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Baltic Exchange

Xinhua-Baltic International Shipping Centre Development Index Report (2023)

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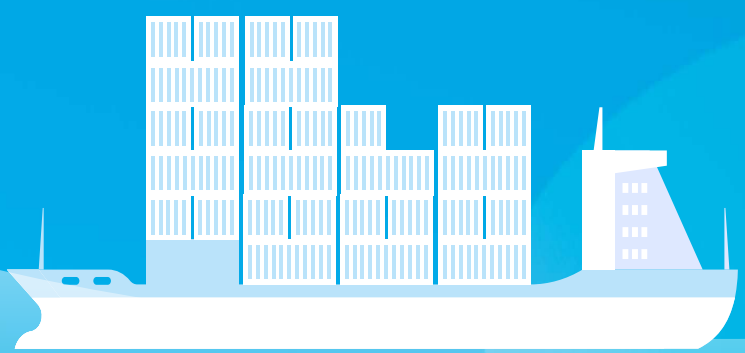

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Introduction

10 years of collaboration between
Xinhua and the Baltic Exchange

This year marks the tenth anniversary of the Xinhua-Baltic International Shipping Centre Development Index (ISCDI) produced by China Economic Information Service, a subsidiary of Xinhua, in collaboration with the Baltic Exchange.

Once again this index has ranked the 43 top port cities and maritime centre around the world, using a variety of metrics.

These metrics cover all aspects of a shipping centred environment, including business factors covering a number of professional maritime service providers such as lawyers, financiers and shipbrokers; port factors such as cargo throughput, draught and container berth length; as well as assessments of the general business environment including customs tariffs and logistics performance.

Whilst there is little movement on the first five of the top 10 rankings this year - Singapore sits at the top of the pile for the tenth consecutive year – it's all change in the last three rankings. New York/New Jersey dropped two places from eight to tenth this year, as the historical shipping centre of Athens nudges back up by one place to eighth and space is made for relative newcomer, Ningbo Zhoushan, to sit at number nine.

For the main three shipping segments – dry, liquid bulk and containers - each tell a different story. The container shipping market has normalised over the past year, following an extraordinary increase in demand during COVID-19. Increased oil demand and longer trade routes have buoyed tanker shipping, whilst dry bulk freight rates remain soft.

All three sectors will be impacted by the most recent International Maritime Organization (IMO) greenhouse gas (GHG) reduction ambitions, which were announced at the beginning of July. At present, how the industry will reach net-zero by 2050 is unknown, but it will likely be supported through low-carbon fuels - the landscape for which remains unclear.

We hope this report provides some useful insight into ocean-going shipping and the maritime centre supporting the industry that moves 90% of world trade.

Huge congratulations to Singapore, as well as London and Shanghai for securing second and third places respectively in this Index, and we commend all the locations covered in our report.

We thank our partners at Dentons'International Arbitration Group, Drewry, International Union of Marine Insurers (IUMI), Petrofin, oceanis, and the many shipping centre representatives that have provided articles and data for this report.

How the rankings are decided

The rankings are based on the following categories:

Port inputs (20% of weighting)

Container throughput (TEU)

Dry bulk cargo throughput (tons)

Liquid bulk cargo throughput (tons)

Cranes (no. of)

Container berths (length of)

Port draught (m)

Sources: Drewry, Shanghai International Shipping Institute

Business services inputs (50% of weighting)

Shipbrokers, managers, liner & bulker companies (no. of)

Classification society offices (no. of)

Maritime legal (no. of lawyers & arbitrators)

Ship finance (no. of banks)

Hull underwriting premiums ($)

Sources: Baltic Exchange, International Association of Classification Societies, International Union of Marine Insurers, Dealogic, Legal 500, London Maritime Arbitrators Association, Singapore Chamber of Maritime Arbitration, Alphaliner

General environment inputs (30% of weighting)

Government transparency

Extent of e-government and administration

Customs tariffs

Logistics performance index

Sources: United Nations

For full methodology details, please see Appendix 1.

Message from the Baltic Exchange

Photo: Shutterstock

It's been a decade since the Baltic Exchange started working with Xinhua News Agency on this index and during that time we have witnessed a growing amount of trade move from west to east. This shift in trade flows is clearly visible when looking at the Xinhua-Baltic International Shipping Centre Development Index (ISCDI) top 10 rankings over the past decade.

Whilst Singapore has sat at number one since the Index began, Shanghai has ascended from seventh place in 2014, to third place this year. Hong Kong is still amongst the top five centre and the large Chinese container port of Ningbo Zhoushan entered the top 10 in 2021 and has ambitions beyond the port to become a recognised maritime services centre.

Shipping will always be at the mercy of international trade relations and economic and geopolitical conditions. The current outlook is turbulent as energy trade flows alter course and bulk cargo shipping faces an uncertain path ahead, for the foreseeable future at least. Against this backdrop, the shift of trade from west to east for containerised goods shows no sign of slowing. I look forward to observing these trends through the lens of the Xinhua-Baltic ISCDI in the years to come.

Meanwhile, the traditional shipping hubs of London, Hong Kong, Athens, Hamburg and New York still feature in the top 10 and are testament to the solid foundations that these maritime centre have built over the decades.

London and New York still command a presence in maritime services circles, particularly in the insurance and arbitration sectors. Hamburg remains a strong maritime centre and Germany a major shipowning nation. Meanwhile, Greek shipowners continue to control the largest share of the merchant fleet.

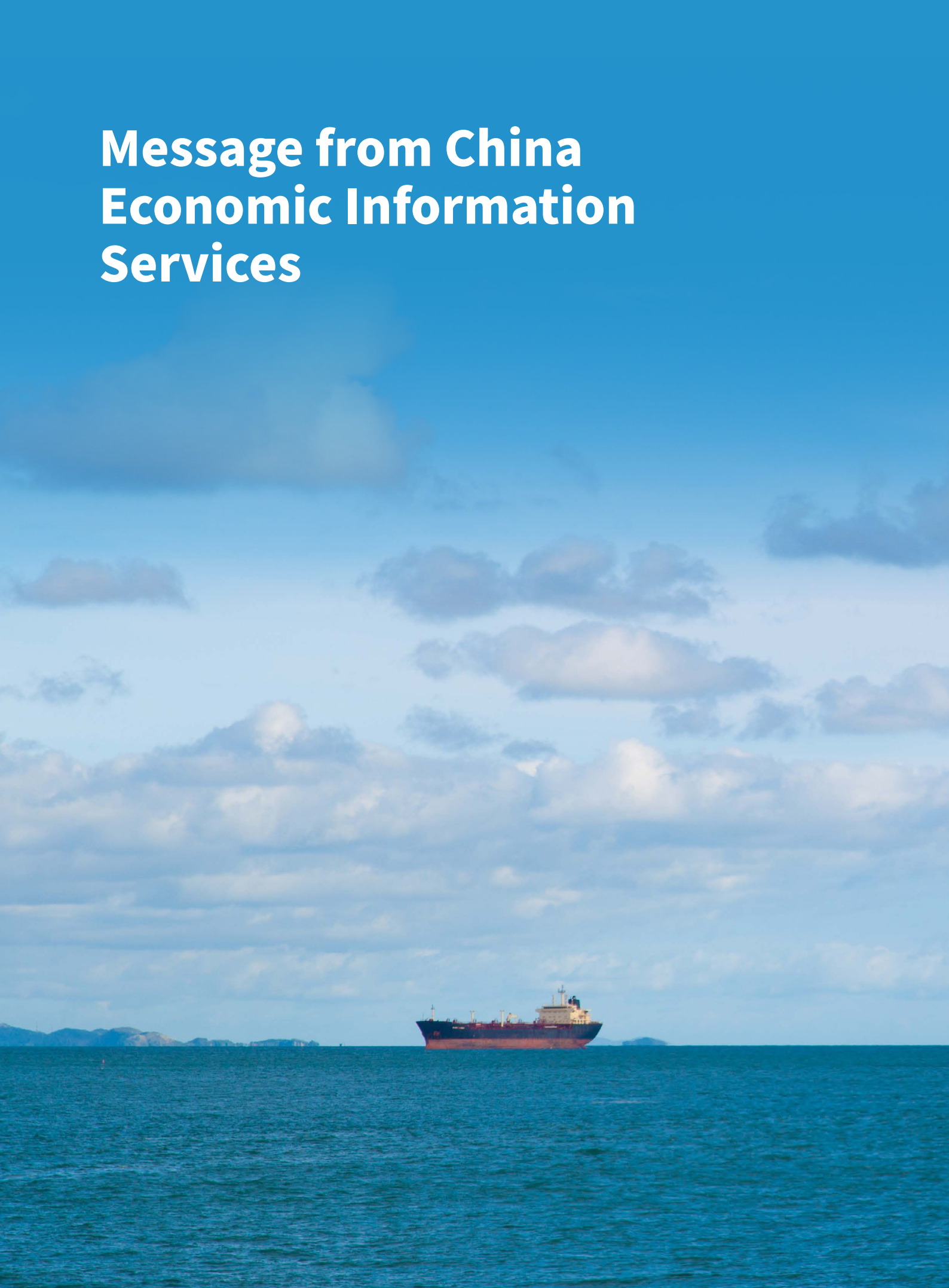
Despite the international nature of the maritime industry and the uptake of digital solutions, it seems that physical location still matters. All centre that feature in the top 10 have their own strengths, but equally, they all have the necessary infrastructure to attract and retain business. Many are desirable locations to live in, have access to talent and provide a range of services to shipowners and charterers. Whilst some boast a huge transhipment port, others may offer world-class legal finance, legal, shipbroking, IT and classification services.

The Index is built on numerous datasets to offer an independent benchmark of maritime centre across the globe and the report is a reflection of how all these aspects of shipping come together to support global trade.

We hope this report sheds some light on the merits and ambitions of some of the most noted maritime centre and encourages governments to see the value of maritime sectors within their economies.

Mark Jackson
Chief Executive, the Baltic Exchange

Message from China Economic Information Services



In 2014, China Economic Information Services, in collaboration with the Baltic Exchange, introduced the first Xinhua-Baltic International Shipping Centre Development Index to the industry. Since its inception ten years ago, it has been gaining international influence.

An international shipping centre is an important port city with a range of key characteristics. These include excellent port facilities, advanced logistics systems and a key geopolitical location; it also has highly efficient shipping services as its core driver, as well as global shipping resources.

In the past decade, the world supply chain and also the industry chain of global shipping have undergone some subtle changes. Singapore, London and Shanghai had became the most important centres in the world and played a crucial role of ensuring the smooth operation of the global shipping system. Key Shipping Centres in Europe and North America have become stable. In particular, with the promotion of the "the Belt and Road" initiative and the RCEP agreement, regional economic and trade cooperation has become closer and Shipping Centres in the Asia Pacific regional play an increasingly important role in the global port and shipping supply chain.

In 2023, with the worst of the impact of COVID-19 behind us, geopolitical conflicts, changes in the supply chain pattern, reform of the international carbon tax system and other factors still have an inestimable impact on the development of the international maritime industry on all continents. Research shows that in response to changes in the international economic, trade, and maritime patterns, various Shipping Centres have strengthened logistics supply chain management and integrated the development of "port-industry-city", and vigorously promoted the formation of a combination port or port group development models with complementary resources and business collaboration with surrounding ports. At the same time, low-carbon operation and green development have been accelerated, and automation technology has been widely adopted to achieve technological empowerment

Each year we strive to make this research report as robust as possible. As such, we value and appreciate our readers' comments and feedback. Our Comprehensive Environmental Index aims to reflect, as accurately as possible, the differences between domestic shipping cities within a large country.

We welcome and encourage other ports and shipping centres to join us in a collaborative effort to explore how we can further develop international Shipping Centres. A collective industry effort is required to help promote a rational allocation of global shipping resources, enhance the movement of global commodities and support the scientific development of international Shipping Centre.

Editorial Board,
China Economic Information Services

A decade of top 10 Shipping Centres

Ranking	2014	2015	2016	2017	2018
1	Singapore	Singapore	Singapore	Singapore	Singapore
2	London	London	London	London	Hong Kong
3	Hong Kong	Hong Kong	Hong Kong	Hong Kong	London
4	Rotterdam	Rotterdam	Hamburg	Hamburg	Shanghai
5	Dubai	Hamburg	Rotterdam	Shanghai	Dubai
6	Hamburg	Shanghai	Shanghai	Dubai	Rotterdam
7	Shanghai	Dubai	New York/ New Jersey	New York/ New Jersey	Hamburg
8	Tokyo	New York/ New Jersey	Dubai	Rotterdam	New York/ New Jersey
9	New York/ New Jersey	Busan	Tokyo	Tokyo	Tokyo
10	Busan	Athens/Piraeus	Athens/Piraeus	Athens/Piraeus	Busan

