of infrastructure and volume development between Piraeus port and Haikou port. The comparison is based on key figures of ports, including capacity, pier length, water depth, throughput, yard area, handling equipment and etc. Methodology of SWOT is also used in the thesis, being to evaluate the Strengths, Weaknesses, Opportunities and Threats of Piraeus Port and Haikou Port. This study will give the opportunity of having a good understanding of the operation and development of international ports, resulting in deep knowledge of international shipping industry.

More specifically, there are many similar aspects between Piraeus Port and Haikou Port, such as:

- The strategic location as a hub
- Same activities including container cargo handling, and cruise& ferry passenger handling
- Logistics service
- Management under same majority shareholder and etc.

Following a historical overview and presentation of the port, current thesis focuses on the comparison and development of each specific activity.

Key words: Piraeus port, Haikou port, development, infrastructure, volume

## ΠΕΡΙΛΗΨΗ

Η Ελλάδα και η Κίνα είναι και οι δύο αρχαίοι πολιτισμοί και μεγάλες ναυτιλιακές χώρες. Η συνεργασία μεταξύ των δύο χωρών γίνεται όλο και πιο στενή τα τελευταία χρόνια, ιδιαίτερα στον ναυτιλιακό τομέα. Σε αυτή τη διατριβή, επιλέγω δύο τυπικά λιμάνια αυτών των δύο χωρών: το λιμάνι του Πειραιά της Ελλάδας και το λιμάνι Χαϊκού της Κίνας. Στην παρούσα διπλωματική εργασία θα παρουσιαστεί και θα γίνει η σύγκριση των υποδομών καθώς και της ανάπτυξης όγκου μεταξύ του λιμανιού του Πειραιά και του λιμένα Χαϊκού. Η σύγκριση βασίζεται σε στοιχεία των λιμανιών, συμπεριλαμβανομένης της χωρητικότητας, του μήκους της προβλήτας, του βάθους νερού, της διεκπεραίωσης, την προβλήτα των τερματικών σταθμών, του εξοπλισμού χειρισμού κ.λπ. Η μεθοδολογία της SWOT analysis, που θα χρησιμοποιηθεί σε αυτή την μελέτη θα δώσει την ευκαιρία να έχουμε μια καλή κατανόηση της λειτουργίας και ανάπτυξης των διεθνών λιμένων, με αποτέλεσμα τη βαθιά γνώση της διεθνούς ναυτιλιακής βιομηχανίας.

Πιο συγκεκριμένα, υπάρχουν ομοιότητες μεταξύ του λιμανιού του Πειραιά και του λιμανιού Χαϊκού όπως:

- Η στρατηγική θέση ως κόμβος
- Ίδιες δραστηριότητες, συμπεριλαμβανομένης της διακίνησης εμπορευματοκιβωτίων και της διαχείρισης επιβατών κρουαζιέρας και πορθμείων
- Υπηρεσία logistics
- Διοίκηση υπό την ίδια πλειοψηφία μετόχου κ.λπ.

Κάνοντας μια ιστορική αναδρομή και παρουσίαση των λιμένων, η παρούσα διατριβή θα εστιάζεται στη σύγκριση και ανάπτυξη κάθε συγκεκριμένης δραστηριότητας.

Η μελέτη θα επικεντρωθεί κυρίως στον τομέα διακίνησης εμπορευματοκιβωτίων και επιβατηγού φορτίου, που αποτελούν τις κύριες επιχειρηματικές δραστηριότητες του λιμανιού του Πειραιά και του λιμανιού Χαϊκού. Επωφελούμενοι από την πολιτική της Κίνας “One Belt – One Road” και το Hainan Free Trade Island, τα λιμάνια του Πειραιά και Haikou Port γίνονται καταλύτες για τις υπηρεσίες του μέλλοντος, αγκαλιάζοντας την ψηφιοποίηση σε κάθε λειτουργία της. Υπό την αιγίδα της COSCO Shipping, και τα δύο λιμάνια χρησιμοποιούν την

πιο προηγμένη, εξελιγμένη και πλήρως ασφαλή τεχνολογική υποδομή και υπηρεσίες για να αυξήσουν ολιστικά τις δυνατότητες εξυπηρέτησης των τελικών πελατών μας.

Λέξεις κλειδιά: λιμάνι Πειραιά, λιμάνι Χαϊκού, ανάπτυξη, υποδομή, όγκος, One Belt – One Road

## INTRODUCTION

Vessels are travelling all over the world. They load the cargo at one port and discharge at another port. Port is like a 'chain' in shipping industry, connecting different countries and distributing goods to clients and people from different places with transport links by sea, canal, road and rail. Ports are key to the maritime logistics system as part of effective supply chain management.

In the past, wherever ancient civilizations engaged in maritime trade, they tended to develop sea ports. One of the world's oldest known artificial harbors is at Wadi al-Jarf on the Red Sea.<sup>1</sup> Along with the finding of harbor structures, ancient anchors have also been found.

Other ancient ports including Haikou Port during Song Dynasty (1174-1179) China and Piraeus Port, served as the port of Athens since ancient times.<sup>2</sup> Both of those two ports are very important to its local region and country.

Nowadays, Piraeus Port is the chief port of Greece, serving but not limited to a local market of 10.7 million people of Greece.<sup>3</sup> The strategic location of Piraeus makes it an ideal port to be used as a hub for destinations in the Central and Eastern Mediterranean, as well as the Black Sea. Its scope of business expands broadly in cargo handling, passenger shipping, logistics service and ship repair activities. Port of Piraeus completed equity restructuring and managed by China COSCO SHIPPING Corporation Limited in 2016, which is the majority shareholder and owning 67% ownership. Piraeus Port Authority S.A. (PPA S.A.) is an Athens Stock Exchange listed company, to manage and operate the Port of Piraeus.<sup>4</sup>

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<sup>1</sup> Tira Shubart, 'Tanzanian dig unearths ancient secret', *BBC News*[website], UK, 2002, <http://news.bbc.co.uk/2/hi/africa/1924318.stm>, (accessed: 27 February 2022).

<sup>2</sup> 'Piraeus, the port of Attica', *touristorama*[website], 2012, [https://www.touristorama.com/en/athens\\_piraeus%20-01971](https://www.touristorama.com/en/athens_piraeus%20-01971), (accessed: 20 March 2022)

<sup>3</sup> 'Population in Greece - 10.7 Million People', *Sofia News Agency*[website], 2020, <https://www.novinite.com/articles/202716/Population+in+Greece++10.7+Million+People>, (accessed: 22 March 2022).

<sup>4</sup> 'China's Cosco now owns 67% of Greece's Piraeus Port', *Romanian Daily News In Brief* [website], 2021, <https://worldmarketsdaily.com/2021/10/08/chinas-cosco-now-owns-67-of-greeces-piraeus-port/>, (accessed: 22 March 2022).

While, Haikou Port is the biggest port of Hainan Province, China. It serves but not limited to local market of 10.08 million people of Hainan Province.<sup>5</sup> The competitive location of Hainan Island makes it an ideal port to be used as a hub for destinations of Southeast Asia, Japan, Korea, India and Pakistan, as well as Australia. Its scope of business covers cargo handling, container shipping, passenger shipping, logistics service and cargo agency service, etc. On November 27, 2019, the port completed equity restructuring and was managed by China COSCO SHIPPING Corporation Limited, which is the majority shareholder and owning 45% ownership. Hainan Strait Shipping Co., Ltd. controlled by Haikou Port is a company listed on the Shenzhen Stock Exchange.<sup>6</sup>

The international trade is one of the main economic generators of most of the countries. At the same time, some countries highly dependent on imported products. The concepts like national advantages, born golden theories came into existence due to international trade. So, it is important to have transportation of goods to keep the trade flowing. Sea transport is cheap when compared to air transportation. Further, it is too risky to carry heavy and large quantities of cargo on air. So, using maritime transportation is more practical, reliable and cost-effective. More than 90% of the world trade handle via sea. With that, sea transportation became crucial for trade. No doubt, ports are obviously needed to facilitate sea transportation. Further, port act as the connecting surface for watercrafts and land.<sup>7</sup>

China and Greece are both ancient civilizations and shipping countries. I have chosen to compare Piraeus Port and Haikou Port because there are many similar aspects between Piraeus Port and Haikou Port: same activities including container& RO-RO cargo, and cruise& ferry passenger handling, logistics service, performance of listed companies, under same majority shareholder's management after equity restructuring, and etc. I believe that the presentation of the development, operation and role of port is absolutely necessary in order to understand how the shipping industry works and develops. It is very important to have a good understanding of

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<sup>5</sup> 'Economic Data of Hainan Province', *Macao Trade and Investment Promotion Institute*[website], China, 2021, <https://www.ipim.gov.mo/pt-pt/services/representative-offices-in-mainland-china/representative-office-of-fuzhou/brief-introduction-of-economic-profile/economic-data-of-hainan-province/> , (accessed: 22 March 2022).

<sup>6</sup> 'Equity Restructuring of Hainan Harbor & Shipping Holding Co., Ltd. Completed', *xinde marine news*[website], China, 2019, <https://www.xindemarinenews.com/en/carrier/2019/1203/16630.html> , (accessed: 22 March 2022).

<sup>7</sup> 'Introduction to Sea Port and Harbour', *Daily Logistics*[website], 2021 <https://dailylogistic.com/introduction-to-sea-port-and-harbour/> , (accessed: 31 March 2022).

the operation and development of international ports, in order to have deep understanding of international shipping industry.

In order to make a complete presentation of Piraeus Port and Haikou Port, this thesis will present and compare their infrastructure, volume, investment, development, financial performance and etc., to thoroughly introduce and compare each activity and the whole port.

The methodology being followed to prepare this thesis is as following:

- Through the study of Chinese and foreign language literature, gaining information that helped to understand the subject dealt with in each chapter and to develop the ideology while using this knowledge on the subject.
- Focus on the port infrastructure and volume comparison between Piraeus Port and Haikou Port, based on the data and performance in recent years, indicating their development of those two ports.
- Using SWOT analysis to evaluate the Strengths, Weaknesses, Opportunities and Threats of Piraeus Port and Haikou Port.
- Also referring to scientific articles and official websites of organizations, bodies, associations, companies and offices active in the maritime and port industry, in order to gain access to latest information which is particularly useful in the analysis of individual issues.
- To do case studies drawing data from official sources on internet and proceeded to present and analyze them to address practical issues of port development.
- Including in the work statistical data in tables aiming at the aggregate presentation of basic data and data. and also adding pictures as the interactive presentation contributes to a better understanding of the issues being analyzed.
- Also bases on the Chinese and international legislation and the international conventions as the legislative and institutional framework is necessary for the understanding of the issues that are analyzed and the reference is deemed necessary.

The structure of the thesis consists of 6 chapters:

Particularly:

- The first chapter presents the introduction of Piraeus Port and Haikou Port, including the history, location, business activities and etc.
- In the second chapter, it presents the infrastructure and volume details of container terminals of Piraeus Port and Haikou Port, which is the most important activity for both ports. Regarding the infrastructure, the key specifications of each container terminal are presented, such as: capacity, water depth, pier length, storage area, QCs, RMGs, ERTGs and etc. Regarding the container volume, it presents the annual container throughout flow of both ports during the recent years. Also considering the benefits from parent company, national policy and world situation.
- In the third chapter, it presents present the infrastructure and volume details of ferry terminals and coastal shipping of Piraeus Port and Haikou Port, which is also very important activity for both ports. Regarding the infrastructure, the key specifications of each ferry terminal are presented, such as: capacity, water depth, pier length, passenger terminal and etc. Regarding the volume, it presents the annual passenger and vehicle throughout during the past 5 years. Also considering the benefits from parent company, national policy and world situation.
- In the fourth chapter, the SWOT analyses of Piraeus Port and Haikou Port are presented, being to evaluate their Strengths, Weaknesses, Opportunities and Threats.
- In the fifth chapter, the discussion of development comparison between Piraeus Port and Haikou Port, combined with the previous analysis.
- In the sixth chapter, a conclusion is addressed based on the above discussion. Another essential point is considering the benefits from parent company, national policy and world situation.

## CHAPTER 1 - INTRODUCTION OF PIRAEUS PORT AND HAIKOU PORT

In order to have a good understanding of Piraeus Port and Haikou Port, it is must for us to know their history, position, activities and etc. This chapter will present the history, position, business activities and etc., of those two typical ports, based on the latest information and material.

### 1.1 INTRODUCTION OF PIRAEUS PORT

Piraeus is a Greek settlement whose name roughly translates as “the place over the passage” and is located about thirty minutes away from Athens. The ancient port of Piraeus was located in roughly the same spot, but there are portions of Piraeus that might still be underwater.<sup>8</sup> The architect Hippodamus designed the urban planning of Piraeus in the med 5<sup>th</sup> century BC,<sup>9</sup> which became one of the most prosperous ports in Greece and even Europe at that time and for quite a long time afterwards.

The Port of Piraeus is the main seaport of Athens, Greece. Located upon the Saronic Gulf on the western coasts of the Aegean Sea, the Port is the largest port in Greece and one of the largest in Europe. The port is the main link between the mainland and the Aegean islands and Crete. It also serves as the main sea gate of Europe at its southeastern edge.

The history of the port can be traced back to 490 BC, when the Athenians realized the strategic importance of the deep-water harbor and converted it into a military port.

The proximity of the port to the capital city of Athens, its prime geopolitical location in the Aegean, the construction of the Athens-Piraeus Railway line and the creation of the Corinth Canal in 1893 provided a great impetus to the development of the port.<sup>10</sup>

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<sup>8</sup> ‘About the Ancient Port of Piraeus’, *GreekBoston.com*[website], 2019, <https://www.greekboston.com/culture/ancient-history/about-piraeus/>, (accessed 20 March 2022).

<sup>9</sup> ‘Piraeus Port of Athens’, *Piraeus.org*[website], 2021, <https://www.piraeus.org/>, (accessed 20 March 2022).

<sup>10</sup> ‘Port of Piraeus’, *Port Technology International*[website], 2019, <https://www.porttechnology.org/news/port-of-piraeus/>, (accessed 19 March 2022).



Piraeus Port has superior excellent port conditions and favorable geographical location. From the point of view of natural hydrology, Piraeus Port is a natural harbor with deep water. Geographically, it is also unique that the Mediterranean Sea is in the south and the Balkan Peninsula is in the north, making it an important transportation hub in the Mediterranean.

Regarding the seaway, Piraeus Port is the nearest deep-water port from Europe continent to the Far East, as well as one of the nearest ports from Europe continent and Mediterranean region to the main international route ‘the Suez Canal – Gibraltar’. The Port of Piraeus is good hub for ships from the Mediterranean to the Atlantic Ocean, through the Red Sea to the Indian Ocean, through the Sea of Marmara, Turkey to the Black Sea, connecting Balkan Peninsula, Southern Europe, the Black Sea region with Western Europe, Central and Eastern Europe, the Middle East and Africa, to facilitate international maritime trade.

Piraeus Port Authority S.A. (PPA S.A.) is an Athens Stock Exchange listed company, its purpose being to manage and operate the Port of Piraeus. The scope of business expands broadly in both passenger and cargo handling activities. Following an international contest, COSCO Shipping group has acquired 67% of Piraeus Port Authority (PPA) S.A. on August 2016 and published an ambitious port Master Plan, a 10-year Development program (2016-2026), including a series of investments in all parts of the Port of Piraeus. <sup>11</sup>

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<sup>11</sup> ‘ANNUAL FINANCIAL REPORT 2016’, *Annual reports.com*, Greece, Annual reports.com, 2017, p. 25, [https://www.annualreports.com/HostedData/AnnualReportArchive/p/piraeus-port-authority\\_2016.pdf](https://www.annualreports.com/HostedData/AnnualReportArchive/p/piraeus-port-authority_2016.pdf) ,(accessed 23 March 2022).

