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Spatial Pattern and Regional Relevance Analysis of the Maritime Silk Road Shipping Network

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Abstract: Under the strategy of "One Belt and One Road", this paper explores the spatial pattern and the status quo of regional trade relevance of the Maritime Silk Road shipping network. Based on complex network theory, a topological structure map of shipping networks for containers, tankers, and bulk carriers was constructed, and the spatial characteristics of shipping networks were analyzed. Using the mode of spatial arrangement and the Herfindahl–Hirschman Index, this paper further analyzes the traffic flow pattern of regional trade of three kinds of goods. It is shown that the shipping network of containers, tankers and bulk carriers are unevenly distributed and have regional agglomeration phenomena. There is a strong correlation between the interior of the region and the adjacent areas, and the port competition is fierce. Among them, the container ships network is the most competitive in the region, while the competitiveness of the tankers network is relatively the lowest. The inter-regional correlation is weak, and a few transit hub ports have obvious competitive advantages. The ports in Northeast Asia and Southeast Asia are the most significant. The research results combined with the Maritime Silk Road policy can provide reference for port construction, route optimization, and coordinated development of regional trade, which will help to save time and cost of marine transportation, reduce energy consumption, and promote the sustainable development of marine environment and regional trade on the Maritime Silk Road.

Keywords: maritime silk road; shipping network; complex network; regional analysis; Herfindahl–Hirschman index

1. Introduction

The 21st Century Maritime Silk Road is a strategic concept proposed by General Secretary Xi Jinping during his visit to ASEAN in October 2013. It is in line with the common needs of countries along the route and provides new opportunities for complementary advantages and opening up and development of the countries along the line. In March 2015, the Chinese government formally released the "Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road" to promote the connectivity of Asian, European and African continents and their adjacent seas [1,2]. At present, Russia, South Korea, Maldives, Pakistan, Egypt, and Iran have signed regional cooperation memoranda with China to jointly realize the sustainable development of the regional economy. The 21st Century Maritime Silk Road is facing some challenges, for example, the coordinated development of the coastal areas, prominent and competitive situation of the countries along the line, the requirement of huge amounts of funds for port construction and interconnection of infrastructures, and so on. In this competitive oceanic century, in order to meet the challenge of a new situation in the development of maritime transport, achieve sustainable development of global shipping and improve the open and competitively-ordered market system, it is of great importance for the construction of the 21st Century Maritime Silk Road and the development of maritime transport to research the spatial pattern of maritime networks and the differences in trade transport between regions and the competitiveness of the ports.

International maritime cargoes transport has become a major mode of transport in international trade attracting many scholars to carry out maritime transport network study [3–7]. This is because it has advantages of high currency capacity, low freight rate, convenient transportation and high adaptability to cargoes, together with the unique geographical conditions of the world. Ducruet discussed the degree of overlap among the different layers of circulation composing global maritime flows from 1977 to 2008 through complex network theory, and analyzed the connectivity of Chinese shipping [8,9]; Liu analyzed the spatial heterogeneity of global ports by weighted ego network [10]; Wang studied the vulnerability of the global shipping network [11]; and Peng researched the robustness of the global shipping network [12]. These studies have analyzed the spatial pattern of maritime transport network and characteristics, ranging from regional to global, static to dynamic aspects. The research on the distribution pattern of space cargo flow is mainly based on the first contact method [13,14] and the significant flow analysis method [15,16] to extract the core cargo flow in the ocean transportation network, and then obtain the corresponding network hierarchy structure. Some scholars have done a lot of research on port competitiveness [17–23]. Notteboom used the Herfindahl–Hirschman Index to analyze the evolution and competition status of European container port system [24,25]; Lee studied competition and partnerships in global container ports [26]; Wang analyzed the evolution of the spatial pattern of China and the country along the Maritime Silk Road and analyzed the competitiveness of China's ports [14]; and Lu analyzed the competition and partnerships of container transport by sea and land on China and Europe [27].

To date, there have been a number of studies on the Maritime Silk Road [28–31]: Zong and others analyzed the national association pattern and network spatial distribution characteristics of the Maritime Silk Road [32,33]; Zheng and others studied the relevance of shipping and trade, the status quo of the trade channel, and the strategy of the Maritime Silk Road [34–36]; Wang analyzed the evolution of the Maritime Silk Road container shipping system based on growth, hierarchical diffusion and networking phases [37]; and Yuan studied the optimization of regional hub ports of the Maritime Silk Road [38]. The above studies mainly focused on the container port system, the spatial pattern and evolution of shipping networks, and the characteristics of shipping networks. Currently, there is a lack of research on the mode of spatial arrangement and the competitiveness of intra-regional ports for various cargo transportation in various areas along the Maritime Silk Road network. Based on the existing research, considering the complex network attributes and geospatial attributes of maritime network, this article studies the spatial distribution characteristics in container ships, tankers and bulk carriers shipping networks, and further analyzes the trade transport between the ports in the region and regional port competitiveness, using traffic outward degree and the Herfindahl–Hirschman Index (HHI). It can provide a theoretical basis for the construction of ports along the Maritime Silk Road, the balanced development of the port network, regional cooperation and exchange, which will help to optimize routes, reduce energy consumption, promote regional trade, and achieve sustainable development goals.