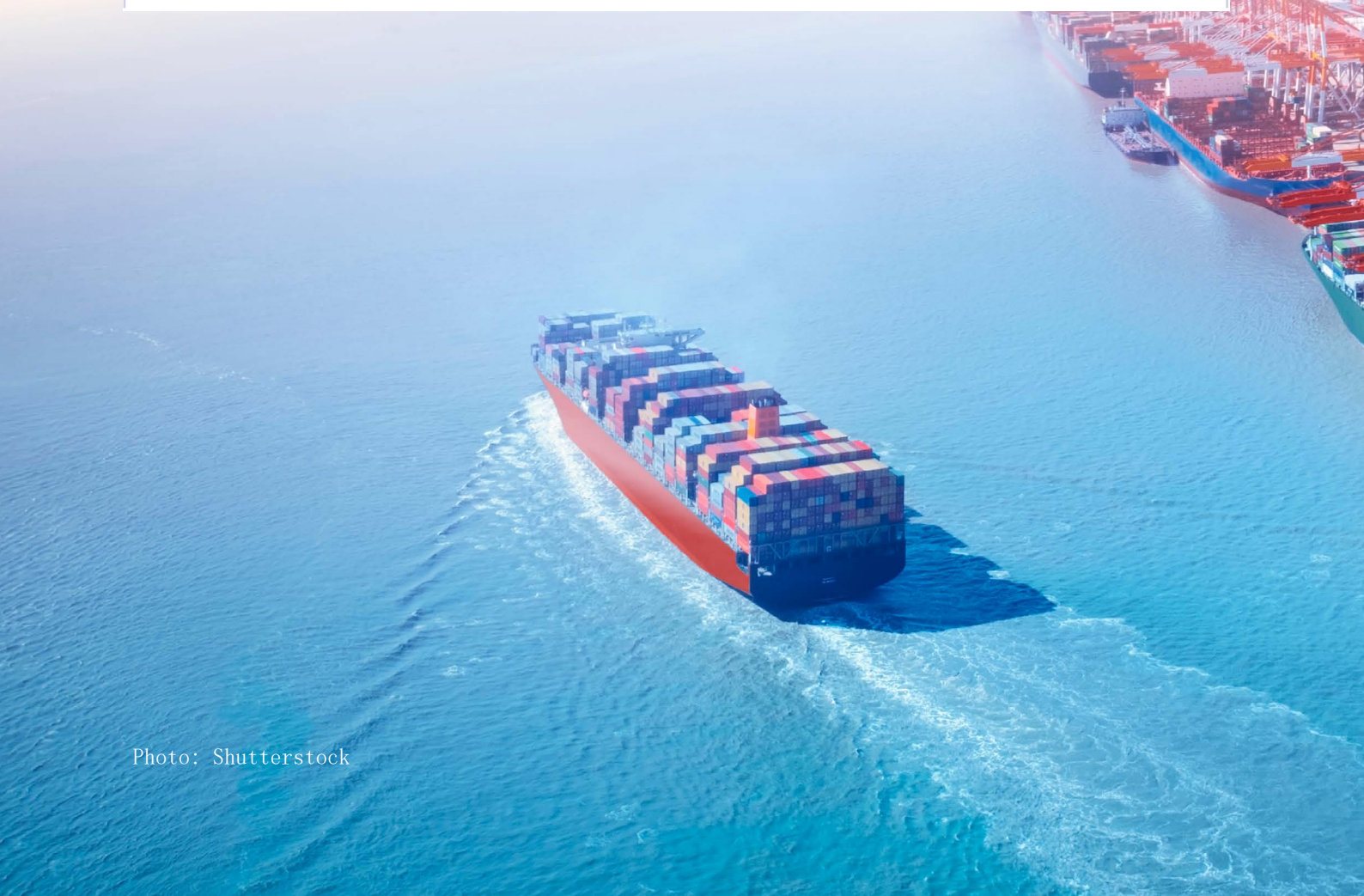


Photo: Shutterstock

Ranking	2019	2020	2021	2022	2023
1	Singapore	Singapore	Singapore	Singapore	Singapore
2	Hamburg	London	London	London	London
3	Shanghai	Shanghai	Shanghai	Shanghai	Shanghai
4	Hong Kong	Hong Kong	Hong Kong	Hong Kong	Hong Kong
5	London	Dubai	Dubai	Dubai	Dubai
6	Shanghai	Rotterdam	Rotterdam	Rotterdam	Rotterdam
7	Oslo	Hamburg	Hamburg	Hamburg	Hamburg
8	Tokyo	Athens/Piraeus	Athens/Piraeus	New York/ New Jersey	Athens/Piraeus
9	Dubai	New York/ New Jersey	New York/ New Jersey	Athens/Piraeus	Ningbo zhoushan
10	Busan	Tokyo	Ningbo zhoushan	Ningbo zhoushan	New York/ New Jersey

Asia rises

10 years of tracking Shipping Centre'success shows a shift from west to east

Photo: Shutterstock

The Baltic Exchange and Xinhua News Agency have been collaborating on the International Shipping Centre Development Index (ISCDI) for the past 10 years and the data that they have collected shows how the global trade map has evolved during that time.

For a decade, the two organisations have gathered data about key maritime centre, their strengths and what they bring to shipping. From legal to ship classification, cargo handling to insurance, the Xinhua-Baltic ISCDI delves into the nuances of what puts a shipping centre on the map.

Starting at the top, the standout in the maritime industry is Singapore with its well-established services sector, international outlook and huge transhipment port. It is the established number one service centre in this Index and no other city or region is in a position to topple it from the top spot, for the foreseeable future at least.

Hong Kong too has always been a reliable stalwart in the Index and whilst it has lost some ground over the years, it always sits at around three or four in the ranking.

Shanghai has grown steadily, and the shipping centre that was number seven a decade ago now sits firmly at third on the list and has done for the past four years. Further, Ningbo Zhoushan, situated close to Shanghai in the Yangtze River Delta, entered the top 10 list for the first time in 2021, and this year comes in at number nine, pushing the legal powerhouse of New York and its New Jersey port down into tenth place.

These movements up and down the ranking reflect the shift of trade from the western countries of Hamburg, Rotterdam, Athens and New York, once the centre of world trade, to Asia in general and the economic powerhouse that is China more specifically. The three Chinese maritime centre mentioned, represent nearly a third of the Index's top 10.

The Asian Shipping Centre of Busan and Tokyo have also made appearances in the top 10 throughout the years, and although their spots are not as secure – both hover around the lower end of the top 10, but are safely in the top 20 – they still stand tall on the world maritime stage. If we look further down this year's Index in the top 20, five maritime centre ranked between 11-20 are based in Asia, further demonstrating the shift from west to east.

World trade may be slowing slightly right now, but the economic centre of gravity is still heading eastward. According to the International Monetary Fund (IMF), Asia (including India), boosted by China's reopening, is expected to contribute around 70% of global growth this year.

The ISCDI will continue to act as a bellwether of maritime trade and service centre amidst changing global dynamics.

Shipping Centre and services data from the 2023 index report

Photo: Shutterstock

Overall rankings 2023

	Country	City	Vs 2022
1	Singapore	Singapore	→
2	UK	London	→
3	China	Shanghai	→
4	China	Hong Kong	→
5	UAE	Dubai	→
6	Netherlands	Rotterdam	→
7	Germany	Hamburg	→
8	Greece	Athens/Piraeus	↑
9	China	Ningbo Zhoushan	↑
10	USA	New York/New Jersey	↓
11	USA	Houston	↑
12	Japan	Tokyo	↓
13	China	Guangzhou	→
14	Korea	Busan	↑
15	China	Qingdao	→
16	Belgium	Antwerp	↓
17	China	Shenzhen	→
18	Norway	Oslo	↑
19	Australia	Melbourne	↑
20	USA	Los Angeles	↓

Singapore: a winning combination

The number one shipping centre is pushing forward on alternative fuels

Photo: Shutterstock

Singapore has swept the board once again. For the tenth year running the Xinhua-Baltic ISCDI has crowned the maritime island the world's number one shipping centre.

The Lion City's location is no doubt part of its success. Nestled in the centre of Southeast Asia and the region's fast-growing markets, and on the trade route between Europe and the global manufacturing superpower of China, Singapore sits at the centre of maritime commerce.

But more than that, over the past 80 years, Singapore has grown itself into an international-facing country, with the right frameworks and incentives to make itself attractive to business.

As a city with no natural resources, maritime has proven to be the silver bullet.

Connected to 600 ports in over 120 countries, Singapore's global network allows goods to be transported efficiently to anywhere in the world. Its port is one of the busiest in the world and in 2022, it handled 37.3 million containers.

It is the world's top bunkering hub and last year sold 47.9 million tonnes of fuel, including liquefied natural gas and biofuels. It is making progress in supplying alternative fuels, including methanol, ammonia, hydrogen and biofuels and sales included around 140,000 tonnes of biofuel blends, surpassing 16,000 tonnes of Liquid Natural Gas (LNG) bunker sales.

Meanwhile, its maritime professional services landscape rivals only London and New York.

It is home to some 20 local and international banks with ship finance portfolios, intermediaries as well as advisory firms. This network is complemented by a diverse suite of alternative financing options for the shipping industry, including maritime leasing and listing opportunities on the Singapore Exchange.

According to the Maritime and Port Authority (MPA) of Singapore, it aims to be a Global Green Ship Financing Centre, with a variety of diverse financial institutions offering wide-ranging green and sustainability-linked solutions and services from bank debt to private equity to capital markets and advisory services.

"There are already several workstreams underway to support this vision", the MPA told the ISCDI Report. "MPA has partnered with Monetary Authority of Singapore and the Green Finance Industry Taskforce to develop a taxonomy which defines activities that can be considered for green or transitioning financing. The taxonomy will provide a common language across the maritime and financial services sector on green shipping, which will help facilitate financing flows for maritime decarbonisation-

related investments in Singapore", it said.

The MPA is also developing financing mechanisms to help green the maritime sector. As an example, MPA will launch an Expression of Interest (EOI) to call for proposals on the design and development, demand aggregation and green financing for new electric harbour craft.

"This is envisaged to bring together various industry players such as manufacturers, harbour craft operators and financial institutions to help lower the cost of adoption and mobilise support for early adopters", the MPA said.

Further, more than 30 leading international shipbroking firms, over 30 law firms with a maritime practice, and as well as a number of prominent premium insurers are based on the island.

A total of 10 (of a possible 12) P&I clubs have offices in Singapore, with a growing pool of Lloyd's Syndicates writing marine lines of business. An important milestone for Singapore's marine insurance landscape was the launch of a Singapore War Risk Mutual in 2015. MPA has plans to further strengthen Singapore's offerings in marine insurance through co-development of cyber-insurance products.

It is hoped that these products will complement "the Maritime Cyber Assurance and Operations Centre, which aims to provide real-time, 24/7 security, monitoring and dissemination of cyber risk-related information to forewarn key maritime stakeholders such as port and terminal operators, shipping lines and marine service providers with digital systems", said the MPA.

Meanwhile, its law and arbitration sector continues to thrive. The Singapore Chamber of Maritime Arbitration (SCMA) has a panel of more than 130 arbitrators capable of arbitrating maritime-related disputes, such as maritime charter parties, commodities and offshore oil and gas (O&G), amongst others.

The future is green

Singapore is taking bold steps to decarbonise its maritime sector and aims to achieve net-zero emissions by 2050. To meet these targets, from 2030, MPA will require all new domestic harbour craft operating in the port waters to be fully electric, be capable of using B100 biofuel, or be compatible with net-zero fuels such as hydrogen.

To support this transition, MPA has developed the world's first marine biofuel provisional national standard for biofuel blends of up to 50% or B50. "MPA will progressively update this standard to include B100, and this is expected to be

completed by 2025", said the MPA.

MPA has also worked with the Energy Market Authority Singapore to publish an expression of interest for interested parties to build, own and operate an end-to-end low or zero-carbon ammonia power generation and bunkering solution. To help determine when Singapore will be ready to carry out ammonia bunkering, in May this year, a scenario-based workshop was held by the MPA, the Embassy of France in Singapore, and Innovation Norway, with the support of the European Union-funded project "Enhancing Security Cooperation In and With Asia", which attracted 70 industry participants from across 12 countries.

Singapore also aims to conduct its first methanol bunkering in Q3 this year (2023), in coordination with Maersk Oil Trading, Mitsui & Co, Mitsui & Co Energy Trading Singapore and the American Bureau of Shipping (ABS). "In preparation for this, MPA has been working very closely with the industry, research community and fellow agencies to develop safety procedures and standards", it told the ISCDI Report.

Further, in August 2022, MPA and the Port of Rotterdam signed a memorandum of understanding to establish the world's longest Green and Digital Shipping Corridor to enable low and zero-carbon shipping. This year, MPA, Port of Los Angeles, and Port of Long Beach signed an MoU to establish a corridor between Singapore and the San Pedro Bay port complex .

Onwards to Tuas

More than 10 years ago in 2012, the Singapore government announced an extensive plan to create a single location for Singapore's container handling activities, to reduce inter-terminal haulage operations and greenhouse gas (GHG) emissions.

While the port is on schedule to be completed in the 2040s, the first phase opened in September last year. When completed, it will be a fully automated container terminal, capable of handling 65 million TEU containers annually - "twice our current handling capacity", noted the MPA.

Automation and digitalisation are at the core of Tuas Port's operations and will feature full electric-automated rail-mounted gantry cranes and electric automated guided vehicles. It "will reinforce Singapore's status as an international maritime centre and enable many maritime companies in Singapore to flourish", said the MPA.

Such technologies will enable port equipment to be remotely controlled and monitored from an operations centre, improving safety, labour productivity and creating better jobs for port workers.

Further, Singapore's port operator, PSA, wants Tuas to achieve net-zero emissions by 2050. Plans to achieve this include using electrified equipment and vehicles, smart power management platforms and green buildings.

Smart technologies are being deployed to enhance digital connectivity at the port with the overall aim of achieving better efficiency and productivity. MPA has introduced digitalPORT@SGTM, designed to be a one-stop single window for port clearances and regulatory transactions. The MPA introduced the platform to enhance port efficiency, reduce ship turnaround time and cut GHG emissions by minimising ships'idling time at anchorages through just-in-time services and the Active Anchorage Management System (AAMS).

As port operations gradually shift to Tuas, the MPA expects vessel traffic to increase in scale, density and complexity. To further strengthen vessel navigational safety and efficiency as the hub port continues to grow, MPA is developing an artificial intelligence-enabled Next Generation Vessel Traffic Management System (NGVTMS) to replace the existing Vessel Traffic Information System (VTIS).

"With data analytics and machine learning to identify traffic hotspots as well as advanced algorithms to predict potential collisions, the NGVTMS will allow MPA to provide ship captains with more accurate and timely information to take early actions for navigational safety", said the MPA.

London retains its "competitive edge"

UK invests in decarbonisation to reach net-zero and grow its maritime sector

Photo: Shutterstock

London may no longer be a significant exporter of physical cargoes or a transhipment hub, but it is a world leader in professional services, and in no sector is this more evident than in the maritime space.

With a world-class maritime legal system, significant insurance presence, established financial sector and some of the biggest shipbroking companies both based in the city and making deals through the London market, it offers all the services required for shipping business. Baltic Exchange statistics show that UK-based shipbrokers transact around 30-40% of dry bulk and 50% of tanker fixtures.

A critical part of the ecosystem is English law, which is still the specified default in most shipping contracts. HFW, Clyde & Co, Watson Farley & Williams, Norton Rose Fulbright and Hill Dickinson as well as countless smaller firms advise on deals and disputes. Although this year saw one of the UK's oldest names in maritime law, Ince & Co, go into administration, the UK is still a leader in maritime legal services. English courts are still perceived as offering the highest possible standards of consistency and integrity.

Leading classification societies, including Lloyd's Register, are based in London along with the regional offices of nine other societies, accounting for 90% of the world's cargo-carrying tonnage, according to Maritime London statistics.