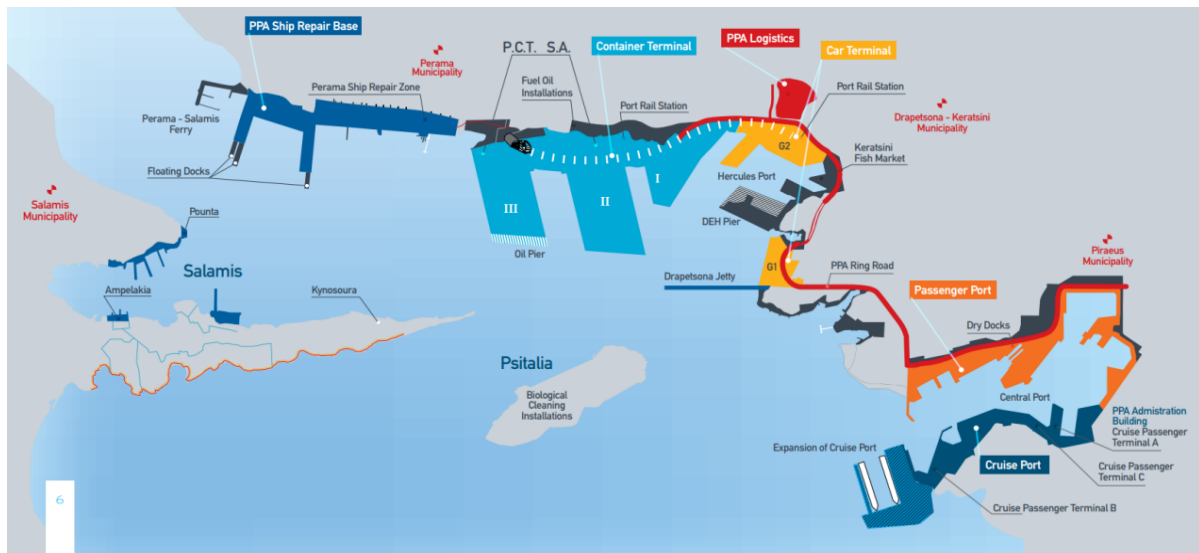


Figure 1 Port of Piraeus, Piraeus Port Authority S.A, 2018, <https://www.olp.gr>, Access on 16 March, 2022

Port of Piraeus has six business sectors, including container terminal business, logistics and storage business, shipbuilding and repair business, cruise terminal business, RO-RO terminal business and ferry terminal business, which is highly coordinated with the existing activities of COSCO Shipping Group.

#### (1) Container terminals

Container cargo handling is the biggest activity of the port. The Port of Piraeus handles about 70-80% of Greece's annual container volume. There are three (3) docks available for container vessels, which can serve the largest container ship in the world. With 5.44 million TEUs completed in 2020, the global ranking rose to 26th from 93th in 2009. After the completion of the expansion of Pier III in 2019, the total design capacity of the port reached 7.2 million TEU. In the future, Pier I will be renovated and expanded to increase the total designed throughput of the port to 10.7 million TEU, and strive towards the goal of becoming the top three port in Europe and the largest port in the Mediterranean with 10 million TEU. <sup>12</sup>

Overland, Piraeus Port is the southern gate of the Balkans and the gateway to Central and Eastern Europe by connecting to the railway line in the hinterland of central and Eastern Europe.

<sup>12</sup> Tassos Vamvakidis, 'Piraeus Port, the head of Dragon COSCO', *BELT AND ROAD ASSOCIATES*, Athens, BELT AND ROAD ASSOCIATES, 2021, p. 6, <http://www.beltandroadassociates.com/wp-content/uploads/2021/04/VAMVAKIDIS-PCT-BOR.pdf>, (accessed 21 March 2022).

When Chinese Premier Li Keqiang met with the prime ministers of Serbia, Hungary and Macedonia in Belgrade in 2014, they agreed to jointly build the ‘China-Europe Land-Sea Express Line’. The ‘China-Europe Land-Sea Express’ is an upgraded version of the Hungary-Serbia railway, starting from the port of Piraeus in the south and reaching Budapest, Hungary in the north, passing Skopje in Macedonia and Belgrade in Serbia on the way. Afterwards the Piraeus port is connected with the China-Europe Land-Sea Express Line, jointed transportation between sea and railway can be used to transport containers to Austria, the Czech Republic, Poland and other Central and Eastern European countries immediately after they arrive at the Piraeus port in Greece. This will provide a more convenient and low-cost route for cargos from the Far East to the hinterland of Central and Eastern Europe.<sup>13</sup>

## (2) Ferry Terminal

Piraeus is the largest port in Greece with sailings every day to the most popular island groups including the Santorini, Dodecanese, Saronic, Ionian, and North Aegean islands, and Crete. The port is a hub for the leading ferry companies operating in the Aegean including Anek Lines, Hellenic Seaways, Blue Star Ferries, Seajets and Minoan Lines. The port of Piraeus (including Main Port, Perama, Ikonion, Drapetsona & Iraklion) is the chief port in Greece, the largest passenger port in Europe and the second largest in the world, servicing about 20 million passengers annually.<sup>14</sup> Piraeus Port is also a supply base from mainland to the most Aegean islands, it is main distribution center for cargo entering Aegean islands, including seafood and etc., to ensure island residents daily supplies.

## (3) Cruise terminal

The Port of Piraeus is an important destination for cruise ships in Greece and the Mediterranean Sea. It has 11 places for the simultaneous berthing of vessels and can accommodate even the largest cruise ships in the world. Piraeus Port, located in the southeast of Greece, is home to Europe’s biggest passenger port and as such is a huge draw for cruise ships from around the world bringing tourists eager to explore this centuries-old city. Piraeus Port has 3 Passenger

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<sup>13</sup> ‘China, CEE countries eye land-sea express passage’, *The People’s Republic of China* [website], China, 2021, [http://english.www.gov.cn/premier/news/2014/12/18/content\\_281475025689786.htm](http://english.www.gov.cn/premier/news/2014/12/18/content_281475025689786.htm) ,(accessed 23 March 2022).

<sup>14</sup> ‘Coastal Shipping’, *EISA*[website], <https://www.economou.gr/port/piraeus/> ,(accessed 29February 2022).

Terminals and receives 1.5-2 million tourists every year. All major cruise lines and most mid-size cruise lines sail through the Port of Piraeus during their Mediterranean routes.<sup>15</sup>

#### (4) RO-RO and car terminals

Ro – Ro Terminals of Piraeus Port are one of biggest hubs for transit cars for the Eastern Mediterranean, Black Sea and North Africa. In addition to the loading/unloading and storing of new vehicles, at Ro- Ro Terminals all kind of wheeled cargo is handled, such as heavy machinery, trucks, low roll trailers (mafi), trailers etc. as well as general cargo. The list of port customers includes all of the major automakers, which are transfer through PPA’s Ro – Ro Terminals more than 260.000 vehicles per year. The terminal has a total handling capacity of 600,000 vehicles. The list of port customers includes all of the major automakers, which are transfer through PPA’s Ro – Ro Terminals more than 260.000 vehicles per year. After the disposal of the majority of PPA SA’s shares to COSCO SHIPPING Co. in the middle of 2016, the Ro – Ro Terminals are being developed rapidly keeping high the customer service level and near to zero the percentage of damage.<sup>16</sup>

#### (5) Logistics and storage

The PPA warehouses complex located within the fenced land area of 86.402 m<sup>2</sup> with a perimeter of 1.157 m. at Keratsini of Piraeus (former ODDY area) and consists of:

- Warehouse C-3 (imported goods), which has a covered space of 5,480 square meters.
- Warehouse C-5 (imported goods), which has a covered space of 2,250 square meters.
- Warehouse C-8 (unclaimed goods, which has a covered space of 1,645 square meters.
- the Export Warehouse, which has a covered space of 162 square meters.<sup>17</sup> After the Greek government approves the investment plan of COSCO SHIPPING, the old warehouse facilities will be demolished and rebuilt, to further improve the logistics and warehousing service capacity to a modern Logistics Center, with a budget of 30 million euros.

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<sup>15</sup> ‘Cruise’, *Piraeus Port Authority S.A.* [website], Greece, 2021, <https://olp.gr/en/services/cruise-terminal> ,(accessed 15 February 2022).

<sup>16</sup> ‘Car Terminal’, *Piraeus Port Authority S.A.* [website], Greece, 2021, <https://olp.gr/en/services/car-terminal> ,(accessed 17 February 2022).

<sup>17</sup> ‘Logistics Center Installations’, *Piraeus Port Authority S.A.*[website], Greece, 2021, <https://olp.gr/en/services/logistics-center>, (accessed 17 February 2022).

## (6) Ship repair business

Ship repair is an important activity of Piraeus Port, 80% of Greek coastal ferries and many international vessels are repaired there. Piraeus Port has five (5) docks for repairing ships:

- Piraeus III Floating Dock with 22.000t lifting capacity, 240m LOA and 35m internal breadth.
- Piraeus I Floating Dock with 15.000t lifting capacity, 202m LOA and 31m internal breadth.
- Piraeus II Floating Dock with 4.000t lifting capacity, 113m LOA and 18m internal breadth
- Big Graving Dry-Dock with 140m LOA and 18,5m internal breadth.
- Small Graving Dry-Dock with 85m LOA and 12,5m internal breadth.<sup>18</sup>

At present, the company has not obtained the ship repair license yet issued by the Greek government, and the ship repair business is mainly outsourced by the private shipyards in the port. It performs as public repair zone. Following the global bidding, Piraeus Port Authority S.A. has purchased a floating dock of Panamax, which is currently the most suitable for ships' (especially ferries) daily maintenance, repair and dry-docking in Greece. In the future, the company will further enhance ship repair business and strive to become a regional ship repair center.

## 1.2 INTRODUCTION OF HAIKOU PORT

Port Haikou is situated on the northern coast of Hainan Island, facing the Hainan Straits. General overview: Haikou is the most important of the island's ports because of its key location. General and bulk cargoes and containers are handled, but the port also offers passenger services to Hong Kong and the mainland. Large vessels are lightered at the anchorage. Imports: Steel

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<sup>18</sup> 'Dry Dock department', *Piraeus Port Authority S.A.*[website], Greece, 2021, <https://olp.gr/en/services/dry-dock-department>, (accessed 17 February 2022).

products, cement, fertilisers, coal, chemicals and LPG. Exports: General cargo. Traffic figures: approximately 451 foreign vessels, 23,918,000t of cargo, 245,000TEU and 1,400,000 passengers are handled annually. Load line zone: China Sea Seasonal Tropical Area, Tropical Jan 21 to Apr 30, Summer May 1 to Jan 20. Max size: LOA 215m, draught 10.0m (HW), no beam restriction. Chemical: LOA 150m, draught 7.2m. LPG: Max 3,000DWT.<sup>19</sup>

Haikou originally served as the port for Qionghshan, the ancient administrative capital of Hainan island, located 5 km inland. In the 13th century it was fortified and became a military post under the Ming dynasty (1368–1644). The port is located west of the mouth of the Nandu River, Hainan’s principal river. When Qionghshan was opened to foreign trade under the Treaty of Tianjin (1858), Haikou started to rival the old administrative city. In 1926, Haikou overtook Qionghshan in population. In 1930s Haikou was declared as a separate administrative county, and developed as a port during the Sino-Japanese War (1937–45). The Japanese occupied Hainan Island from early 1939 till 1945.<sup>20</sup>

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<sup>19</sup> ‘HAIKOU (CHINA)’, *SHIPNEXT* [website], <https://shipnext.com/port/haikou-cn-hak-chn> , (accessed 17 March 2022).

<sup>20</sup> ‘Haikou Hainan History, History of Haikou’, *Sunny Hainan. com* [website], <https://www.sunnyhainan.com/haikou-hainan-history/> , (accessed 23 March 2022).

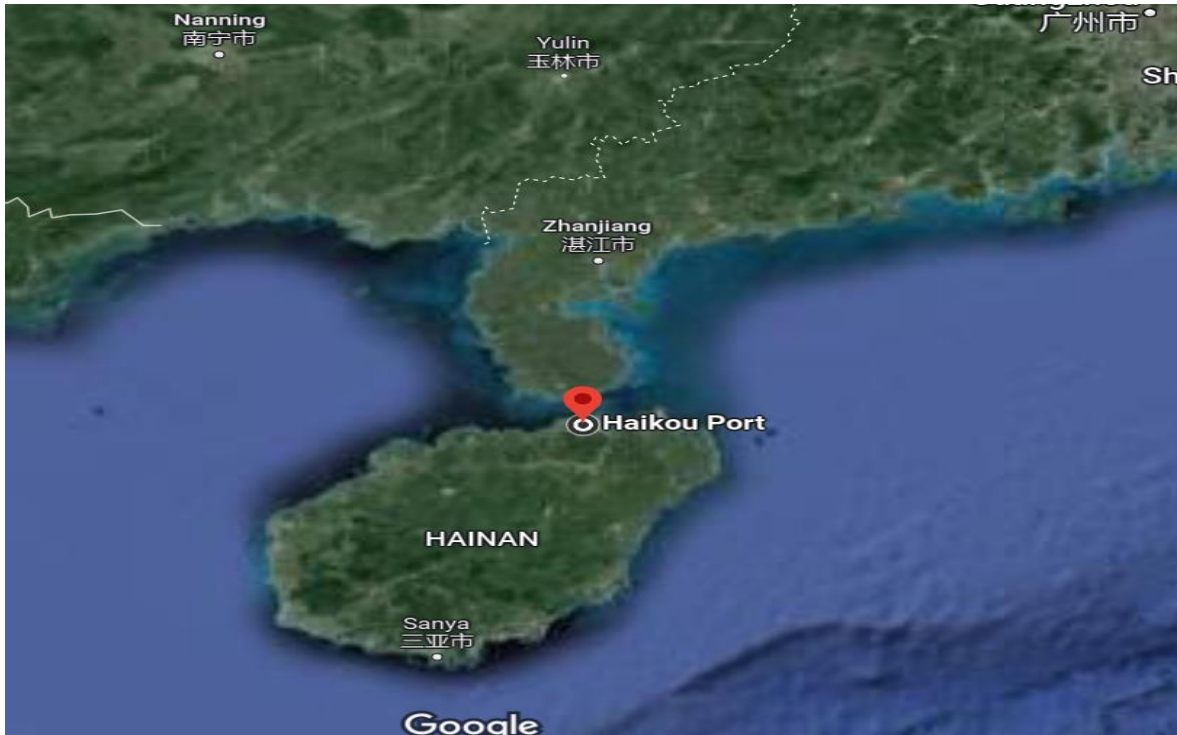


Figure 2 Haikou Port , Google Map, 2021,  
<https://www.google.com/maps/place/Haikou+Port/@20.674397,107.3604631,726877m/data=!3m1!1e3!4m9!1m2!2m1!1shaikou+port!3m5!1s0x31522c55100015b9:0xfc9c2a5a3cb0044!8m2!3d20.025744!4d110.280993!15sCgtoYWlrb3UgcG9ydJIBA2JheQ!5m1!1e4?hl=en>  
 Access on 16 March,2022

During the mid-1980s, when Hainan was still part of the Guangdong Province, a fourteen-month episode of marketing zeal by Hainan Special District Administrator Lei Yu. In 2005, Hainan Province began integrate the three port: Xiuying Port, Xingang Port and Macun Port into Haikou port. Since that, a new Haikou port is occurred.<sup>21</sup>

Nowadays, Haikou Port is the biggest port of Hainan Province, handling about 50-60% of Hainan's annual cargo volume. Different from Piraeus Port, it consists of three parts: Haikou Xiuying Port, Haikou New Port, Ma Cun Port, which are in different locations, but under unified planning, construction, operation and management. Among them, Haikou Xiuying Port is the communication hub of Hainan Province and the passenger and cargo collection and distribution center. It is listed as the main hub port in China's coast harbor developmental strategy by the Ministry of Communications and the international container skeleton line

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<sup>21</sup> 'Hainan', *en-academic.com* [website], <https://en-academic.com/dic.nsf/enwiki/112832> , (accessed 23 March 2022).



harbor of Hainan Province. It is a national kind of open port. Haikou New Port and Ma Cun Port already passed the acceptance by the state and formally opened toward the world on June 1, 2005.

Xiuying Port area is located in the south of Haikou Bay, on the south side of Qiongzhou Strait, outside the mouth of Haidian River, with geographic coordinates of 110°16' 27 "E and 20°01' 24" N. Xiuying Port is a transportation hub and a passenger and cargo distribution center in Hainan Province. As a category-I open port, it was listed by the Ministry of Transport as a major coastal port in China and an international container port in Hainan Province in China's coastal port development strategy. Currently, Xiuying Port has 20 berths, including container berths, general break-bulk cargo berths, multi-functional berths and passenger and cargo RO-RO berths.

The Haikou New Port is located in the southwest of Tianwei Jiao shallow bay- New Bay, facing the Leizhou Peninsula across the Qiongzhou Strait to the north, 21 kilometers away from Haikou city by land, the geographical coordinates are 110°08' 49 "E, 20°03' 13" N. The Haikou New Port area is a specialized ferry terminal, owns 18 passenger and RO-RO cargo berths with a capacity of 10,000 DWT. There is rail way connection line in Haikou New Port. The line has operated since January 2003, carrying both freight and passenger trains, enabling direct train service between the mainland and the cities of Haikou and Sanya on Hainan Island.<sup>22</sup>

The Macun Port area is located in the northwest of Hainan Island and west of Chengmai Bay of Qiongzhou Strait. The port is adjacent to Macun Town and Dongshui. The geographical coordinates are 110°01' 18 "E and 19°57' 18" N. On June 1, 2005, the Macun port area was officially opened with functional areas for general cargo, bulk cargo, containers, liquefied petroleum gas, etc., and is expected to become the central port area in the future. It now has 9 berths for bulk and general cargo. The Yangpu port of Macun Port area is a joint venture with Hainan Yangpu Development and Construction Holding Co., Ltd. through the integration of port resources. It has three multi-functional berths with a capacity of 50,000 DWT. In the future, Yangpu Port of Macun Port area will become the main container terminal of Haikou Port.<sup>23</sup>

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<sup>22</sup> Xie Chuanjiao, 'Train-ferry project making solid progress', *China Daily*[website], China, 2006, [http://www.chinadaily.com.cn/china/2006-06/06/content\\_609278.htm](http://www.chinadaily.com.cn/china/2006-06/06/content_609278.htm) , (accessed 17 March 2022).