2. Materials and Methods

2.1. Study Areas and Data

Since ancient times, the Maritime Silk Road has been China's maritime gateway for trade with the rest of the world. Its main coverage extends eastward from China to Japan and South Korea; west to the Indian Ocean, extending to Europe; and south to the South Pacific. Based on Automatic Identification System (AIS) data of the global container ships, tankers, bulk carriers starting from 1 January 2014 to 31 March 2015, this paper extracted the ship arrival and departure records and combined them with basic information data of ports and countries including 60 countries and regions, and 1024 ports along the Maritime Silk Road are selected. There are 209,686 container ships' origin–destination (OD) data, 260,574 tankers' OD data and 134,563 bulk carriers' OD data. For the sake of statistical integrity, the data reserves all ports of size, aiming to reflect the true maritime network situation. According to the area where the port is located, the maritime network is divided into six regions: Northeast Asia, Southeast Asia, South Asia, West Asia, Northeast Africa, and Europe, as shown in Figure 1, so as to study the spatial distribution characteristics of the Maritime Silk Road by ports and the status quo of regional relations.

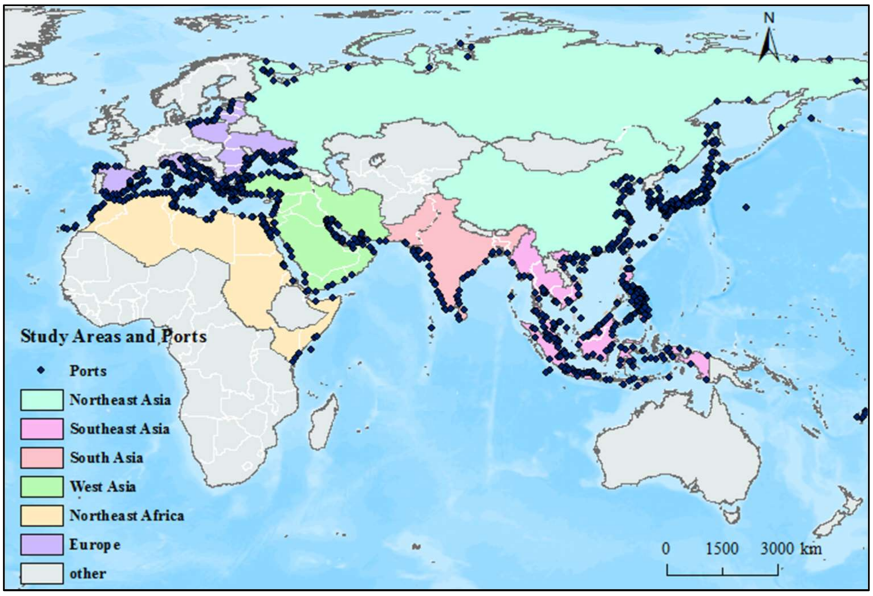


Figure 1. The study areas and ports.

2.2. Research Methods

This paper conducts research on the related issues of container ship, tanker and bulk carrier shipping network structure, spatial distribution pattern of traffic flow and port competitiveness using the degree indicator, the mode of spatial arrangement and the Herfindahl–Hirschman Index.

2.2.1. Complex Network Analysis Method

The rapid development of complex network theory is permeating into many different fields [39–44]. Some studies have shown that complex network theory can be used to quantitatively and qualitatively reflect various real network systems and reveal the complicated characteristics of the network [45]. If a port is regarded as a node and there is any ship between two ports, the line between the two ports is regarded as an edge [39].

Degree is a basic parameter of the topology in a complex network and is used to describe the direct influence of network nodes. In a directed network, the degree of a node is divided into in-degree and out-degree. In-degree reflects the node's attractiveness to other nodes and out-degree reflects the node's influence on other nodes in the network. In an undirected network, the degree of a node in a network refers to the number of adjacent edges that are directly connected to the node. The greater the degree of a node is, the more its neighboring edges are, and the stronger connectivity in the network is, the more it is located at the center of the network topology. The formula is [43]:

$$D_i = \sum_{j=1, j \neq i}^{n} L_{ij}, \tag{1}$$

where L_{ij} is the number of edges between node i and node j, and n is the total number of nodes.

