# Xinhua – Baltic International Shipping Centre Development Index Report

**(2015)**



**Xinhua Indices • Xinhua News Agency • The Baltic Exchange**

**July 2015**

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# Chapter 1 Global Economic Trade and Shipping

## 1. Global Economy

Since 2015, the global economy has been weak and regional differentiation becomes increasingly apparent. The weak economic situation not only impacted global trade but also seriously affected global shipping and port development that are closely associated with emerging markets.

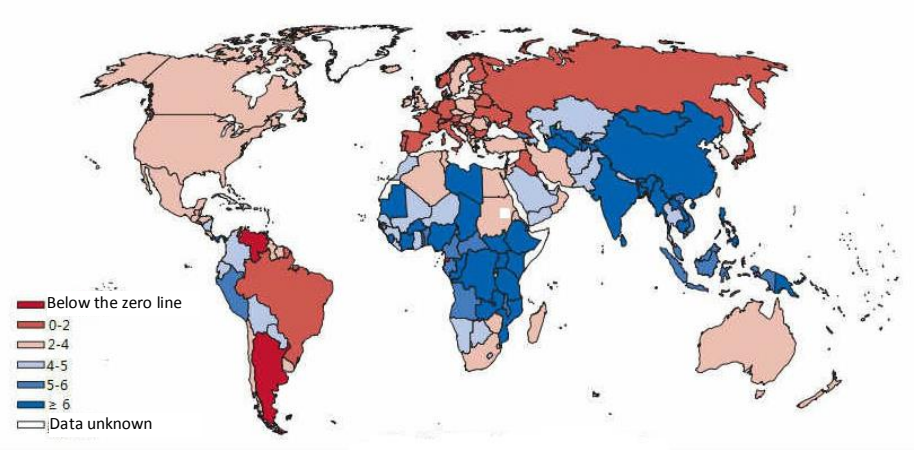



Figure 1 2015 Global economic growth and expected potential downside risk (%)

Source: International Monetary Fund

According to the latest IMF report, global economy is expected to grow by 3.5% in 2015. The economic outlook of developed countries is predicted to continue to improve while growth in emerging countries is slowing down, despite the fact that the latter account for 70% of total world growth. Ayhan Kose, the World Bank's Director of Development Prospect, said that the global economy was projected to expand by 2.8%, slightly higher than the 2.6% in 2014. He said that the economic

situation would continue to improve and was expected to reach 3.3% level in 2016.

## 2. Trends in Global Trade

Global trade is an important component of the global economy. Import and export of goods and services by various countries has a profound impact on the progress of global economic integration resulting in the structural adjustment in domestic industries of competing countries. As global integration faces increasing hindrance, countries are increasingly keen in setting up regional integration to meet their own economic growth requirements. The World Trade Organisation's recently released annual report shows that in 2014, global trade growth was below 3% for the third consecutive year, but is expected to attain 3.3% in 2015. The Asia region will lead the world in 2015 with trade export growth at 5%; while the North America region will manage 4.5%. The forecasted trend is highly consistent with the proposed "One Belt, One Road" global initiative. Free trade flow advocated by the "One Belt, One Road" global initiative will bring important support to trade growth in the Asia Pacific region.

Table 1 Top Ten in the 2014 list of "100 Most Influential Persons in the Shipping Industry"

| Rank | Influential Person | Country | Post |
|---|---|---|---|
| 1 | Xi Jinping | China | President of the People's Republic of China |
| 2 | Nils S. Andersen and Søren Skou | Denmark | CEO of Maersk Group and CEO of Maersk Line |
| 3 | OPEC and the oil men | — | — |
| 4 | John Angelicoussis | Greece | CEO of Angelicoussis |
| 5 | Other people's money | — | — |
| 6 | Aponte family | Switzerland | Founder of Mediterranean Shipping Company |
| 7 | Eyal ofer | United Kingdom | Chairman of Zodiac Group |
| 8 | Idan ofer | Israel | Chairman of Quantum Pacific Shipping Group |
| 9 | Emanuele Lauro | Monaco | CEO of Scorpio Group |
| 10 | John Fredriksen | Norway | SeaTankers group |

Source: "Lloyd's List"

## 3. International Shipping

Since 2014, a sustained slowdown in global economy has continued to affect the shipping market which was already in the doldrums. World container freight volumes only managed a minimal growth of 6.7% with respect to the year 2013. Growth of container freight volumes on the Asia-Europe trunk routes was relatively lower while regional secondary trunk routes saw a slight increase. Continuing on its decline, global dry bulk cargo grew at only 4.54%. This was predominantly due to declining demand in bulk commodities such as oil, iron ore and coal. On the international shipping scene, the entry of new 2M and Ocean3 shipping alliances in 2015 will instil stiff competition with the incumbents – CKYHE and G6 shipping alliance – on major global container routes.

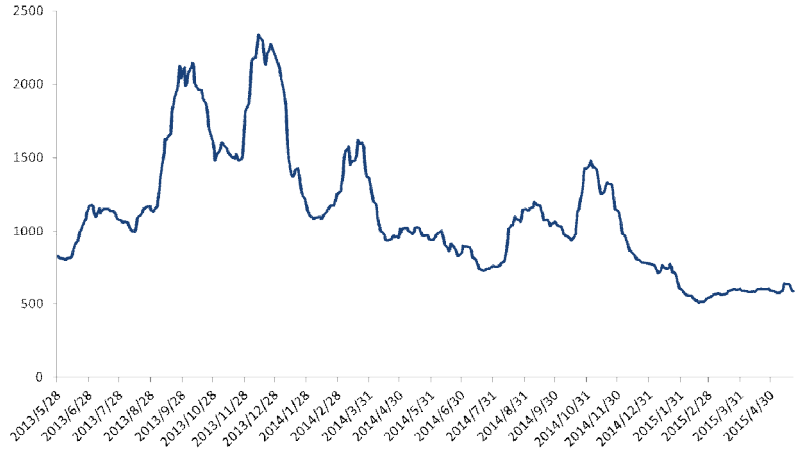



Figure 2 Baltic Dry Index (BDI)

In 2014, container throughput of the world's major ports showed the following characteristics: Firstly, the market for container throughput in major ports of the world has largely taken shape while Asia, an important cargo hub, has been in a dominant position for a very long time. The top three spots in terms of container throughput were all

occupied by international shipping centres in Asia, namely Shanghai, Singapore and Shenzhen. Secondly, in comparison with 2013, the ranking of container throughput of the world's major ports was relatively more stable in 2014. Finally, total container throughput of the world's major ports reached 359,349.5 kTEU, a 4.2% growth from 2013.

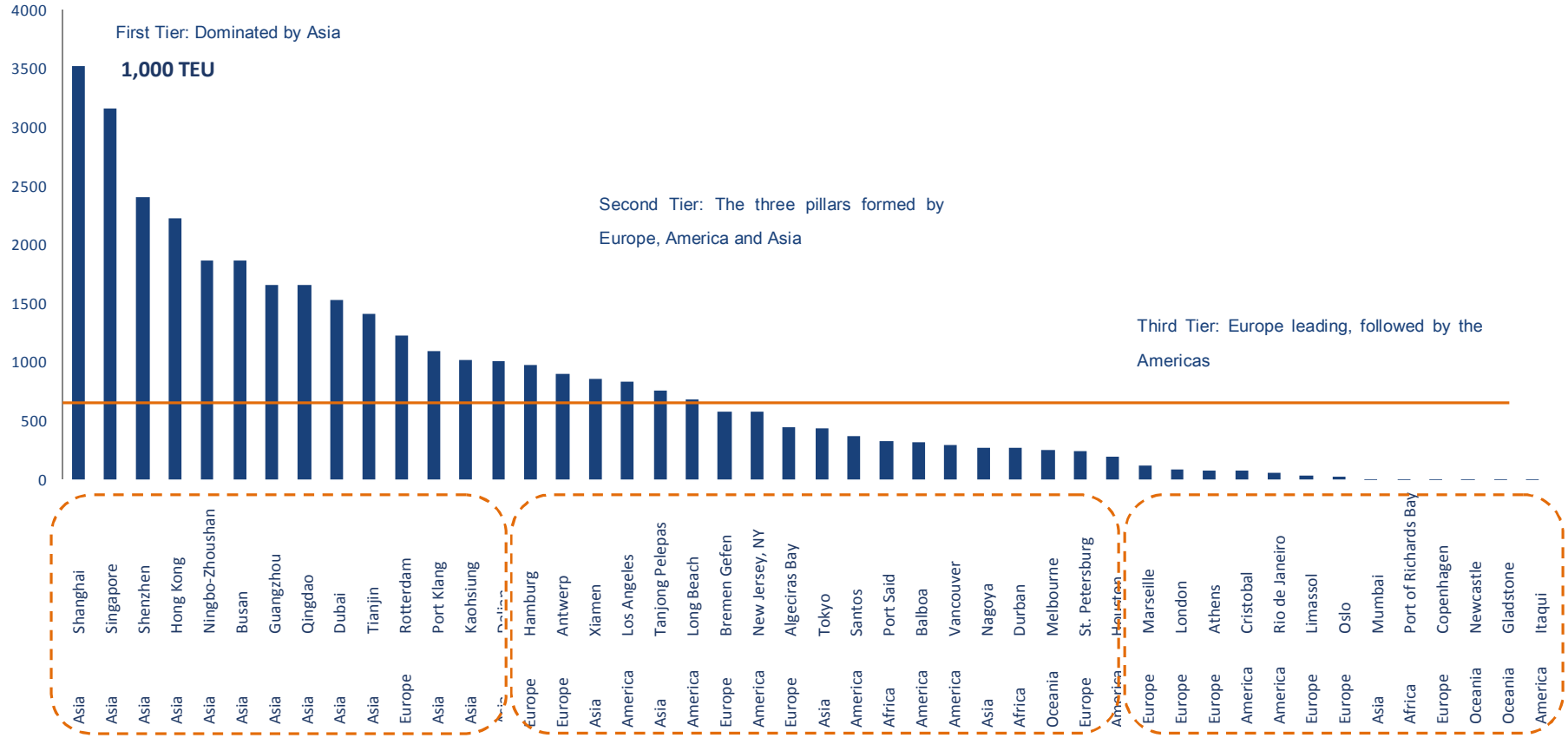



Figure **3** **2014 Container throughput by tier**

## Global Viewpoint：

**Nigel Gardiner**
**Group Managing Director**
**Drewry**

The shipping industry is the heart of international trade, as it is the only practicable and cost effective way of transporting large volumes of many essential commodities and semi-finished/finished goods over long distances. Approximately 90% of world trade in volume terms is moved by ships. In 2014, 10.2 billion tons of cargo (of all types) was moved by sea, of which 6.6 billion tons were dry cargo and 3.6 billion tons were liquid cargo. During the period 2004 to 2014 world seaborne trade grew at a compound growth rate of 3.4%.