<sup>23</sup> 'Introduction of Haikou Port (CNHAK)', *SEABAY LOGISTICS* [website], China, <https://www.seabaycargo.com/seaport/detail/CNHAK.html> , (accessed 17 March 2022).



Hainan Harbor & Shipping Holding Co., Ltd. was officially established on January 14, 2005 by reorganizing the state-owned capital interests of Haikou Port Group Company and Hainan Shipping Corporation as well as the coastal resources of Macun Port. Its purpose being to manage and operate the Port of Haikou. On November 27, 2019, the Company completed equity restructuring and was managed by China COSCO SHIPPING Corporation Limited. The Company has 12 departments, 5 affiliated centers and 30 subsidiaries. It hosts a complex and unique variety of port activities, including cargo and passenger handling and coastal (ferry/passenger) shipping as main activities, as well as logistics warehousing service, leasing, providing ships with shore power, fuel, freshwater and living supplies, port construction, tourist project development, processing of light industrial products, personal accident insurance and cargo transportation insurance agency service (only provided by subsidiaries), processing and marketing of building materials, ship service, etc. It is currently the largest state-owned port and shipping enterprise in Hainan Province, with total assets of 11 billion RMB yuan and more than 3,800 employees in 2019. Hainan Strait Shipping Co., Ltd. controlled by the Company was listed on the Shenzhen Stock Exchange on December 16, 2009 under the stock code 002320.

The company owns 19 RO-RO passenger ships and high-speed passenger ships, 7 harbor tugs and 412 sets of production machinery and equipment of all kinds. Its warehouses and production yards cover an area of 100,000 m<sup>2</sup> and 990,000 m<sup>2</sup>, respectively. The Company operates the shipping routes from Haikou to Hai'an and Beihai, as well as Haikou coastal tour and Xisha eco-tourism routes. The company is the largest state-owned port and shipping enterprise in Hainan province, mainly engaged in port and Qiongzhou Strait ferry transportation, and diversified in tourism, tugboat, logistics, tally, shipping agency, property management, asset management and information system development and maintenance.

There are 50 production berths at public docks under the management of the company, and the port cargo throughput accounts for more than 50% of the province. There are 20 special container berths, general cargo berths, multi-purpose berths and passenger/cargo roll-on berths in Xiuying Port Area, 18 ten-thousand-ton passenger/cargo roll-on berths in New Port Area, 9 bulk cargo berths in Macun Port area and 3 multi-purpose berths in Yangpu Port Xiaochatan Operation Area. <sup>24</sup>

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<sup>24</sup> 'Corporate Profile', *Hainan Harbor & Shipping Holding Co., Ltd.* [website], China, 2020, <http://en.hnhs.coscoshipping.com/col/col17625/index.html>, (accessed 17 January 2022).

## 1. Container terminals

The container terminals are located in Xiuying Port area and Yangpu Port of Macun Port Area. Hainan Harbor & Shipping Container Terminal Co., LTD., which was established in 2020 and a wholly-owned subsidiary of Hainan Harbor & Shipping Holding Co., LTD., is the company mainly engaged in the container business management.<sup>25</sup>

At present, the capacity of container terminals of Haikou Port is 2.65 million TEUs, with total 2,144m coastlines and 1.327 million square meters of port area, among them, the storage yard area is 774,000 square meters. In the year of 2020, the total container throughput of Haikou port reached 2.84 million TEU, showing an increase of 14.4% compared with year 2020. From 2021, the company will carry out infrastructure update and expansion of the container terminals, realizing that berths reached 8, the total length of coastline reaches 2,208m, the total port area reaches 1.327 million square meters, the storage yard area is 774,000 square meters, and the annual container throughput capacity reaches 7.8 million TEU before 2025. <sup>26</sup>

With the development of China's national strategy: 'New International Land-Sea Trade Corridor and the Free Trade Port of Hainan', relying on COSCO SHIPPING Group's global industrial chain resources, build the Yangpu port into a globally competitive regional international container transshipment hub port, replicating the Model of Piraeus Port, make Haikou Port to 'Piraeus port in the east', make the Yangpu port become the leader of the construction of the free trade port in Hainan.

## 2. Ferry terminals and shipping

The Ferry terminals are located in Xiuying Port and New Port area. The beautiful scenery of Hainan Island attracts millions of visitors every year. Haikou port is the largest port in Hainan with sailings every day from China mainland cities to Hainan Island and Nansha island groups. Xiuying Port has 12 along-side berths with a berth length of 450m for Ro-Ro passenger ships. New Port has 18 along-side berths with a berth length of 2,115m for Ro-Ro passenger ships.

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<sup>25</sup> 'Haikou Port Container Terminals of Haikou Harbor Container Terminals Ltd.', *Portcode.net* [website], 2021, <http://en.hnhs.coscoshipping.com/col/col17625/index.html>, (accessed 23 March 2022).

<sup>26</sup> 'Container Terminals', *Hainan Harbor & Shipping Holding Co., Ltd.* [website], China, 2020, <http://hnhs.coscoshipping.com/col/col17081/index.html>, (accessed 17 January 2022).

In year 2020, Haikou Port had a throughput volume of about 4.18 million passengers, showing a decrease of 22.6% compared with year 2019 due to the covid-19.

Hainan Strait Shipping Co., Ltd., which is a listed company and subsidiary of Hainan Harbor & Shipping Holding Co., LTD., is the company mainly engaged in the ferry terminals and shipping management. The Company owns 19 Ro-Ro passenger ships and high-speed passenger ships and 7 tug boats.<sup>27</sup>

### 3. Logistics service

The logistics warehouses are located in Xiuying Port area, New Port area and Yangpu Port of Macun Port Area. Hainan Harbor & Shipping Logistics Co., LTD, which was established in 2020 and a joint venture of Hainan Harbor & Shipping Holding Co., LTD. and COSCO SHIPPING Logistics Co., Ltd., is the company mainly engaged in the logistics business management, to carry out supply chain services such as warehousing, processing, packaging, display, trading, distribution, dispatching and cold chain business. Its purpose being dedicated to providing ‘one-stop’ logistics solutions.<sup>28</sup>

### 4. General cargo terminals

The general cargo (bulk cargo) terminals of Haikou Port are located in Xiuying Port and Macun Port area. The total capacity is 7.96 million tons. Xiuying Port has 8 berths with a berth length of 899m for bulk carriers. Macun Port has 9 berths with a berth length of 1.56km for bulk and general cargo. In year 2020, Haikou Port had a throughput volume of about 9.3 million tons of general cargo, showing a decrease of 3.9% compared with year 2019.

Hainan Harbor & Shipping General Terminal Co., LTD., which was established in 2016 and a wholly-owned subsidiary of Hainan Harbor & Shipping Holding Co., LTD., is the company mainly engaged in the general cargo terminals management.<sup>29</sup>

### 5. Port and shipping service

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<sup>27</sup> ‘Coastal shipping and tourism’, *Hainan Harbor & Shipping Holding Co., Ltd.* [website], China, 2020, <http://hnhs.coscoshipping.com/col/col17077/index.html> , (accessed 17 January 2022).

<sup>28</sup> ‘Logstics service’, *Hainan Harbor & Shipping Holding Co., Ltd.* [website], China, 2020, <http://hnhs.coscoshipping.com/col/blue17078/index.html> , (accessed 17 January 2022).

<sup>29</sup> ‘General cargo terminals’, *Hainan Harbor & Shipping Holding Co., Ltd.* [website], China, 2020, <http://hnhs.coscoshipping.com/col/col17076/index.html> , (accessed 17 January 2022).

Hainan Harbor & Shipping Modern Service Co., LTD., which was established in 2020 and a wholly-owned subsidiary of Hainan Harbor & Shipping Holding Co., LTD., is the company mainly engaged in port and shipping service, including leasing, property management, labor services, fuel supply, technical maintenance, information services and digital operation and etc.<sup>30</sup>

## **CHAPTER 2 – CONTAINER CARGO HANDLING OF PIRAEUS PORT AND HAIKOU PORT**

Regarding the container terminal activity, Piraeus Port is an ideal port to be used as a hub for destinations in the Central and Eastern Mediterranean, as well as the Black Sea, she can serve the largest container ship with a total Pier length of 4000m and a max depth of 19.5m. The capacity of Piraeus Port is up to 7.3 million TEUs. Haikou Port is close to the main international seaway, facing the Indian Ocean and Pacific Ocean with 15 berthing positions, and provide important support for the two major China’s national strategies of Haikou Free Trade Port and New Western Land-Sea Corridor. In Year 2020, Haikou Port completed 1.0193 million TEUs historically, a year-on-year increase of 44.02%.<sup>31</sup> The target of COSCO SHIPPING Group is to make Haikou Port ‘Eastern Piraeus Port’. An agreement was made between COSCO SHIPPING Group and the Haikou Provincial Government that Haikou Port shall complete 5.1 million TEUs by 2025. In this thesis, I will present the container terminal’s infrastructure, volume, investment, development plan of both ports.

In this chapter, I will present their infrastructure and volume concerning the container terminals.

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<sup>30</sup> ‘Port and shipping service’, *Hainan Harbor & Shipping Holding Co., Ltd.* [website], China, 2020, <http://hnhs.coscoshipping.com/col/col17079/index.html> , (accessed 17 January 2022).

<sup>31</sup> ‘Annual container throughput of Haikou Yangpu Port exceeds 1 million’, *The Peoples Government of Hainan Province* [website], China, 2020, [http://www.ehainan.gov.cn/2020-12/28/c\\_579639.htm](http://www.ehainan.gov.cn/2020-12/28/c_579639.htm) , (accessed 17 March 2022).

## 2.1 INFRASTRUCTURES FOR CONTAINER CARGO HANDLING OF PIRAEUS PORT AND HAIKOU PORT

Port infrastructures will increasingly support and become integrated with port operations and waterborne and hinterland logistics by adapting near shore extensions and offshore ports and by establishing flexible and resilient solutions for future ship and vessel types, hinterland logistics, new port activities and climate change. In this respect, new facilities for the (re)generation of zero emissions energy and green supply for ships, vessels, port activities and society will be developed. Cutting-edge adaptive secure communication and IT architecture (real time information, etc.) will be introduced to the benefit of strategic traffic and port management and ship-assist infrastructure (smart berths, towage, mooring, MARPOL, bunkering, etc.). Furthermore, city-port-nature oriented planning (building with nature, smart industry, coastal recreation, etc.) will promote leisure and business integrated hubs for passenger transport, closely linked to public transport, the cities and the local tourism sector.

The port infrastructure is the base for port operations to serve the vessel, cargo and passengers which pass through ports. The development of port infrastructures requires capital-intensive investments, a long lead-time and therefore long-term planning. This means that the design of port infrastructures should anticipate the needs of the Waterborne, logistics and transport sector. This is an especially difficult task at a time when the transport and logistic sector is immersed in a deep transformation, as is currently the case, affecting both maritime and inland aspects (new fuels, autonomous transport and cargo handling, self-organising logistics, new business models, etc.). Furthermore, port infrastructures should also anticipate and adapt to the development of new waterborne activities (blue growth) and to other external factors, such as new extreme weather conditions resulting from climate change.<sup>32</sup>

### *2.1.1 INFRASTRUCTURES FOR CONTAINER CARGO HANDLING OF PIRAEUS PORT*

The Port of Piraeus is located at the Crossroads of Europe, Asia and Africa, situated at the intersection of sea routes linking the Mediterranean with Northern Europe and its geographic

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<sup>32</sup> ‘SUSTAINABLE PORT DEVELOPMENT’, *waterborn*. [website], <https://www.waterborne.eu/vision/port-infrastructure> , (accessed 23 March 2022).

position (south of the 38th parallel) enables major liner ships to access it without significant deviation from the Far East trade routes.<sup>33</sup>

Regarding the container terminals of Piraeus Port, it has three piers: Pier I is currently under the management of Piraeus Port Authority S.A. (PPA S.A.) with a capacity of 1.1 million. Pier II and III are currently under the management of Piraeus Container Terminal Single Member S. A (PCT S.A.), which is a wholly-owned subsidiary of COSCO SHIPPING Ports Limited, with a total capacity of 6.2 million TEU. The total capacity for containers of Piraeus Port would reach 7.2 million TEU. There is a Free-Zone at both terminals, operating under the Customs Code of the European Union. Links to road and rail networks for Greece and all neighbouring Balkan countries.<sup>34</sup>



*Figure 3 container terminals of Piraeus Port, Piraeus Container Terminal Single Member S.A., 2019, <https://www.pct.com.gr>, Access on 16 February 2022*

Pier I can serve the largest container carriers up to 16k TEUs with a total Pier length of 1150 meters and a max depth of 18 meters. The total storage area for containers is 72.400 m<sup>2</sup>

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<sup>33</sup> ‘ANNUAL FINANCIAL REPORT 2020’, *Piraeus Port Authority S.A.*, Greece, Piraeus Port Authority S.A., 2020, p. 9, <https://olp.gr/en/investor-relations/annual-reports/itemlist/category/246-2020> ,(accessed 20 March 2022).

<sup>34</sup> ‘Terminals and Facilities’, *Orient Overseas Container Line* [website], China, <https://www.oocl.com/greece/eng/localinformation/terminalsandfacilities/Pages/default.aspx> ,(accessed 20 March 2022).

The equipment of Pier I consists of :

Eight (8) Ship to Shore Cranes:

Five (5) Over Super Post Panamax (22–wide / 65 tons under Spreader) Twin-lift

Three (3) Panamax (13–wide / 65 tons under Spreader) Twin-lift

One (1) Harbor Mobile Crane:

Panamax (13-wide / 100 tons under hook / 50 tons under Spreader) Twin-lift

Eight (8) rail -mounted gantries (RMG)’s (14 wide / 5+1 high)

Twenty-two (22) Straddle Carriers (1 over 2 high)

Twenty-eight (28) Terminal Tractors

Two (2) Reach Stackers

Four (4) Empty Container Handlers.<sup>35</sup>

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<sup>35</sup> ‘Container Terminal- Infrastructure/equipment’, *Piraeus Port Authority S.A.* [website], 2021, <https://olp.gr/en/services/container-terminal> , (accessed 17 February 2022).



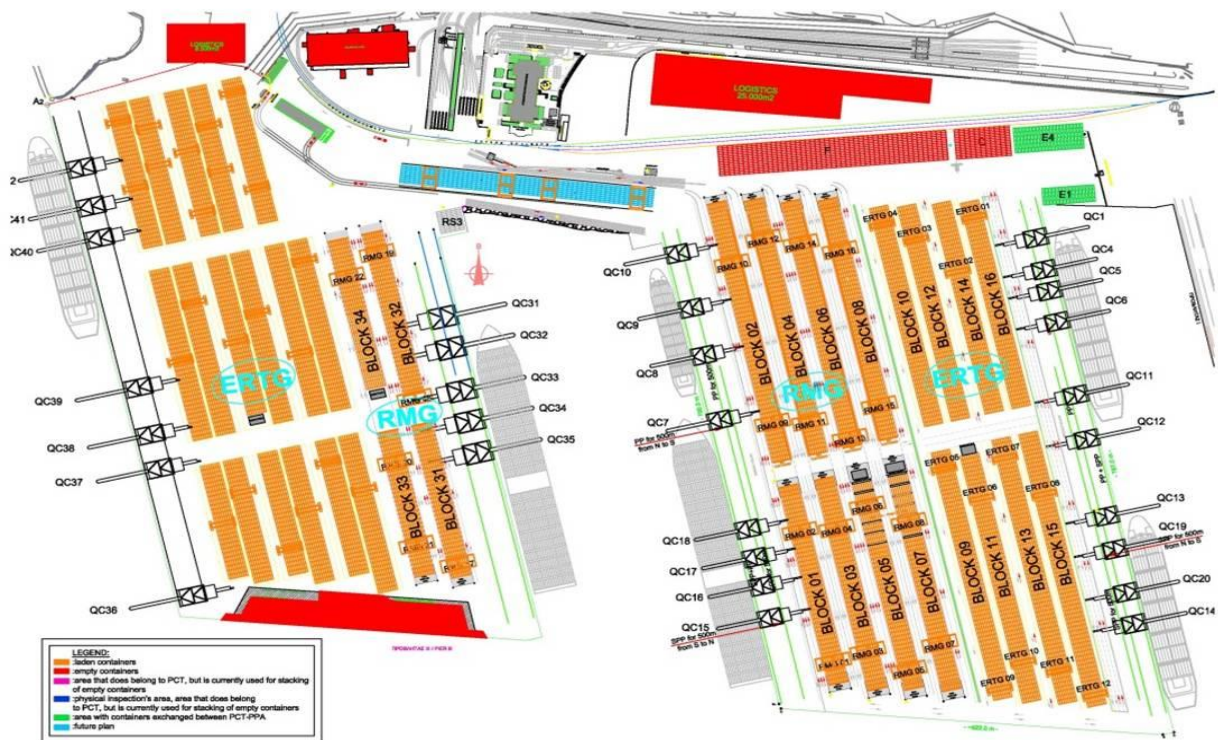


Figure 4 Future Terminal Capacity of Piraeus Port, Piraeus Container Terminal Single Member S.A, 2016, <https://www.pct.com.gr>, Access on 16 February 2022

Pier II can serve the largest container ship in the world with a total Pier length of 1.485 meters and a max depth of 16,5 meters. The total storage area for containers is 320000 m<sup>2</sup>. The equipment of Pier II consists of :

Eighteen (18) Ship to Shore Cranes (QC):

Six (6) Over Super Post Panamax with 24 rows Twin-lift

Twelve (12) Panamax (13–wide / 65 tons under Spreader) Twin-lift

Sixteen (16) semi -automated rail -mounted gantries (RMG) (14 wide / 5+1 high)

Sixteen (16) rubber-tired gantries (E-RTG), among which four (4) E–RTGs are between Pier II & Pier III, one (1) E-RTG is in the Train area.