It is also the seat of the industry's regulatory body, the International Maritime Organization (IMO), home to many maritime associations, including the International Association of Classification Societies (IACS), Intertanko, Intercargo and International Group of P&I Clubs (IG), and is close to UK and European decision makers.

The UK does not take London's strong presence on the international maritime stage for granted and is actively promoting both the country and city as a place for the industry to do business.

A UK government announcement in May allows for more flexibility in the UK tonnage tax regime, increasing entitlement to capital allowance for shipping companies and allowing third-party ship management parties to join. The UK Chamber of Shipping welcomed the news, but also said in a statement: "To ensure our tonnage tax regime is world-leading, attracting further jobs and investment into the UK, we do need to see further reform including greater flexibility around how companies are able to opt into the regime".

Jos Standerwick, CEO of Maritime London, the industry-led body representing maritime professional services in the UK, is also optimistic about what the recent changes to the UK tonnage tax regime could mean for the UK. He told the Xinhua-

Baltic ISCDI report that "the opening of the election window is part of a series of measures to boost UK tonnage tax and retain the UK's system's competitive edge over similar regimes offered in other jurisdictions".

Meanwhile, the government has several initiatives underway, most of which are geared to both industry growth and decarbonisation. Last year, the UK transport department set up an office with £206 million (US$257 million) at its disposal to invest in research and development to tackle sustainable shipping. Called UK Shore, it will also help develop infrastructure to build the new vessels, as well as focus on the sustainable energy needed to power them including hydrogen, electricity and ammonia.

In February it was announced that UK Shore and the Engineering and Physical Sciences Research Council (EPSRC) are jointly allocating £7.4 million (US$9 million) for a competition to establish a flagship national Clean Maritime Research Hub. The project will be match-funded by the winning university and provides an opportunity for academia and industry to work together to help decarbonise shipping.

Maritime London also continues to work with government to "leverage new forms of guarantees to help with some of the commercial issues we're experiencing, partly in the context of competitiveness whilst decarbonising", said Standerwick. He referenced a December 2022 joint industry and academic report that highlighted the challenges, which offers guidance on "some of the mechanisms which could be deployed to provide security for businesses against investing in zero-carbon assets". The report is currently working its way through government.

As one of the founding signatories to the Clydebank Declaration, the UK government has a keen eye on green corridors. Green corridors showcase zero-emission fuels and technologies along maritime trade routes between two or more ports.

"I expect green corridors, both international and domestic, with UK government involvement to come online in the not-too-distant future", said Standerwick, adding that these act as "lightning rods" for investment and provide a test bed for new technology and fuels.

The offshore wind farm sector is also being boosted by government policy following an announcement in 2021, with £160 million (US$199 million) of government money earmarked for investment in port and manufacturing infrastructure.

Other government activities to encourage investment include the Maritime Capability Campaign Office (MCCO) set up in 2022 to support the refreshed national shipbuilding strategy. MCCO will target export opportunities "worth up to £600 million over the

next five years", said a government statement.

At time of writing, London International Shipping Week (LISW23) was around the corner (September 2023) and Standerwick said to "watch out for a number of significant announcements highlighting clear partnership between industry and government as we tackle some of the biggest challenges in the market".

"While there is always more to do, in general, we are experiencing a positive shift in how the government views the UK in relation to international shipping".

All about arbitration

"English law is near ubiquitous in international shipping contracts", said Standerwick. "Year on year we see the continued growth of referrals conducted under London Maritime Arbitrators Association (LMAA) terms and English arbitration remains dominant globally. Further, the LMAA is doing an excellent job, where appropriate supported by Maritime London, in promoting the advantages of English arbitration globally", said Standerwick.

Standerwick says in support of arbitrating in London: "Firstly, circa 80% of arbitrations are paper based. Secondly, [whilst] the global pandemic has also opened the door to virtual or hybrid arbitrations, in-person arbitration still takes place for the biggest disputes, where the new London International Dispute Resolution Centre (IDRC) provides genuinely world-leading facilities. Lastly, the wealth of shipping case law, the flexibility of ad-hoc procedures and the availability of the right to appeal on commercial points of law mean that London is the natural 'seat' for maritime arbitrations".

Shanghai: back open for business

The east China city is building itself up as centre for shipping that goes beyond port logistics

Photo: Shutterstock

With COVID-19 behind us, China's most cosmopolitan and commercially-focused city is reintegrating itself back into the global economy. Boasting the biggest port in the world and with business-friendly policies, an educated population and a modern, vibrant city, it is no surprise that Shanghai is being primed to become China's premier international shipping centre.

Shanghai and Ningbo Zhoushan ports are both situated in the Yangtze River Delta economic circle and are integral to plans to promote the region. Already a significant manufacturing hub, the Yangtze River Delta is considered an important gateway to the Pacific Ocean and of great strategic significance for government plans to open up central and western areas of China and link them to the coast. Further, the government is promoting economic integration in the region to boost it as a centre of business and trade, including maritime.

Shanghai is central to many of these plans including the re-development of an existing business district in the west of the city into Hongqiao International Open Hub - an international business and trade centre due to be completed in 2035. According to a government press release, it hopes to attract businesses to create trade, digital, high-end services, fashion, life sciences technology, automobile and low-carbon energy business clusters.

The Chinese government announced in late 2022 that it will "provide a more market-oriented, law-based and internationalised business environment for foreign companies, seeking to invest and do business in the country".

It's a statement supported by World Bank data, which listed China amongst a small group of economies whose 'ease of doing business' has improved the most. According to the World Bank's most recent Doing Business report, published in 2020, China has introduced reforms across corporate income tax, cross-border trading, enforcing contracts, resolving insolvencies, starting a business and dealing with construction permits.

Meanwhile, the Port of Shanghai, which has been ranked as the top port globally for container throughput for the past 13 years, continues to go from strength to strength.

Situated at the borders of the Yangtze River and facing the Pacific Ocean, Shanghai port is key to China's 'Belt and Road' initiative – a huge series of China-led infrastructure projects dotted about the globe to further link East Asia and Europe.

The Shanghai International Port Group (SIPG)-operated site handled 47.3 million TEU in 2022, a 0.6% increase on the year before. Its strategic location is coupled with the dual benefits of being a deep-sea port on the East China Sea and a river port on

the Yangtze. It features 49 container berths, three break-bulk terminals and two bulk cargo terminals.

Plans were unveiled in September last year to add further capacity with ¥50 billion (US$7.2 billion) in investment to build a new terminal in Yangshan, one of the three main container terminals that comprises the overall port. The project, scheduled for completion in 2030, will increase capacity and boost the terminals' river-to-sea intermodal shipping with seven new 70,000-tonne class berths and 15 20,000-tonne class berths.

To further integrate its cargo handling offering, SIPG introduced in 2020 the Yangtze River Port and Shipping Blockchain Integrated Service Platform. "With the aim of promoting online and offline collaboration between ports, shipping companies and cargo operators, the platform will enable real-time tracking across the logistical chain, increase operational efficiency of all stakeholders and lower the overall shipping costs, thus empowering the ecosystem and adding value for all", said SIPG in a statement.

The initiative is part of a wider push to make Shanghai the global capital for digitalisation by 2035.

Meanwhile, in February it was announced that a global cruise cluster would be developed in Pudong to the east of Shanghai. The cluster will be centred at Waigaoqiao Free Trade Zone – established in 1990 and the first free trade zone (FTZ) in China. The aim is to develop the FTZ into a "world-level cruise manufacturing and assembling base by 2025, with its service scope covering China and reaching the whole of Asia. The FTZ will be further developed into a global cruise industry cluster by 2035", said Shanghai Free Trade Zone (SFTZ) in a statement.

Looking beyond infrastructure and the port, Shanghai continues to bolster its presence as a shipping centre with an increasing focus on services and international collaboration.

Over the past few years, the country has emerged as a leading player in marine insurance. According to the International Union of Marine Insurance (IUMI) 2022 report, China now accounts for 14% of the cargo market – the single biggest provider of marine insurance – with Japan coming in second with an 8.4% market share.

Further, most top shipping-related companies and organisations have a presence in Shanghai. It's a top spot for ship management companies and most of the top 10, including V.Group, Anglo-Eastern and Bernhard Schulte have offices in the city, as do the majority of the 11-strong membership of the International Association

of Classification Societies, including China Classification Society (CCS). Numerous container liners and international shipping organisations have a presence in the city, including BIMCO, the Baltic Exchange and International Maritime Organization (IMO) Asia Maritime Technology Cooperation Center.

Most recently, in January, the China Shipowners' Association (CSA) joined the UK-based International Chamber of Shipping (ICS). The association, which moved from Beijing to Shanghai in 2016, said: "China Shipowners' Association's participation in the ICS will provide Chinese shipowners with a stepping stone, who can contribute to globalisation by constructing a safe supply chain and making the Chinese shipping industry heard. Chinese shipowners will grow together with other international maritime companies".

Shanghai is also seizing opportunities to adopt more sustainable and environment-friendly practices. French liner heavyweight CMA CGM is now using ship-to-shore power for 13 of its vessels during calls at the port, with more connections set to be available later this year. In February 2022,Shanghai became the first Chinese port to offer Liquid Natural Gas (LNG) bunkers and in March this year, SIPG signed a Memorandum of Understanding with Maersk to cooperate on a methanol marine fuel project. "The two parties will join hands to explore green methanol fuel vessel-to-vessel bunkering operation after Maersk's green methanol container vessels being delivered in 2024", said the Danish shipping company in a statement.

It has also entered into a partnership with the US west coast Port of Los Angeles to develop a green corridor between the two locations.

Hong Kong: looking up, whilst facing west

Hong Kong to create an action plan to entrench its status as an international maritime centre

Photo: Shutterstock

Hong Kong is busy rejuvenating its position as a world-renowned maritime services centre. The city finally emerged from COVID-19 era restrictions on 1 March this year ready o reverse its declining economy and defend its position at fourth place in this year's Xinhua-Baltic ISCDI ranking.

The maritime sector is key to Hong Kong. Although 2019 figures show it only contributes 1.1% of Hong Kong's Gross Domestic Product. (GDP), equating to HK$30.8 billion (US$3.9 billion), it underpins the trading and logistics sector which is worth approximately one-fifth of its GDP.

The Chinese government is actively working to further improve Hong Kong's place on the maritime map, as demonstrated by a 19 April announcement confirming the establishment of a Task Force on Maritime and Port Development Strategy. By the end of 2023, the task force will be expected to put forward an action plan on strategies to further promote the development of Hong Kong as an international maritime centre.

The task force initiative was originally announced in February by Hong Kong Financial Secretary Paul Chan in his budget speech with US$2.5 million allocated to promote the maritime services sector.

Task force members include experts for the shipowning, shipping, marine insurance, maritime arbitration, tax and commodity trading policy research sectors and will be headed by Bjorn Hojgaard, CEO of ship management company Anglo-Eastern, which was founded in Hong Kong nearly 50 years ago and manages over 600 vessels on behalf of owners.

They will be expected to develop ways to grow the internationally facing ship finance, marine insurance, maritime arbitration and ship management sectors.

Plans to support the global maritime and port industries to work towards zero emissions and digitalisation also fall under its remit.

The task force will also seek ways to enhance exchanges across the Greater Bay Area (GBA) – a 56,000 km2 integrated economic area, which includes Hong Kong and Macao and the nine municipalities of Guangzhou those being Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen and Zhaoqing in Guangdong province.

Operating under the Chinese government's policy of 'one country, two systems', Hong Kong is the most international city in the GBA and plays a key role in the government's vision for the region. The plan is for Hong Kong to help facilitate the development of industries, in which it is already established (such as finance and other professional services, transport and trade) within the GBA area, "capitalising on

Hong Kong's strengths to serve the country's needs", said the GBA website.

One area for potential growth is the marine insurance industry, and the GBA, with Hong Kong's professional services background, would be the ideal location to develop this sector. Favourable tax measures for marine insurance companies introduced in 2020, support this vision and the International Union of Marine Insurance (IUMI) already has a presence here.

At Hong Kong Maritime Week in November 2022, the Hong Kong Permanent Secretary for Transport and Logistics, Mable Chan, said that Hong Kong should be viewed "in the context of the whole GBA and how our international connectivity can add favour to our international competitiveness of the port cluster in the GBA".

As Hong Kong continues to develop in line with GBA ambitions, it is also keen to maintain a strong international presence. To showcase itself as once again open to tourism, this year the Hong Kong government gave away 500,000 free airline tickets to travellers from all over the world.

More specific to shipping, in July 2022,the Hong Kong government announced that qualifying ship agents, managers and brokers would benefit from half-rate profits tax concessions (equivalent to a tax rate of 8.25%).

A spokesperson for the Transport and Logistics Bureau said, "As these businesses serve to facilitate ship ownership and operation, which also generate demand for other maritime business services, fostering the development of shipping commercial principals in Hong Kong is conducive to the growth of our shipping business and maritime cluster".

Hong Kong's position as a leading maritime service centre is being challenged, as other centre jostle for market share to grow their hubs. But its long legacy as a maritime nation is holding up.

According to Hong Kong Maritime Hub's database, it has around 50 ship agents, nearly 40 ship management companies, 30 maritime consultants, nearly 20 maritime law and insurance firms and many brokers and class societies. 11 of the 12 members of the International Group of P&I Clubs (IG) maintain an office presence here. Its efficient port situated in the South China Sea on one of the busiest trade routes in the world, a strong maritime services sector and a proactive government, along with its international outlook will set it in good stead for years to come.