The oil tanker industry is enjoying its strongest trading period since the economic crisis of 2007/2008. Demand for oil in Asian countries such as China and India is robust, and oil consumption on a per capita basis is much lower in Asia than either North America or Europe, thereby pointing to continued growth in oil demand. With little indigenous supply many Asian countries are net importers of oil and this is stimulating increases in seaborne oil trades and rising tanker demand. In addition, structural changes in the oil market have opened up longer-haul oil trades from West Africa and South America to Asia, which has also helped boost tanker demand. Supply growth in the oil tanker sector in 2014 was low (less than 1 percent in the case of the very large crude oil carriers) and this is likely to remain the case in 2015 and much of 2016. With a more balanced market it is not surprising that oil tanker freight rates have risen sharply in recent months and with market sentiment positive, conditions in the tanker sector are likely to remain favourable for the remainder of 2015 and into 2016.。

While the oil tanker market is enjoying good fortune, the same cannot be said of the dry bulk sector. Dry bulk freight rates and vessel values are currently weak due to a combination of lower growth in vessel demand and a rapid and large build-up in vessel supply since 2010. Dry bulk carriers transport over forty different commodities, but over a half of all seaborne trade is accounted for by three commodities – iron ore, coal and grain. Asian demand for imported dry bulk commodities led to the most recent boom in dry bulk shipping and the current slowdown in the Chinese economy is therefore having a detrimental impact on dry bulk seaborne trades, especially iron ore. Growth rates in seaborne trade have therefore slipped and this means weaker demand for dry bulk carriers. At the same time, the previous freight market boom led to massive new vessel ordering and the size of the dry bulk fleet growing by over 40%% between the end of 2010 and the end of 2014. With excess capacity, it is not surprising that dry bulk freight rates have been very depressed. However, looking ahead supply growth in the dry bulk sector is expected to moderate and with seaborne dry bulk trades continuing to grow, the conditions are being laid for a recovery in the market. As such, we anticipate that freight rates in the dry bulk sector will improve in the second half of 2015 and into 2016.

With the exception of 2009, global container trade has increased every year since the introduction of long-haul containerized shipping lanes in the late 1960s. In 2014, world container trade reached 185 million TEU and in the period 2004-2014 it grew by a compound growth rate of 5.8%. There are four core trades: the Transpacific, Transatlantic, Asia-Europe and Asia-Middle East/South East Asia trades. These trades are often referred to as the East-West routes.

The Main Container Trades

(Million TEU)


Source：Drewry

Trade along these routes is primarily driven by United States and European consumer demand for products made in Asia. However, the volume of trade between Asia and the Middle East is now larger than that on the Transatlantic and should be considered as a major east-west trade on which carriers can deploy very large ships. The East-West trades are generally served by the large and very large containerships. In 2014 the Asia to Europe and Asia to U.S. head haul trades increased in volume terms and they continue to dominate overall movements. Supporting the main east-west trades are the North-South trades and a network of regional trades, of which the largest is the intra-Asia market.

Overall, in volume terms the container shipping market continues to grow, but global container fleet growth will present a challenge to the industry as carriers seek to deploy the very large containerships across their portfolio of services without damaging the supply/demand balance. In mid-2015 the container orderbook for new vessels expressed as a percentage of the existing fleet is close to 18%. Almost 60% of the current containership orderbook is for vessels in excess of 10,000 TEU and of late, the major carriers have shown much interest in large ships, in some cases in excess of 20,000+ TEU. Some of the large containerships on order will be able to transit the enlarged Panama Canal, including ships with capacity of up to 13,500 TEU. However, the largest containerships currently on order (20,000 TEU) will not be able to transit the enlarged waterway and they have primarily been designed towards deployment in the main Asia-Europe trades.

# Chapter 2 Theoretical Research

## 1. Definition of Concept

With rapid progress in economic globalisation, international shipping centres have become a topic widely discussed both in industry and academia. Many countries are investing in international shipping centres in an attempt to seize some market share in the maritime transport industry or to become a shipping transport power. Their ultimate goal is to promote rapid domestic economic development and enhance the overall strength of their economy. In defining the concept of international shipping centres, foreign scholars tend to define the concept based on semantics and etymology, while domestic academia prefer to interpret the concept using formative factors, location factors as well as dynamics of development.

### (1) Definition of "International Shipping Centre" by foreign scholars

In the paper "Regional governance of port development in China: a case study of Shanghai International Shipping Centre" dated 2004, James J. Wang defined international shipping centre as a "Shipping Centre". This definition highlights the "Shipping" characteristics of a shipping centre but fails to reflect on its key element as a centre of congregation.

While researching on Nordic maritime issues, Sonja Randa defined shipping centre as a "Cargo Centre". Such definition focuses mainly on the "cargo" aspect and lacks a comprehensive view of the function of a

shipping centre.

In the paper “Clustering and performance: the case of maritime clustering in the Netherlands”, P. W. de Langen used “Maritime Cluster” to define “international shipping centre”. This is a wider definition that reflects the integrated nature of a shipping centre that includes a multitude of elements such as shipping, shipbuilding, port and maritime services. As such, this definition is more commonly used internationally.

**(2) Definition of concept based on formation and location factors by domestic academia**

Scholars like Xu Xing and Sun Guangqi proposed to define “international shipping centre” based on its formative factors: that an “international shipping centre” must be a comprehensive shipping hub with hardware infrastructures including container ports served by a multitude of shipping routes, deep water channels and transport distribution network, as well as software infrastructures to provide financial, commercial and information services to the shipping industry.

Wang Jie believes that an “international shipping centre” is based fundamentally on location; and is essentially an economic phenomenon of a specific location space whose economy is based primarily on shipping activities. The definition encompasses the congregation of infrastructures, shipping services and other economic elements in a shipping space which ultimately forms a highly integrated entity of port, city and industries. In terms of infrastructure support, an international

shipping centre must meet the essential prerequisites of international shipping such as sufficient port cargo throughput, shipping channels and anchorage. In terms of shipping services and financial industry elements, the support of information technology, legal and municipal policies is essential to ensure close integration and the mutual development of both shipping activities and municipal economy.

**(3) Definition of the concept from a dynamic development perspective**

While exploring development patterns and trends of world shipping centres, Xu Gang chose to look at it from the dynamic development perspective. From the perspective of locality expansion, the development of international shipping centres coincides with the shifting of world economic centres – from London in Western Europe during the nineteenth century to New York in North America after the Second World War, and more recently, to Singapore and Hong Kong (China) in East Asia. With the continuous shifting of the location of international shipping centres, their scopes, functions and concepts are also continuously being improved. Therefore, from a dynamic development perspective, international shipping centres evolved from their initial stage as cargo centres to become trade centres, and finally comprehensive resource allocation centres. The concept of the shipping centre is constantly improved with continuous development.

Zhu Hui believed that the concept of international shipping centres could be divided into three temporal stages. The first stage took place in the nineteenth century where port cities like London and Rotterdam

exploited their superior geographical localities, efficient transport and distribution network, and economy of scales to become transit shipping centres offering simple and primary distribution services. The second stage was from the 1950s to 1980s. With the advent and rise of container shipping, international shipping centres evolved from “transit centres” to become “value-added centres” with emphasis on proactive value-added services such as rework or repackaging. The third stage began after the 1980s. The advent of economic globalisation and advancement in information technology has forged much closer interaction and higher degree of information flow within the industry. International shipping centres need to evolve from merely providing hardware infrastructure to providing information, finance, trade and legal services as the basis of their business model. In short, it will become a comprehensive city hub with integrated software and hardware infrastructures to provide service functions including transport, industries, commerce and information technology.

Whichever way you look at it, the concept of the international shipping centre is still evolving and its content is still being enriched. Based on the above knowledge, international shipping centres can decidedly be major port cities responsible for the allocation of shipping resources globally; and the basic elements constituting an international shipping centre include superior port facilities, advanced logistics systems, key geopolitical advantages and highly efficient shipping services as the driving force.

## 2. Theoretical Basis

Competitiveness is a manifestation of comparative capability through competitive comparison between two parties or amongst multiple parties. It is a relative concept based on comparison. Assessment of competitiveness must be based on consistency in time, certainty in scope and completeness of content.

Firstly, the time element may refer to an instant in time or a period of time. As the competing bodies are in a flux of development and changes, we need to make comparison in a consistent time instant or time period to ensure a scientific assessment of the overall level of competencies of the competing bodies.

Secondly, the scope of assessment may be national or regional. Different assessment scope may entail different size of the industry and hence different evaluation system. Therefore, it is only feasible and scientific if a consistent assessment scope is applied in comparing competitiveness.

Lastly, comparison of competitive advantage will require assessment of contents by evaluating specific benchmarks involving mainly physical products and the ability to achieve market targets by the enterprise or industry. Such competitive advantage is manifested not only by the ability to optimise resource allocation but also the agile adaptation to the dynamics of market development.

**(1) Competitiveness assessment models by IMD and GCO**

Lausanne International Institute of Management Development (IMD) is of the view that a country's competitive environment is shaped by four forces; and we can derive from these four forces the factors for assessing an industry's competitiveness. First, locality versus globalisation, i.e. whether production is located within the region or globally; second, attractiveness versus penetrability, i.e. the ability to attract foreign investment and the ability to expand overseas for greater revenue; third, assets versus processes, i.e. the former emphasises stocking of assets while the latter emphasises methods and technologies to enable value-adding on stored assets; and fourth, individual risk taking versus social cohesiveness, i.e. the emphasis on deregulation and privatisation as well as social equity and cohesion.

The Global Competitiveness Organisation (GCO) is an organisation that conducts global competitiveness research and assessment. Its competitiveness assessment report is authoritative and second to none. GCO categorises competitiveness into three facets: namely core competitiveness, basic competitiveness and environmental competitiveness. Of these, core competitiveness reflects directly any results of competitive actions including the ability to research on production innovation, ability in enterprise management and operation, as well as efficiency in industry operation mechanisms. Basic and environmental competitiveness are supplementary analysis indicators which include basic strengths, human resources and government management ability.

**(2) Assessing competitiveness of international shipping centres**

The Competitiveness assessment model for international shipping centres in terms of competitive environment and level of positioning draws upon the international competitiveness assessment systems championed by both IMD and GCO. Particularly, it involves the collation of domestic and international literatures as well as analysis of international competitiveness assessment system to devise a three-dimensional assessment model which examines specific operation details of shipping centres with respect to time, scope and content.