Twenty-two (22) Straddle Carriers (1 over 2 high)

Twenty-eight (28) Terminal Tractors

Two (2) Reach Stackers



Four (4) Empty Container Handlers, 760 reefer plugs for 1090 reefer TEU

Pier III can also serve the largest container ship in the world with a total Pier length of 1.362 meters and a max depth of 19,5 meters. The total storage area for containers is 380000 m<sup>2</sup>. The equipment of Pier III consists of :

Thirteen (13) Ship to Shore Cranes (QC):

Thirteen (13) Super Super Post Panamax (SSPP) QCs, new generation 26 rows tandem spreader

Six (6) semi -automated rail -mounted gantries (RMG) (14 wide / 5+1 high)

Sixteen (18) rubber-tired gantries (E-RTG), among which four (4) E-RTGs are between Pier II & Pier III, one (1) E-RTG is in the Train area.

360 reefer plugs

Twenty-two (22) Straddle Carriers (1 over 2 high)

Twenty-eight (28) Terminal Tractors

Two (2) Reach Stackers

Four (4) Empty Container Handlers<sup>36</sup>

In 2021, also saw China-based port equipment supplier Shanghai Zhenhua Heavy Industries (ZPMC) had delivered three remote controlled intelligent quay cranes to the Piraeus Container Terminal (PCT). They are the first machines in Greece to operate with what ZPMC calls a “smart core”, which enables easier semi-automated container handling operations.

They feature a lifting height of 46m, rated load of lifting appliance of 65t, lifting speed of 180m/min, trolley speed of 240m/min, front extension distance of 60m, rear extension distance of 17m, crane speed of 45m/min, pitch time of 6 min, gauge of 20m, and a lifting efficiency doubly increased than the old quay crane.

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<sup>36</sup> ‘Container Terminal- Infrastructure/equipment’, *Piraeus Container Terminal Single Member S.A.* [website], Greece, <https://www.pct.com.gr/content.php?id=24> , (accessed 17 February 2022).

All three are equipped with remote control system, with mature anti-sway system, real-time ship profile scanning system (SPSS), precise chassis positioning system (CPS), high-definition closed circuit television (CCTV), and container number recognition system (OCR).

The whole crane is equipped with leading sensors, scanners and cameras, which can realise high-efficiency remote semi-automatic quay crane operation and automatic operation of quay crane in the middle after the driver remotely operates both ends to grab and place the container.

These three new cranes with “smart core” will be combined with the original cranes of the PCT terminal after layout adjustment to improve the loading and unloading capacity and service quality of the container terminal in Piraeus Port, making the on-site operation smoother, orderly and safe, and also providing support for the future automation transformation of the terminal.<sup>37</sup>

Infrastructure and terminal specification of Piraeus container terminals as below:

	Capacity	Pier length	Largest vessel can serve	Water depth	Storage area	Super Post Panamax QC	Panamax QC	RM G	ERT G
Pier I	1.1M TEU	1150 m	16k TEUs	18 m	72.400 m <sup>2</sup>	5 Sets	3 Sets	8 Sets	0 Sets
Pier II	3.2M TEU	1485 m	16k TEUs	16.5 m	32000 m <sup>2</sup>	6 Sets	12 Sets	16 Sets	16 Sets
Pier III	3.2M TEU	1362 m	23k TEUs	19.5 m	38000 m <sup>2</sup>	13 Sets	0 Sets	6 Sets	13 Sets
Piraeus Port	7.5M TEU	3997 m	23k TEUs	19.5 m	77240 m <sup>2</sup>	24 Sets	15 Sets	30 Sets	29 Sets

<sup>37</sup> Port Technology International Team, ‘ZPMC delivers ‘smart core’ quay cranes to Piraeus Container Terminal’, *Global Trade*[website], 2021, <https://www.globaltrademag.com/top-5-ports-in-europe-2021/>, (accessed 21 February 2022).

Table 1 Infrastructure and terminal specification of Piraeus container terminals, Source:PPA S.A. and PCT S.A.

The Rail service through Piraeus Port became available in 2014, enabling Piraeus port to serve inland destinations of Europe, such as Hungary, Slovakia, Czech Republic, Poland and of course the Balkans and Black Sea Region. The completion of rail infrastructure provided added value to Piraeus port and great opportunity to cargo service, connecting Piraeus Container Terminal (PCT) with the national rail network. Offering rail services through Piraeus Port enhances potential opportunities for the port itself as well as for the rail industry in general.

Weekly Liner trains depart from Piraeus Container Terminal (PCT), (Container Yard) in Neo Ikonio, Perama, to the respective city's Intermodal Terminal (for efficient and safe interchange between road and rail transport). Each liner train is shunted to serve, up to 76 TEUs, to the most remote destinations in Central & South Eastern Europe. Destinations up to 200km from the rail terminal can be served by road transport. Ocean Rail LTD. which was established in 2017 in Greece and a joint venture of COSCO SHIPPING Lines Co., LTD. and COSCO SHIPPING Logistics Co., Ltd., is the company mainly engaged in the rail transportation management, providing dedicated BLOCK TRAIN service from Piraeus Port to Central Europe & The Balkans, customized on clients' needs.<sup>38</sup>



<sup>38</sup> 'COSCO SHIPPING Lines Transportation Rail', *COSCO SHIPPING Lines (Greece) S.A.*[website], Greece, <https://www.coscoshipping.gr/rail/>, (accessed 17 February 2022).

*Figure 5 China Europe Ocean Rail, COSCO SHIPPING Lines (Greece) S.A., <https://www.coscoshipping.gr>, Access on 16 February 2022*

Piraeus Port Authority is transforming the Port of Piraeus, the chief port of Greece, through a series of expansion projects. The transformation is a part of a scheme for improvements to the infrastructure of the port. The port is the largest port in Greece and has passenger traffic of up to 20 million a year.

The total investment of €600m (\$660m) is planned to be pumped into the modernization of Port of Piraeus over several years as part of the master plan. One of the key projects of the expansion programme is a new terminal, whose construction is currently underway. The improvements to the port will generate new jobs and support the economic growth of the country, and contribute towards enhancing cruise shipping and tourism and reduction of the transportation costs.

The master plan includes future development plans and initiatives to increase the competitiveness of the terminal. Port of Piraeus transformation details

The port transformation will include the upgrade of the existing container terminal, construction of a new cruise passenger handling facility, and enhancements to the ship repair area. A portion of the investment will also be made in the expansion of car shipping facilities and the development of a new port logistics facility.

The transformation plan includes the construction of an additional passenger terminal and the expansion of the current cruise terminal. The new terminal is expected to increase the port's handling capacity by three million containers annually.<sup>39</sup>

Prime Minister Mitsotakis had started the discussion in Shanghai about the offsetting measures by COSCO for the local population in Piraeus and the other municipalities next to the port in order to eliminate any reservations and objections and ensure that the 300-million-euro fourth

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<sup>39</sup> 'Port of Piraeus Transformation', *SHIP TECHNOLOGY* [website], 2020, <https://www.ship-technology.com/projects/port-of-piraeus-transformation/>, (accessed 29 March 2022).

container terminal enjoys wide approval. The fourth terminal is set to raise the capacity of Piraeus port from 7 million containers handled per annum, projected for 2021, to 10 million.<sup>40</sup>

### *2.1.2 INFRASTRUCTURES FOR CONTAINER CARGO HANDLING OF HAIKOU PORT*

The container terminals of Haikou port are located in Xiuying Port area and Yangpu Port of Macun Port Area, situated on the northern coast of Hainan Province in southern China, directly across from the Chinese mainland. The total capacity of Xiuying container terminals is 2.8 million TEU and total capacity of Yangpu container terminal of Macun Port is 1.6 million TEU. Hainan Harbor & Shipping Container Terminal Co., LTD., which was established in 2020 and a wholly-owned subsidiary of Hainan Harbor & Shipping Holding Co., LTD., is the company mainly engaged in the container business management. It is the first state-owned enterprise in Hainan to run international and domestic container handling, storage, packing and unpacking, and land transportation. They also take care of specialist freight requirements such as cold storage and waterways.



Figure 6 Container terminal of Xiuying Port, Haikou Web, <http://www.hkwb.net>, Access on 16 February 2022

<sup>40</sup> ILIAS BELLOS, 'Making Piraeus Europe's biggest port', *EKATHIMERINI.COM* [website], 2019, <https://www.ekathimerini.com/economy/246370/making-piraeus-europe-s-biggest-port/>, (accessed 29 March 2022).





*Figure 7 Yangpu Port, Xinhua News, <http://news.cn>, Access on 18 February 2022*

Container terminals of Xiuying Port can serve the container ship up to 2.2k TEUs with a total Pier length of 1596 meters and a max depth of 12.5 meters. The total storage yard area is 450,000 square meters. Among them, the domestic trade container yard is 345,000 square meters, which can store 28,133 TEUs of domestic trade containers. The foreign trade container yard is 105,000 square meters, which can store 4097 TEUs of foreign trade containers. The equipment of Xiuying Container terminals consists of:

Fourteen (14) Ship to Shore Cranes (QC):

Six (6) Panamax with 24 rows Twin-lift

Eight (8) Panamax with 24 rows Single-lift

Fifteen (15) semi -automated rail -mounted gantries (RMG)

Yangpu Port can serve the container ship up to 5k TEUs with a total Pier length of 782 meters and a max depth of 14.4 meters. The total storage yard area is 320000 square meters. The equipment of Yangpu Port consists of:

Eight (8) Ship to Shore Cranes (QC):

Eight (8) Post Panamax with 24 rows Twin-lift

Two (2) semi -automated rail -mounted gantries (RMG)

Thirty (30) rubber-tired gantries (E-RTG)<sup>41</sup>

Infrastructure and terminal specification of Haikou container terminals as below:

	Capacity	Pier length	Largest vessel can serve	Water depth	Storage area	Post Panamax QC	Panamax QC	RMG	ERTG
Xiuying Port	2.8M TEU	1596 m	2200 TEUs	12.5 m	450000 m <sup>2</sup>	0 Sets	14 Sets	15 Sets	13 Sets
Yangu	1.6M TEU	782 m	5000 TEUs	14.4 m	324000 m <sup>2</sup>	8 Sets	0	2 Sets	30 Sets
Haikou Port	4.4M TEUs	2378 m	5000 TEUs	14,4 m	774000 m <sup>2</sup>	8 Sets	14 Sets	17 Sets	43 Sets

*Table 2 Infrastructure and terminal specification of Haikou container terminals, Source: Hainan Harbor & Shipping Holding Co., Ltd.*

Haikou Port plays a major role in helping Hainan build a pilot free trade zone, and in creating better access to shipping routes in the Indian Ocean and Pacific Ocean. This activity has seen their throughput increase to more than 6 times what it was just 10 years ago – from 300,000 TEU in 2008 to 1.847 million in 2018. At only 280,000 m<sup>2</sup>, the site area is limited, as are the number of berths. With a lot of cargo coming through a small space, operating pressure is understandably high. Traffic flow is uneven, so blockages sometimes occur, affecting the efficiency of container Handling. Haikou’s first experience with Konecranes was in 1994,

<sup>41</sup> Li Jianchun, personal communication, March 3, 2022.

when they purchased a gantry crane with a 37-meter outreach and a lifting capacity of 40 tons. Impressed with its performance, they turned to Konecranes again when they needed to develop their lift truck fleet.

Since they started using their first two Konecranes SMV 6/7 ECB90 empty container handlers in 2008, Haikou Customer has been very pleased with the equipment. With a powerful 7 liters, 180 kW, 1050 Nm engine, these ECBs have greatly boosted site productivity and have proven to be highly durable. Each lift truck operates up to 20 hours per day, which means 5000+ hours every year.

Even with this sustained heavy-duty operation, there have been no major faults, just whatever has been needed to take care of the machines on a daily basis. A lack of mechanical failure combined with low-cost maintenance showed Haikou that Konecranes lift trucks could support them in their toughest container handling tasks. As business just kept on growing, Haikou bought their third Konecranes empty container handler in 2010, and two more in 2012. With their current volume of cargo, all five ECBs run almost continuously.<sup>42</sup>

### 2.1.3 INFRASTRUCTURES COMPARISON FOR CONTAINER CARGO HANDLING OF PIRAEUS PORT AND HAIKOU PORT

From what has been discussed above, the comparison of infrastructure for container cargo handling between Piraeus Port and Haikou Port can be made as below:

	Capacity	Pier length	Largest vessel can serve	Water depth	Storage area	Super Post Panamax QC	Panamax QC	RMG	ERTG
Piraeus Port	7.5m TEUs	3997 m	23k TEUs	19.5 m	772400 m <sup>2</sup>	24 Sets	15 Sets	30 Sets	29 Sets
Haikou	4.4m TEU	2378 m	5000	14,4	77400	8 Sets	14	17	43

<sup>42</sup> 'FAST GROWTH CREATES DEMAND FOR MORE CONTAINER HANDLERS', *Konecranes* [website], <https://www.kcliftrucks.com/node/941> ,(accessed 24 March 2022).



Port	sn TEU s		TEUs	m	0 m <sup>2</sup>		Sets	Sets	Sets

*Table 3 comparison of infrastructure for container terminals between Piraeus Port and Haikou Port, Source: PPA S.A. and PCT S.A. and Hainan Harbor & Shipping Holding Co., Ltd.*

From this list, it can clearly be seen that Piraeus Port has better port conditions, including capacity, pier length, water depth and etc., as well as more modern and big port equipment than the Haikou Port concerning container cargo handling.

One fact has to be pointed out that Hainan Harbor & Shipping Holding Co., Ltd. completed equity restructuring and was managed by China COSCO SHIPPING Corporation Limited on November 27, 2019. During these two years up to now, they had made an obvious progress regarding infrastructure updating, for example: in 2020, Shanghai Zhenhua Heavy Industry (ZPMC) has inked a port crane purchase contract with Hainan Harbor & Shipping for Yangpu Xiaochantan terminal. The contract includes four gantry cranes and twenty-four RTGs, which are due for delivery in the first half of 2021. The deal is expected to support Yangpu port area to achieve 5m TEU container throughput by 2025. The container handling capacity of Xiaochantan terminal will be improved from 650,000 TEU to 1.8m TEU.<sup>43</sup> They have a clear strategy being to build Haikou Port to become ‘Eastern Piraeus Port’, concerning container cargo handling.

Starting from 2021, the Hainan Harbor & Shipping Holding company will carry out expansion and transformation of the two container port areas, to realize that Haikou port would have 8 10,000-ton berths, total shoreline length of 2208m, total port area of 1.327 million square meters, storage yard area of 774,000 square meters, and annual container throughput capacity of 7.8 million TEU by 2023.

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<sup>43</sup> Katherine Si, ‘Shanghai Zhenhua Heavy Industry (ZPMC) has inked a port crane purchase contract with Hainan Harbor & Shipping for Yangpu Xiaochantan terminal’, *Seatrade Maritime News* [website], 2020, <https://www.seatrade-maritime.com/ports-logistics/zpmc-supply-28-sets-cranes-hainan-harbor-shipping> ,(accessed 20 March 2022).