Dubai: quick off the mark

Its strategic location and business-oriented outlook has fast-tracked the Emirate to international maritime hub status

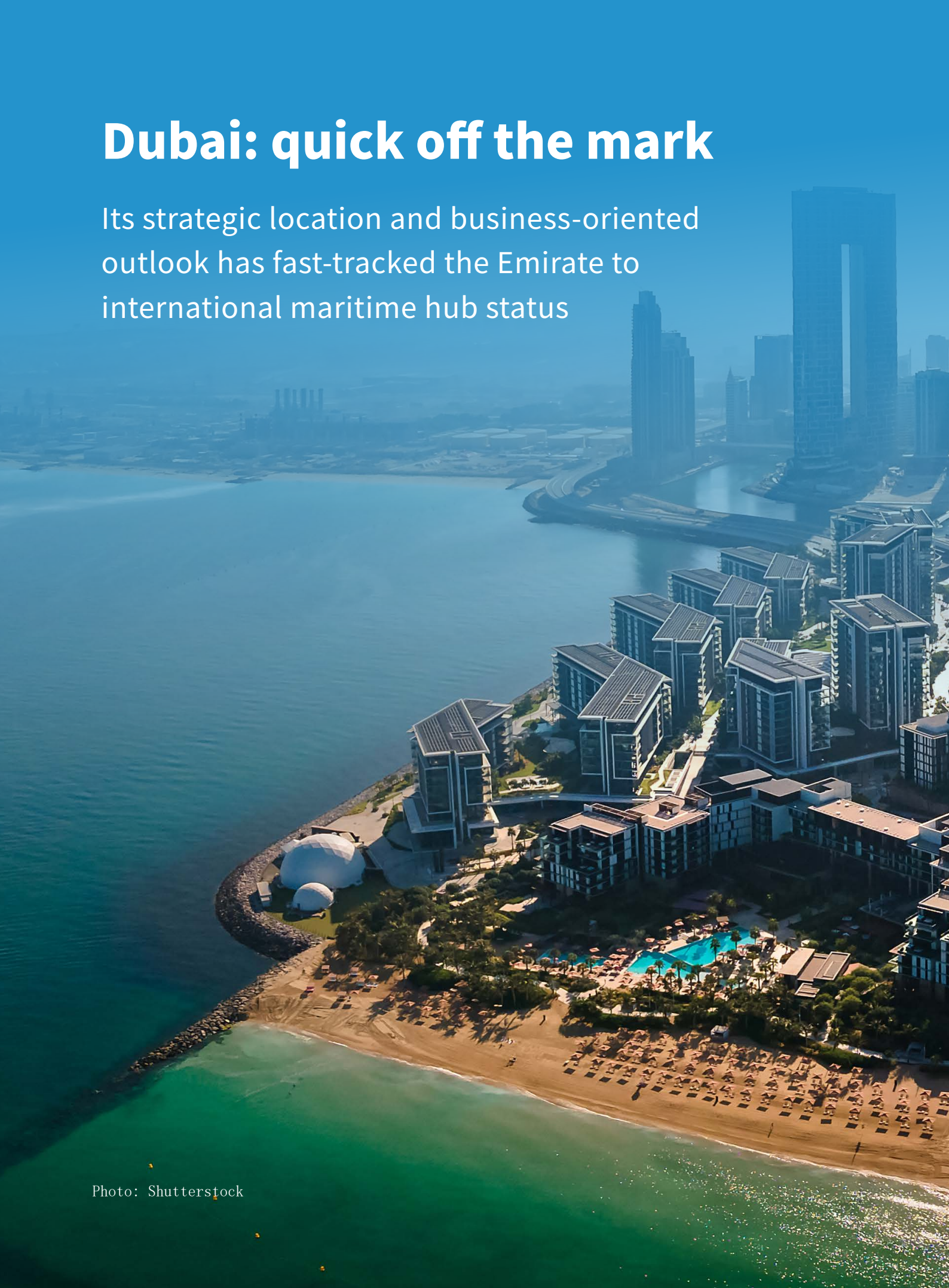


Photo: Shutterstock

Dubai is not a place where time stands still. Its rapid development since the discovery of oil in the late 1950s is a good example of what can be achieved if money and vision come together. Nationally, the ports across the United Arab Emirates (UAE) saw more than 25,000 vessel calls and handled more than 19 million TEUs in 2022.

As a relatively young country that's quick to adopt emerging technology, when the UAE sets its sights on something it tends to happen with an opulent, state-of-the-art, flourish.

Dubai's man-made Palm Islands and Burj Khalifa, the tallest building in the world,and the UAE's appointment in 2017 of the first-ever minister of artificial intelligence (AI) are all testament to its modern approach to building its economy.

According to the US International Trade Administration, "The UAE has already begun integrating AI with industries such as education, healthcare, space, transportation and aviation. AI is a key part of the ambitious plans of the UAE government to diversify their economy and become a knowledge economy".

This business-oriented attitude is what drives Dubai's position as a world-class maritime hub and is, at least in part, the reason it has retained its position at number five in the Xinhua-Baltic ISCDI report for the past four years.

Aside from its strategic location between east and west – one-third of the world's leisure destinations and business hubs can be reached within a four-hour flight and two-thirds within an eight-hour flight – Dubai has put measures in place to make it an attractive place to do business.

It's a strategy that continues to deliver. According to Dubai's Ports Customs and Free Zone Corporation (PCFZC), the "increase in maritime companies for Q1 2023 of 12%" compared to Q1 2022.

"Dubai is seen as a highly appealing location for maritime business", PCFZC told the Baltic-Xinhua ISCDI report".We are seeing strong growth driven by positive regulations and incentives of Maritime sector in Dubai; specific initiatives to attract and sustain international companies; flexible legislation; 100% ownership; and no tax on personal income".

Why Dubai for maritime? Its world-class ports – Jebel Ali handled 14 million TEU in 2022, its location at the centre of a major oil region and near the Arabian Sea and ease of doing business all count in its favour.

Its dry dock facilities are popular. Dry Docks World Dubai completes over 300 projects

a year on average at its shipyard located next to Port Rashid. The yard is spread over 200 hectares and includes three graving docks and a floating dock, as well as more than 3.7 km of berth space.

When it comes to international investment, the government has reduced barriers so that companies can easily set up their businesses. "An entirely different set of rules and regulations are applicable to foreign investors who want to set up business in Dubai", said PCFZC. Paperwork is minimal and procedures are fast-tracked to support an easy and seamless company setup, licensing and registration process".

Earlier this year,the Emirate established legal changes in a move partly designed to enhance its status as a trade hub, attract foreign investment and improve maritime security. Dubai Maritime Authority, which is responsible for regulating the shipping and maritime sector in Dubai, is now also affiliated with PCFZC.

Speaking at the Maritime Government Leaders Roundtable during UAE Maritime Week in May 2023, Anders Østergaard, Secretary General of Emirates Shipping Association which represents companies in the region and CEO of bunker firm Monjasa, said: "The capabilities of the UAE's maritime sector are well known all over the world. Ranked 3rd globally in facilitating seaborne trade, 7th in container handling capacity and 12th in efficiency of seaport services; the nation continues to stay at the top of international charts. These numbers would have been impossible to achieve without detailed discussions and careful planning of our strategies and initiatives to ensure success. As a result of our sustained efforts, the UAE has become a preferred destination for international maritime businesses seeking to expand their operations globally, by leveraging the strategic advantages of the Middle East and the wider Asia-Pacific region".

UAE Maritime Week also saw the UAE Ministry of Energy and Infrastructure launch the 'Blue Pass' project to further boost the region's maritime business cluster. Blue Pass uses an online portal and smart app that connects maritime companies operating in UAE's ports and territorial waters so that services can be transparently offered to others in the region.

"We are confident that the Blue Pass project will contribute to enhancing the UAE's maritime reputation", said Suhail bin Mohammed Al Mazrouei, UAE Minister of Energy and Infrastructure. "Our destiny is to connect the world and be its top maritime hub. We are keen to enhance the sustainability of the maritime sector and reward all companies and ships that adopt green practices so that the project becomes an incentive for building a cleaner maritime sector".

Other benefits include 100% foreign ownership for onshore companies in the UAE –a policy introduced in 2021–and no personal income tax. Companies can also access the Dubai International Arbitration Centre (DIAC), an autonomous non-profit institution that provides regional and international business communities with arbitration services.

Further, in May this year Dubai Maritime Authority introduced a new directive, which aims to promote best commercial practices and fair competition across its maritime sector, and enhance transparency of local sea container charges.

Its multicultural community and high-class housing and accommodation also play to its favour.

Rotterdam looks past the port

The gateway to Europe seeks to expand its professional services presence

Photo: Shutterstock

Rotterdam, located at the mouth of the Rhine River, presents itself as the 'maritime capital of Europe' and in many ways it is. Home to the largest port in Europe, its 2022 throughput was 467.5 million tonnes, much of which is transhipped to the European hinterland, the UK and beyond.

It has an established petrochemical and oil industry, with five refineries and more than 45 chemical companies, all based in its chemical cluster. It was one of the first ports to introduce automation at its terminals and Maasvlakte 2, built on reclaimed land and was one of the most advanced automated terminals in the world when it opened in 2013. Earlier this year, APM Terminals confirmed that it would be increasing capacity at Maasvlakte 2 by around 2 million TEU by late 2026.

Meanwhile, it is future-proofing itself with projects in hydrogen as a fuel, circular value chains and green and digital corridors. It has set itself substantial sustainability targets and aims to be carbon-neutral by 2050.

A pioneer in sustainability, digitalisation, hinterland logistics and technology, the North Sea port was up until 20 years ago the busiest in the world. And although the neighbouring port of Antwerp in Belgium 100 km south is challenging the port's status as the EU's busiest, that title still sits with Rotterdam for the time being at least.

But there is more to Rotterdam than its port. The city is keen to expand its status as a professional maritime service entre and according to city-port partnership Rotterdam Maritime Capital (RMC), there are more than 150 companies in the cluster.

Professionals from the fields of finance, insurance, tax, classification, surveying, arbitration and shipbroking, amongst others, all feature in the hub. Many of these companies are members of the Rotterdam Maritime Services Community which works to promote the area and create exposure and networking opportunities.

One strong sector is insurance and RMC says that Rotterdam is amongst the top 10 global insurance markets. "It is the only insurance market, other than the UK, that operates a co-insurance system".

Meanwhile, its high-quality education in tax affairs and economics supports its position as a recognized maritime tax hub. "There are numerous firms advising on issues related to the maritime sector and international tax planning", said RMC.

It also has a legal ecosystem. Rotterdam Court has a special Maritime Chamber and shipping and trade arbitration institutions, including alternative dispute resolution institution UNUM, which can be used to settle disputes in Dutch, English and German. Furthermore, efforts are being made to boost its arbitration sector through promotion of the UNUM rules, which offer an alternative to English rules.

Hamburg develops partnerships

The port city strengthens ties with China and seeks to build its maritime talent to meet skills gap

Photo: Shutterstock

Hamburg port and city owe their good fortunes to the Elbe River on which they are situated 100 km upstream from the North Sea. The port is the country's largest and the third largest in Europe. In the first quarter of 2023, it handled 28.1 million tons of cargo at its 75 terminals.

China is the country and port's main trading partner. US$320 billion were traded between Germany and China, up around 21% from 2021, according to data from the German statistics office.

At the Port of Hamburg, around 30% of goods handled are either going to or coming from China.

It is for this reason that in May, the German government decided to strengthen cooperation between the two nations with approval of a 24.9% minority shareholding for Chinese company COSCO Shipping Ports (CSPL). The decision will enable Hamburger Hafen und Logistik AG (HHLA) to press ahead with the transaction with COSCO for a stake in HHLA's Container Terminal Tollerort (CTT).

In a statement, HHLA said that "the decision will now enable CTT to be expanded into a preferred handling location for HHLA's long-standing customer COSCO, where freight flows between Asia and Europe will concentrate.

"CSPL's minority shareholding thus secures employment and boosts Hamburg's national and international importance as a logistics hub as well as Germany's position as an industrialised nation".

The port city is also eyeing opportunities to grow its maritime sectors. Germany is a significant shipowning nation and owns 10.7% of the world fleet's containerships, making it number one by number of vessels. Further, it owns 6.8% of small dry bulk carriers, 2.3% of bulkers and 2.3% of tankers.

It also sits amongst the main maritime financial centre in Europe, along with others such as Antwerp in Belgium and Oslo in Norway.

Central to the campaign to promote the cluster is the German Shipowners Association (VDR). In an update on the state of the German shipping sector, it highlighted the need to "strengthen Germany"s ability to compete as an international shipping hub, to intensify efforts to train and secure young men and women for the sector, to operate the German merchant fleet in a climate-neutral manner by 2050 and to safeguard Germany's access to free, safe sea routes and global trade".

Managing director Martin Kröger commented that the maritime skills gap can no longer be met by well-trained young workers and that safeguarding maritime know-

how in Germany for the future is vital.

"This is why we, as the VDR, are proclaiming 2023 the 'Year of Training'. We need to get a lot more talented young men and women interested in maritime shipping again".

Meanwhile, the city will welcome the maritime industry once again next year at one of the biggest and most established maritime trade fairs - the Shipbuilding, Machinery and Marine Technology trade fair (SMM). The biennial event attracts around 30,000 visitors and 2,000 exhibitors from over 100 nations to the port city.

Athens: building on strengths in shipownership

Technology also makes its mark on Greek shipping

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The Greeks know a thing or two about shipping. As the biggest shipowning nation in the world, maritime is enshrined within their culture and according to a 2020 Deloitte report, represents around 6.6% of the country's Gross Domestic Product (GDP). Over 1,000 shipping offices have their headquarters in Athens and the wider region of Attica.

Greek shipping is a vital component in the facilitation of world trade. Figures from the Union of Greek Shipowners (UGS) in August show that 5,520 ships, approximately 21% of the world fleet, are owned by Greeks, with market share increasing since 2014.

By vessel type, they control nearly 32% of tankers, 25% of dry bulk carriers, just over 22% of Liquid Natural Gas (LNG) carriers and nearly 9% of containerships.

The Greek government has long supported its national shipowners with preferential tax treatment. The headline tax rate is 5%, but in 2022 the Greek shipping community voluntarily contributed more than US$62 million to the state budget. Addressing its annual gathering in February, UGS's president Marina Travlos said that shipping foreign exchange reached € 20 billion (US$21.8 billion) in 2022, noting that investments in the shipping sector and other sectors of the national economy created hundreds of thousands of jobs.

Themis Vokos, the influential founder of Posidonia, Greece's main maritime trade fair adds: "The Greek government has demonstrated a commitment to the maritime sector, implementing policies and regulations which enable business and streamline procedures and the establishment of a legal framework conducive to maritime activities, which has resulted in attracting companies and investments to the cluster".

It is the huge base of large and small shipowning and management companies that underpin Athens' and Piraeus' status as a leading global maritime hub.

Recent years have shown immense development and growth of Greek marine equipment and marine IT companies. The Hellenic Maritime Equipment Manufacturers Association (HEMEXPO) has showcased immense growth in recent years, by adding new companies, innovative products and new solutions into its portfolio and managing to get on the maker's list of established international shipyards, including shipyards in Korea. The Greek start-up ecosystem includes a plethora of IT companies which develop maritime-specific solutions and contribute to enhancing productivity levels of shipping companies, meeting environmental challenges, lowering expenses such as fuel consumption and spearheading the transition to alternative fuels.