From the perspective of time dimension, the model mainly focuses on contemporary situations and places emphasis on comparing current competitive advantages of various port cities.

From the perspective of scope dimension, ports nominated for international shipping centre assessment are all world-renowned port cities. These cities possess better port factors and developed economic hinterland. Basic shipping centre functions, optimal allocation of resources, size and location of a shipping centre are important considerations in establishing the scope. Such factors have a profound impact on the cost effectiveness and development potential of the transportation industry.

From the perspective of content dimension, the competitiveness assessment of international shipping centres includes both hard environment and soft power factors. Hard environment refers to the

shipping centre's infrastructure and port factors. Complete infrastructure and excellent port factors are an essential assurance of the centre's handling capacity. Soft power refers to shipping services and the general environment. Restructuring of shipping centres in response to economic globalisation has made shipping services the utmost priority in the shipping industry. International shipping centres require the support of financial, legal and economic initiatives as well as the collaborative development of supporting industries such as shipping finance, shipping agencies, ship engineering, ship management, maritime laws, shipping insurance and ship repair to ensure rapid and stable development. In addition, the general environment constitutes another important facet of soft power. This includes government transparency, e-government and administration, economic freedom, custom tariffs, ease of doing business and logistics performance. In summary, the development of international shipping centre not only depends on infrastructures and port factors, but also depends on shipping services and the general environment as supplementary support. Therefore, in establishing an assessment system for comprehensive evaluation of competitiveness of an international shipping centre, we must consider all three key factors that affect the competitiveness of an international shipping centre – namely port factors, shipping services and general environment.

# Chapter 3 Fundamental Elements of International Shipping Development Index

## 1. Functional Significance

The Xinhua-Baltic International Shipping Development Index is a numeric outcome of the general assessment of selected international shipping centres in the world that meet certain specified criteria, through analysis of factors closely related to shipping. It is a systematic, comprehensive and unique evaluation model that employs corresponding indexing methods to quantify assessment with the goal to measure the true reflection of a port city's general strength at a predefined time period. A simple, intuitive, objective and impartial measure of the level of development and state of international shipping centres, the index will be a valuable guide and reference for the development of international shipping centres. It will also have a role in promoting sustainable development and optimal allocation of resources in the world's maritime trades.

## 2. Design Principles

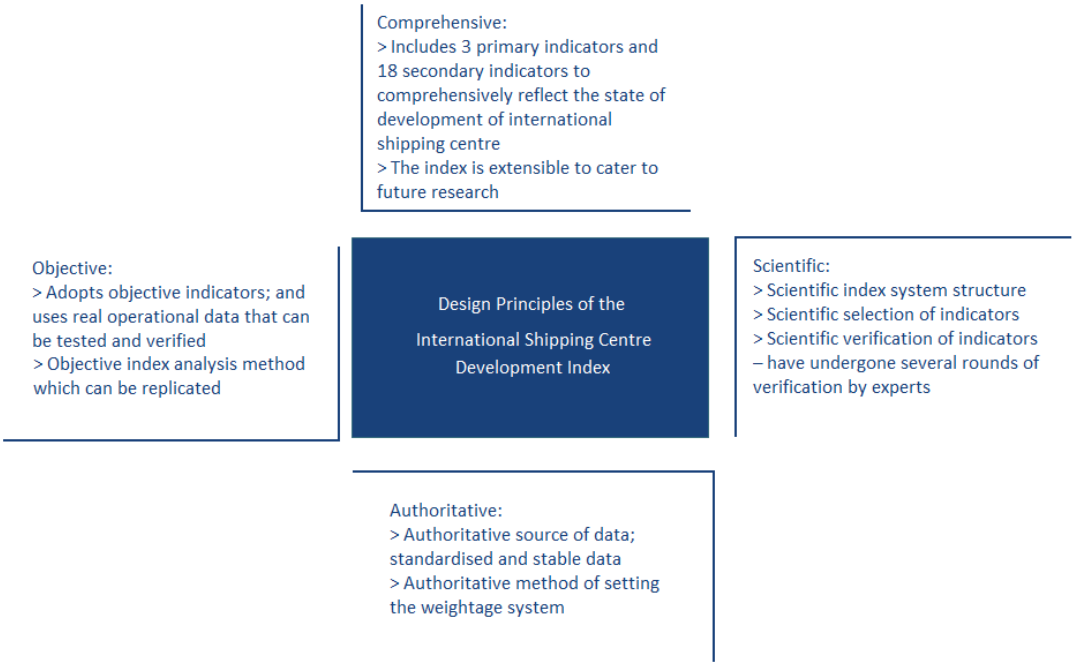
Objective: Emphasis on using real operational data that can be tested and verified while minimising the use of synthetic indicators. Fundamental indicators that can be tested and are accessible will be used. The method allows for weighted computation with an adjustment mechanism to prevent ambiguity while preserving traceability of the

index. The analysis method for the index is objective and replicable.

Comprehensive: The index system includes 3 primary indicators and 18 secondary indicators to comprehensively reflect the state of development of international shipping centres. The index has some extensibility to cater for future research and allows for maximal improvement by way of amendments and supplements in response to industrial feedback and suggestions.

Scientific: The index system's indicators have undergone several rounds of verification through feedback by both domestic and foreign experts and confirmed by a committee of experts. Each indicator reflects a certain aspect of the city housing the international shipping centre. Taken together, all indicators will coalesce into an index system that meets the requirements of being logical, conforming, representative, relevant and relatively independent.

Authoritative: All indices selected originate from domestic or foreign



authoritative statistics which represent sources of standardised and stable data. Such data are easy to compare and compute and hence produce an unambiguous assessment indicator. Having been put through several rounds of feedback and consideration, the weighting system is not only authoritative but can also be used as a guide or reference.

Figure 4 Design principles of Xinhua-Baltic International Shipping Centre Development Index

## 3. Framework of Indicators

Based on the indicator selection principles of Xinhua-Baltic Exchange


Figure 5 Framework of indicators for Xinhua-Baltic International Shipping Centre Development Index

International Shipping Centre Development Index, the index establishes a framework of indicators system to achieve objective evaluation. All indicators are either available from authoritative agencies whose raw data can be obtained from public sources, or systematically and scientifically computed. The indicators are maintained by a professional team that regularly updates the data sources.

The index system includes three primary indicators and 18 secondary indicators. Of these, primary indicators characterise the inherent laws of municipal development supporting international shipping centre through three dimensions – namely major contributing factors of a port, shipping services and general environment. Secondary indicators are the expansion on specific functional attributes of the primary indicators. The various levels of indicators are weighted and combined in a stepwise manner in consideration of their authenticity, comprehensiveness and availability of data.

For better overall monitoring of the state of development of international shipping centres and measuring of the level of competitiveness of port cities, this report made minor adjustments to some indicators in response to experts' opinions. Firstly, maritime arbitration services, which falls under the sub-index for shipping services, is expanded to become maritime legal services. The overall service level of maritime legal services will be assessed from two perspectives – maritime arbitration service and total number of partners practicing in legal offices. Secondly, maritime insurance service, which falls under the sub-index for shipping services, is expanded to become maritime finance

services. The objective is to enable deeper analysis of the level of financial services of an international shipping centre from four perspectives: namely ship finances, fund settlement, shipping insurance and shipping derivatives.

**4. Sample Selection**

Basic principles are followed in the selection of samples for the international shipping centre development index: it not only observes full compliance with data standards for port city core indicators but also takes full consideration of comments and opinions of the Global Shipping Experts Committee. The above components – with data standard as the core and experts' opinion as a supplement – form a perfect union of qualitative and quantitative analysis.

**Step 1** Basic sampling guidelines for international shipping centre: Based on data standard of core indicators that focus on three characteristic indicators of a port city: namely container throughput, bulk cargo throughput and port draught. Port cities that comply with any one of the following conditions will be selected into the initial sample pool.

No.1 Port city with annual container throughput > 5 million TEU, and maximum port draught > 15 m;

No.2 Port city with annual bulk cargo (dry or liquid) throughput > 60 million ton, and maximum port draught > 15 m;

**Step 2** Based on professional assessment and recommendations by members of the Global Shipping Experts Committee jointly convened by Xinhua News Agency and the Baltic Exchange. The committee shall, by way of vote, select port cities shortlisted in the initial sampling pool that possibly satisfy the following port category conditions to form a refined sampling pool:

No.1 For some ports included in the initial sampling pool, even though their current throughput may be large, they may be weak in other shipping services. The expert committee shall, by way of vote, decide if these ports should be eliminated. There are numerous such emerging port cities in the Asia Pacific region.

No.2 For some port cities not included in the initial sampling pool, even though their current throughput may be relatively small, they have a high standard of shipping services and good business operating environment. The expert committee shall, by way of vote, decide if these ports should be included in the sampling pool. There are such port cities in Europe and America that provide traditional shipping services.

Supplementary explanation of voting mechanism for inclusion of sample: “Nomination – Research – Voting” process is adopted. During the nomination process, emphasis must be paid on general recognition of the port city’s position in the world. The research process focuses on advanced integration of capital flow, information flow and goods flow, as well as the degree of contribution by the port function toward municipal development. The voting phase focuses on fairness by drawing

judgement from several experts.

**Step 3** After the two selection processes above, a final sampling pool for international shipping centres is established. This sampling pool is adjusted dynamically according to changes in annual data. Only port cities that meet the screening requirements are eligible for global competitiveness assessment.