2.2.2. The Mode of Spatial Arrangement

The mode of spatial arrangement was analyzed in terms of road passenger flow [46], railway passenger flow [47], and corporate contacts [48]. In order to portray the geographical spatial distribution of traffic flow in a port, this paper analyzes the characteristic by the mode of spatial arrangement. The mode of spatial arrangement refers to the link between the ports in the maritime area where it is located and the external ports of the area, which can reflect the situation that one port serves the maritime trade within the region and the outside of the region. It is measured by export outward degree (the ratio of traffic flows from the port to regional external to the total export traffic flows of the port) and import outward degree (the ratio of traffic flows from regional external to the port to the total import traffic flows of the port). The mode of spatial arrangement is divided into export-oriented (E_i > 60%), balanced (40% < E_i < 60%) and inward-oriented (E_i < 40%). Supposing there is a port in the shipping area A and it is calculated as:

$$E_i = \frac{\sum_{j \notin A} W_{ij}}{\sum_{j \in A} W_{ij} + \sum_{j \notin A} W_{ij}} \times 100\%, \tag{2}$$

where $W_{ij} \in \{W_{ijE}, W_{ijI}\}$, $\sum_{j \in A} W_{ijE}$ and $\sum_{j \notin A} W_{ijE}$ are respectively the export traffic flows between the internal ports of region A and the external ports of region A, the sum of the two is the regional total export traffic flows of the port in the maritime network. $\sum_{j \in A} W_{ijI}$ and $\sum_{j \notin A} W_{ijI}$ are the import traffic flows between the internal ports of region A and the external ports of region A respectively, and the sum of the two is the regional total import traffic flows of the port in the maritime network.

2.2.3. Regional Traffic Flows Concentration

At present, studies have been conducted to study the concentration and dispersion of container port systems through industrial organization theories, such as industry concentration (CRn), the Gini coefficient, and the Herfindahl–Hirschman Index that represent market concentration. Since the Gini coefficient can only measure the gap between the Gini coefficient and the maximum value, the industry concentration (CRn) can only reflect the cumulative proportion of the top n companies in the scale and the total market share. These methods have certain flaws. The Herfindahl–Hirschman Index (HHI) is derived from Bain's Structure–Conduct–Performance theory, that is, the market structure determines the behavior of companies in the market, and the corporate behavior determines the market operation economic performance in all aspects. The HHI index can comprehensively consider the number and relative size of ports in the port system. In addition, it can better reflect the competition among various ports within the port system. The Herfindahl–Hirschman Index is used to measure the concentration of the distribution of traffic flows in the intra-regional ports, including regional total traffic flows, regional internal traffic flows and regional external traffic flows. HHI ranges from 0 to 1. The greater the HHI is, the higher the concentration of traffic flows in the shipping area is, and the higher the monopoly of traffic flows in a few ports is. The formula is [21]:

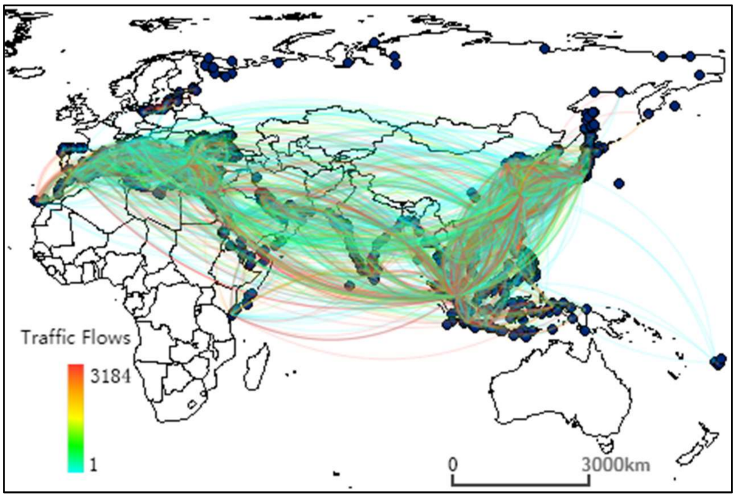
$$\mathrm{HHI} = \sum_{i=1}^{n} (X_i / X)^2, \tag{3}$$