With the development of Haikou Port, I believe that the infrastructure gap between Piraeus Port and Haikou Port will become smaller and smaller.

## 2.2 CONTAINER VOLUME OF PIRAEUS PORT AND HAIKOU PORT

The most commonly quoted statistics on the size of the global container market refer to the number of container handling movements in ports, which is a more readily observable magnitude.

Port cargo handling volumes differ from the number of container movements because:

- Each container is counted at least twice, once at the port of export and once at the port of import;
- Some containers are trans-shipped at intermediate ports en route to their destination, in which case the container is counted twice more in port statistics: once as it is taken off the vessel and once as it is put back on;
- Port statistics also include empty containers loaded and unloaded in the port; <sup>44</sup>

In this chapter, I will present their container volume development and comparison in recent years, between Piraeus Port and Haikou Port.

### *2.2.1 CONTAINER VOLUME OF PIRAEUS PORT*

The Greek port is still expanding and has become the largest in the Mediterranean Sea, growing by 70% since 2015.

In 2019, the Greek port of Piraeus recorded 5.6m TEU to become the largest port in the Mediterranean Sea, also establishing itself among the biggest in the world. Four years of unimpeded growth mean Piraeus has increased its throughput levels by 70% since 2015. It is

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<sup>44</sup> 'CONTAINER PORT VOLUMES', *The Economic and Social Commission for Asia and the Pacific (ESCAP)*, The Economic and Social Commission for Asia and the Pacific (ESCAP) , p. 1, [https://www.unescap.org/sites/default/files/pub\\_2398\\_ch5.pdf](https://www.unescap.org/sites/default/files/pub_2398_ch5.pdf) ,(accessed 24 March 2022).

now the fourth-largest port in Europe and among the 30 biggest globally. The 15.1% throughput growth it achieved during 2019 was primarily driven by China COSCO Shipping Group’s Piers II and III, which accounted for more than 5m TEU. The company, which took over operations in 2016, said in its annual report that traffic was boosted by increased calls from the Ocean Alliance and The Alliance, whose members are some of the biggest containership firms in the world.

In 2019, the port authority also secured the new Greek government’s approval for its master plan that includes €611.8m (\$700m) of new investments in the port. Piraeus secured €140m of funding from the European Investment Bank to help with these investments and part of that will go towards updating container terminal operations.

The port has potential to become even bigger. Beyond its approved plan, COSCO has said it wants to spend up to €800m on the port and ultimately expand its capacity by 2.8m TEUs to 10m TEU. “COSCO Shipping Ports will spend efforts to make Piraeus port an important container transshipment port, a hub for sea-land transshipment and international logistics distribution center in the Mediterranean region, playing an important pivot role in Sino-European sea-land expressway and the ‘Belt and Road’ Initiative,” it said in its annual report.<sup>45</sup>

In the past ten years since 2010, the container volume of Piraeus Port has increased a lot, below Piraeus Port Yearly Throughput 2010-2020<sup>46</sup> could show the details:

Piraeus Port Yearly Throughput 2010-2020											
in TEUs	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PPA	194.083	502.321	695.470	651.000	633.642	304.867	278.731	453.264	498.708	489.434	539.911
PCT	685.440	1.188.148	2.108.088	2.520.000	2.986.903	3.034.426	3.470.978	3.691.815	4.409.205	5.158.626	4.896.886
<b>Total</b>	<b>879.523</b>	<b>1.690.469</b>	<b>2.803.558</b>	<b>3.171.000</b>	<b>3.620.545</b>	<b>3.339.293</b>	<b>3.749.709</b>	<b>4.145.079</b>	<b>4.907.913</b>	<b>5.648.060</b>	<b>5.436.797</b>

<sup>45</sup> ‘Lloyd’s List One Hundred Ports 2020, *Lloyd’s List*, Lloyd’s List, 2021, p. 66, <https://lloydslist.maritimeintelligence.informa.com/one-hundred-container-ports-2020/Digital%20edition%20ebook> , (accessed 24 March 2022).

<sup>46</sup> Tassos Vamvakidis, ‘Piraeus Port, the head of Dragon COSCO’, *BELT AND ROAD ASSOCIATES*, Athens, BELT AND ROAD ASSOCIATES, 2021, p. 4, <http://www.beltandroadassociates.com/wp-content/uploads/2021/04/VAMVAKIDIS-PCT-BOR.pdf> ,(accessed 17 March 2022).

*Table 4 Piraeus Port Yearly Throughput 2010-2020, Source: BELT AND ROAD ASSOCIATES*

Greek port sees its first throughput decline since 2015 amid the coronavirus pandemic. After four years of unbridled growth, the port of Piraeus suffered a decline in throughput due to the coronavirus pandemic. Overall throughput dropped by 3.7% last year, largely on account of the decline in Pier II and Pier III.

These terminals, which are run by COSCO Shipping Ports-owned Piraeus Container Terminal, saw throughput fall by 5.1% to less than 4.9m TEU. COSCO Shipping Ports has attributed that fall to the pandemic. However, Pier I, the smaller terminal operated by the Piraeus Port Authority, saw a 10.5% increase in throughput, due to a boost in transshipment business that came mainly thanks to a relevant agreement with PCT. Despite the drop in 2020, Piraeus remains the largest European port in the Mediterranean and will continue to be a strategic interlocutor between Europe, Asia and Africa. COSCO Shipping Line recently added Piraeus to its service connecting US and Asian ports, with two weekly stops from ships capable of carrying 10,000 boxes each. The Greek port is the only European one in that service.

In 2021, the PPA also made investments in five new stacking cranes, other equipment and operation modernization efforts, including cranes that can service vessels of up to 20,000 TEU. It said these moves will boost Pier I's capacity by 30% to 1.3m TEU per year.

Longer term, with the current investment plan to expand the port's capacity to handle 10m TEU, Piraeus looks set to remain a key fixture in the region.<sup>47</sup>

After a decline in 2020, a total of 5.3 million TEU passed through its facilities in 2021.<sup>48</sup> Among them, the total volume of Pier I increased by 13.9% (from 540,591 in 2020 to 615,510 TEUs in 2021) due to the increase in transshipment volumes and a significant increase in local volume. The transshipment volumes increased by 7.8% (from 445,949 in 2020 to 480,912 TEUs in 2021), mainly due to the contribution of the COSCO Shipping group while the local cargo increased by 42.2% (from 94,642 in 2020 to 134,598 TEUs in 2021) corresponding to

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<sup>47</sup> 'Lloyd's List One Hundred Ports 2021, *Lloyd's List*, Lloyd's List, 2021, p. 60-61, <https://lloydslist.maritimeintelligence.informa.com/-/media/lloyds-list/images/top-100-ports-2021/top-100-ports-2021-digital-edition.pdf>, (accessed 20 March 2022).

<sup>48</sup> Port Technology International Team, 'Top 5 Ports in Europe 2021', *Global Trade* [website], 2022, <https://www.globaltrademag.com/top-5-ports-in-europe-2021/>, (accessed 21 February 2022).

the increase in imports/exports observed in the Greek economy.<sup>49</sup> While, the total volume of Pier II and Pier III for 2021 reached 4.693 million TEU, showing a decrease of 4.1%.<sup>50</sup>

Valencia port has closed 2021 handling a total of 5,604,478 TEU, which is an increase of 3.25% over 2020, as well as 3% over the pre-pandemic year 2019.

Valencia's container volumes confirm the forecasts of the Port Authority of Valencia (PAV) that the Spanish port would surpass the Greek Port of Piraeus, which was the fourth busiest port in Europe in 2020.<sup>51</sup> Valencia port became the first container port in Mediterranean Sea in 2021.

From what has been discussed above, the container cargo handling volume of Piraeus Port 2010-2021 can be made as below:

In Million TEU	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Piraeus Port	0.87	1.69	2.8	3.17	3.62	3.34	3.75	4.15	4.91	5.65	5.44	5.31

*Table 5 Container cargo handling volume of Piraeus Port 2010-2021, Source: BELT AND ROAD ASSOCIATES, Port Technology International Team*

<sup>49</sup> ‘ANNUAL FINANCIAL REPORT 2021’, *Piraeus Port Authority S.A.*, Greece, Piraeus Port Authority S.A., 2022, p. 35, <https://www.olp.gr/en/investor-relations/annual-reports/itemlist/category/284-2021> ,(accessed 21 March 2022).

<sup>50</sup> ‘Container Throughput 2021’, *COSCO SHIPPING Ports Limited*, China, COSCO SHIPPING Ports Limited, 2022, p. 1-2, <https://ports.coscoshipping.com/en/Businesses/MonthlyThroughput/pdf/2021.pdf> ,(accessed 21 March 2022).

<sup>51</sup> ‘Valenciaport surpasses COSCO’s Piraeus port, handling more than 5.6 million TEU in 2021’, *CONTAINER NEWS* [website], 2022, <https://container-news.com/valenciaport-surpasses-cosco-piraeus-port-handling-more-than-5-6-million-TEU-in-2021/> ,(accessed 21 March 2022).

### 2.1.2 CONTAINER VOLUME OF HAIKOU PORT

The economy of Hainan Province is an island-type economy with strong external dependence. The main way of importing and exporting materials and foreign trade is by sea, and most of the goods entering and leaving the island are completed by sea. Therefore, the economic construction of the whole province is closely related to the development of water transport. Compared with the inland provinces and cities, the port is more important to the development of the economy and tourism of Hainan province.

The port city of China's Hainan Island revealed ambitions to become a top transshipment hub in south China. Throughput of Haikou Port reached 1,640,000 TEU in 2017, showing an increase of 17% compared with 1,402,000 TEU of Year 2016.<sup>52</sup>

Haikou also took advantage of the booming economy of south China last year. Official data showed the gross domestic product of Hainan Province grew by 7% in 2017.

The port's main operator is Haikou Harbor Container Terminal, a subsidiary of state-owned Hainan Harbor & Shipping Holding (HNHS). Since 2017, HNSH has been authorized to streamline the container operations for the whole province. Subsequently Haikou took off with improved operational efficiency Average waiting time reportedly fell to 21.35 hours as of January, from the previously recorded 37.01 hours.

Haikou Port continues to see benefits rise in trade, as well as growing intra-Asia trade, with throughput rising 12.8% to 1.9m TEU in 2018. Meanwhile, there have been developments at a corporate level to boost Haikou as an international port. COSCO Shipping has taken a stake in port operator Haikou Harbor Container Terminal's parent, Hainan Harbor & Shipping Holding.

The intention is to develop new trade routes linking Southeast Asia and Europe through Hainan. A new Hainan-Singapore route was launched at the end of 2018 and more services, such as a Hainan-Myanmar service, continue to be launched. Apart from transshipment, logistics, warehousing and other services are also being planned for the port to develop as a maritime center. This will position Haikou to benefit not only from the hoped-for transshipment volumes but also as a gateway port for what could become one of the world's largest free trade zones.

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<sup>52</sup> '93 Haikou (China)', *Lloyd's List* [website], 2018, <https://lloydslist.maritimeintelligence.informa.com/LL1123568/93-Haikou-China> ,(accessed 24 March 2022).

HSSH is already planning for aggressive expansion in the Macun area to the west of the current terminal area, which is constrained from further development because of its proximity to the city. The current 786 m quay, which can take in two vessels, will be expanded to a total quay length of 3,450 m with a 10 m draught. It will be able to handle nine vessels simultaneously and boost annual capacity to 6.2m TEU.<sup>53</sup>

COSCO Shipping's involvement is expected to have a positive effect on the port's development, bringing advantages from its liner network

The investment of COSCO Shipping in Haikou port operator Hainan Harbor & Shipping Holding is combining with added impetus to build up the island as a free trade zone. The aim is to set it up as potentially one of the more exciting port developments in the next few years. The pace of throughput growth at Haikou has slowed from the previous year but this is probably more symptomatic of weak global trading conditions than an indicator of its fortunes.

Among the key developments is a move to build up the Yangpu port area into the main base for international volumes. Meanwhile, more traffic will be transferring from the crowded Xiuying port area in downtown Haikou to the Macun terminals, where there is more room for expansion.

Yangpu port's infrastructure is being improved, with a contract signed for four gantry cranes and 24 rubber-tyred gantry cranes, due for delivery in the first half of 2021. This is expected to boost capacity to 5m TEU by 2025. The container-handling capacity of Yangpu's Xiaochantan terminal will be improved from 650,000 TEU to 1.8m TEU. Hainan Harbor&Shipping Holding operates ports at Xiuying, Macun, Xinhai and Yangpu. After taking a stake in the company, COSCO Shipping is forging ahead with plans for the third and fourth phases of Macun port as part of the island's free trade zone plans. The major Chinese shipping line has quickly brought the advantages of its global shipping network to Haikou, opening up three domestic routes and six international routes in 2019 alone. This has positioned Yangpu as a domestic hub, while extending networks to Southeast Asia and South Asia. Among these are a new service that will include Yangon as well as Singapore and Pasir Gudang in southeast Malaysia; and another Hainan-Asean route that will feeder into Singapore.

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<sup>53</sup> 'Lloyd's List One Hundred Ports 2019, *Lloyd's List*, Lloyd's List, 2020, p. 118- 119, <https://lloydslist.maritimeintelligence.informa.com/one-hundred-container-ports-2019/Digital%20edition> , (accessed 20 March 2022).

There are further plans to start up routes from Yangpu to Australia, New Zealand, India and Pakistan. Yangpu currently has 45 berths and serves 22 domestic and foreign trade routes, connecting the Beibu Gulf, Yangtze River Delta, Pearl River Delta, north and northeast China and other domestic coastal ports, as well as Vietnam, Singapore, Malaysia and Myanmar.

It is envisaged that the port will form the basis of a route network covering Southeast Asia and South Asia, with Yangpu as the transit hub for China-Asian shipping. There are plans to add five more domestic and foreign trade routes during 2020. With the participation of COSCO Shipping, there are also plans to ultimately turn Hainan into a trade and shipping hub and a vital pivot in the International Land-Sea Trade Corridor — China's latest iteration of a plan to better connect its inland western provinces — and consequently a key link in China's Belt and Road Initiative.

There are hopes that with Hainan opening up as a free trade port, it will become a key supply chain hub. It will also break new ground in opening China up further through intermodal rail links running westwards into inland China — and eastwards on sea connections to the Pacific and Indian oceans. Hainan is also home to China's largest container shipping e-commerce platform for domestic trade, which will feed into the central government's plans to develop the island as a free trade port.

The shipping sector there will also benefit from plans to build up a ship registry. COSCO Shipping's involvement is expected to have a positive effect on the port's development, bringing advantages from its liner network. CHINA's Hainan free trade port recently saw the launch of its first inter-continental shipping service at Xiaochantan terminal, Yangpu port.

The newly launched Yangpu-South Pacific-Australia shipping route, connecting ports in China, the Philippines, Papua New Guinea and Australia, provides a direct shipping service for the trade of coconuts, beef, minerals, logs and consumer products between China and South Pacific-Australia, reports Colchester's Seatrade Maritime News.

The service is provided by COSCO Shipping Lines, deploying two 1,740 TEU box ships on a bi-weekly schedule.

The opening of this new service is a breakthrough for Hainan on intercontinental shipping route operation and marked the beginning of an international container hub port development of Yangpu.



Yangpu terminal posted 497,000 TEU container throughput during the period of January and August of 2020, an increase of 66 per cents year on year with the foreign trade container volume amounting to 118,000 TEU, a huge surge of 432 percents compared to the same period last year.<sup>54</sup>

The Port of Yangpu, in Hainan, China's only island province in the South China Sea, posted a 36.5 per cent year-on-year January-November increase in container volume to 1.2 million TEU, reported the state-owned Hainan International Communication Network.

Hainan authorities regard the construction of Yangpu port infrastructure as an important part of the province's free trade port project, with the goal of increasing both domestic and overseas cargo traffic. Yangpu port is working hard to meet the requirements of an annual volume of 10 million TEU in the future.

From January to November of 2021, more than 1,800 ships called, up 14.5 per cent year on year. In addition, 30 international vessels weighing a total of about 4.8 million tons were registered in the port. In 2021, according to the article, about 114 foreign ships also remotely passed operating safety checks in the Port of Yangpu.

China's authorities intend to turn Yangpu port in the northwestern part of the Hainan Island into a key distribution channel for the flow of goods from various regions of China to southeast Asia and Oceania, Europe and North America by 2035.

Yangpu port will play an important role in implementing the plan to form a new integrated maritime and land corridor, a project developed by China's National Development and Reform Commission and aimed at speeding up and improving the efficiency of regional and global trade and economic projects, as well as providing advanced customs and logistics services.<sup>55</sup>

Throughput stagnates as the southwestern China port blames coronavirus and frequently severe weather. Throughput stagnated from the previous year(2020)'s level as Haikou port blamed the

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<sup>54</sup> 'Cosco provides inter-continental service linking Hainan free trade port', *Shanghai International Shipping Institute* [website], China, 2020, <http://sisi.gstta.org/index.php?c=article&id=19256> ,(accessed 21 March 2022).