Meanwhile, the country's pro-tech government is driving a plan to fully digitalise the

country by 2025 and bring standards up to the highest European level. Its efforts have led to major investments into the country by big-name US firms such as Microsoft, IBM, Digital Reality, Amazon and CISCO.

Prime Minister Kyriakos Mitsotakis described the country's achievements to date in technology, data and communications and as an incubator of innovative new startups as a "small revolution". Within five years, he said, Greece's technology sector will account for 10% of GDP, he told Enterprise Greece.

The Greek capital, Athens, is now home to a growing number of technology companies.

Greece has a highly educated workforce, and according to Enterprise Greece which promotes the country's trade and investment opportunities, it "boasts one of the highest ratios of STEM – science, technology, engineering and math – graduates among OECD countries". Further, maritime expertise is constantly being encouraged through the universities of Athens and nearby Piraeus, which both offer specialist maritime courses.

It's no surprise that as a shipping-focused nation, a selection of new technology is geared towards application within the industry. Bid2board, Nereus Digital Bunkers, MarineTraffic, DeepSea, Metis, HarborLab and ProcureShip are all Greek success stories. However, as Themis Vokos explains, "It's important to note that as the landscape is dynamic, new players emerge regularly".

Indeed, some of these companies have been spawned by established shipowning families that see an opportunity to do things differently. Ioannis Martinos, from the family that owns tanker company Thenamaris and set up Signal Group, a ship management and data company, is one example.

"I have seen a definite shift in the mindset of the Greek shipping community over the past five years", says Antonis Malaxianakis, CEO and founder of Greece-based maritime software provider, Harbor Lab. "Even the most conservative companies are beginning to realise the commercial possibilities that digitalised processes and technology can offer. As shipping companies make capital investments in emissions reduction technology in light of new regulations, they are looking to save money elsewhere. New processes supported by software can definitely help streamline workflows and reduce costs. It's a win-win situation", he said.

Meanwhile, the country has embarked on a privatisation plan for many of its ports. The most well-known is Greece's main port of Piraeus, situated about 7km away from Athens and one of the largest ports on the Mediterranean Sea. In 2016, China's COSCO

Shipping brought a 51% stake in the port, and then in 2021, it gained another 16%, making its total stake in the port today 67%. In 2018, a 67% stake in Thessaloniki on the north-east coast was sold to a German consortium.

More recently in April, Greece handed over operations for the port of Igoumenitsa in northwestern Greece, to an Italian-Greek consortium, says Enterprise Greece, "and drawn strong interest from investors in the central Greek port of Volos as part of its privatisation plan for the country's regional ports".

At Piraeus port, throughput numbers are increasing under its new owners. COSCO Shipping announced earlier this year that the port had a "new historic record high in revenue and profitability". Its container terminal saw a 5.4% increase in containers handled.

Piraeus Port is also focusing heavily on the cruise industry sector and is growing in status as a homeport hub for many cruise lines. Construction of a new cruise terminal is underway which, when completed, will be able to host the world's biggest cruise ships. In 2022, 880,000 passengers passed through the port.

Ningbo Zhoushan's rise continues

The region plans to be a modern shipping service centre by 2027

Photo: Shutterstock

For the second year running, the port city of Ningbo Zhoushan has made it into the list of top 10 Shipping Centre. Its rise is at least in part due to its strategic position on the Chinese east coast, approach depth, port facilities and development potential.

The ports of Ningbo and neighbouring Zhoushan merged in 2006 and since then have together been growing at an exponential rate. It is now the busiest port in the world in terms of cargo tonnage – in 2022, it handled 1.261 billion tonnes of cargo, an increase of 3.1% over the same period last year.

Its position in this year's ranking is almost entirely due to these impressive figures. Although the port can already receive some of the largest (420,000 dwt) crude oil carriers, has three berths capable of handling 400,000-tonne ore carriers, and can accommodate the largest containerships, plans are underway to increase capacity.

Meanwhile, the region is also looking beyond the port and eyeing opportunities to develop itself into an international shipping centre.

Located in the coastal province of Zhejiang, Ningbo has the support of the provincial government to become an "international maritime services base", Ningbo Shipping Exchange told the Xinhua-Baltic ISDCI.

Zhejiang "has put forward the goal that by 2027, Ningbo and Zhoushan will become a major port and shipping logistics centre and a modern shipping service base in the world", said the company.

Plans include the further development of the China (Zhejiang) Pilot Free Trade Zone (FTZ), launched in 2017. According to the Zhejiang government website, the regulations surrounding the FTZ were revised last year to make it "further aligned with advanced international rules, create a high-quality market-oriented, law-based and international business environment, attract business and promote the introduction of projects, so as to help Zhejiang Pilot Free Trade Zone achieve high-quality development".

Ningbo Shipping Exchange says that over the next five years, ¥250 million (US$36 million) will be allocated to support the development of a modern shipping service industry, while ¥300 million will be available to support the development of the maritime service industry.

The plan is to facilitate investment and trade in the region, encourage the development of a high-end industry cluster, maintain a well-regulated, legally compliant environment and attract financial services.

"In addition, it will aim to deliver significant improvements in the global allocation of bulk commodities, particularly oil and associated products. It will also play a key role in establishing a free trade port area meeting international standards", says Ningbo Shipping Exchange.

Ningbo and Zhoushan have also formulated policies to attract and retain port, shipping and maritime services talent. Last year. Ningbo launched the Yongjiang Talent Introduction Programme, which is focused on the introduction of talent and projects in the fields of science and technology.

The programme aims to reform the whole cycle of talent innovation and entrepreneurship, and "expedite the building of a precise talent service system", said Ningbo Shipping Exchange. "Relying on specialised colleges and training institutions, scarce interdisciplinary talent in shipping finance, shipping insurance, maritime law, port and shipping logistics fields will be cultivated in an accelerated manner".

A 2021 action plan to "Strengthen Weak Links of the Port and Aviation Service Industry" also aims to boost the region.

Meanwhile, the port remains central to its overall vision. Ningbo Zhoushan Port's impressive cargo figures put it first in the world in terms of tonnage throughput, for last year and the previous 14 years. From a container throughput perspective, which in 2022 amounted to 33.35 million TEU representing growth of 7.3% year on year, it ranks third.

Growth is still firmly on its agenda however as it continues to take "multiple measures to boost the sustained and steady development of the port", said Ningbo Shipping Exchange.

These measures include additional port service capacity, including seven new berths (including three container berths able to accommodate vessels of over 10,000 gross tonnes) in 2022 alone. It now has 205 berths, 39 of which are container berths, some of which can accommodate some of the largest vessels in the world.

Ningbo Zhoushan is using technology to help maintain its position and has developed an automated container terminal management system, promoted the use of electronic port business documents and taken the lead in "building container import and export and sea-rail intermodal transport into paperless container business", said Ningbo Shipping Exchange.

The port is also continuously optimising its container liner network, and at the end of 2022, the total number of routes that stopped at Ningbo Zhoushan reached 300,248 of which were international routes.

External cooperation is also cited as a key component to its growth. According to Ningbo Shipping Exchange, the port has equity partnerships with China Merchants Port Group and Shanghai International Port Group (SIPG) to jointly facilitate wharf construction projects and deepen cooperation with a number of sectors including mining, manufacturing and photovoltaic enterprises.

It has also actively built specialist exchange and cooperation platforms and industrial introduction platforms for the port and shipping sectors, strengthened exchanges and partnerships with upstream and downstream players in port-related industries and expanded the influence of Ningbo City and Ningbo Zhoushan Port.

Now with an established port, the region is expanding its presence to build a shipping centre that will also rival, older more established centre. It has the government backing, space, expertise and access to talent needed to meet its 2027 goal to be a global, modern shipping service base.


ROYAL PRINCE

Indomitable New York

The US powerhouse stands strong as a significant port and maritime service centre

Photo: Shutterstock

New York's success as the trading capital of the world stems from a naturally deep harbour and the strategic location of its port. Over the past 400 years, it has grown into one of the biggest ports in the US by container throughput and competes only with the west coast Port of Los Angeles.

In 2022, the port handled almost 9.5 million TEU and over 3.5 million tonnes of bulk commodities. 31.9% of all North American east coast container traffic was handled via New York/New Jersey and it enjoyed a 16.4% market share nationally. These figures set a new record for the port. 2023's figures to date remain strong, with 5% more cargo moved in May 2023 than in May 2019 and 1.6 million TEU handled.

In shipping centre terms, New York is not just Manhattan, but also areas of the state of Connecticut, particularly Stanford and Greenwich, which are easily reached and have long been home to a thriving community of shipbrokers, owners and charterers. New York is a significant international maritime services hub, with particular strengths in the finance, marine insurance and arbitration sectors.

It is the only US shipping hub to appear in the top 10 of this year's Xinhua-Baltic shipping centre development index.

Today the New York maritime cluster is comprised of over 250 shipping companies, says New York-based Society of Maritime Arbitrators, adding that it is the "world's best tax haven for a foreign shipping company to base its operations if it qualifies for exemption under US tax laws or a US treaty".

According to Capital Link data, nearly 60 shipping companies are listed on the New York Stock Exchange and NASDAQ combined. Companies including Liquid Natural Gas (LNG) carrier CoolCo, dry bulk owner Himalaya Shipping, Heidmar and Toro Corp are all new listings for 2023. However, in recent years the market capitalisation of shipping companies listed in New York has declined as some of the larger companies including DryShips, Atlas and Hoegh LNG have been taken into private hands.

From an insurance perspective, New York has a well-developed body of statutory and reasoned decisional insurance law which according to local maritime association NYMAR, "addresses issues of bad faith, coverage, attorneys' fees and jurisdiction and has judges who are readily conversant with marine insurance. Many aspects of marine insurance are exempt from state regulation, in part due to successful lobbying by marine interests over the years".

The port and city together act as a central pillar in New York's economy and, according to 2017 statistics from the NYC Economic Development Corporation (EDC), the port alone supported 400,000 jobs in the region.

New York has more than 300 venture capital firms, and more than 25,000 tech-enabled startups, supported by over 200 co-working spaces and 100 accelerators and incubators. Furthermore, it is "home to more Fortune 500 companies than any other city in the world", says EDC, and has "long been a global leader in traditional 'anchor' industries, including financial services, insurance, healthcare, media and fashion retail and manufacturing".

Elsewhere in the index

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Qingdao: China's eastern gateway

Strategically situated in Shandong province on the Yellow Sea in east China, sits the port of Qingdao. Surrounded by some of the biggest ports in the world – it's 700 km north of Ningbo Zhoushan, 440 km southeast of Tianjin and 330 km south of Dalian and 800 km west of the Korean port of Busan – Qingdao is ranked 15th in this year's Xinhua-Baltic ISCDI and is amongst the biggest ports in China and the world.

Qingdao has been owned and operated by Shandong Port Group (SPG) since 2019, along with three other ports – Rizhao, Yantai and Bohai Bay. According to SPG, the four ports together create "the world's largest port group in terms of throughput", which totals around 1.4 billion tonnes.

Xinhua Silk Road Information Services says the four ports together handle cargoes on 327 container routes and 82 sea-rail combined transport routes, reaching around 100 countries and regions.

The SPG's integrated group approach to cargo handling is part of its success, with "Qingdao port as the leader, Rizhao and Yantai ports as the two wings, Bohai Bay Port being an extension and numerous inland ports as the support", said SPG.

The company's overall goal is to develop its East China site into a world-class maritime port and is focused on smart and green initiatives, as well as providing efficient operations as evidenced by its investment in automation. It announced last year that its fully automated container terminal had achieved an average efficiency of 52.7 containers/hour for a single crane "setting a new world record for the eighth time".

The third phase of the automated terminal is scheduled to complete this year.

This box handling capability may be useful as the port grows its throughput, which according to maritime publisher Informa was 23.7 million TEU in 2021, a 7% increase on the previous year.

Further, reports suggest that in 2021 Qingdao started trialling the first 'hydrogen + 5G' crane technology, reducing carbon emissions for each container by around 3.5 kg and sulfur dioxide emissions by 0.11 kg.

SPG is establishing international collaborations and in May it opened a European arm in the port city of Rotterdam and in February a southeast Asia arm in Singapore. These activities are in line with SPG's aim to develop itself from a port operator to services provider.

Qingdao has a strong relationship with the US, especially Long Beach and in 1985 the two cities established the Long Beach Qingdao Association to foster friendship and trade between two sister cities.

Japan: Growing through technology

Japan, small in land mass (378,000 km^2) but with a large coastline (340,000 km), has more ports than any other country in the world. Of its 300-plus ports, however, only a handful are considered major ports, including Tokyo, Osaka and Kobe. The country's biggest however is Nagoya on the south coast, situated 160 km east of the capital, Tokyo.

An industrial city, Nagoya is the home of vehicle company, Toyota, and a significant amount of cargo handled by the port are cars. These are shipped internationally with the biggest importing nations being the United States (US$32.9 billion), China (US$8.85 billion), Australia (US$7.17 billion), Saudi Arabia (US$3.38 billion) and Canada (US$3.35 billion), according to figures from the Observatory of Economic Complexity (OEC).

Meanwhile, the total cargo throughput at the Port of Nagoya in 2022 was 164 million tonnes, of which 108.76 million tonnes, was international trade, said Nagoya Port Authority in a statement, down 6.9% on the previous year. "Major export items were completed automobiles, automobile parts, industrial machinery, steel materials and miscellaneous chemical products. Major import items were Liquid Natural Gas (LNG), crude oil, iron ore, coal and wearable items", it said.

Further west in Osaka Bay sits Kobe, the seat of Japan's shipbuilding empire. Whilst Japan has lost market share over the past decade to China and Korea, it is still in the game. Clarksons data shows that in 2022 Japan had a 17.2% stake in vessel completions, compared to Korea, with 29.6% and China with 46.6%. Japanese shipbuilding heavyweights include Kawasaki, Mitsubishi and Imabari - the latter of which in early 2023 announced it had built the world's first ship using low-CO2 (carbon dioxide) steel.

Japan has a good reputation as a technologically advanced nation and ranked 13th in the 2022 Global Innovation Index. Many household names such as Nintendo, Sony and Toshiba are based in the country and are a testament to its pioneering spirit. This, along with its world-class shipbuilding capabilities enabled it to launch last year the Soleil ferry, which made the first 100% autonomous voyage.