where n is the total number of regional ports, and $X_i \in \{X_{iT}, X_{iE}, X_{iI}\}$, $X_{iT} = \sum_{j \in A} W_{ij} + \sum_{j \notin A} W_{ij}$ is the total traffic flows in the port i. $X_{iE} = \sum_{j \notin A} W_{ij}$ is the external traffic flows in the port i. $X_{iI} = \sum_{j \in A} W_{ij}$ is the internal traffic flows in the port i. $X \in \{X_T, X_E, X_I\}$, $X_T = \sum_{i=1}^{n} X_{iT}$ is the regional total traffic flows, $X_E = \sum_{i=1}^{n} X_{iE}$ is the regional external traffic flows, and $X_I = \sum_{i=1}^{n} X_{iI}$ is the regional internal traffic flows for all ports. $\mathrm{HHI} \in \{\mathrm{HHI}_T, \mathrm{HHI}_E, \mathrm{HHI}_I\}$, HHI_T is a measure of the extent of concentration of the distribution of the total traffic flows in the intra-regional ports. HHI_E is a measure of the extent of concentration of the distribution of the external traffic flows in the intra-regional ports. HHI_I is a measure of the extent of concentration of the distribution of the internal traffic flows in the intra-regional ports.

3. Results and Discussion

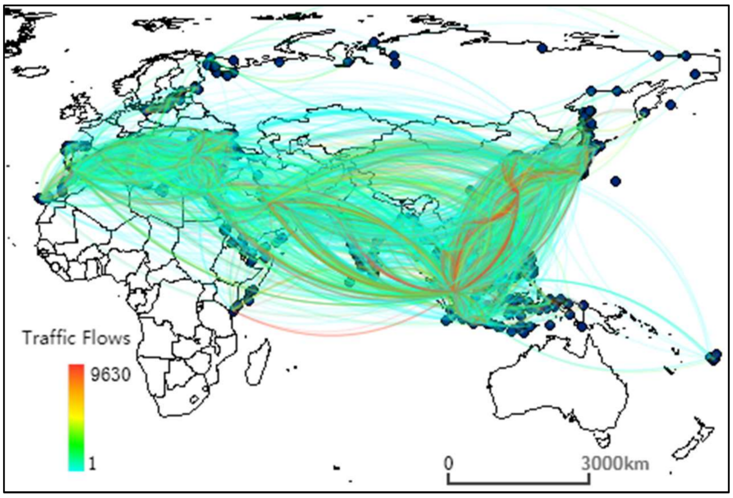
3.1. Network Topology Construction and Spatial Distribution Characteristics

The traffic flow is directional in marine transportation. This paper calculates the connection adjacency matrix between nodes according to the in-degree and out-degree of nodes. The connection frequency matrix between ports is obtained according to the number of connections between nodes, and then the degree of the node is calculated by replacing the connection frequency matrix with an undirected graph. From January 2014 to March 2015, the container shipping network has 577 nodes and 5794 edges, the tanker shipping network has 708 nodes and 13,935 edges and the bulk carrier shipping network has 700 nodes and 15,337 edges in the Maritime Silk Road shipping network. The topology network of container ship, tanker and bulk carrier ports were constructed as weighted and undirected as shown in Figure 2 respectively.



(**a**)

Figure 2. *Cont.*



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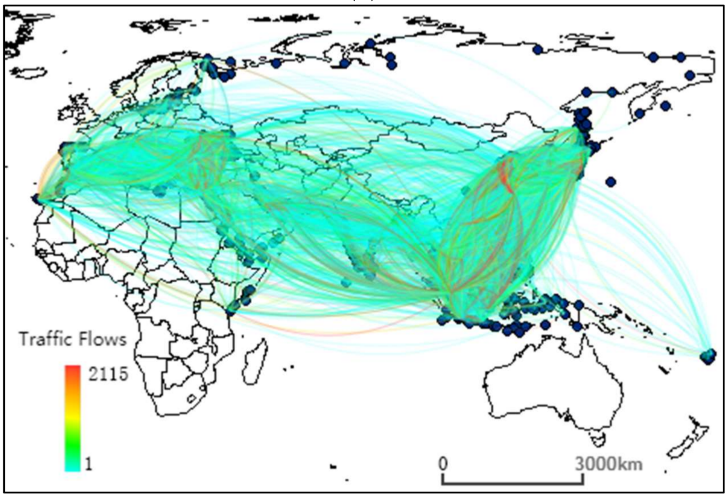


(**c**)

Figure 2. Space distribution of shipping network. (**a**) Container shipping network; (**b**) tankers shipping network; (**c**) bulk carriers shipping network.