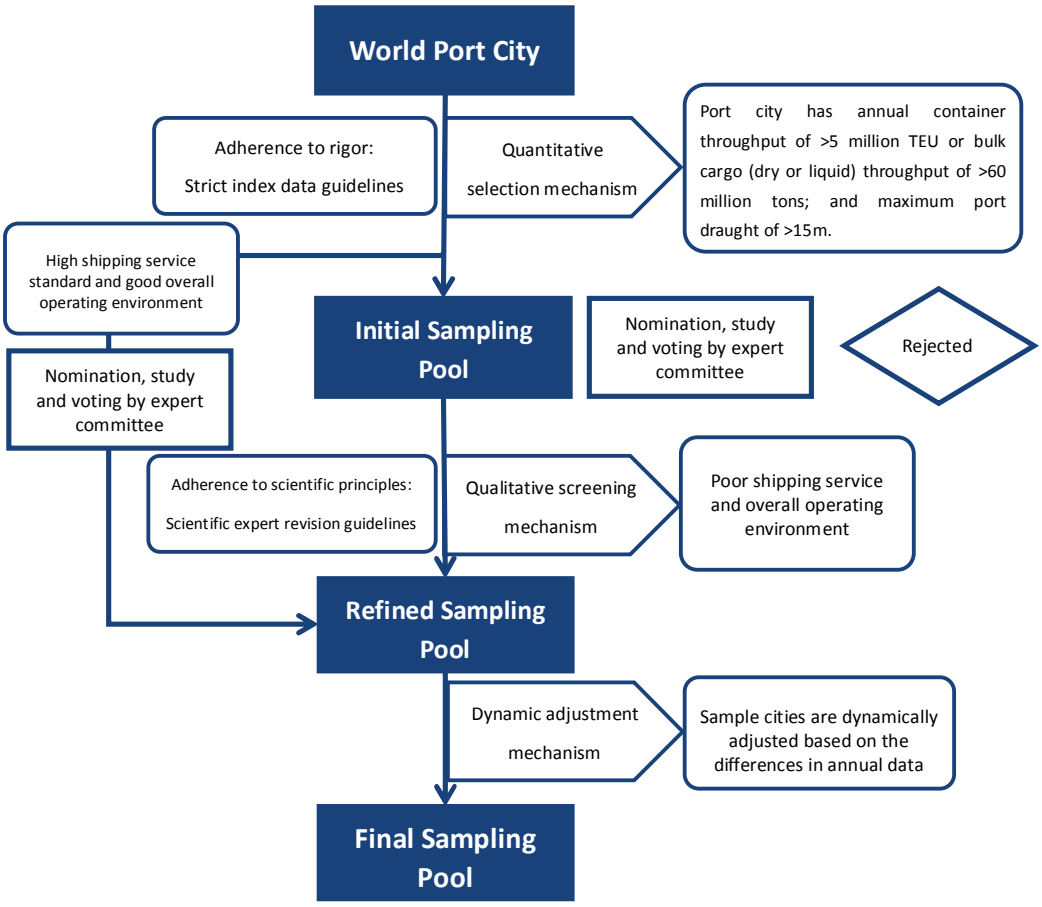



Figure 6 Sample selection process for Xinhua-Baltic International Shipping Centre Development Index

# Chapter 4 Evaluation Result of Xinhua-Baltic International Shipping Centre Development Index

## 1. Evaluation result for Top 10 Global Shipping Centres

According to the results of general evaluation of international shipping centres in 2015, the top ten international shipping centres in the world are Singapore, London, Hong Kong, Rotterdam, Hamburg, Shanghai, Dubai, New York, Busan and Athens respectively. As compared with 2014, the evaluation result was relatively stable with only minor changes: Athens earned a spot in the top 10 while Tokyo was excluded. Singapore, London and Hong Kong are the absolute leaders occupying the top three ranks in the table. Shanghai overtook Dubai to take the sixth place while New York and Busan both advanced by one rank.

Table 2 Top 10 port cities of Xinhua-Baltic International Shipping Centre Development Index

| Rank | 2015 | Rank | 2014 |
|---|---|---|---|
| 1 | Singapore | 1 | Singapore |
| 2 | London | 2 | London |
| 3 | Hong Kong | 3 | Hong Kong |
| 4 | Rotterdam | 4 | Rotterdam |
| 5 | Hamburg | 5 | Hamburg |
| 6 | Shanghai | 6 | Dubai |
| 7 | Dubai | 7 | Shanghai |
| 8 | New York | 8 | Tokyo |
| 9 | Busan | 9 | New York |
| 10 | Athens | 10 | Busan |

## 2. Evaluation result of Global Shipping Centres by Tier

46 port cities of the world were divided into three tiers based on the evaluation result of the global shipping centres. The first tier consists of port cities that occupied the top ten places based on their evaluation scores in the international shipping centre development index. These port cities were generally regarded as “international” shipping centres with a very strong competitive advantage over the other port cities in terms of port throughput and shipping services. Their final scores were more than 60 points. The second tier consists of “quasi-global” shipping centres. Some key factors of these cities were prominently more advantageous than other port cities but with an average score of 50 points, they still lagged behind the first tier port cities in terms of general strength. The third tier consists of “specialised” shipping centres. With scores of less than 50 point, their general strength was far behind that of the first and second tier port cities.

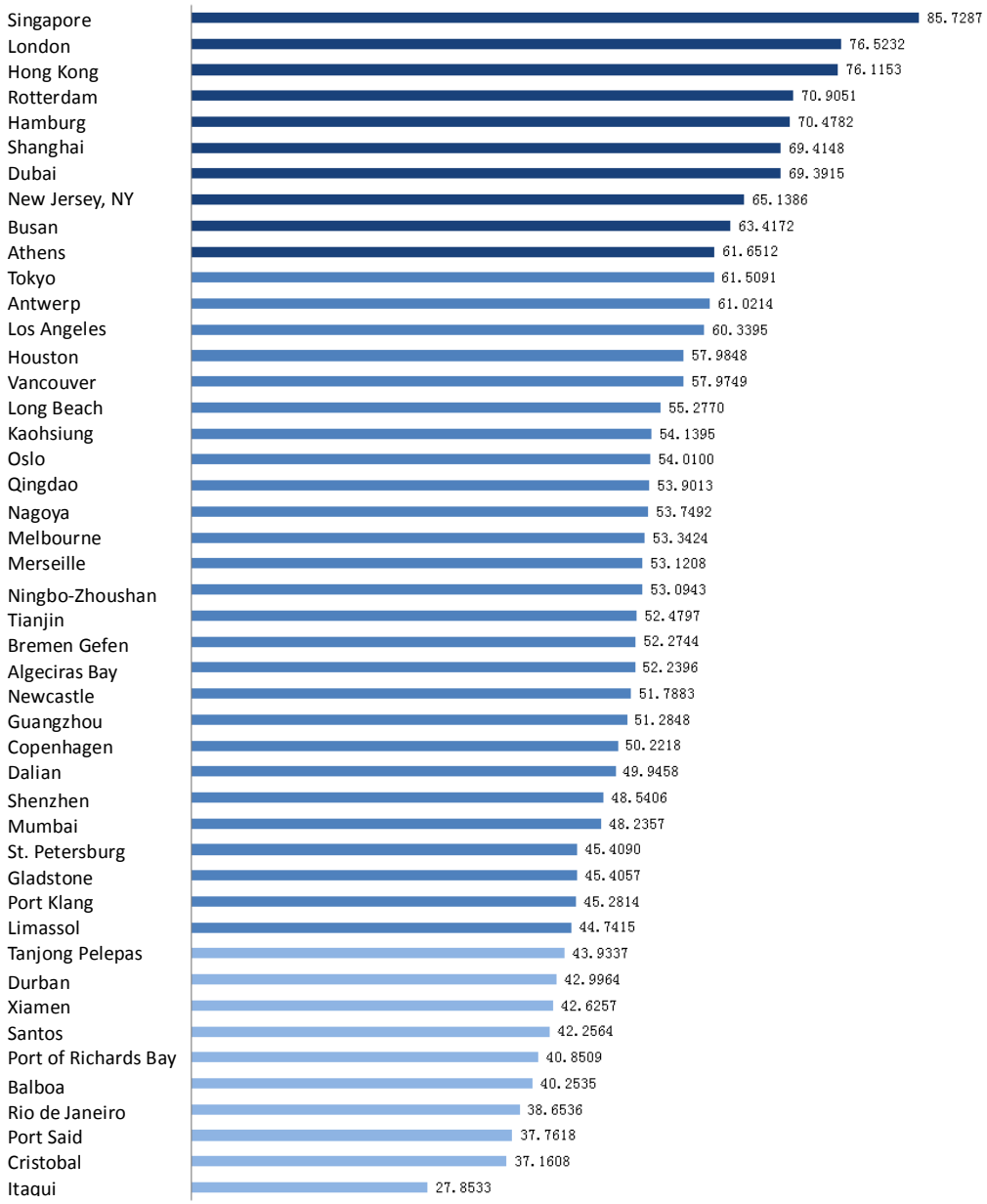



Figure 7 Evaluation result of Xinhua-Baltic International Shipping Centre Development Index by tier

The ranking of international shipping centres in 2015 was very similar to that of 2014, showing that the system is generally quite stable. Of these, there were 27 international shipping centres with stable or relative stable ranking in 2015. This accounted for 58.7% of total sample count. 19 shipping centres saw abnormally or relatively volatile ranking shift.

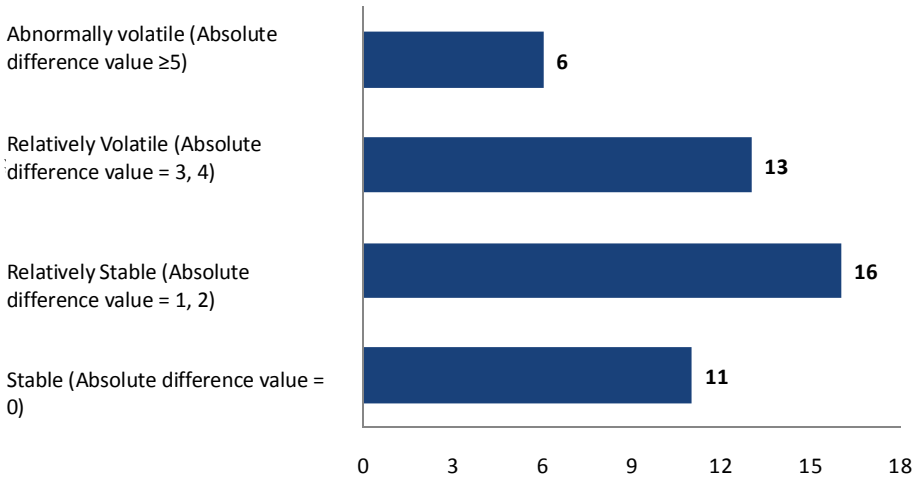



Figure 8 Absolute difference analysis of Xinhua-Baltic International Shipping Centre Development Index

# Chapter 5 Special Topic on Global Shipping Services

With continuous upgrading and restructuring of shipping centre development, shipping services have gradually become the core driving force of international shipping centre development. Thus, they naturally become the core factor for assessing the level of competitiveness of an international shipping centre.

The shipping services sub-index was obtained by general assessment of six indicators: namely shipping agency, ship engineering, ship management, maritime legal, shipping finance and ship repair. Evaluation shows the top ten port cities with the best shipping services are, by order of ranking, London, Singapore, Hong Kong, Shanghai, Athens, Dubai, Hamburg, New York, Tokyo and Mumbai. Occupying the top three ranks, London, Singapore and Hong Kong possess significant advantage in shipping services ability. Shanghai and Athens have seen improvement in the level of development in shipping services of which Athens managed to achieve a more balanced shipping service development with outstanding performance especially in the areas of shipping agency, ship engineering and ship management. Meanwhile, Dubai and New York moved down slightly in their ranking.