Looking to the capital city and the location of the country's second-largest port, Tokyo ranks 12th in this year's Xinhua-Baltic ISCDI. It dropped one place down from 11th, where it narrowly missed a place in the top 10 last year. The city has an established arbitration commission overseen by the Japan Shipping Exchange and is home to the Japan P&I Club and one of the leading classification societies, ClassNK.

Japan is one of the top three shipowning nations in the world along with Greece and China. According to the Japanese Shipowners' Association, the country has more than 130 shipowning companies, including well-known names such as NYK, "K" Line, Mitsui O.S.K. Lines (MOL) and ONE. The country's fleet is young and utilizes new technology to achieve reduced fuel consumption and greater efficiencies.

Always with one eye on technological opportunities, a group of 10 Japanese companies, including ClassNK, Mitsubishi Heavy Industries and "K" Line have come together to establish the Maritime and Ocean Digital Engineering (MODE) cooperation programme at the University of Tokyo. The plan is to create "a cooperative simulation platform for sustainable maritime logistics", said a statement issued by Mitsubishi Heavy Industries.

It is hoped that the initiative will support the country's maritime industry as it tackles challenges such as "developing and implementing new technologies in the context of global decarbonisation, maintaining shipping services by integrating autonomous ships to assist seafarers and improve safety and ensuring high productivity among increasing complexity in ship design and manufacturing process", said the statement.

Oslo: Rising up

Lower down the ranking, the maritime hub of Oslo leapt forward by four places to land 18th in the index. It swapped places with Copenhagen of Maersk and APM Terminals fame, which fell to 21st place.

With a coastline of 2,650 km, the second-largest in the world, Norway is an old, established shipping nation. It has 12 main ports, with Oslo the biggest. According to Statistics Norway,around 1,600 vessels are owned by Norwegian companies, representing around 3% of the global fleet. Norwegian owners are prominent within the offshore service sector, oil tankers, bulk carriers, chemical tankers, gas (LNG/LPG) carriers, tankers, car carriers, cruise operations, and include companies such as ro-ro shipping company, Wilhelmsen; bulk liquid carrier, Odfjell and dry bulk carrier Spar Shipping.

In turn, these companies have spawned a wider maritime hub. Around 58 shipbrokers have a presence in the country, as well as insurance and financial services. 40 maritime companies with a combined market capitalisation of close to €20 billion are listed on the Oslo Stock Exchange (OSE), which is part of the Euronext Group. This is

up from less than 30 companies just a few years ago. It is also the home to the world's largest class society, DNV, as well as shipyards, ship equipment manufacturers, maritime education and research and development. It has an arbitration presence governed by the Nordic Offshore and Maritime Arbitration Association (NOMA), which was established in 2017.

Norway, like other Nordic countries such as Denmark and Sweden, has long been considered a sustainability pioneer. Its power system was developed on hydro in the 19th century, says Business Norway, and provides 96% of electricity.

It's no surprise then that Norway is one country championing shipping's decarbonisation. The Norwegian Shipowners' Association (NSA) has been lobbying the International Maritime Organization (IMO) to ban fossil fuels by 2050.

Norway's domestic and shortsea shipping sector has already invested in new energy options, with many vessels now powered by battery technology.

Like Japan, it is also developing technology for automated shipping. Chemical company, Yara and technology company, Kongsberg, both Norwegian, have an autonomous and zero-emission container vessel in operation, Yara Birkeland.

According to Yara, the new vessel will reduce diesel-powered truck journeys by 40,000 every year, and "reduce Nox (nitrogen oxide) and CO2 (carbon dioxide) emissions, improve road safety, reduce road dust formation and traffic noise. The zero-emission vessel will transport mineral fertilizer from Yara's production plant in Porsgrunn, Norway to the regional export port in Brevik".

The country is also looking for opportunities to reduce emissions in the deep sea, including using biogas, hydrogen and ammonia.

Busan: Further developments

Strategically situated at the tip of the Korean Peninsula on the Sea of Japan, Busan port sits between China and Japan. The port is made up of five separate ports overseen by Busan Port Authority (BPA), with a combined throughput of 22 million TEU in 2022. The newest arrival is the Busan New Port, which opened for operations in 2006. The high-tech, deepwater port with five terminals was developed to accommodate the growing cargo volumes at nearby North Port and to attract new cargoes and transhipment volumes.

Busan New Port's 23 container berths can handle over 10 million TEU annually. It has

a water depth of over 17m and can handle vessels of up to 19,000 TEU. Busan North Port, Korea's first international trading port, could be the site of World Expo 2030 if Korea is successful in its bid to host the exhibition.

Busan is now one of the busiest ports in the world and ranks 14th in the Xinhua-Baltic ISCDI, up two places from last year.

The government's ambitions for the port city don't end there. In 2019, it announced plans to invest more than $35 billion in up to 12 of the country's ports, including Busan, over the next 20 years. Plans include the development of two new ports. Of the overall amount, nearly a third would be allocated to Busan to help it compete with Shanghai and Singapore.

Busan is home to the Korean Register, a fast-growing classification society which in 2022 classed in excess of 80 million gross tonnage of shipping.

It's Houston's time

The energy capital of the world is boosted by expanding shipping and green energy sectors

Tucked away in Galveston Bay off the Gulf of Mexico sits Houston, whose port has been at the centre of the US oil and gas (O&G) industry since the 1900s. Its rise to prominence as an important exporting port for these commodities is due to its naturally deep harbour and close proximity to the Texas O&G fields – the state is the country's largest producer of both and Houston is the second largest exporter of crude oil in the US after Corpus Christi.

Over the past decade, Houston's imports may have slipped but its exports have increased, buoyed in recent years by growing oil markets in Europe. It is also expanding its container cargo sector, handling 7% of the US container business. It is the US fifth busiest container port, handling 3.9m TEU in 2022. It is the biggest exporter of petrochemicals in the US, accounting for 42% of the country's petrochemical capacity. The Houston Ship Channel complex and its more than 200 public and private terminals, collectively known as the Port of Houston, is the nation's largest port for waterborne tonnage. The Port of Houston supports the creation of nearly 1.35 million jobs in Texas, 3.2 million jobs nationwide and economic activity totalling US$339 billion in Texas.

Look beyond the port environs and you'll see a city, once synonymous with O&G,

that is diversifying and undergoing a shipping renaissance. Lured by its attractive tax policies – Texas has no personal income or corporation tax – relaxed land use policies and a pro-business environment, companies – shipping and otherwise – are moving to Houston.

"Companies from New York, Connecticut and Chicago to name a few, are all moving to Houston to take advantage of these favourable conditions. It's a compelling location to do business these days", Paul Mazzarulli the Baltic Exchange's US representative told the Xinhau-Baltic ISCDI Report.

The city's evolution began in the 1990s when, after the oil price shocks, carbon-dependent Houston decided to diversify away from energy. As such, Houston created the right environment to encourage medical and research companies to base their businesses there and it now boasts one of the world's largest life science campuses.

"It's a similar scenario right now with shipping", Mazzarulli continued. "The competitive costs of running a business here in Houston and its position as the world-leading energy hub makes it very attractive. Shipping companies moved to Houston and so brokers followed", as did services such as legal, finance and insurance.

"Once it starts it gathers momentum", he said.

Notable shipping companies with a base in Houston include Maersk, COSCO, MSC, OOCL, Stena Bulk, Clipper and Teekay.

"Until the 1970s, lower Manhattan was the place to be, then it moved to Connecticut in the 1970s/80s and in the early 2000s, companies started gravitating towards Houston", said Mazzarulli.

Considered the de facto energy centre of the world, Houston is using its experience in O&G markets to leverage itself as a leading green energy hub. According to an Inside Climate News report published in March this year, Texas is the largest US generator of clean energy. In wind and solar power alone it can generate 131,118 gigawatts/hour (of which nearly 120,000 gw/h is wind powered). This is compared to the state of California, which ranks second according to the US Energy Information Administration, with a current capacity of 57,927 gw/h – less than half of the overall total of Texas.

In turn, Houston has become a centre for startups and venture capital investing in the region's green energy future.

It's been further boosted by a Biden-Harris proposal announced in February this year for an offshore wind lease sale for three areas in the Gulf of Mexico, offshore from Texas and the neighbouring state of Louisiana, amongst other wind industry targets.

Further, it is recognised as a leading hub in clean hydrogen. It has ample green energy and natural gas, both of which can be used to create hydrogen. It also has established production capacity and access to innovators and academics.

According to a report published last year by consultancy company McKinsey, "The Gulf Coast is positioned to be the centre of a clean-hydrogen US export hub, given the region's ability to potentially compete with likely major exporters (for example, Australia, Chile and Saudi Arabia) on the delivered cost of hydrogen by leveraging its cost advantages and significant port infrastructure".

Meanwhile, one of the challenges to ensuring the success of these economies is to train and attract people with the right skills. Various initiatives have been launched including UpSkill Houston – a company-led collaboration created to help close the current skills gap. According to its website, "Houston's skills gap has reached critical proportions among middle-skill jobs - those that require more education and training than a high school diploma but less than a four-year degree. Of Houston's 3.6 million jobs, 1.4 million — or approximately 40% — are considered middle-skill positions".

But it has the potential to close these gaps. "It's a city that is growing at a phenomenal rate", said Mazzarulli. "It may be the fourth-largest city by population right now, but by 2025 it will have eclipsed Chicago, currently the third-largest city. It's also one of the most diverse cities in North America, after only Vancouver and Toronto, and the most diverse in the US with a growing Latino, Caribbean and African population".

Container market review

Photo: Shutterstock

The container shipping market peaked in early 2022 and has over the past 18 months gone through first a normalisation process, then a dip below normality in terms of freight rates and now appears to head towards a slight rebound even though there is an outlook for overcapacity ahead.

Operationally, the market disruptions caused by pandemic bottleneck effects resulted in 14% of the global capacity not being available at the beginning of 2022. By late spring 2023, this had reduced back to around 3% which is in line with what is normal. Hence, from an operational perspective, the global shipping markets have fully normalised. There were still disruptions such as the strikes which emerged on both the US and Canadian West Coasts. Whilst these were indeed operationally disruptive, such impact must also be said to be part of the normality in container shipping markets.

In terms of freight rates, the market reached its maximum in late 2021 driven by a severe lack of capacity. As an example, the spot rate from Shanghai to Los Angeles peaked at around 12,500 USD/FFE (forty-foot equivalent unit). For comparison the spot rate in the same market was on average around 1,600 USD/FFE in 2019. Before the pandemic. In 2023, the spot rate continued to decline to a bottom below 1,600 USD/FFE and then staged an increase during July back above 2,000 USD/FFE.

The challenge is that summer is the traditional peak season which ought to boost demand, and hence freight rates. However, by end-July 2023 the markets appear not to have yet felt any material peak season. For the US, a key part of the problem is that despite negative freight volume, development since September 2022 has failed to materially lower the inventory levels for the US importers. The strengthening of the freight rates during July was therefore not driven by demand but was instead driven by a significant withdrawal of capacity. Towards the end of June, the container lines announced a significant amount of cancellations of otherwise planned sailings in July and,by the end of that month, 16% of planned sailings were cancelled.

In the Asia-Europe market, the freight rate development largely followed the same pattern as seen in the Pacific. However, it failed to see an increase in July. Instead, the pace of rate declines abated and the levels stabilised. The data also shows that the carriers did not cancel as many sailings in this trade as they did in the Pacific.

A third of the large east-west trades is made up of the Atlantic trade. This trade was resilient in terms of freight rates which remained at an extremely high level until end-2022. Then a process began and during June and July 2023 rate levels fell rapidly and substantially below pre-pandemic levels. This is a behavioral pattern seen often before in the industry. The extremely high rates prompted container lines to

inject additional capacity and in the absence of a strong demand decline served to undermine freight rate levels. Even during July, when rates went 40% below pre-pandemic levels,there was still no concerted effort by container lines to cancel sailings.

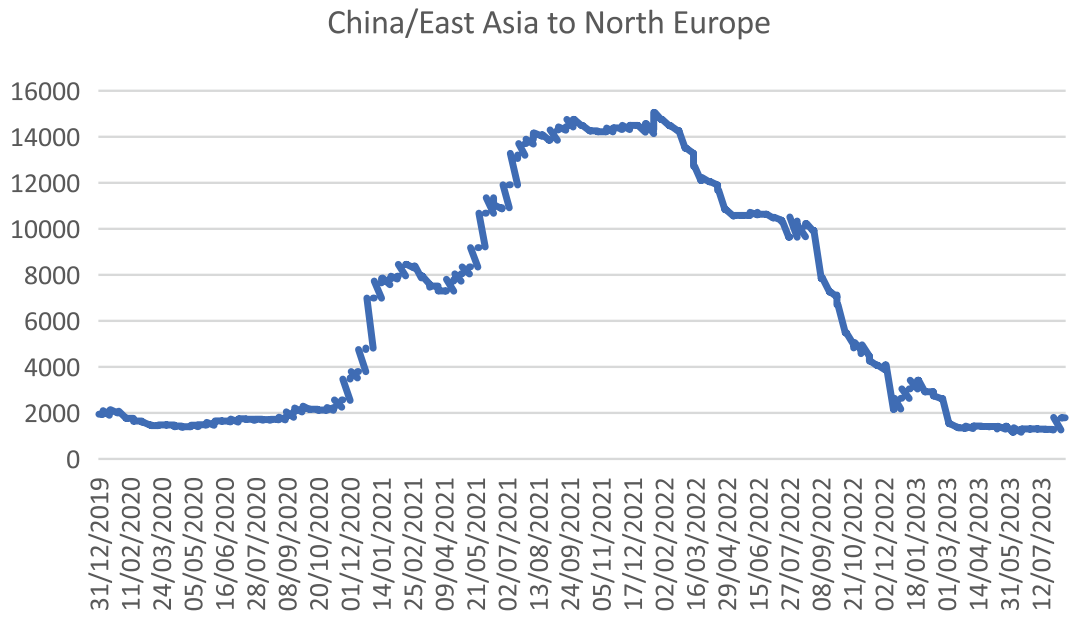
In the first seven months of 2023, the capacity of the global container vessel fleet grew 5.6% and at the same time, demand was slightly negative. Going forward, 2023 will see the additional injection of 2-3% capacity and 2024 is poised to see another 8-9% capacity injection.