<sup>55</sup> 'Hainan port ups volume 36.5pc in 11 months to 1.2 million TEU', *Shanghai International Shipping Institute* [website], China, 2022, <http://sisi.gstta.org/index.php?c=article&id=20789> ,(accessed 21 March 2022).

coronavirus epidemic, a decline in cargo volume, and the frequent occurrence of severe weather for the challenges facing it.

However, COSCO Shipping has also given mixed signals about its role vis-à-vis Qinzhou port — just across the bay from Haikou and on the mainland, with intermodal rail-sea connections — which has recently been given added impetus from investment by its ports arm.

There have been efforts to increase local network connectivity between the terminals and also provide new services to take advantage of the free trade rights granted to Hainan province as a whole. This includes new routes to and from Asian ports and on to northern China ports, such as Jinzhou and Tianjin, as well as other budding domestic hubs such as Nansha and Qinzhou. However, these seem to be more to the benefit of the newer terminal.

Overall, COSCO Shipping and other domestic shipping companies opened up five domestic and foreign trade transportation routes at the Yangpu International Container Terminal, which enables same-ship transshipment of foreign boxes to other Chinese ports. In addition, eight new international routes were opened up, including one mainline service. Two intra-island barge services linking various container terminals were also introduced. While the service to Vietnam is being run by China United Shipping, other more groundbreaking routes, such as the Yangpu-South Pacific-Australia route, billed as the first intercontinental route opened by the Hainan Free Trade Port — are being driven by COSCO Shipping.

The giant line also launched a new Yangpu-Hong Kong-Papua New Guinea-New Zealand-North Australia route, ostensibly to meet the needs of customers and support China's dual-circulation policy while creating a new southbound international waterway. On-going trade tensions with countries in the region might have put a damper on these ambitions.

New investments in equipment are also being allocated to the up-and-coming provincial port. Yangpu International Container Terminal has become the first container terminal with automated yard operations in the so far relatively undeveloped Hainan province, increasing its handling capacity from 650,000 TEU to 1.6m TEU. Being designated a free trade port and coming under the wing of a state-owned giant has benefits and suggests a degree of favor.

However, ultimately success must depend on the viability of the port itself, as artificial supports can only achieve so much while their continued provision is also uncertain.<sup>56</sup>

COSCO Shipping’s grand plans for its network of China ports are just starting from now as the entire sector just about completes its consolidation process.

Haikou data was reported at 160.000 Units in Jan 2022. This records an increase from the previous number of 120.000 Units for Dec 2021.<sup>57</sup>

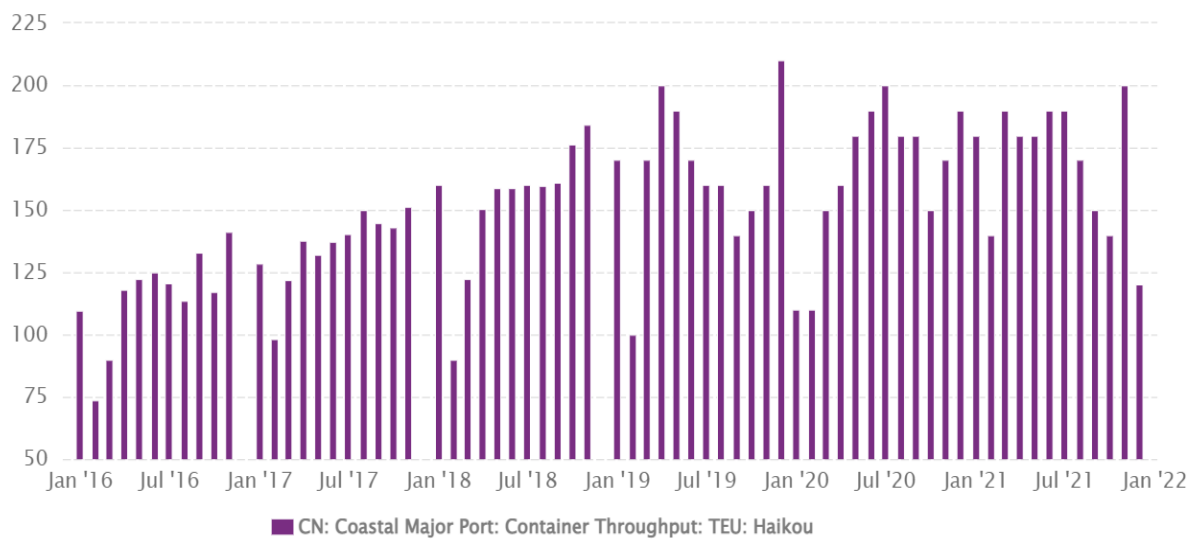


Figure 8 Container Throughput of Haikou Port 2016-2021, CEIC, <https://www.ceicdata.com/en/china/waterway-container-throughput-coastal/cn-coastal-major-port-container-throughput-teu-haikou> ,accessed 26 March 2022

From what has been discussed above, the container cargo handling volume of Haikou Port 2016-2021 can be made as below:

In M TEU	2016	2017	2018	2019	2020	2021
Haikou Port	1.4 m	1.64 m	1.83 m	1.97 m	1.97 m	2.01 m

<sup>56</sup> ‘Lloyd’s List One Hundred Ports 2021’ , *Lloyd’s List*, Lloyd’s List, 2021, p. 111, <https://lloydslist.maritimeintelligence.informa.com/-/media/lloyds-list/images/top-100-ports-2021/top-100-ports-2021-digital-edition.pdf>, (accessed 20 March 2022).

<sup>57</sup> ‘Coastal Major Port: Container Throughput: TEU: Haikou’ , CEIC[website], <https://www.ceicdata.com/en/china/waterway-container-throughput-coastal/cn-coastal-major-port-container-throughput-teu-haikou> , (accessed 26 March 2022).

*Table 6 Container cargo handling volume of Haikou Port 2016-2021, Source:CEIC*

**2.1.3 CONTAINER VOLUME COMPARISON BETWEEN PIRAEUS PORT AND HAIKOU PORT**

From what has been discussed above, the comparison of volume for container cargo handling between Piraeus Port and Haikou Port from year 2016 to year 2021 can be made as below:

In TEU	2016	2017	2018	2019	2020	2021
Piraeus Port	3.75 m	4.15 m	4.91 m	5.65 m	5.44 m	5.31 m
Haikou Port	1.4 m	1.64 m	1.83 m	1.97 m	1.97 m	2.01 m

*Table 7 Comparison of volume for container cargo handling between Piraeus Port and Haikou Port 2016 - 2021,Source: BELT AND ROAD ASSOCIATES, Port Technology International Team,CEIC*

From this list, it can clearly be seen that Piraeus Port has bigger volume than the Haikou Port concerning container cargo handling. After year 2019, both Piraeus port and Haikou port didn't achieve any big progress due to the COVID- 19, Piraeus port even had a small decrease from 2019 to 2021.

To be fair and another view to do the comparison, below list is made to show the container volume development between Piraeus Port and Haikou Port at the beginning years since COSCO Shipping has taken the management:

In TEU	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year
Piraeus Port	0.87 m	1.69 m	2.8 m	3.17 m

Haikou Port	1.83 m	1.97 m	1.97 m	2.01 m
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*Table 8 Container volume development of Piraeus Port and Haikou Port since COSCO Shipping has taken the management, Source: BELT AND ROAD ASSOCIATES, CEIC*

There was a significant increase in throughput volume in the port of Piraeus (Greece) after it came under the ownership of the China Ocean Shipping Group Company (COSCO). The port is conveniently located and has services in ports in Europe, Asia, and Africa. It is the only port on the eastern Mediterranean coast to have transshipment infrastructure.

Despite the impact of the COVID-19 pandemic and the cold weather, Hainan’s Yangpu Port made a good start to the year’s business by achieving “double growth” in January this year: total cargo throughput grew 11.8% year-on-year to 5.26 million tons, while container volume rose 87.1% year-on-year to more than 154,000 TEUs.

Generally speaking, January is the off-season for domestic shipping. However, preferential policies offered by the Yangpu Port as well as the Hainan Free Trade Port have encouraged shipping companies to increase their business volume. Meanwhile, operational procedures at the Yangpu Port are being constantly optimized by local authorities, improving efficiency.

As the main driving force of the Yangpu Port's “double growth” in January this year, the Yangpu International Container Port saw total cargo throughput grow 10.2% year-on-year to more than 960,000 tons, and container volume rise 92.7% to more than 138,000 TEUs.<sup>58</sup>

It takes 9 years for Piraeus Port to reach the volume 5 million TEU in 2019 from 0.8 million TEU in 2010, after COSCO Shipping has taken the management.

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<sup>58</sup> Li Xiang, ‘Hainan's Yangpu Port gets off to a good start in 2022’, *HICN* [website], China, 2022, <https://www.hicn.cn/system/2022/02/14/032703037.shtml> , (accessed: 24 March 2022).

McKinsey expects the global economy's GDP compound annual growth rate to decline to 2.9% in the next decade and China's GDP growth rate to 4.0%.<sup>59</sup> In this context, China's port shipping industry is expected to face a longer period of medium and low growth.

Against the backdrop of the free trade port construction, Hainan's future economic development will be more closely linked to the world economy and will also inevitably be impacted by the peripheral market. Considering the release of dividends associated with the construction of the free trade port, Hainan's economic growth during the 14th Five-Year Plan period is likely to be higher than the national average growth rate.

In comparison to other free trade zones (ports), Hainan's GDP in 2019 is 15%, 19% and 19% of that of Shanghai, Singapore and Hong Kong respectively. <sup>60</sup>The potential GDP growth rate of Hainan in the 14th Five-Year Plan is likely to be around 6%-8%, taking into account the late-stage advantages that will be created by the implementation of the policies of the free trade port. From the perspective of the port and shipping industry, the growth rate of regional transport demand is basically synchronized with economic growth, but the growth of each segment is slightly different due to the constraints of factors such as unbalanced capacity on the supply side of the industry. It is expected that the trend of internationalization of the cargo structure of container transport may become more obvious, and the routes and berthing of large vessels may show a growth trend.

To summarize everything what has been stated so far, the container volume of Haikou Port would reach 5 million by 2025.

### **CHAPTER 3 – PASSENGER HANDLING OF PIRAEUS PORT AND HAIKOU PORT**

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<sup>59</sup> 'Beyond the pandemic: Eight charts on COVID-19 and the next phase of global economic growth', *McKinsey* [website], 2021, <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/beyond-the-pandemic-eight-charts-on-covid-19-and-the-next-phase-of-global-economic-growth> , (accessed: 26March 2022).

<sup>60</sup> Li, Yu-wai Vic. "The Irreplaceable Outpost? Whither Hong Kong in China's Financial Future." *China Review*, vol. 20, no. 3, The Chinese University of Hong Kong Press, 2020, pp. 261–78, <https://www.jstor.org/stable/26928119> , (accessed: 26March 2022).

The beautiful scenery of Greece and Haikou Island attracts millions of tourists every year. Ferry and cruise are the most common and popular transportation way for the tourists, connecting islands with mainland. Piraeus Port is the largest port in Europe and one of the largest in the world concerning passenger traffic. It has a throughput volume of about 20 million passengers per annum (including the ferry traffic Salamis – Perama, which has a throughput volume of about 8 million passengers per year). It is the main link between the mainland and the Aegean islands and Crete, while also being the main sea gate of the European Union at its southeastern edge. The same condition happens with Haikou Port, known as the gateway of Haikou Province, is now serving as Haikou to Zhanjiang, Guangzhou, Beihai, Hong Kong and other 4 maritime passenger routes. In this thesis, I will present the passenger terminal's infrastructure, volume, investment, development plan of both ports.

### 3.1 INFRASTRUCTURES FOR PASSENGER HANDLING OF PIRAEUS PORT AND HAIKOU PORT

Ferry facilities form a key component of the overall transport network. This water-based mode offers an efficient link for customers to access their destination as a transport mode on its own or in combination with land based modes, including active transport. The design of new and/or upgraded public transport infrastructure needs to consider current and future capacity requirements. This is particularly important for ferry terminals and services, which have higher infrastructure, fleet and operating costs than land public transport.<sup>61</sup>

#### *3.1.1 INFRASTRUCTURES FOR PASSENGER HANDLING OF PIRAEUS PORT*

Piraeus port is the largest port in Greece, and the busiest passenger port in the eastern Mediterranean. Dozens of ferries depart every day for the Greek islands, and hundreds of cruise boats arrive every year. Here's all you need to know for the port of Piraeus.

Piraeus port is about 11 kilo miters south-west of Athens, the Greek capital. It's a huge, bustling port, where thousands of ferries come and go year-round. Every year, several million people

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<sup>61</sup> 'Ferry terminal infrastructure', *Publication Portal*, Publication Portal, 2020, p. 6-16, <https://www.publications.qld.gov.au/ckan-publications-attachments-prod/resources/>, (accessed 27 March 2022).

take a ferry or cruise ship from Piraeus port. Piraeus is by far the largest of the three ferry ports of Athens.

Although it can be a bit daunting at first, Piraeus port is very easy to navigate. The large port is easily accessible on various means of public transportation, taxis and pre-booked transfers. Grab yourself a coffee and enjoy the experience! If you have booked your ferry tickets and need to collect them at the Piraeus Athens port, all ferry companies have ticket booths a short walk from the gate your ferry is departing from.<sup>62</sup>

Piraeus. The largest port in Greece in terms of commercial and passenger traffic and the most important port in Eastern Mediterranean. The largest port in Europe in passenger traffic and the Greek mainland hub to the Aegean islands; the mecca of Greek mercantile marine. A historic seaport of Athens since antiquity; the centre of Athens' exports and trading but also a symbol of naval strength of the ancient Athenian state. Surrounded by fortifications and the famous Long Walls that served as protection as well as a link to the city of Athens. A fabled maritime city of the classical Hellenistic period, ornamented with grand public buildings that were destroyed along with the city by the roman legions. Then the city was plunged in decadence. Porto Leone and Porto Drako of the Byzantine and Ottoman rule; an ancient port deserted until the mid-19th century when the commercial and industrial hub of modern Greece was brought back to life.

Spreading around three natural bays in the southwestern shores of Attica, from the gulf of Elefsina to the cove of Faliro, modern Piraeus is a busy port-city with a unique character. Modern yet traditional; authentic yet cosmopolitan; aristocratic yet bohemian. A many-faceted and contradicting personality; a seducing mix of urban and popular culture; a melting pot of different people and social classes who came from every corner of Greece to form the city's unique character. This osmosis is the source of Piraeus' unique charm and the idiosyncrasy of the locals: an amalgam of plain simplicity and honesty, diligence and pride, open-heartedness and pure soul.

The birthplace of important personalities of the arts and literature, the cradle of the "rebetiko" music and the mythology surrounding it; a source of inspiration for many favourite Greek songs and unforgettable movies; the ark of fine samples of neoclassical and industrial architecture,

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<sup>62</sup> Dave Briggs, 'Piraeus Port Athens – Ferry Port And Cruise Terminal Information 2022', *DAVE'S TRAVEL PAGES* [website], 2022, <https://www.davestravelpages.com/piraeus-port/>, (accessed 29 March 2022).



Piraeus is full of traces of a bygone glory and rich social history. Outside the port gates, a city full of experiences, enchanting secrets and open-hearted people just waits to be discovered.<sup>63</sup>



*Figure 9 Ferry terminal of Piraeus Port, Piraeus Port Authority S.A, 2018, <https://www.olp.gr>, Access on 29 March,2022*

The port of Piraeus is located 12km southwest of the center of Athens, on the east coast of the Saronic Gulf. It is the main gateway from the Greek mainland to the islands of the Aegean and Crete. The port is big and has 12 gates from which the ferries depart.<sup>64</sup>

Piraeus is the largest port in Greece with sailings every day to the most popular island groups including the Cyclades, Dodecanese, Saronic, Ionian, and North Aegean islands, and Crete. The port is a hub for the leading ferry companies operating in the Aegean including Anek Lines, Hellenic Seaways, Blue Star Ferries, Seajets and Minoan Lines. A port since the fifth century BC, much of Piraeus is of archaeological interest. There is plenty to occupy you while you are waiting for your connection including the Archaeological Museum and the Bay of Zea, are relaxed spots with waterfront tavernas and an attractive marina. Facilities at Piraeus port are as below:

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<sup>63</sup> 'PIRAEUS', *ANEL LINES* [website], Greece, <https://www.aneke.gr/en/destination/piraeus/>, (accessed 2 April 2022).