Table 3 Top 10 shipping services sub-index of Xinhua-Baltic International Shipping Centre Development Index

| Rank | 2015 | Rank | 2014 |
|---|---|---|---|
| 1 | London | 1 | London |
| 2 | Singapore | 2 | Singapore |
| 3 | Hong Kong | 3 | Hong Kong |
| 4 | Shanghai | 4 | Dubai |
| 5 | Athens | 5 | Shanghai |
| 6 | Dubai | 6 | Hamburg |
| 7 | Hamburg | 7 | Tokyo |
| 8 | New York | 8 | Mumbai |
| 9 | Tokyo | 9 | Athens |
| 10 | Mumbai | 10 | New York |

# Chapter 6 Methodology for International Shipping Centre Development Index

## 1. The General Rationale

The research process for Xinhua-Baltic International Shipping Centre Development Index consists of six steps:

Step 1 Theoretical research on index: Collate and study relevant literature to achieve a comprehensive understanding of the theoretical foundation of international shipping centres and the current state of development. Conduct in-depth interviews with government organisations, university academia and professional experts to collate their expertise and suggestions on the rationale for selecting indicators and the methodology for index computation.

Step 2 Index system design: The Xinhua-Baltic International Shipping Centre Development Index system has been jointly developed by Xinhua News Agency and the Baltic Exchange and authenticated by an expert committee convened by both parties.

Step 3 Data collection and processing: Initial data for indicators were collected through two channels: Xinhua News Agency and the Baltic Exchange. These data went through a normalisation process to form the relevant indicator data.

Step 4: Index model construction and computation: Based on earlier theoretical research and in accordance with correlations between indicators, an index model was constructed. Subsequently an index was computed using the model.

Step 5 Index report writing: A report about the creation of the index was produced under the guidance of the index expert committee.

Step 6 Announcement of index results.

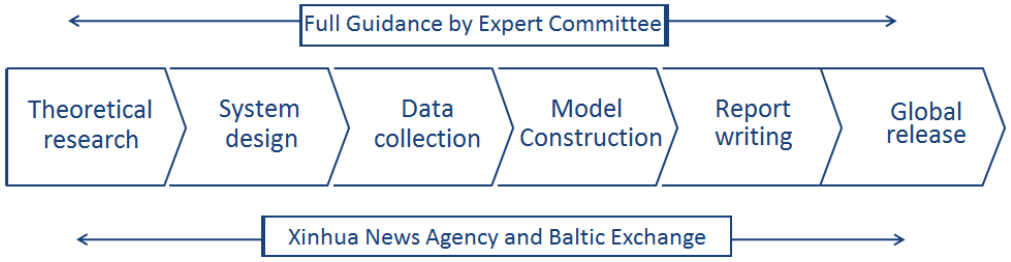



Figure 8 Research process for Xinhua-Baltic International Shipping Centre Development Index

## 2. Index System

Table 4 Indicator system and associated weightage for Xinhua-Baltic International Shipping Centre Development Index

| Primary Tier | | Secondary Tier | |
|---|---|---|---|
| **Name** | **Weight** | **Name** | **Weight** |
| Port Factors **($A_1$)** | 0.20 | Container throughput **($B_1$)** | 0.20 |
| | | Dry bulk cargo throughput **($B_2$)** | 0.14 |
| | | Liquid bulk cargo throughput **($B_3$)** | 0.14 |
| | | Number of cranes **($B_4$)** | 0.15 |
| | | Total length of container berths **($B_5$)** | 0.18 |
| | | Port draught **($B_6$)** | 0.19 |
| Shipping Services **($A_2$)** | 0.50 | Shipping Agency Service **($B_7$)** | 0.20 |
| | | Ship engineering service **($B_8$)** | 0.15 |
| | | Ship management service **($B_9$)** | 0.16 |
| | | Maritime legal service **($B_{10}$)** | 0.20 |
| | | Shipping finance service **($B_{11}$)** | 0.15 |
| | | Ship repair service **($B_{12}$)** | 0.14 |
| General Environment **($A_3$)** | 0.30 | Government transparency **($B_{13}$)** | 0.14 |
| | | Extent of e-government and administration **($B_{14}$)** | 0.14 |
| | | Economic freedom **($B_{15}$)** | 0.20 |
| | | Customs tariff **($B_{16}$)** | 0.18 |
| | | Ease of doing business index **($B_{17}$)** | 0.17 |
| | | Logistics performance index **($B_{18}$)** | 0.17 |

### $A_1$ Port Factors

This mainly refers to infrastructures of the port city and the actual throughputs of various types of cargo.

**$A_2$ Shipping Services**

This mainly refers to the level of shipping services provided by the port city. This can be gauged by how the shipping centre exploits its services to portray its ability in allocation of shipping resources globally.

**$A_3$ General Environment**

This mainly refers to the business and economic environment and government policy measures to support the development of the port city.

**$B_1$ Container throughput**

Container throughput is an important indicator of the size of the port. It refers to the number of containers passing through the boundary of the port via its waterway for loading or unloading within the reported period. Container throughput data used in this report is container count. The computation unit is “kTEU”.

**Source of data:** Xinhua Indices Database

**$B_2$ Dry bulk cargo throughput**

This refers to the quantity of dry bulk cargo passing through the boundary of the port via its waterway for loading or unloading within the reported period. The unit is “ton”.

**Source of data:** Xinhua Indices Database

**$B_3$ Liquid bulk cargo throughput**

This refers to the quantity of liquid bulk cargo passing through the boundary of the port via its waterway for loading or unloading within the reported period. The unit is "ton".

**Source of data:** Xinhua Indices Database

**$B_4$ Number of cranes**

Cranes are machinery for loading and unloading containers in the wharf area. Operating capacity of cranes can determine the cargo handling capacity of a wharf.

**Source of data:** Drewry

**$B_5$ Total length of container berths**

Berths refer to locations within the port where ships can dock. A single location equipped with berthing facilities to accommodate a single ship is called a berth. The length of a berth is determined by the length of ships it plans to accommodate and the safety distance required for two adjacent ships. These include quayside berth, pontoon berth and anchorage berth.

Berthing facilities is an important indicator reflecting the ability of a port to accommodate berthing ships. It is one of the basis for measuring the size and capacity of the port. Total length of container berth refers to the actual length of berth available – including various types of fixed or floating wharf – for berthing of ships for loading and unloading of containers within the reported period. The unit of computation is "metre".

**Source of data:** Drewry

### $B_6$ Port draught

Draught of a ship refers to the maximum depth of the ship that is under the water line. Different ships have different draught. Moreover, the draught of a ship may even differ depending on its load and the salinity of water in the region. Port draught is an important indicator that reflects the deadweight of a ship that can be accommodated by the port. Port draughts in this report refers to water depth statistics of the deepest container berth in the port.

**Source of data:** Drewry

### $B_7$ Shipping brokerage service

Characterised by its intermediary services, brokerage is the key services provided by shipping agencies. An important component of shipping services, shipbrokers provide professional agency, brokerage and consultancy services on a gamut of industries including transportation, insurance, financial and commerce. It is akin to a lubricant for shipping development.

In this report, shipping brokerage services are assessed based on the distribution of the Baltic Exchange – Global Shipping Brokers Membership together with other factors.

**Main source of data:** The Baltic Exchange

### $B_8$ Ship engineering service

Ship engineering service enterprises are companies with marine engineering professionals having the ability to provide ship engineering technology and related services. The sector also provides training on basic theory and technical skills in seamanship and transportation that comply with relevant occupational certification by the authorities; as well as training of professional on advanced applied technologies to enable them to navigate ocean liners.

In this report, ship engineering service is assessed based on the number of shipping companies available in the port city together with other factors. Professional fields of ship engineering company include ship engineering, repairs, quantity surveying and ship classification.

**Main source of data:** International Association of Classification Societies (IACS)

### $B_9$ Ship management service

Ship management is an important element in maritime traffic supervision. It includes administration of ship registration, administration of visas for ship entering and leaving port, administration of foreign ships, administration of ship maintenance, administration of ship engineering as well as administration of ships berthing at wharf.

A ship management company refers to a qualified company which possesses professional ship management technologies. A ship management company may manage its own fleet or fleets commissioned

by other owners.

In this report, ship management service is assessed based on the number of ship management companies operating in the port city as published by the Lloyd's List website, in conjunction with other factors.

**Main source of data:** Lloyd's List

**$B_{10}$ Maritime legal service**

In this report, the overall service level of maritime legal service has been assessed from the two perspectives of maritime arbitration and the total number of partners practicing in legal offices. Maritime arbitration refers to the agreed system whereby any dispute shall be arbitrated in an agreed arbitration institution in accordance with the arbitration agreement (terms) established before or after the dispute event.

In this report, maritime arbitration service is assessed based mainly on the number of arbitrators located in international arbitration centres in London, Singapore and New York, and in conjunction with other factors. The number of partners in law firms is assessed based on the Legal 500 Law Firm Index or enquiry on the number of partners using the Chamber or websites of respective law firms, and in conjunction with other factors.

**Main source of data:** London Maritime Arbitrators Association, Singapore Institute of Arbitrators, Society of Maritime Arbitrators, Legal 500, Chambers

### $B_{11}$ Shipping finance service

The scope of shipping finance service covers four areas: namely ship financing, capital settlement, maritime insurance and maritime finance derivatives.

Maritime insurance refers to a kind of insurance taken on cargo or ship against the potential risks of loss or unforeseen expenses during the sea journey. The types of maritime insurance include cargo insurance, ship insurance, freight charges insurance and protection insurance. Statistical collation by IUMI includes maritime insurance premiums for ship insurance, cargo insurance, maritime liability insurance and offshore energy insurance.

In this report, shipping insurance service is assessed based on maritime insurance expenses of the port city. To compute maritime insurance expenses of a city, first compute the sum of ship and cargo insurance premiums of each country, then distribute the total premium to each port city based on the port's cargo throughput.

**Source of data:** International Union of Marine Insurance（IUMI）

### $B_{12}$ Ship repair service

Ship repair service refers to regular repair and maintenance to keep the ship in good technical condition during its life time. Classified ships (see CCS, China Classification Society) must also be inspected regularly by the

classification surveyor in order to maintain its classification. Ship repairs are categorised into the following five types: annual maintenance, overhaul, voyage repair, accident repair and retrofitting repair.