The different line colors in the spatial distribution of the three kinds of cargoes' shipping network represent the different frequency of contact between the ports; the red is the highest frequency of contact and the blue is the lowest frequency of contact. In the container shipping network, Northeast Asian ports have the most frequent among them: the frequency of Hong Kong to Shekou is up to 3184 times in China and Kelang Port is very close to Keppel Harbor in Southeast Asia; the port of Barcelona and Port of Valencia have a high traffic flow in the European region. In the tanker shipping network, the top 15 ports of contact between the two ports are located in Singapore, with the highest frequency being 9630 times from the port of Pulau bukom to Jurong Island; in Northeast Asia, there are more oil transports between Novorossiysk and Gelendzhik port in Russia and relatively more connections between Istanbul and Gebze Port in Turkey in Europe. The ports of the bulk carrier shipping network which are also located in China have the highest frequency of contact with each other, of which the frequency from Shanghai to Taicang is 2115; this is followed by South Korea's Taesan and Pyeongtaek, Japan's Yokkaichi and Nagoya port, and Qatar's Doha Port and Seemessaieed in West Asia, which have frequent trade contacts. It can be seen that the frequency distribution between ports in the Maritime Silk Road shipping network shows uneven and obvious regional agglomeration, most notably in Northeast Asia and Southeast Asia headed by China and Singapore.

From the actual statistics of the degree of port, the maritime network of the Maritime Silk Road is distributed unevenly. There are more ports with smaller degree, most of which have a value of less than 100, while there are just a few ports having higher degree. In container networks, the ports with high degree are Shanghai Port, Keppel Harbor, Zhoushan Port, Hong Kong Port, and Busan Port; in tanker networks, the ports with high degree are Jurong Island, Keppel Harbor, Pulau Bakum, Khawr Fakkan, Chiba Port; high-value ports in the bulk carrier network include Keppel Harbor, Serangoon Port, Shanghai Port, Tianjin New Port, and Istanbul Port. These ports are very important in the maritime network. A larger degree of ports often lack berths, which results in congested ships and increased transportation costs [49]. The Maritime Silk Road strategy should promote the construction and development of small and medium-sized ports and increase new link selection opportunities to stabilize the maritime network.

3.2. Regional Analysis of Relevance

According to the above analysis of the spatial distribution pattern, the connection of ports are distributed unevenly. There is differentiation in port connectivity having regional agglomeration. In order to further analyze the status of trade transportation between inter-regions and intra-regions, this paper adopts the mode of spatial arrangement and the concentration of regional total traffic flows, regional internal traffic flows and regional external traffic flows to research the Maritime Silk Road regional relevance [50,51].

3.2.1. Analysis of the Mode of Spatial Arrangement

According to the export outward degree, the proportion of export-oriented, balanced and inward-oriented ports in container ports is 10%, 11%, and 79% respectively, in tanker ports is 8%, 7%, and 85% respectively and in bulk carrier ports is 14%, 14%, and 72% respectively. According to the import outward degree, the proportion of them in container ports is 11%, 9%, and 80% respectively, in tanker ports is 9%, 6%, and 85% respectively and in bulk carrier ports is 17%, 14%, and 69% respectively. The distribution and the proportion in the region are shown in Figures 3 and 4.

It can be seen from the results of export outward degree and import outward degree that the inward-oriented ports account for the majority in the three kinds of cargo shipping network, and only a few number of export-oriented ports assume the important task of external relations. This shows that the port is most closely linked within the region. Only the ports in Northeast Africa are sparsely interconnected with the internal ports, and are the most frequently associated with Europe and West Asia. In connection with regional external ports, the ports of the container shipping network between Northeast Asia and Southeast Asia, Europe and West Asia, Northeast Africa and Europe are closely linked; the ports of the tanker shipping network in Northeast Asia and Southeast Asia, Europe and West Asia, Northeast Asia and West Asia, Southeast Asia and West Asia are closely linked; and the ports of the bulk carrier shipping network in Northeast Asia and Southeast Asia, Europe and West Asia, Southeast Asia and South Asia are closely linked. Although most maritime transport areas have some hub ports, the influence of these hub ports is basically confined to their region or geographical proximity.

Export-oriented ports have more extensive connections and they are more likely to develop into hub ports than balanced and inward-oriented ports. For example, the Keppel Harbor and Jurong Island Port in Southeast Asia region; the Shanghai and Zhoushan port in Northeast Asia region; the Alexandria Port and Said Port in Northeastern Africa region, the Chittagong and Colombo Port in South Asia region, which are important transshipment ports in the world sea.