<sup>64</sup> 'Piraeus, Attica, Greece', *ferryhopper* [website], <https://www.ferryhopper.com/en/destinations/piraeus>, (accessed: 29 March 2022).

- Passenger terminals: Five-passenger terminals with air-conditioned waiting rooms, refreshment rooms, and toilets.
- Shuttle bus: Free shuttle bus connecting the different areas of the port.
- Parking: 130 parking spaces located near Terminal 4 and Cruise Terminal B.
- Toilets: All the terminals have toilet facilities with additional toilets at Terminals 3,4 and 5.
- ATM: ATM near Terminal 4 and the Hellenic Seaways ticket office.
- Currency Exchange: Currency exchanges can be found near Terminal 4.
- Luggage lockers: Luggage lockers are located at Terminal 2.
- Tourist information: Tourist Information can be found at Terminal 4.
- Taxi ranks: Taxi ranks are located at each of the passenger terminals.<sup>65</sup>

Piraeus is the largest port in Europe and one of the largest in the world concerning passenger traffic. It has a throughput volume of about 20 million passengers per annum (including the ferry traffic Salamis – Perama, which has a throughput volume of about 8 million passengers per year). It is the main link between the mainland and the Aegean islands and Crete, while also being the main sea gate of the European Union at its southeastern edge. The boundaries of the Main Port are the piers of Themistocles and Krakari. It has The anthropocentric nature of the services of the central port is a basic choice of PPA SA. In this context, an attempt is made to continuously upgrade services:

- Digital information displays for passengers, indoors and outdoors
- Pedestrian bridge
- Electric signs and free transport service within the port
- Improvement of passenger terminals- renovation of the passenger terminal at Tzelepis coast (approved).
- Construction of 2 WCs which also include WCs for the disabled
- Construction of waiting areas with air conditioning and water coolers

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<sup>65</sup> ‘Ports of Athens’, *greek* [website], Greece, <https://www.greeka.com/travel-services/greek-ferries/athens-ferry-ports/>, (accessed 29 March 2022).

- Renovation of 6 canteens
- 3 km path for the disabled
- Reconstruction of a 350m<sup>2</sup> area at Kononos street
- 130 parking spaces
- 13 taxi stations
- 2 vehicle control points
- Alignment and boundary settings for traffic control
- Free Wi-Fi service
- 24 hour telephone service at 14541.<sup>66</sup>

Recently, The Greek Shipping Ministry has announced that it will use funds of up to one billion euros to improve the service of 47 ferry lines and cover 44 projects aimed to upgrade the port infrastructure on islands.

“We have prepared and are implementing a comprehensive plan to carry out critical projects and secure key ferry connections in the island and wider sea area of Greece,” Greek Shipping Minister Yiannis Plakiotakis said in an announcement on Monday.

According to the minister, the financial support will come from national (Greek ‘Nearchos’ program for infrastructure development and island entrepreneurship) and EU funds (NSRF 2021 – 2027 program and Recovery and Resilience Fund) and will:

- improve Greece’s ferry connections between the mainland and the islands as well as between island destinations. Improvements will include increased safety and reduction of transport time and costs.
- upgrade Greece’s port infrastructure for the better and safer service of passengers.
- 33 projects under a budget of 175,210,000 euros to upgrade port infrastructure on the Greek islands (NSRF 2021 – 2027 program)

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<sup>66</sup> ‘Coastal Shipping’, *Piraeus Port Authority S. A.* [website], Greece, 2021, <https://olp.gr/en/services/coastal-terminals> ,(accessed 15 February 2022).

- the financing of plans, studies and interventions for the expansion, upgrade, maintenance and operation of port projects in the next four years under a budget of 200,000,000 euros (Nearchos program)
- 11 projects worth 20,000,000 euros to address climate change and erosion in port infrastructure and facilities on the islands (Recovery and Resilience Fund)
- the financing of 44 intra-island and inter-regional ferry lines under a budget of 370,000,000 euros, through multi-year contracts of 4 to 7 years and that includes incentives for the renewal of coastal shipping fleet (NSRF 2021 – 2027 program)
- the financing of three ferry lines of the central coastal network with 300,000,000 euros (Nearchos program).

“Approximately 1 billion euros of funds have been secured, which will be allocated between coastal shipping and the ports of our islands, giving solutions to two critical issues concerning insularity: securing efficient and quality ferry connections and modern and safe port infrastructure,” Minister Plakiotakis said.<sup>67</sup>

### 3.1.2 INFRASTRUCTURES FOR PASSENGER HANDLING OF HAIKOU PORT

To reach Hainan from the mainland across the sea, you must take a ferry. There are three terminals departing from Guangdong, Zhanjiang Xuwen Port, Hai’an New Port, and Guangdong-Hainan Railway Beigang Ferry Terminal, which depart 24 hours a day.

There are two terminals departing from Guangxi, Beihai Yintan International Passenger Terminal and Dijiao Port Authority Terminal.

Ferries arrive in odd-even day rotations every month. Ferries leave from the two road terminals of Xiuying Port and Xinhai Port in Haikou, as well as the Nangang Ferry Terminal of Guangdong- Hainan Railway.<sup>68</sup>

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<sup>67</sup> ‘Greece to Improve Ferry Transport and Island Port Infrastructure with €1bn in Funds’, *Greek Travel Page* [website], 2021, <https://news.gtp.gr/2021/08/30/greece-improve-ferry-transport-island-port-infrastructure-e1bn-funds/>, (accessed: 31 March 2022).

<sup>68</sup> Jake Canning, ‘China Mainland to Hainan by car – How to’, *TropicalHainan.com* [website], China, 2018, <https://www.tropicalhainan.com/china-mainland-to-hainan-by-car-how-to/>, (accessed: 23 March 2022).

As mentioned above, the ferry terminals of Haikou Port are located in Xiuying Port and Xinhai Port, with a total of 21 berths and an annual design capacity of 20.65 million passengers and 3.45 million vehicles. Each berth is equipped with a lift bridge that can be dynamically adjusted with the tide level, and adopts the loading and unloading operation mode of separating passengers from vehicles and direct loading and unloading.<sup>69</sup>



Figure 10 Haikou Xiuying Ferry terminal, commons.wikimedia, 2012, [https://commons.wikimedia.org/wiki/Category:Haikou\\_Xiuying\\_Port#/media/File:Haikou\\_Xiuying\\_Port\\_03.jpg](https://commons.wikimedia.org/wiki/Category:Haikou_Xiuying_Port#/media/File:Haikou_Xiuying_Port_03.jpg), Access on 29 March,2022

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<sup>69</sup> Li Jianchun, personal communication, March 3, 2022.





Figure 11 Xinhai Port Terminal, Haikou, [hainan.gov.cn](http://hainan.gov.cn),  
<https://www.hainan.gov.cn/hainan/jdsj/202107/aa667fc90b6b439abf6f0a3d2c5627a7.shtml> ,  
Access on 29 March,2022

HAINAN STRAIT SHIPPING CO.,LTD., which is a wholly owned subsidiary of HAINAN HARBOR & SHIPPING HOLDING CO.,LTD, has engaged in passenger ro-ro transportation as its main business and owns 21 passenger ro-ro vessels, which are engaged in the operation of 2 passenger ro-ro transportation routes from Haikou to Hai'an and Haikou to Beihai as well as the Xisha tourism route. On 16 December 2009, the Company's shares were listed on the Shenzhen Stock Exchange (stock code 002320).<sup>70</sup>

The construction of the basic infrastructure of the cargo-passenger terminal at the Xinhai port in Haikou city (the administrative center of Hainan province, South China) is completed, the Hainan Daily reports.

According to the newspaper, the builders finished work on the cargo-passenger concrete decks of the three-storey terminal. The total area of the erected structure, including the underground floor, is 25.6 thousand square meters. At the next stage they will erect the metal structures and the roof.

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<sup>70</sup> 'Corporate Profile', *Hainan Strait Shipping Co., Ltd.*[website], [http://www.hnhs.coscoshipping.com/art/2021/11/8/art\\_17077\\_212868.html](http://www.hnhs.coscoshipping.com/art/2021/11/8/art_17077_212868.html) , (accessed 29 March 2022).

The design of the cargo-passenger hub implies that cargo will be loaded and unloaded by self-propelled and trailed vehicles with the help of cars and trucks, trailers or railway cars, but without cranes or other loading equipment.

This transportation hub is located in the southeastern part of Xinhai Port. The area of the facility is about 365,600 square meters. The total construction area reaches 83,200 square meters, of which surface and underground infrastructure accounts for 76,400 and 6,800 square meters respectively.

Construction works are to be completed by the end of 2022. After the inauguration the transport hub will significantly increase the volume of passenger and freight traffic through the Qiongzhou Strait, which separates Hainan from the mainland.<sup>71</sup>

The completion of this project will help improve the service level of the Xinhai Port in Haikou. Hainan island is to focus on projects such as the new Haikou International Duty Free City complex and promoting its offshore duty free shopping industry, as part of a new recently-announced three-year action plan, TR Business has learned.

According to information posted on the Hainan government website, the purpose of the action plan, revealed on 17 May, is to improve the investment structure and quality of the Hainan Free Trade Port (FTP).

Scheduled to open in mid-2022, the Haikou International Duty Free City project is located at Xinhai Port, Haikou and occupies a plot of more than 675 acres. The site will feature around 930,000sq m of tax and duty free shopping space operated by China Duty Free Group.

As mentioned, part of the three-year plan involves promoting Hainan's new game-changing offshore duty free shopping scheme which was announced last year.

This included the tripling of the duty free allowance to RMB100,000/US\$15,599 per person/per year in line with plans for the FTP, which were announced in early June 2020. The raised allowance and other relevant regulations, including an expanded duty free category list was implemented on 1 July 2020.

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<sup>71</sup> 'Haikou cargo and passenger terminal infrastructure completed in Hainan', *RUSSIAN NEWS AGENCY* [website], [https://tass.com/economy/1362433?utm\\_source=google.com&utm\\_medium=organic&utm\\_campaign=google.com&utm\\_referrer=google.com](https://tass.com/economy/1362433?utm_source=google.com&utm_medium=organic&utm_campaign=google.com&utm_referrer=google.com) , (accessed 29 March 2022).

There has been significant development on the island since the implementation of the raised duty free allowance. Leading retailers such as DFS Group, Dufry and Lagardère Travel Retail have opened stores in partnership with Chinese entities, a home delivery service was introduced and most recently the inaugural China international Consumer Products Expo (7-10 May) took place.<sup>72</sup>

### *3.1.3 INFRASTRUCTURES COMPARISON FOR PASSENGER HANDLING OF PIRAEUS PORT AND HAIKOU PORT*

It's difficult to make a detail comparison list regarding the infrastructure of ferry terminals between Piraeus port and Haikou Port. But from what has been presented above, it can be seen clearly that Piraeus Port has bigger capacity than Haikou Port. Piraeus Port Authority only operates the ferry terminal, Hainan Harbor & Shipping not only operate the ferry terminal, but also operate the ferry shipping company with 19 ships. Ferry terminal of Piraeus Port is performing as a public zone, without any entrance control at this moment yet. After many years of developments, Piraeus Port has got some mature management theories and methods. While, Haikou Port is relatively younger and is on the way of development.

## 3.2 PASSENGER HANDLING VOLUME OF PIRAEUS PORT AND HAIKOU PORT

Many people prefer to take a ferry during their journey to island, it is a very popular way. In this section, the passenger volume of Piraeus Port and Haikou Port from 2016-2021 is presented, the passenger volume comparison between Piraeus Port and Haikou Port is carried out based on it.

### *3.2.1 PASSENGER HANDLING VOLUME OF PIRAEUS PORT*

Gorgeous Greece has ever been a classic, go-to summertime vacation destination, and the pandemic served as a stark reminder that tourism is the main centrifugal driving the economy. As a result, galore caller initiatives were rushed through: from improving infrastructure and promoting sustainability to processing lesser-known destinations.

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<sup>72</sup> 'Hainan to focus on Haikou Intl Duty Free City as part of new FTP action plan', *TRBUSINESS*[website], <https://www.trbusiness.com/regional-news/asia-pacific/hainan-to-focus-on-haikou-duty-free-city-complex-as-part-of-new-ftp-action-plan/207346> ,(accessed 30 March 2022).



Early projections suggest that these measures person succeeded and, if each goes well, 2022 could beryllium a bumper season, with tourism reaching 80-90% of pre-covid levels.

For trips to the islands, ferry timetables alteration from week to week, truthful it's champion to publication tickets 1 to 2 days successful beforehand utilizing a cause specified arsenic First Choice Travel, which has the latest dates and times.<sup>73</sup>

Most ferries to the Greek islands depart from the port of Piraeus. This port is very large, it has 10 gates and ferries to different destinations leave from each gate. The port of Piraeus in Athens is connected to most islands of the Aegean sea. The most popular ferry connections are Santorini, Paros, Mykonos, Milos, Naxos, Hydra, Sifnos, Ios and more. It has been the main port of the town. In ancient times, Piraeus was hosting the fleet of Athens and all the naval expeditions would start from there. In the centuries that followed the decline of classical Athens, the port fell in disuse, however, since the 19th century the port started again to develop.

Today the port of Piraeus is the largest in Europe in terms of commercial traffic as it serves about 20 million passengers a year. Ferries depart from Piraeus to most islands of the Aegean, to Crete and many ports of Peloponnese.

Piraeus is the busiest and biggest passenger port in Greece. There are ferries from the Piraeus to the Cyclades, Dodecanese, and North Aegean islands, as well as to Crete. More specifically, the Piraeus port is directly connected with Mykonos, Santorini, Paros, Milos, Naxos, and other popular Aegean islands. There are ferries from Piraeus to the islands all year round, but itineraries are more frequent during the summer.

Many ferries from Piraeus to the Cyclades depart daily in the summer. Some of the most popular ferry routes from Piraeus are from Piraeus to Mykonos, from Piraeus to Santorini, from Piraeus to Paros, and from Piraeus to Naxos. There are ferries from Piraeus to the Dodecanese islands several times per week throughout the year. Among the most popular ferry routes from Piraeus are from Piraeus to Kos and from Piraeus to Rhodes. There are at least 3 daily ferries from Piraeus to Crete (Heraklion, Rethymnon, and Chania) all year round, but routes are more frequent during the summer. The ferry trip to Crete is at least 9 hours long and usually overnight, so booking a cabin is highly recommended. Many ferries from Piraeus to the Saronic islands

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<sup>73</sup> 'Hidden Greece: where to stay and what to do away from the beaten track', *WORD OF NEWS* [website], <https://news.kapita.my.id/hidden-greece-where-to-stay-and-what-to-do-away-from-the-beaten-track-11780.html> ,(accessed 31 March 2022).

depart every day throughout the year. In the summer, there are even more ferry connections. Some of the most popular ferry itineraries from Piraeus are from Piraeus to Aegina, from Piraeus to Poros, from Piraeus to Hydra, from Piraeus to Agistri, and from Piraeus to Spetses. Ferries from Piraeus to the islands of the Northern Aegean operate all year round. The most popular ferry routes are from Piraeus to Ikaria, from Piraeus to Chios, from Piraeus to Lesbos, and from Piraeus to Samos.<sup>74</sup>

There are sailings from Piraeus port to the following destinations: Heraklion, Chania, Sitia, Milos, Schinoussa, Syros, Tinos, Anafi, Katapola, Aegiali, Donoussa, Ios, Iraklia, Koufonissi, Mykonos, Naxos, Paros, Thira, Sifnos, Serifos, Kimolos, Kythnos, Sikinos, Folegandros, Astypalea, Rhodes, Tilos, Karpathos, Kalymnos, Kastelorizo, Kos, Leros, Nisyros, Patmos, Lipsi, Symi, Chalki, Diafani, Kasos, Poros, Aegina, Agistri, Hydra, Spetses, Chios, Fournoi, Limnos Psara, Karlovassi, Vathi, Mytilene, Ermioni, Porto Heli, Kavala, Oinousses, Methana, Agistri, Myli Evdilos, Agios Kirikos. To check times and destinations, contact the Piraeus Port Authority on +30 210 4147800 or use the 24-hour telephone information service 14541.<sup>75</sup>

Measures introduced by Greece and other countries to contain the spread of COVID-19 are yet to impact trade in Greece's main port Piraeus, though the measures include the shutdown of a number of retail businesses, and a ban on cruise liners approaching Greek ports and restrictions on the movement of ferries.<sup>76</sup>

Based on so many ferry lines departure from Piraeus, the passenger volume of Piraeus Port is a huge number, below list shows the passenger volume data of Piraeus Port from year 2016 to year 2021:

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<sup>74</sup> 'Piraeus', *Ferries in Greece* [website], Greece, <https://www.ferriesingreece.com/destinations/ferry-to-piraeus/>, (accessed 31 March 2022).