During spring and early summer (April to July) 2023, carriers increasingly began to slow down their vessels as well as insert additional port calls on existing services. This leads to a situation where more vessels are needed to maintain the existing service networks – and hence absorb part of the overcapacity. Overall, this means the market is still heading for a capacity-driven cyclical downturn in 2023 - 2024 but the severity is likely to be somewhat curbed due to these effects.

Another important element to note is the announced break-up of the 2M alliance from the beginning of 2025. This is already now having an effect with for example Mediterranean Shipping Company (MSC) launching stand-alone services in the Asia-Mediterranean market without participation from Maersk. Additionally, MSC is seen to be rapidly growing in market share, increasing the competitive pressure in the market. It must be expected that the shake-up will also spread to Ocean Alliance and THE Alliance. Ultimately, this will lead to a market where there are still alliances, or similar large-scale vessel-sharing agreements, but the partnerships and carrier constellations will undergo a change in the coming years.

An operational element which made a market entry in 2023 was unusually low water levels in the Panama Canal. This led to restrictions on vessels passing the canal. This problem is likely amplified by the El Nino weather phenomenon and must therefore be expected to become even worse in 2024. For container lines, this likely means a shift of some vessel deployments to favour the longer routing via the Suez Canal instead. This routing would be more stable and from a carrier perspective have the added benefit of needing more vessels – and hence absorb part of the coming overcapacity.

The final element to notice is the introduction of carbon emission taxation in the European Union (EU) from 2024. This will add significant costs to all carrier services to and from the EU. Customers need to prepare for the introduction of new surcharges to cover this new cost already from 2024.



Source: Baltic Exchange. FBX 11: Spot rates for 40ft container

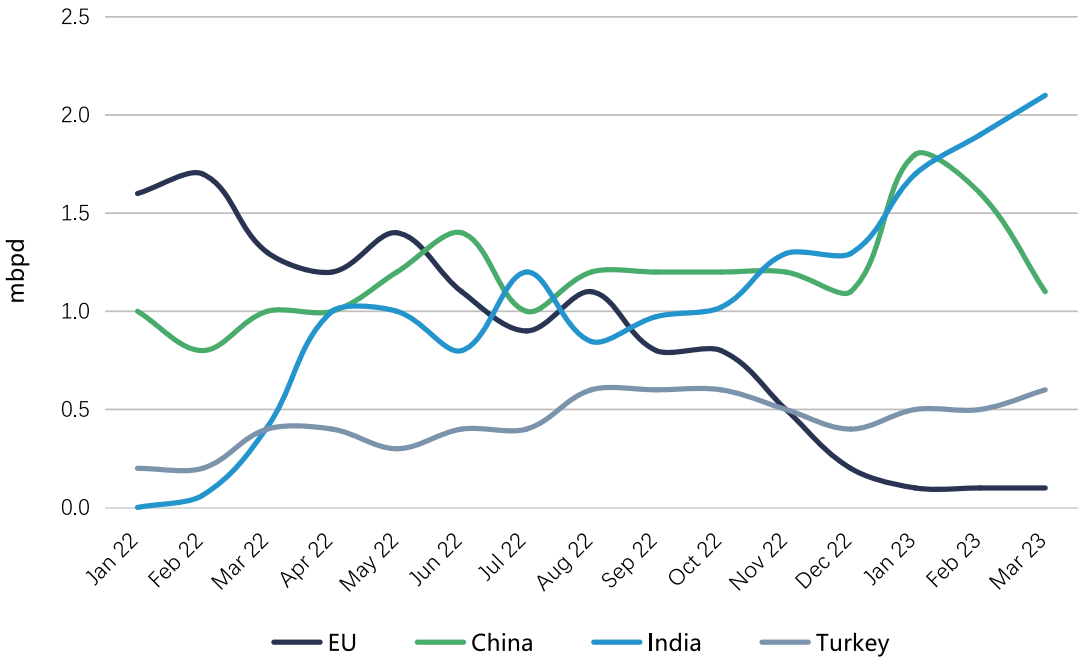
Positive outlook for LNG and crude oil carriers

Tim Power, managing director, head of maritime advisories at Drewry, considers energy trades in the wake of Russia-Ukraine conflict

Photo: Shutterstock

At the time of outbreak of Russia-Ukraine conflict on 24th February 2022, Europe was heavily dependent on Russian gas and the European Union (EU) was the largest market for Russian crude oil. Since that date, sanctions progressively reduced European imports of Russian energy, leading to a significant reordering of global energy trades. In 2022, China's demand suffered from the effects of COVID-19 and resulting lockdowns. The overall effect was significant uncertainty in energy markets.

All about arbitration

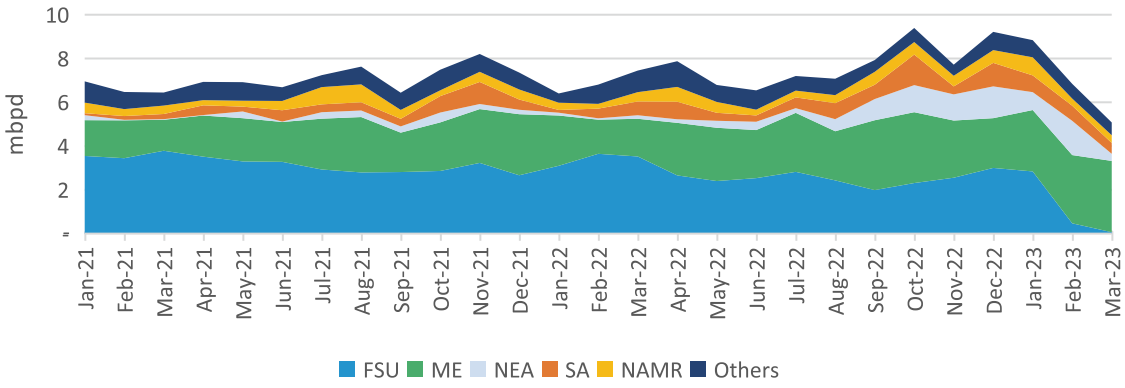


Russian exports of crude oil by main destination (2022-23)

The most obvious change in crude oil markets has been the progressive decline in Russia's exports to Europe and the increase in export volume to Asia.

In January 2022, Russia exported 1.6 mbpd (million barrels per day) to the EU. This volume fell sharply in March and continuously thereafter. In March 2023, volume to EU was only 0.1 mbpd. While it was expected that Russia would increase crude exports to China, the very rapid growth in exports to India was more surprising; volume reached 2.1 mbpd in March 2023.

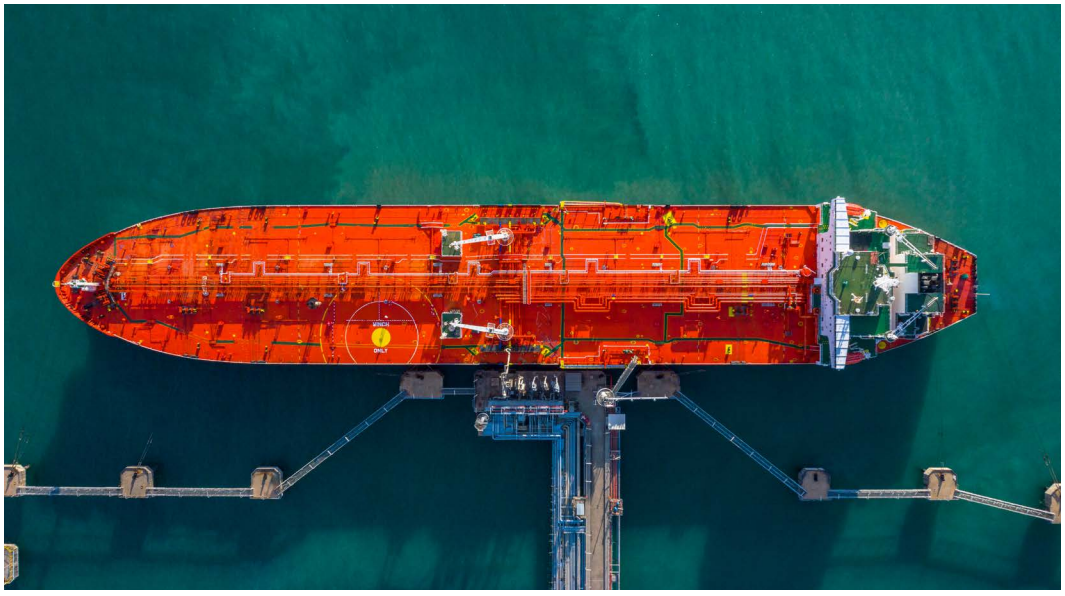
While Russia has to seek alternative export markets, the EU needed new sources of supply, although demand growth fell in Q1 2023. The major contributor was the Middle East while significant volume also moved from North East Asia and South Asia in Q4 2022.



EU crude oil imports by main source (2021-23)

We expect that the overall result of this reordering of global crude oil trades will be a significant increase in tonne miles: in 2022, tonne miles increased by 2.9%; we expect tonne mile growth of 5.4% in 2023 and beyond.

Long haul eastbound crude trades from the FSU (former Soviet Union) and US are predicted to increase significantly, driving higher tonne miles. Middle East growth is also expected. Increased tonne miles is also a feature of westbound trades where shorthaul FSU to EU traffic is replaced by longer haul Middle East to EU volume.

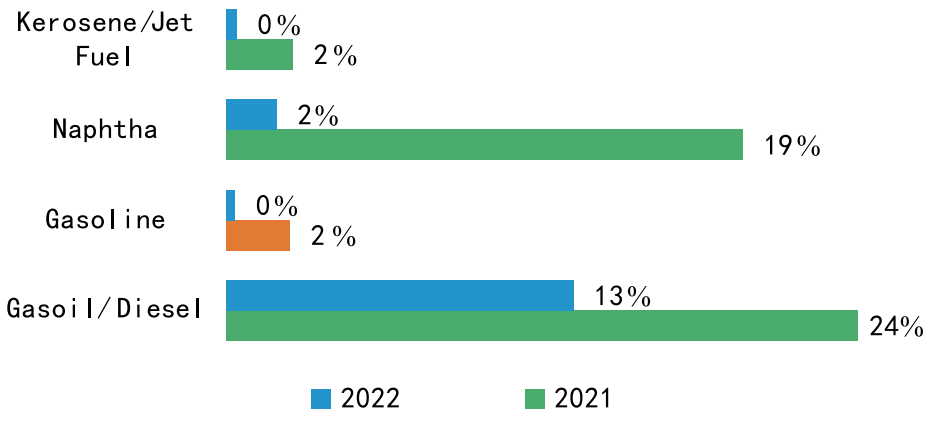


While all of this is good news for crude tanker operators, a voluntary production cut by the Organization of the Petroleum Exporting Countries (OPEC) producers is causing some uncertainty about future demand growth. 2 mbpd was cut in October 2022 and voluntary cut of a further 1.6 mbpd was introduced from May to December on 4th April 2023.

If this second cut were implemented in full and if demand were strong, there would be an extreme oil deficit resulting in a massive drawdown in strategic and commercial inventories and soaring oil prices that would slow economic growth and could crush crude tanker demand. This situation is not apparent at the time of writing. We expect that OPEC will restore output once demand improves and that there will be a surge in oil demand and trade in 2H23 on the back of the resurgent Chinese demand.

The crude tanker market is gearing up for a long bull run. After a remarkable performance in 2022, crude tankers are expected to enjoy high earnings in 2023, as robust demand will keep tonnage utilisation high. While mid-sized tankers will continue to benefit from the new trade patterns, VLCCs will gain from the expansion in refinery runs in China. The market's dream run might extend further as tepid supply growth is likely to keep tonnage utilisation high in 2024-25.

Product trades have undergone a similar process of re-routing as Europe reduces imports of Russian refined products. Russia's share of the naptha and kerosene trades collapsed quickly while gasoline and diesel fell progressively. North America, South Asia and Middle East replaced the gap created by Russian diesel in EU trade matrix. We expect that this new trade pattern will be sustained.

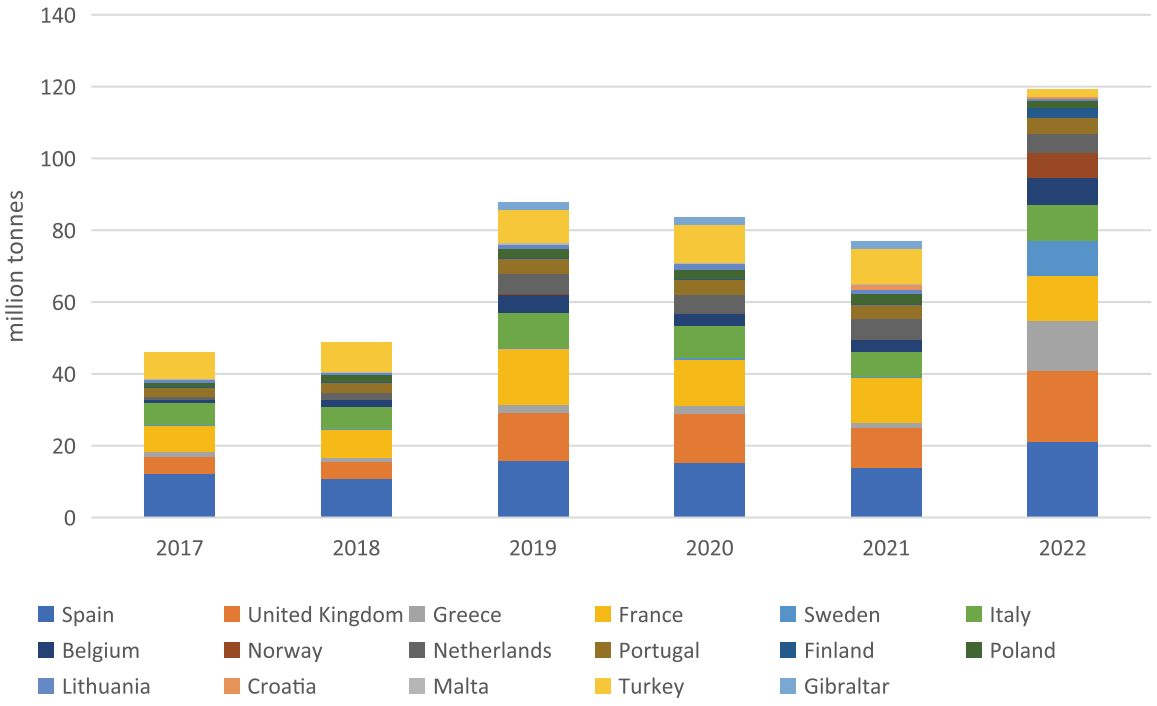


Russia's share of EU imports: 2021 versus 2022

The full impact of the trade shift will be visible in 2023 as Russian exports to Europe were active before the G7 price cap and the EU sanctions imposed on Russia in February. The EU will be compelled to source its entire product requirement from more distant destinations, boosting tonne-mile demand.