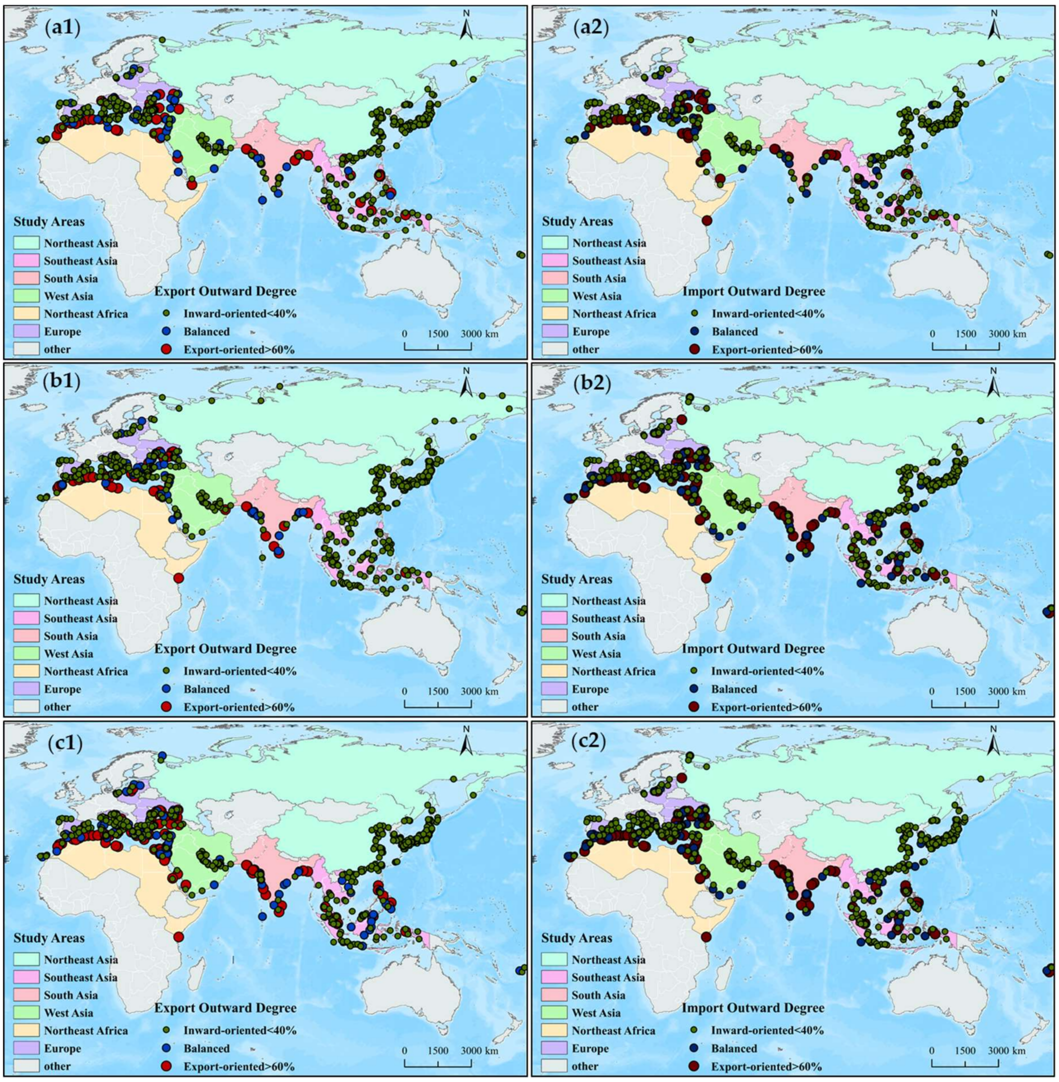
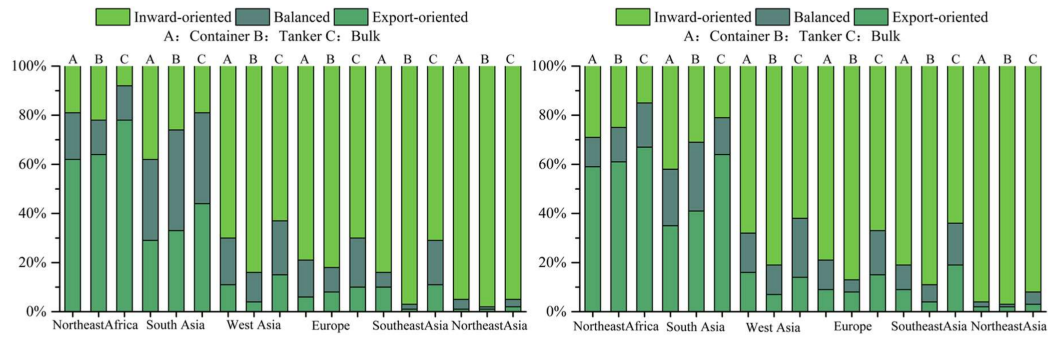


Figure 3. The mode of spatial arrangement of traffic outward degree. (**a1**) Export outward degree of container ports; (**a2**) import outward degree of container ports; (**b1**) export outward degree of tanker ports; (**b2**) import outward degree of tanker ports; (**c1**) export outward degree of bulk carrier ports; (**c2**) import outward degree of bulk carrier ports.