In this report, ship repair service is assessed based on the number and types of repair services (including full overhaul, ordinary repairs and emergency repairs) that can be handled by the port city in conjunction with other factors.

Ship repair can be categorised as follows:

A – Overhaul: Complete retrofitting or reconstruction in a well-equipped dock
B – Moderate overhaul: Complete retrofitting or reconstruction without the need for docking system
C – Ordinary repair: Small repair jobs that can be carried out by independent machine shops or factory
D – Emergency repair

**Main source of data:** United Nations Conference on Trade and Development

### $B_{13}$ Government transparency

Government transparency is a concept about publicised rules, plans, processes and operations so that the general public understand the why, how, what and how much of policies. Transparency can ensure that the behaviours of public officials, civil servants, administrators, company

board members and businessmen are open and understandable. Reports can also be made against them so that they would be held accountable for their behaviours. This is the most reliable way to prevent corruption and help increase our confidence towards this group of people who are closely linked to our future.

**Source of data:** Transparency International

### $B_{14}$ Extent of e-government and administration

E-Government and administration refers to the government's willingness and ability to implement information technology in the provision of public services. Ability, as used here, refers to the extent of support provided by the government towards national finance, infrastructure, human resources, management, administration and system function. The willingness to provide information and knowledge to empower its citizens is a measure of the government's commitment.

**Source of data:** United Nations e-Government Development Database

### $B_{15}$ Economic freedom

Economic freedom means each individual has the fundamental right to control his/her own labour and property. In a free economy and society, an individual is free to work to engage in production, consumption and investment in any way. The government will allow free movement of labour, capital and goods. The government will avoid applying excessive constraints on freedom while in the process of protecting and maintaining freedom itself.

**Source of data:** "Wall Street Journal" and The Heritage Foundation, 2013 Index of Economic Freedom

**$B_{16}$ Custom tariff**

Custom tariffs refer to the rate applicable to computation of tax on targeted taxable goods stipulated in custom regulations.

**Source of data:** "Wall Street Journal" and The Heritage Foundation, 2013 Index of Economic Freedom

**$B_{17}$ Ease of Doing Business Index**

Economies are ranked on their ease of doing business, from one to 189; one being the best. A higher rank means the regulatory environment is more conducive for doing business. The index is derived from simple averages of national ranking by percentage scores on 10 themes under doing business ranking by the World Bank.

**Source of data:** World Bank Database

**$B_{18}$ Logistics performance index**

Logistics performance index is a score that reflects the following logistics attributes of a country: The efficiency of customs clearance process; quality of trade and transport related infrastructures; the ease of arranging competitively priced shipments; quality of logistics services; ability to track and trace cargo; and the frequency with which shipment reaches the recipient within expected delivery schedule. The index ranges from one to five; a higher score means better logistics

performance. The data are derived from the Logistics Performance Index Survey, which is conducted by the World Bank in cooperation with academic institutions, international organisations, private enterprises and international logistic professionals.

**Source of data:** World Bank Database

### 3. Data Processing

Data for secondary indicators required for the Xinhua-Baltic International Shipping Centre Development Index are mainly sourced from authoritative organisations such as the Baltic Exchange, Drewry, World Bank and World Economic Forum.

Due to the differing nature of various indicators (size, ranking, ratio, etc.), if the raw values of these indicators are used directly in analysis, then indicators with large quantitative values may weaken the effects of indicators with smaller quantitative values; thus resulting in unequal contribution of each indicator to the computation. To avoid such phenomenon, each indicator should be normalised – through relative processing to make its statistical variables dimensionless – before using it in index computation.

Divide the raw data into two categories: The first comprises indicators with score values ranging from 1 to 100. This category of indicators can be used directly for computation. The second category comprises indicators with absolute score values. These indicators will be normalised by applying the standard deviation approach on data distribution.

**(1) Determining sample mean and standard deviation**

Supposing that the data distributions of secondary indicators are all normal distributions, bootstrap resampling is applied to these samples. After 500 resampling, the mean value and standard deviation are computed from the normal distribution of each indicator.

$$mean_{l,m} = \frac{1}{a}\sum_{i=1}^{a} \bar{x}_{l,mi}, sd_{l,m} = \frac{1}{a-1}\sum_{i=1}^{a} (\bar{x}_{l,mi} - mean_{l,m})^2$$

Where, $l = 1,2,3$ , $m = 1,2,\cdots,6$ , $\bar{x}_{l,mi}$ is sample mean of each sampling of the m-th indicator, $a = 500$ indicates a total of 500 resampling, $mean_{l,m}$ is the mean value obtained after bootstrapping the m-th secondary indicator, and $sd_{l,m}$ is the standard deviation obtained after bootstrapping the m=th secondary indicator.

**(2) Computing the score for secondary indicators of sample cities**

Based on the mean value and variance of each indicator, compute the indicator's quantile score for each city.

The quantile score of the m-th indicator for the p-th city is computed with the following formula:

$$y_{l,mp} = \phi(\frac{x_{l,mp} - mean_{l,m}}{sd_{l,m}})$$

Where, $y_{l,mp}$ is the quantile score of the m-th secondary indicator for

the p-th city, $x_{l,mp}$ is the indicator value of the m-th secondary indicator for the p-th city, and $\phi(\square)$ is the distribution function of standard normal distribution.

## 4. Model Computation

### (1) Design of weighting system

The design of the weighting system for the Xinhua-Baltic International Shipping Centre Development Index employs analytic hierarchy process (AHP algorithm).

The basic principle of AHP is to break down the problem into a hierarchical structure consisting of goals, sub-goals (guidelines), constraining criteria and departments to analyse the various factors. From the hierarchical structure, apply pair-wise comparison to determine the judgement matrix. Derive the components of the eigenvector corresponding to the largest eigenvalue of the matrix. These components represent the corresponding coefficients that will be used to compute the weight of each factor (degree of priority).

AHP algorithm can be broken down into the following six basic steps:

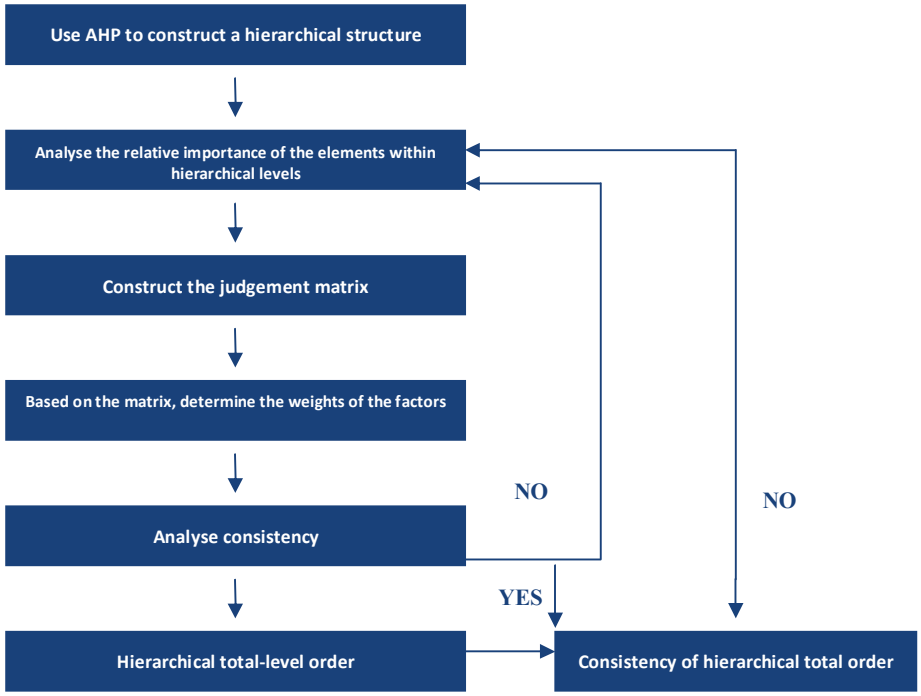



Figure 9 Basic processes of AHP algorithm

(a) Defining the problem: Clarify the problem in terms of scope, contributing factors and the relationship between different factors in order to have sufficient understanding of the problem.

(b) Construct a hierarchical structure: In this step, the factors are assigned to different hierarchical levels. It comprises the goal at the top level (goal level), several intermediate levels (guidelines levels) and the bottom level (solutions level). If an element is linked by all elements from the next level immediately below it, this element is said to have complete hierarchical relationship with the next level. If an element is linked by only some elements from the next level immediately below it, this element is said to have incomplete hierarchical relationship with the next level. A sub-level can be inserted between two hierarchical levels. This sub-level is subordinate to one element on the main level. The elements of the sub-level may be linked with the next level but the sub-level may not constitute an independent level.

(c) Construct judgement matrix: This is the critical step in AHP. The judgement matrix defines the relative importance of relevant elements within a hierarchical level that is linked to an element in a higher level. For n indicators, $\{A_1, A_2, \cdots, A_n\}$, $a_{ij}$ is the judgement value that signifies the importance of $A_i$ relative to $A_j$. $a_{ij}$ is generally assigned a 5-grade rating scale of 1, 3, 5, 7, 9. A rating value of 1 means $A_i$ and $A_j$ are of equal importance; 3 means $A_i$ is slightly more important than $A_j$; 5 means $A_i$ is relatively more important than $A_j$; 7 means $A_i$ is significantly more important than $A_j$; and 9 means $A_i$ is extremely more important than $A_j$. The mid values of 2, 4, 6, 8 may also be used for intermediate judgement, especially when five grades become insufficient to represent the level of importance.

(d) Single-level order: The purpose of single-level order is to sort elements in the current level in order of their importance with respect to a linked element in a higher level. It is the basis for ordering all the elements in the current level in terms of importance with respect to an immediate higher level.

If we take the weight vector, $W = [w_1, w_2, \cdots, w_n]^T$, then we have:

$$AW=\lambda W$$

If λ is the largest eigenvalue of A, then W is the eigenvector of A with respect to λ. Hence, single-level order process can be achieved by solving the judgement matrix for the values of λmax and its corresponding eigenvectors to obtain the relative weighting of this group of indicators.

In order to test the consistency of judgement matrix, we need to calculate its consistency index:

$$CI = \frac{\lambda_{\max} - n}{n-1}$$

When CI =0, judgement matrix is complete consistency; conversely, a larger CI value indicates lesser consistency in judgement matrix.

(e) Total-level order: Using the results of single-level order of all the levels with respect to the same level, we can compute the weight values representing the importance of all elements in this level with respect to the immediate higher level. This is known as total-level order. Total-level order must be carried out layer by layer from top to bottom. For the highest level, its single-level order is the same as total-level order.