<sup>75</sup> 'Ports of Athens-Routes from Piraeus Port ', *greek* [website], Greece, <https://www.greeka.com/travel-services/greek-ferries/athens-ferry-ports/>, (accessed 29 March 2022).

<sup>76</sup> David Glass 'Piraeus port remains operational, no restriction on imports/exports', *Seatrade Maritime News* [website], Greece, 2020, <https://www.seatrade-maritime.com/ports-logistics/piraeus-port-remains-operational-no-restriction-importexports>, (accessed 3 April 2022).

<b>Coastal Traffic in Piraeus port FY 2016-2021</b>	
<b>Year</b>	<b>Pax Volume</b>
2016	<b>15.178.279</b>
2017	<b>15.555.123</b>
2018	<b>15.679.520</b>
2019	<b>16.551.054</b>
2020	<b>10.372.523</b>
2021	<b>11.896.187</b>
<b>Total</b>	<b>85.232.686</b>

*Table 9 Coastal Traffic in Piraeus port FY 2016-2021, Source: MRKT Dept. PPA SA*

### *3.2.2 PASSENGER HANDLING VOLUME OF HAIKOU PORT*

Facing the South China Sea, with the Pearl River flowing through it, Guangzhou is one of the most important ports in China, connecting China with over 80 foreign countries and regions. Domestically, it is closely connected with the other major cities in and around the Pearl River Delta, including Hong Kong and Macau Special Regions. From Guangzhou ports, regular ferries leaving for Hong Kong Special Region, Haikou and suburban Guangzhou.

A regular ferry, 'Coconut Princess', leaves from Guangzhou Huangpu Port for Haikou Xiuying Port. Passengers will first see Humen Bridge and the Statue of Kwanyin on Lianhua Mountain and then view the beautiful landscape of the Pearl River, Hong Kong and Macau before arriving at the home of coconut - Haikou.

Departure Time of Coconut Princess:

11:00 on Tuesday, 15:00 on Thursday and 19:00 on Saturday (from Huangpu Port);

09:00 on Monday, 13:00 on Wednesday and 17:00 on Friday (from Haikou Xiuying Port).<sup>77</sup>

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<sup>77</sup> 'Ferries to Haikou and Suburban Guangzhou', *China Tour 360* [website], <https://www.chinatour360.com/guangdong/guangzhou/ferry.htm>, (accessed: 2 April 2022).

There are frequent daily ferries between Haikou and Haian. Takes around 1½ hours and costs about ¥42. There are bus connections from Haian to other cities, but the options are limited compared to Haikou, especially in the evening.

There are daily Haikou-Beihai ferries, leaving Beihai at 6PM, taking around 12 hours and costing between ¥120-400 per person, depending on number of people sharing a cabin. For those of you traveling in China by bicycle, you can also take your bike on the ferry for an additional ¥20.

Buses connect Haikou to many cities on the Chinese mainland, including Guangzhou, Hong Kong, Shenzhen, Guilin, and Nanning. Most buses are overnight sleepers. Buses are loaded on to ferries and arrive in Haikou at either Xingang port or Xiuying port. Here are a few examples of journey duration and price (Mar 2017):

From/to Guangzhou (10 hours) ¥190-230

From/to Guilin (13 hours) ¥338<sup>78</sup>

Hainan Island is the second-largest island of China after Taiwan. Though it is Island, it is still possible to travel by trains from Mainland China. Traveling by train from Mainland China to Hainan would be a good choice for travelers with enough time and want to enjoy the landscapes along the railway.

But some may wonder how you can travel from Mainland to an Island without a railway? NO, no railway connects Hainan Island with Mainland China, but the Chinese engineers solved the problem with China's first sea-rail link by using a ferry to transfer the trains. All the trains will be disconnected upon arrival at Hainan, last stop on Mainland China, then a ferry will transfer them to Hainan Island on the trains will be reconnected and continue their journey to Sanya.

So far there are trains from Guangzhou Guangdong Province to Haikou, trains from Beijing to Haikou & Sanya, trains from Shanghai to Haikou, and also from Changsha Hunan Province to Haikou.<sup>79</sup>

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<sup>78</sup> 'Haikou', *carta. guide* [website], <https://carta.guide/i/haikou/110.405576,19.821076,10?r> , (accessed: 2 April 2022).

<sup>79</sup> 'Hainan Island Transportation Guide, Reach Hainan Island by Flights, Trains & Buses', *Sunny Hainan.com* [website], <https://www.sunnyhainan.com/reach-hainan-island-by-ferry-train-car-flight/> , (accessed: 2 April 2022).

Ferry services resumed morning on the Qiongzhou Strait, a major gateway to China's southernmost island province of Hainan.

More than 8,000 cars were still waiting in or outside the three ports of Haikou, capital of Hainan, as of 7:30 a.m., according to the local government.

Shipping services on the Qiongzhou Strait, between Hainan and Guangdong provinces, were suspended Wednesday night due to low visibility caused by heavy fog. Over 100,000 passengers and more than 10,000 cars were stranded.

After visibility improved, shipping services resumed Thursday morning. However, there is still a backlog of vehicles waiting in Hainan as ferries are travelling slowly due to heavy fog and maintenance work at a port in Guangdong Province. Hainan, known for its tropical climate and clean air, is a popular destination for Chinese tourists taking winter holidays. The Haikou government issued a notice Wednesday night, asking residents to take Thursday, the first working day after the Spring Festival holiday, off to alleviate traffic jams caused by the waiting vehicles.<sup>80</sup>

Based on so many ferry lines to the city of Haikou, the passenger volume of Haikou Port is a huge number, below list shows the passenger volume data of Haikou Port from year 2016 to year 2019:

	2016	2017	2018	2019
Haikou Port	8.921.000	9.915.000	10.433.000	10.228.400

*Table 10 Coastal Traffic in Haikou port FY 2016-2019, Source: Hainan Harbor & Shipping Holding Co., Ltd.*

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<sup>80</sup> 'Ferry services resume to Hainan Province', *xinde marine news*[website], China, 2018, <https://www.xindemarineneews.com/en/market/2018/0222/2586.html> , (accessed: 22 March 2022).

### 3.2.3 PASSENGER HANDLING VOLUME COMPARISON BETWEEN PIRAEUS PORT AND HAIKOU PORT

From what has been discussed above, the comparison of volume for passenger handling between Piraeus Port and Haikou Port from year 2016 to year 2019 can be made as below:

	2016	2017	2018	2019
Piraeus port	15.178.279	15.555.123	15.679.520	16.551.054
Haikou Port	8.921.000	9.915.000	10.433.000	10.228.400

*Table 11 Passenger volume comparison of Coastal Traffic between Piraeus Port and Haikou port FY 2016-2019, Source: MRKT Dept. PPA SA, Hainan Harbor & Shipping Holding Co., Ltd.*

From this list, it is clearly shown that Piraeus port has bigger volume than Haikou Port regarding the passenger handling in recent years. But it is certain that both ports will have more passenger handling with the end of epidemic.

## CHAPTER 4 - SWOT ANALYSIS OF PIRAEUS PORT AND HAIKOU PORT

SWOT is an important acronym for individuals and organizations alike in the business world and it stands for Strengths, Weaknesses, Opportunities and Threats. SWOT analysis is a useful technique to assess these four attributes which play a crucial role in an organization.

Strengths and weakness refer to internal factors such as (current processes, human resources, physical and financial resources etc.) while opportunities and threats focus on external factors such as (market trends, economic trends, political and economic regulations etc.).<sup>81</sup>

An overall SWOT analysis of the Piraeus port and Haikou port is given in this chapter, to assess internal and external factors that give a business a clear advantage and help them keep abreast of consumer trends.

### 4.1 SWOT ANALYSIS OF PIRAEUS PORT

The above presentation provides a general view of Piraeus Port in order to underline the main needs and opportunities of the port in relation with current international and national socio-economic and technological status. SWOT analysis is presented below with the aim to diagnose the benefits and constraints of the port of Piraeus.

#### 1, Strengths

- Geographical position centrally located in the eastern Mediterranean.
- Providing all port services.
- Range of activities.
- Big natural depths and access channels.
- Proximity to Athens, the largest consumer center in Greece.
- Longtime experience executives and staff.

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<sup>81</sup> 'The Importance of SWOT Analysis', *DLT Labs* [website], 2020, <https://medium.com/dlt-labs-publication/the-importance-of-swot-analysis-2ae85762f4b8>, (accessed 27 March 2022).

- Longtime profitable management.
- Benefits from COSCO Shipping Group, to ensure the stable volume.

## 2, Weaknesses

- Border with cities with limited availability of new land areas.
- Significant dependence on a small number of customers in certain activities.
- Difficulties in approval of its Master Plan.
- Inability for staff renewal
- Weaknesses arising from the dual nature of the company in relation to goal setting, strategic direction and operation.

## 3, Opportunities

- High international fuel price.
- Stable political environment.
- Expected recovery in international trade following address of the European and national crisis.
- Funds provided from NSRF.
- New rail connection with the Balkans and Central Europe.
- Increase of the ships size.
- China's Belt and Road Policy

## 4, Threats

- Port intensifying competition with infrastructure development outside the EU.
- Competition from low-wage countries outside the EU.
- Standing competition cities - port to use land areas.
- Increase of the international market concentration in a small number of potential and existing customers.



- Union strike trouble.<sup>82</sup>

## 4.2 SWOT ANALYSIS OF HAIKOU PORT

The above presentation provides a general view of Haikou Port in order to underline the main needs and opportunities of the port in relation with current international and national socio-economic and technological status. SWOT analysis is presented below with the aim to diagnose the benefits and constraints of the port of Piraeus.

### 1, Strengths

- Ideal geographical position to be used as hub.
- Providing all port services.
- Range of activities.
- Proximity to Haikou, the largest consumer center in Hainan Province.
- Longtime experience executives and staff.
- Longtime profitable management.
- Benefits from COSCO Shipping Group, to ensure the stable volume.
- Strong support from China's Central Government and local government

### 2, Weaknesses

- Border with cities with limited availability of new land areas, especially for Xiuying Port.
- Not big natural depths and access channels for big vessels
- Infrastructure is relatively small and old.
- Significant dependence on a small number of customers in certain activities.
- Hainan's overall economic level is relatively backward, the degree of industrialization is low, the endogenous power of the economy is seriously lacking, and the economic development is unbalanced

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<sup>82</sup> PPA, WPT1 'Action Plan for a Sustainable and Low-carbon Port of Piraeus', *Interreg Adrion*, Interreg Adrion, 2019, p. 25-26, <http://www.beltandroadassociates.com/wp-content/uploads/2021/04/VAMVAKIDIS-PCT-BOR.pdf> ,(accessed 21 March 2022).

- Most Port handling operations are domestic trade containers which are lower charged, resulting in container revenue growth much lower than the growth in the number of containers.
- Weaknesses arising from the dual nature of the company in relation to goal setting, strategic direction and operation.

### 3, Opportunities

- High international fuel price.
- Stable political environment.
- Huge benefits from Hainan Free Trade Port
- Funds provided from government.
- New rail connection with the Balkans and Central Europe.
- Increase of the ships size.
- China's Belt and Road Policy

### 4, Threats

- Port intensifying competition with infrastructure development with the nearby Beibuwan Port.
- Competition from other ports in Hainan.
- Standing competition cities - port to use land areas.
- Increase of the international market concentration in a small number of potential and existing customers.<sup>83</sup>

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<sup>83</sup> Hu Baoxin, 'Appraisal of China Hainan free trade zone(port)-Comparing with other ports in the same area', *World Maritime University*, World Maritime University, 2019, p. 34-43, [https://commons.wmu.se/cgi/viewcontent.cgi?article=2474&context=all\\_dissertations](https://commons.wmu.se/cgi/viewcontent.cgi?article=2474&context=all_dissertations) ,(accessed 27 March 2022).

## CHAPTER 5 – DISCUSSION

Port development and productivity play a crucial role in economic development and regional connectivity in Asia and the Pacific. Over the recent years, the rates of economic and trade growth in the Asia-Pacific region have shown to be higher than the world average and this situation is expected to continue, although to a lesser degree. The rate of growth of the maritime and port traffic, which is driven by global economic growth and international trade, is likely to decline slightly due to the global economic downturn and difficult trade relations, but the growth trend is expected to be maintained.<sup>84</sup>

Cooperation between Greece and China has grown closer and closer in recent years, particularly in the maritime sector. In this thesis, two typical ports are selected of those two countries: Piraeus port of Greece and Haikou port of China, which has many similar aspects and are under the same management of COSCO Shipping Group. Common aspects between Piraeus Port and Haikou Port, such as:

- The strategic location as a hub.
- Same activities including container cargo handling, and cruise& ferry passenger handling
- Logistics service.
- Management under same majority shareholder and etc.
- Benefits from the parent shipping company of COSCO Shipping.

In the above text, the introduction, position, business scope including cargo and passenger handling, of Piraeus Port and Haikou Port are presented, for the purpose of getting to know them initially.

After that, the infrastructure and volume of container cargo and passenger handling of Piraeus Port and Haikou Port, are presented with details, which are the most important sectors of those two ports. Meanwhile, the comparison of infrastructure and volume between Piraeus Port and

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<sup>84</sup> 'Port development', *UN ESCAP*, p.1  
<https://www.unescap.org/sites/default/files/Port%20development%20-%20Ch1.pdf> ,(accessed 3 April 2022).

Haikou Port are also carried out, in order to know their performance and development. From the comparison, many findings can be seen.

Firstly, regarding the infrastructure, Piraeus Port has bigger capacity, bigger water depth and pier length. Besides, Piraeus Port has more modern and big cargo handling equipment than the port of Haikou. As mentioned above, Haikou Port has also carried out the infrastructure updating schedule after the management of COSCO Shipping, for example: ZPMC has inked a port crane purchase contract with Hainan Harbor & Shipping for Yangpu Xiaochantan terminal. The contract includes four gantry cranes and twenty-four RTGs, which are due for delivery in the first half of 2021, which will significantly improve technical facilities of Haikou. Following up, the Port of Haikou will work on upgrading port infrastructure and bridging the Gap with Port of Piraeus.

Secondly, regarding the volume, Piraeus Port has bigger volume of container cargo and passenger handling than the port of Haikou. Benefit from the shipping company- COSCO Shipping, the volumes of Piraeus Port and Haikou Port have a significant growth after the management of COSCO Shipping. As presented above, the container volume of Piraeus Port achieved a small decrease affected by the epidemic in Year 2021, the port of Valencia become the busiest port in Mediterranean Sea.<sup>85</sup> Despite the impact of the COVID-19 pandemic and the cold weather, the container volume of Haikou Port even had a small increase. It takes 9 years for Piraeus Port to reach the volume of 5 million TEU in 2019 from 0.8 million TEU in 2010, after COSCO Shipping has taken the management. Here let us venture to imagine: the similar thing will happen to Haikou Port, that is the container volume of Haikou Port will reach 5 million TEU by 2028, with the strong support of COSCO Shipping and benefit from China's 'Belt and Road' and HAINAN Free Trade Port strategy.

Thirdly, China is aiming to establish a set of free trade port policies focusing on trade and investment facilitation across Hainan by 2025, building an economy with a new level of openness by 2035 and a high-level free trade port of global influence by the middle of the century.<sup>86</sup> This is a big and significant benefit for the development of Haikou Port. With the

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<sup>85</sup> Richard Gardham, 'The ten busiest ports in Europe', *Investment Monitor* [website], 2022, <https://www.investmentmonitor.ai/sectors/logistics/the-ten-busiest-ports-in-europe> ,(accessed 3 April 2022).

<sup>86</sup> 'Hainan port gets policy boost to woo investment', *Shanghai International Shipping Institute* [website], China, 2022, <http://sisi.gssta.org/index.php?c=article&id=20789> ,(accessed 21 March 2022).

development of the HAINAN Free Trade Port, more cargo volume will be brought to Haikou Port. Here it is suggested that Haikou Port must catch this once-in-a-lifetime opportunity and integrate himself into it.

Methodology of SWOT is also used in the thesis, being to evaluate the Strengths, Weaknesses, Opportunities and Threats of Piraeus Port and Haikou Port. Among those, the most important advantage of Piraeus Port and Haikou Port are: strategic location as a hub and management of main shareholder.

## **CHAPTER 6 – CONCLUSION**

Piraeus Port and Haikou Port are two typical ports of Greece and China. Both ports have strategic location as a hub and same management of main shareholder. At present, Piraeus Port has gone into the lead. While, Haikou Port has late-developing advantages. With the support of COSCO Shipping and benefits from China's HAINAN Free Trade Port strategy, Haikou Port will achieve great development and become the 'Eastern Piraeus Port'.

Piraeus Port and Haikou Port will become catalysts for the services of the future, embracing digitalization in its every function. Under the auspices of COSCO Shipping, both ports are utilizing the most advanced, sophisticated and fully secure technological infrastructure and services to holistically increase the end-customer service capabilities.

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