(**a**) (**b**)

Figure 4. Proportional distribution over the mode of spatial arrangement by ports number. (**a**) Export outward degree; (**b**) import outward degree.

3.2.2. Analysis of Regional Traffic Flows Concentration

It can be found that the internal ports are most closely linked in the area through analysis of the mode of spatial arrangement. The Herfindahl–Hirschman Index is used to measure the concentration of the distribution of traffic flows in the intra-regional ports. The standards of concentration and dispersion of markets divided by the US Department of Justice and Federal Trade Commission (FTC) is: HHI $\leq$ 1000 is a decentralized market; 1000 < HHI $\leq$ 1800 is a moderately concentrated market; and HHI > 1800 is a highly concentrated market [21,22]. This paper will increase the HHI calculation result by 10,000 times: As can be seen from Figure 5, except for Southeast Asia in the tankers network and South Asia in the bulk carriers network, the concentration of the distribution of regional external traffic flows is higher than that of regional total traffic flows and regional internal traffic flows in other maritime transport areas. There are regional monopolies in a few ports and these ports have obvious competitive advantages. However, the concentration of the distribution of regional total traffic flows and regional internal traffic flows are not high, and the competition is fierce in the ports. The concentration levels of the distribution of the three types of traffic flows have significant differences in the area of internal ports, with the highest concentration of container traffic flows, followed by the higher concentration of bulk carrier traffic flows and the lowest concentration of tankers traffic flows. In the Maritime Silk Road network, only a few ports in the maritime areas that have sufficient supplies, a superior geographical location and high loading and unloading efficiency in the hinterland can be affiliated with the trunk transport vessels, which causes the phenomenon that regional external traffic flows are more likely to generate fewer ports agglomeration phenomena than regional internal traffic flows.

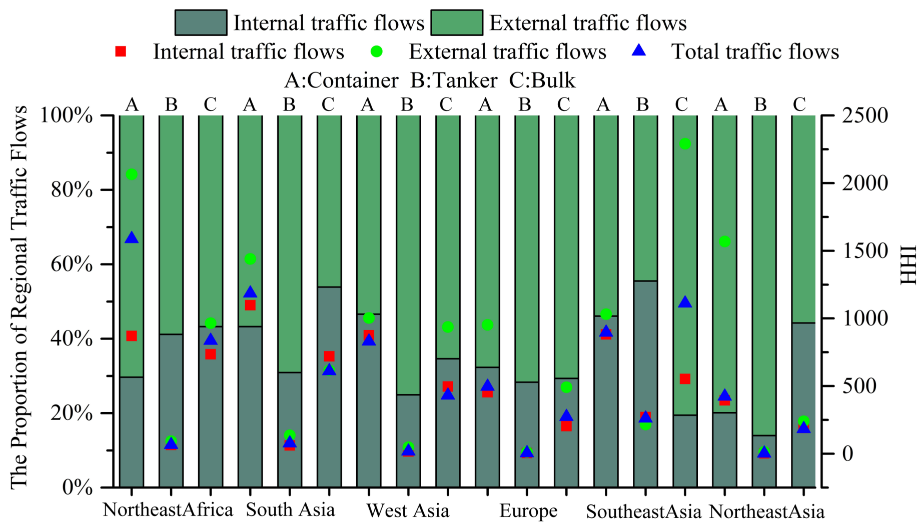


Figure 5. Concentration levels of traffic flows in shipping regions.

In the highly concentrated area, there is a distribution of external traffic flows in the interior of Northeast Africa in the container network and HHI is 2064. The concentration of Said Port is the highest with HHI accounting for 80.72% of Northeast Africa; there is a distribution of external traffic flows in the interior of Southeast Asia in the bulk carrier network and HHI is 2290. HHI of Keppel Harbour is 82.91% in the region, which shows obvious competitive advantage.

In the moderately concentrated area, there is a distribution of external traffic flows in the interior of Northeast Asia, South Asia, Southeast Asia and West Asia in the container network. HHI is 1568, 1439, 1031 and 1003 respectively; there is a distribution of internal traffic flows in interior of South Asia in the container network and HHI is 1097; there is a distribution of the regional total traffic flows in the interior of Northeast Africa and South Asia in the container network and HHI is 1587 and 1185 respectively; and in the bulk carrier network, there is a distribution of the regional total traffic flows in the interior of Southeast Asia, HHI is 1112. There are three or four hub ports in these areas undertaking the transport, forming a moderately concentrated market. In the other regions, regional total traffic flows, internal traffic flows and external traffic flows are distributed everywhere, but this does not mean that the traffic flows in these regions is distributed evenly in the ports within the region. In fact, the traffic flow is still relatively concentrated in a few ports.