If total-level order for all elements $A_1, A_2, \cdots, A_m$ of a higher level is completed, and the corresponding weight values $a_1, a_2, \cdots, a_m$ are obtained, then the results of single-level order for $a_j$ corresponding to elements in the current level $B_1, B_2, \cdots, B_n$ are $[b_1^j, b_2^j, \cdots, b_n^j]^T$. Now, if $B_i$ is not linked to $A_j$, then $b_i^j$ =0, and total-level order is achieved.

(f) Analyse consistency: Similar to single-level order, we need to assess the consistency of the results of total-level order. Therefore, we perform consistency check as follows:

$$CI = \sum_{j=1}^{m} a_i CI_j$$

$$RI = \sum_{j=1}^{m} a_j RI_j$$

$$CR = \frac{CI}{RI}$$

CI is the consistency index for total-level order; $CI_j$ is the consistency index of judgement matrix $a_j$ corresponding to level B; RI is the random consistency index of judgement matrix $a_j$ corresponding to level B; and CR is the ratio of total-level order consistency index to random consistency index. Similarly, when CR<0.10, the consistency of computation results of total-level order is deemed to be satisfactory; otherwise, the judgement matrices for the current level need to be adjusted until satisfactory consistency is obtained for total-level order.

**(2) Model for Index Computation**

Specific computation formulae for the Xinhua-Baltic International Shipping Centre Development Index are as follows:

Use weighted sum method to compute the primary index:

$$y_{lp} = \sum_{m=1}^{l_m} y_{l,mp} * w_m = \sum_{m=1}^{l_m} \phi(\frac{x_{l,mp} - mean_{l,m}}{sd_{l,m}}) * w_m$$

Where, $w_m$ are the weights of m secondary indicators; and $y_{lp}$ is the score of the $l$-th primary indicator of the $p$-th city.

The computation formula for comprehensive score of the sample cities is:

$$y_p = \sum_{l=1}^{3} y_{lp} * w_l = \sum_{l=1}^{3} (\sum_{m=1}^{l_m} y_{l,mp} * w_m) * w_l = \sum_{l=1}^{3} (\sum_{m=1}^{l_m} \phi(\frac{x_{l,mp} - mean_{l,m}}{sd_{l,m}}) * w_m) * w_l$$

Where, $w_l$ is the weight of $l$-th primary indicator; and $y_p$ is the score of the $p$-th city.

## 5. Survey Questionnaire

### (a) Explanation for scoring

This questionnaire uses scoring rules based on the 1-9 scoring scale method of AHP:

- 1 means elements $i, j$ are equally important;
- 3 means element $i$ is slightly more important than element $j$;
- 5 means element $i$ is relatively more important than element $j$;
- 7 means element $i$ is significantly more important than element $j$;
- 9 means element $i$ is extremely more important than element $j$;

The values 2，4，6，8 may also be used as mid value judgement for 1-3，3-5，5-7，7-9 respectively.

An example is shown below (vertical column represents element $i$, while horizontal row represents element $j$):

Element j

| Technological innovation capability (A) | $B_1$ | $B_2$ | $B_3$ |
|---|---|---|---|
| Innovative output capability ($B_1$) | — | 3 | 5 |
| R&D capability ($B_2$) | — | — | 2 |
| Innovation management capability ($B_3$) | — | — | — |

Element i

In the above table, the value 3 (2nd row and 3rd column) means that for Technology Innovation Capability (A) on the target level, Innovative Output Capability ($B_1$) is slightly more important than R&D Capability $B_2$).

## (b) Scoring by experts

### 1. Scoring for primary indicators

(a) Please fill in the value of importance between the primary indicators ($A_1$-$A_3$) with respect to the ultimate indicator (D). The shaded areas need not be filled (same for all tables below).

| Xinhua-Baltic International Shipping Centre Development Index ( D ) | $A_1$ | $A_2$ | $A_3$ |
|---|---|---|---|
| Port Factors ( $A_1$ ) | — | | |
| Shipping Services ( $A_2$ ) | — | — | |
| General Environment ( $A_3$ ) | — | — | — |

### 2. Scoring for secondary indicators

(a) Please fill in the value of importance between the secondary indicators ($B_1$-$B_6$) with respect to the primary indicator ($A_1$).

| Port Factors ( $A_1$ ) | $B_1$ | $B_2$ | $B_3$ | $B_4$ | $B_5$ | $B_6$ |
|---|---|---|---|---|---|---|
| Container throughput ( $B_1$ ) | — | | | | | |
| Dry bulk cargo throughput ( $B_2$ ) | — | — | | | | |
| Liquid bulk cargo throughput ( $B_3$ ) | — | — | — | | | |
| Number of cranes ( $B_4$ ) | — | — | — | — | | |
| Total length of container berths ( $B_5$ ) | — | — | — | — | — | |
| Port draught ( $B_6$ ) | — | — | — | — | — | □— |

(b) Please fill in the value of importance between the secondary indicators ($B_7$-$B_{12}$) with respect to the primary indicator ($A_2$). Shaded areas need not be filled.

| Shipping Services（$A_2$） | $B_7$ | $B_8$ | $B_9$ | $B_{10}$ | $B_{11}$ | $B_{12}$ |
|---|---|---|---|---|---|---|
| Shipping agency service（$B_7$） | — | | | | | |
| Ship engineering service（$B_8$） | — | — | | | | |
| Ship management service（$B_9$） | — | — | — | | | |
| Maritime legal service（$B_{10}$） | — | — | — | — | | |
| Shipping finance service（$B_{11}$） | — | — | — | — | — | |
| Ship repair service（$B_{12}$） | — | — | — | — | — | — |

(c) Please fill in the value of importance between the secondary indicators ($B_{13}$-$B_{18}$) with respect to the primary indicator ($A_3$). Shaded areas need not be filled.

| General Environment（$A_3$） | $B_{13}$ | $B_{14}$ | $B_{15}$ | $B_{16}$ | $B_{17}$ | $B_{18}$ |
|---|---|---|---|---|---|---|
| Government transparency（$B_{13}$） | — | | | | | |
| Extent of e-government abd administration（$B_{14}$） | — | — | | | | |
| Economic freedom（$B_{15}$） | — | — | — | | | |
| Customs tariff（$B_{16}$） | — | — | — | — | | |
| Ease of doing business index（$B_{17}$） | — | — | — | — | — | |
| Logistics performance index（$B_{18}$） | — | — | — | — | — | — |

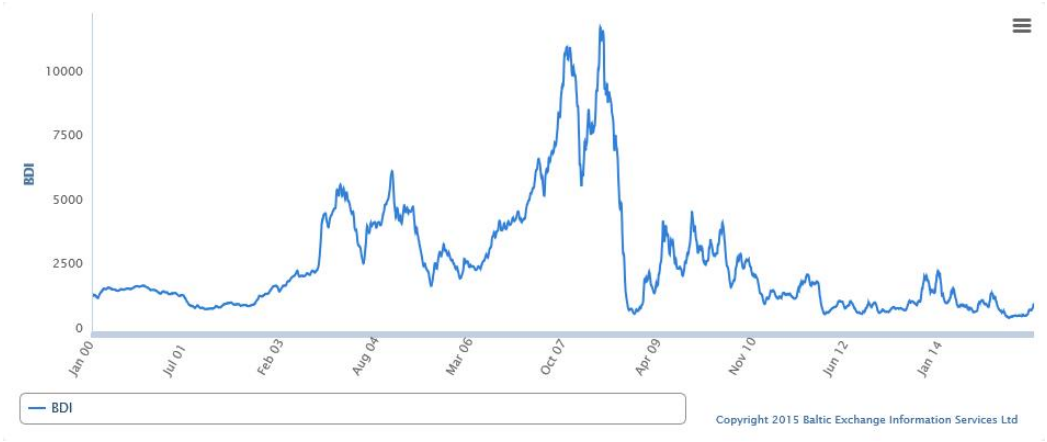
# Appendix I: Speech by Jeremy Penn, Chief Executive of the Baltic Exchange

The Baltic Exchange is delighted that its joint collaboration with Xinhua News Agency, China has continued for this second year, culminating in the launch of the 2015 Xinhua – Baltic International Shipping Centre Development Index. The Baltic Exchange is recognised internationally by the shipping community as a trustworthy provider of market benchmark data, and its indices are therefore used to settle a wide range of physical and derivative shipping contracts. We consider that the Xinhua – Baltic International Shipping Centre Development Index compliments our market benchmark work and can add value for the maritime industry globally.

The Index has been carefully constructed to include all relevant aspects of the maritime world and this year also includes certain additions which we believe are significant improvements. We have included the banks that are providing shipping finance services and we have also measured the scale of shipping law firms by considering the number of partners in each maritime law firm as an indicator of the scale of the firm's involvement.

Although the size of a port is obviously important, factors that should not be overlooked include the importance of professional services in the development of an international shipping centre - including various fields like broking, maritime law, shipping finance, sale & purchase and derivatives.

Strict attention has been applied to methodology and the correct weighting of sectors to give a representative viewpoint.




The above graph shows the historical values of the Baltic Dry Index over the past 15 years which demonstrates the volatility of the Dry Bulk shipping market.

With the constant evolution of shipping, the Baltic must keep abreast with the market conditions: eco speeds, upgrading of vessel sizes, addition of new routes and deleting of obsolete ones. As the market evolves, the Baltic finds it necessary to modify ships and routes in its benchmark data in order to stay aligned with the moderns shipping marketplace. In the same way, with publication of this year's International Shipping Centre Development Index, we note that the entire landscape changes with remarkable speed.

# Appendix II: Nigel Gardiner, Group Managing Director, London Drewry Shipping Consultant Ltd.

## The International Shipping Markets

The shipping industry is the heart of international trade, as it is the only practicable and cost effective way of transporting large volumes of many essential commodities and semi-finished/finished goods over long distances. Approximately 90% of world trade in volume terms is moved by ships. In 2014, 10.2 billion tons of cargo (of all types) was moved by sea, of which 6.6 billion tons were dry cargo and 3.6 billion tons were liquid cargo. During the period 2004 to 2014 world seaborne trade grew at a compound growth rate of 3.4%.

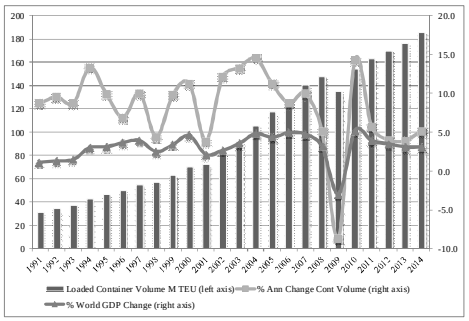
Demand for shipping continues to grow but in mid-2015 the main shipping markets, oil, dry bulk and containers, are experiencing mixed fortunes, with somewhat different trading outlooks.