3.3. Discussion

The spatial pattern of maritime networks is uneven, where a few ports have close connection with other ports [5]. These ports are full-featured integrated ports, with excellent geographical location, fixed routes, complete service facilities, and a wide radiation area. They play important roles in the network and attract transport ships on the main line to anchor. However, berthing at these ports does not mean that the choice of routes is optimal. Many ships in the port will cause tight harbor berths, congested ships, and delays in loading and unloading cargoes. This will increase the time and cost of cargo transportation, resulting in an increase of energy consumption, ship pollution emissions, and domestic garbage, putting pressure on the environment and restricting the sustainable development of the economy and the environment. If the construction of small and medium-sized ports with potential along the Indian Ocean is enhanced to meet the demand of ship docking, it will provide more route choices for cargo transportation, reduce travel and costs, increase transportation efficiency, reduce energy consumption, and facilitate the sustainable development of the economy and the environment.

The connections within the region along the Maritime Silk Road are more closely linked than those outside the region. Besides the distance factor, it is more due to the fact that the number of transit hubs connecting the external regions is less, which restricts the trade between regions. These hub ports have obvious competitive advantages. In the long run, it will aggravate the unbalanced development of cargo transportation. Southeast Asia has obvious geographical advantages. As regional hubs, ports play an important transfer and connection role in the construction of the Maritime Silk Road [33]. Northeast Asia has a large supply and demand of goods, and the coastal port has a strong cargo capacity. It is a leading area on the Maritime Silk Road [16]. Due to the low manufacturing and processing capacity in the Northeast African region, most of the export products are unprocessed or rough-processed products, especially energy–mining products. This determines that the main export target countries can only be the developed countries and new industrialization outside the region. The proportion of intraregional trade is not high. The potential hub ports in South Asia, West Asia and Indian Ocean should strengthen investment and construction and provide more convenient services for the transportation of goods on the Maritime Silk Road. The Chinese government has also invested in some potential ports, such as Chittagong in Bangladesh, Colombo in Sri Lanka, and Gwadar in Pakistan [52]. These measures will improve the maritime network of the entire Maritime Silk Road and provide more route choices for trade transport between Far Eastern countries and Europe, making regional trade more efficient and smooth. In addition, the Chinese government has also developed road and rail corridors, and the construction of various forms of logistics network facilities will contribute to sustainable development within and between regions.

This article has some limitations in measuring regional trade through traffic flow, but the overall results conform to the status quo. Additionally, it can provide a reference for the construction of the Maritime Silk Road and the development of regional trade cooperation.

4. Conclusions

Based on the theory of complex networks, the topological network of the Maritime Silk Road is established. This paper analyzes the features of the spatial distribution of the shipping network and regional relevance by the mode of spatial arrangement and regional traffic flows concentration analysis method. The research indicates that:

Firstly, shipping networks of the Maritime Silk Road show uneven distribution characteristics and obvious agglomeration. The ports of China and Singapore are of great importance. In order to further strengthen the trade links between countries along the Maritime Silk Road, they should be closely linked with important hubs such as Shanghai, Hong Kong, Kelang Port, and Keppel Harbor. In addition, an upgraded version of the China–ASEAN Free Trade Area should be actively promoted to increase trade links with the maritime powers.

Secondly, according to the analysis of the mode of spatial arrangement, container ship, tanker, and bulk carrier networks formed different spatial traffic flow patterns between regions. The ports have the closest connection within the region and the proportion of export-oriented ports is very small. Compared with the balanced and inward-oriented ports, the export-oriented ports are more influential in the shipping network. The development of the Maritime Silk Road should speed up the construction of trade routes among countries and strengthen the construction of potential ports such as Chittagong, Colombo, and Piraeus. Additionally, it should also expand the open structure along the border and promote the sustainable economic development of countries along the border.

Thirdly, according to the analysis of the Herfindahl–Hirschman Index, the distribution of regional internal traffic flows mostly shows a non-concentrated state and the competition between ports is fierce. The concentration of regional external traffic flow is high. A few ports have obvious competitive advantage in the region, such as Keppel Harbour and Said Port, forming a hierarchy of shipping network pattern. In the maritime network, the competition of container ports is the most competitive. In order to ensure the sustainable development of the Maritime Silk Road, container port companies should continuously improve their quality, build a soft environment and improve their competitiveness. In addition, the port companies should change their development from an extensive form to a refined and agile form to avoid excessive competition. From the perspective of port clusters, a road for competition and innovation between ports should be sought for actively.

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Conflicts of Interest: The authors declare no conflict of interest.

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