The oil tanker industry is enjoying its strongest trading period since the economic crisis of 2007/2008. Demand for oil in Asian countries such as China and India is robust, and oil consumption on a per capita basis is much lower in Asia than either North America or Europe, thereby pointing to continued growth in oil demand. With little indigenous supply many Asian countries are net importers of oil and this is stimulating increases in seaborne oil trades and rising tanker demand. In addition, structural changes in the oil market have opened up longer-haul oil trades from West Africa and South America to Asia, which has also helped boost tanker demand. Supply growth in the oil tanker sector in 2014 was low (less than 1 percent in the case of the very large crude oil carriers) and this is likely to remain the case in 2015 and much of 2016. With a more balanced market it is not surprising that oil tanker freight rates have risen sharply in recent months and with market sentiment positive, conditions in the tanker sector are likely to remain favourable for the remainder of 2015 and into 2016.

While the oil tanker market is enjoying good fortune, the same cannot be said of the dry bulk sector. Dry bulk freight rates and vessel values are currently weak due to a combination of lower growth in vessel demand and a rapid and large build-up in vessel supply since 2010. Dry bulk carriers transport over forty different commodities, but over a half of all seaborne trade is accounted for by three commodities – iron ore, coal and grain. Asian demand for imported dry bulk commodities led to the most recent boom in dry bulk shipping and the current slowdown in the Chinese economy is therefore having a detrimental impact on dry bulk seaborne trades, especially iron ore. Growth rates in seaborne trade have therefore slipped and this means weaker demand for dry bulk carriers. At the same time, the previous freight market boom led to massive new vessel ordering and the size of the dry bulk fleet growing by over 40%% between the end of 2010 and the end of 2014. With excess capacity, it is not surprising that dry bulk freight rates have been very depressed. However, looking ahead supply growth in the dry bulk sector is expected to moderate and with seaborne dry bulk trades continuing to grow, the conditions are being laid for a recovery in the market. As such, we anticipate that freight rates in the dry bulk sector will improve in the second half of 2015 and into 2016.

Container shipping occupies an increasingly important position in world trade and it has been the fastest growing sector of international shipping in the last two decades. Containerships are the principal way to transfer finished and semi-finished goods, and therefore as population and global GDP grow, demand for containerships grows as well. The relationship between container trade growth and changes in global GDP is shown in the chart below.

**World Loaded Container Volumes and Global GDP**




**Source: Drewry**

With the exception of 2009, global container trade has increased every year since the introduction of long-haul containerized shipping lanes in the late 1960s. In 2014, world container trade reached 185 million TEU and in the period 2004-2014 it grew by a compound growth rate of 5.8%. There are four core trades: the Transpacific, Transatlantic, Asia-Europe and Asia-Middle East/South East Asia trades. These trades are often referred to as the East-West routes.

**The Main Container Trades** [(1)]

*(Million TEU)*


Source: Drewry

Trade along these routes is primarily driven by United States and European consumer demand for products made in Asia. However, the volume of trade between Asia and the Middle East is now larger than that on the Transatlantic and should be considered as a major east-west trade on which carriers can deploy very large ships.

The East-West trades are generally served by the large and very large containerships. In 2014 the Asia to Europe and Asia to U.S. head haul trades increased in volume terms and they continue to dominate overall movements. Supporting the main east-west trades are the North-South trades and a network of regional trades, of which the largest is the intra-Asia market.

Overall, in volume terms the container shipping market continues to grow, but global container fleet growth will present a challenge to the industry as carriers seek to deploy the very large containerships across their portfolio of services without damaging the supply/demand balance. In mid-2015 the container orderbook for new vessels expressed as a percentage of the existing fleet is close to 18%. Almost 60% of the current containership orderbook is for vessels in excess of 10,000 TEU and of late, the major carriers have shown much interest in large ships, in some cases in excess of 20,000+ TEU. Some of the large containerships on order will be able to transit the enlarged Panama Canal, including ships with capacity of up to 13,500 TEU. However, the largest containerships currently on order (20,000 TEU) will not be able to transit the enlarged waterway and they have primarily been designed towards deployment in the main Asia-Europe trades.

Nigel Gardiner
Group Managing Director
Drewry
1st July, 2015

# Appendix III: Top Ten of "100 Most Influential Persons in the Shipping Industry"

Table 5 Top Ten in Lloyd's List of "100 Most Influential People in the Shipping Industry"

| Top Ten in Lloyd's List of "100 Most Influential People in the Shipping Industry" | | | |
|---|---|---|---|
| Rank | **2012** | | |
| 1 | John Fredriksen | London, Cyprus, Norway | Shipowner with SeaTankers group |
| 2 | Nils Andersen<br>SØren Skou | Denmark | Maersk Group/Maersk Line |
| 3 | Xu Zuyuan | China | Vice Minister of the Ministry of Transport |
| 4 | John Angelicoussis | Greece | CEO of Angelicoussis Shipping Group |
| 5 | George Economou | Greece | Chairman and CEO of Dryships |
| 6 | Li Shaode | China | Chairman of China Shipping Group |
| 7 | Roger Janson | Switzerland | Head of Cargill Ocean Transportation |
| 8 | Khalid Al-Falih | Kingdom of Saudi Arabia | CEO of Saudi Aramco Oil Company |
| 9 | Ma Zehua | China | General Manager of China Ocean Shipping (Group) Company |
| 10 | Fu Chengyu | China | Chairman of Sinopec Corp. |
| Rank | **2013** | | |
| 1 | All seafarers | Global | |
| 2 | Emanuele Lauro | Monaco | CEO of Scorpio |
| 3 | Nils S. Andersen<br>Søren Skou | Denmark | CEO of Maersk Group and CEO of Maersk Line |
| 4 | John Fredriksen | Norway, London | Shipowner with SeaTankers group. |
| 5 | John Angelicoussis | Greece | CEO of Angelicoussis Shipping Group |
| 6 | Roger Janson | Switzerland | Head of Cargill Ocean Transportation |
| 7 | Gianluige Aponte | Switzerland | CEO of Mediterranean Shipping Company |
| 8 | Angeliki Frangou | Greece | CEO of Navios |
| 9 | George Economou | Greece | Chairman and CEO of Dryships |
| 10 | Maria Das Graças Foster & Sergio Machado | Brazil | Petróleo Brasileiro S.A. |

**JEREMY PENN**
**Chief Executive of the Baltic Exchange**

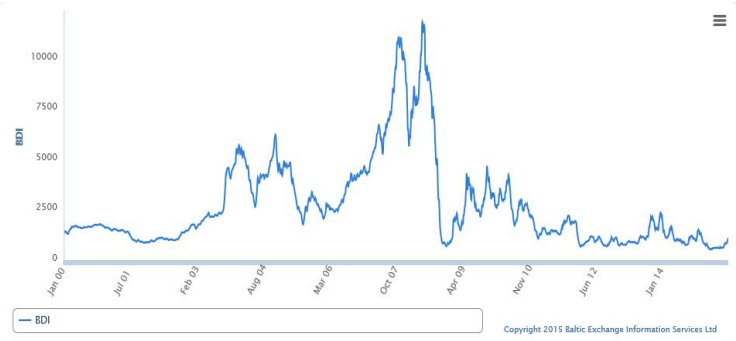
The Baltic Exchange is delighted that its joint collaboration with Xinhua News Agency, China has continued for this second year, culminating in the launch of the 2015 Xinhua – Baltic International Shipping Centre Development Index. The Baltic Exchange is recognised internationally by the shipping community as a trustworthy provider of market benchmark data, and its indices are therefore used to settle a wide range of physical and derivative shipping contracts. We consider that the Xinhua – Baltic International Shipping Centre Development Index compliments our market benchmark work and can add value for the maritime industry globally.

The Index has been carefully constructed to include all relevant aspects of the maritime world and this year also includes certain additions which we believe are significant improvements. We have included the banks that are providing shipping finance services and we have also measured the scale of shipping law firms by considering the number of partners in each maritime law firm as an indicator of the scale of the firm's involvement.

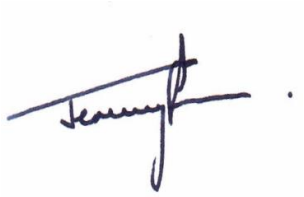
Although the size of a port is obviously important, factors that should not be overlooked include the importance of professional services in the development of an international shipping centre - including various fields like broking, maritime law, shipping finance, sale & purchase and derivatives.

Strict attention has been applied to methodology and the correct weighting of sectors to give a representative viewpoint.

The above graph shows the historical values of the Baltic Dry Index over the past 15 years which demonstrates the volatility of the Dry Bulk shipping market.




With the constant evolution of shipping, the Baltic must keep abreast with the market conditions: eco speeds, upgrading of vessel sizes, addition of new routes and deleting of obsolete ones. As the market evolves, the Baltic finds it necessary to modify ships and routes in its benchmark data in order to stay aligned with the moderns shipping marketplace. In the same way, with publication of this year's International Shipping Centre Development Index, we note that the entire landscape changes with remarkable speed.



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Xinhua Indices
The Baltic Exchange
July 2015

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By adhering to scientific, objective and accurate standard of measures, Xinhua aims to be a professional, international index company with the responsibility to enhance the authoritativeness of China's financial sector. The company aims to construct and release four types of indices suitable for tracking product trading, price benchmarking, economy characterisation and competitiveness evaluation. With these indices, the company hopes to exploit its strategic advantages in enhancing market allocation of resources and gradually build a set of market-influencing RMB-based index products.

## About the Baltic Exchange

The Baltic Exchange is the world's only independent maritime information publisher. It provides information on the trading of physical and derivative shipping products. Our community of more than 600 member firms encompasses the majority of the world's shipping entities. These members are committed to a code of business conduct administered by the Baltic Exchange. The Baltic Exchange members are responsible for a large proportion of all dry cargo and tanker fixtures as well as the sale and purchase of merchant vessels.

Services offered by the Baltic Exchange include the following: Providing independent, quality freight information for dry bulk cargo, oil and gas shipping market; providing settlement prices for shipping freight forwarding contracts; providing multilateral trading platform, Baltex, for freight forwarding contracts; providing the market platform for self-regulated ship chartering, and sale and purchase of ships and freight derivatives; providing centralised communication platform for profit-chasing freight market; providing services for non-litigation dispute resolution; helping members to establish high-standard business ethics and partnership opportunities; and providing business facilities in London-based headquarters for members.