LNG shipping

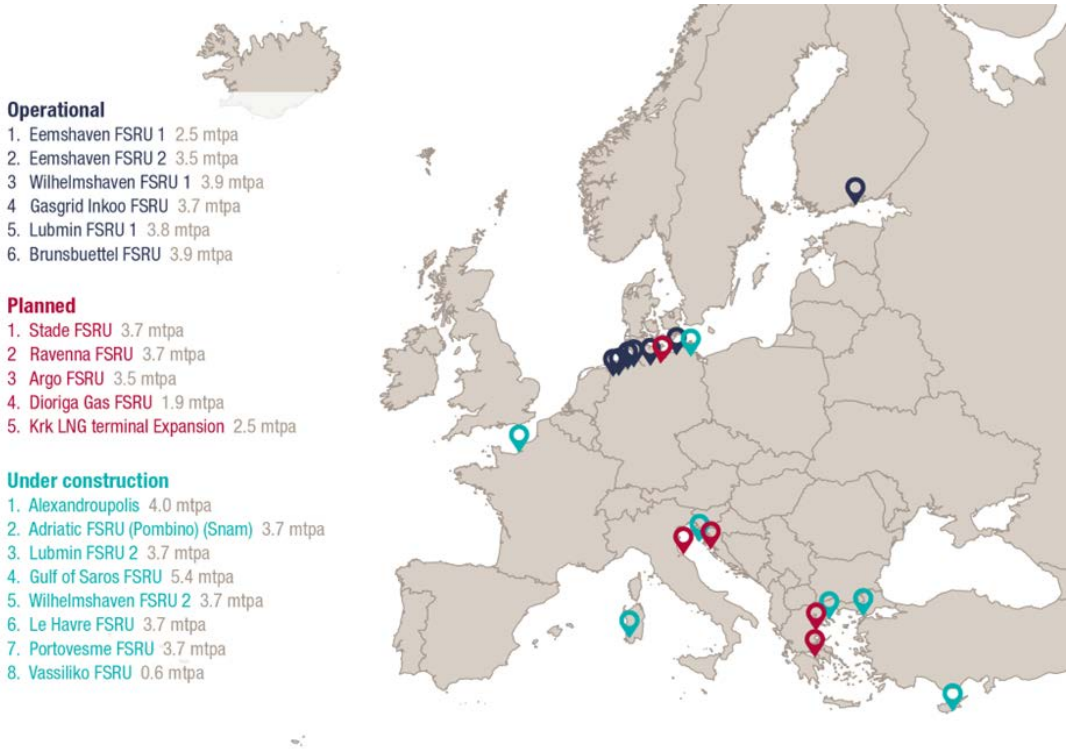
Europe's dependence on Russian gas supplied by pipeline was a major policy challenge at the start of the Russia-Ukraine war. The EU, in particular, had to reduce its use of Russian gas while avoiding the economic and social effects of serious energy shortages. A key element in Europe's response to this challenge was an increase in imports of LNG.



European imports of LNG

European imports of LNG rose by 56% in 2022. Major buyers such as Spain and the UK imported more and new buyers, such as Greece, began importing.

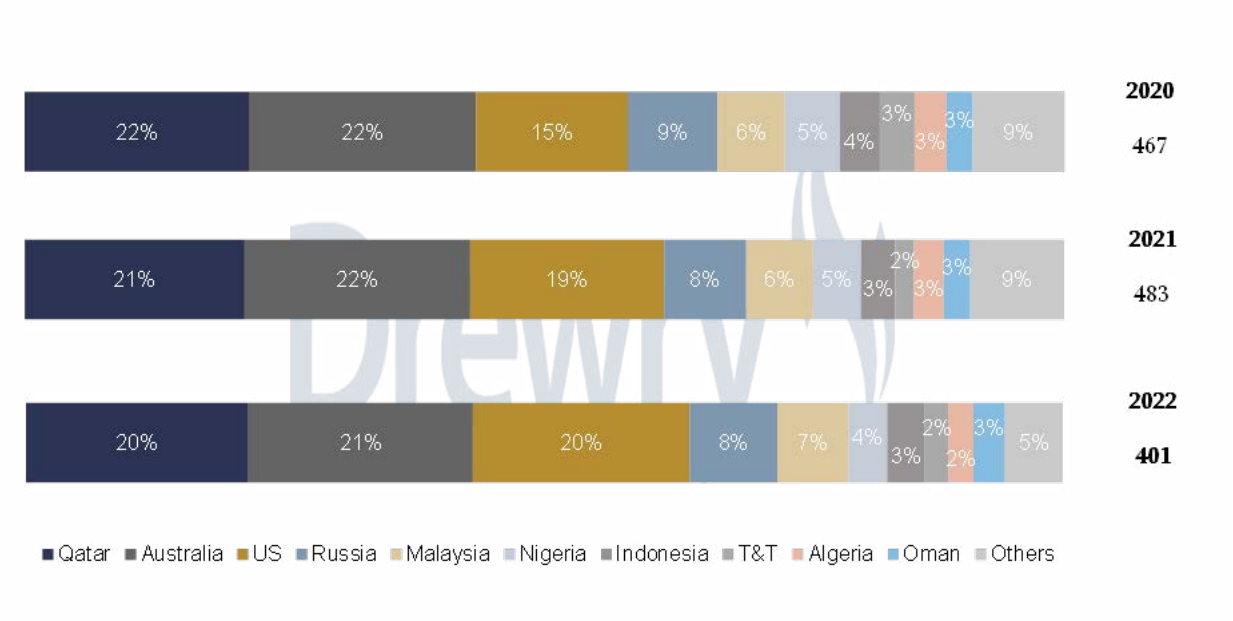
The use of Floating Storage and Regasification units (FSRU) allowed Europe to respond swiftly. There was also significant intra-Europe movement of gas (e.g., from France to Germany) that assisted individual countries.



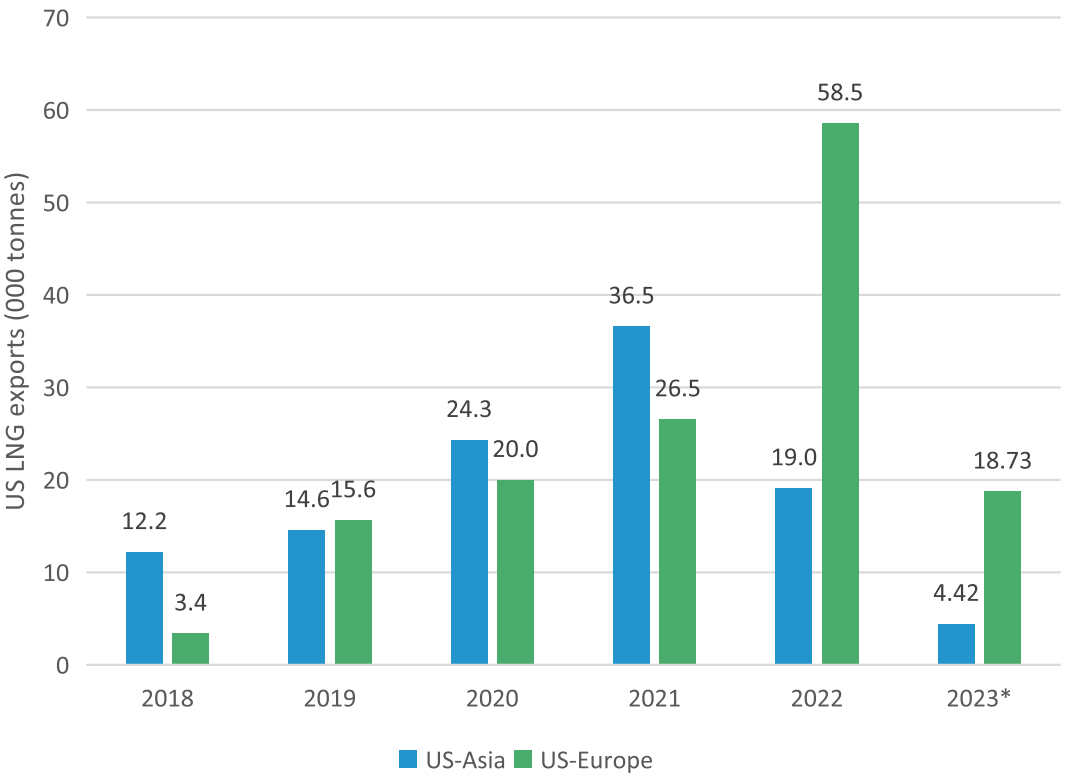
Deployment of FSRUs in Europe

Germany, in particular, has moved very quickly to charter floating storage and regasification units (FSRUs); six are now deployed with a capacity in excess of 20 million tonnes per annum (MTPA). Further developments are under construction and planned.

The US was the major source of incremental LNG volume for Europe. Before 2022, Asia was by far the most important market for US LNG; this changed dramatically in 2022 as European demand soared. With US exporters having a significant freight cost advantage over other exporting countries (Australia and Qatar), it will likely retain its position as the primary source of LNG to Europe for at least until 2024. The US has significantly increased its overall market in recent years.

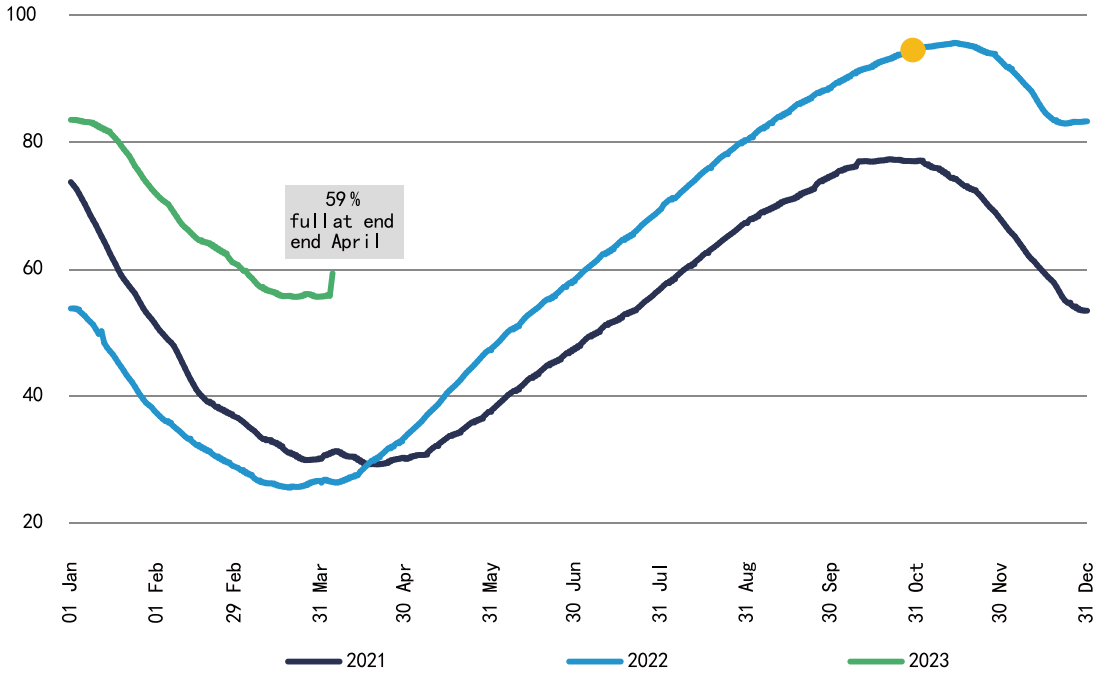


Major exporters LNG market share 2020-22



US LNG exports to Asia and Europe 2018-2023 (*Q1)

The result of these efforts was a much stronger European gas inventory: 56% utilisation of storage capacity at end April 2023; utilisation was less than 30% at the same time in 2022.



European gas storage utilisation (2021-23)

European LNG demand is expected to grow in 2023 as it continues its quest to move away from Russian gas. Although the inventory position looks strong, there will be increased competition for LNG supply as Asian demand strengthens. The EU's gas shortfall could reach 57 billion cbm in 2023, equating to a shortage of 14.5%. With fixed domestic and pipeline supplies from Norway, Algeria and Azerbaijan, LNG imports will remain Europe's last resort to achieve the targeted gas inventory of 90% before 1 November. Weather conditions and gas inventories are pivotal in determining the demand for LNG in Europe.

Global energy markets and energy shipping proved to be remarkably resilient and adaptable in facing the challenges posed by Russia-Ukraine conflict.

Bunker market hubs adapting for low carbon future

Photo: Shutterstock

Cargo volumes, distance, sailing speed and ship size are important drivers for bunker demand and 2022 was a year of significant trade disruption and oil market movements.

Singapore, the world's largest hub for refuelling ships, supplied 47.8 million tonnes of bunkers to vessels in 2022, a 4.3% drop from the previous year. A reduction in port calls to Singapore contributed to the downturn, as did increasingly competitive rates in China's Zhoushan bunker hub and Korean ports. Europe's main bunkering hub in Rotterdam saw sales up 5.9% to 10.8 million tonnes, whilst Fujairah in the Middle East registered a 1.5% dip in volumes to 7.7 million tonnes.

Closer analysis of the statistics released by bunker hubs in 2022 shows that sales of high sulphur fuel (HSFO) have actually increased and accounts for around a quarter of global sales. Looking at top bunkering locations, 28% of bunker sales in Singapore were HSFO, along with 31% in Amsterdam – Rotterdam – Antwerp (ARA), and 35% in the US Gulf Coast.

Only vessels fitted with abatement technologies known as scrubbers are able to burn high sulphur fuels under regulations introduced globally by the IMO (International Maritime Organization) in 2020. Scrubberless vessels are required to burn fuel with no more than 0.5% sulphur content. According to research by the shipbroker Clarksons, scrubbers were installed on 399 ships in 2022 and at the start of 2023, 13% of bulker, container and tanker ships had a scrubber installed. The percentage of ships with scrubbers is set to increase in the coming years as 17% of the dry bulk, container and tanker ships in the shipyards' order books are expected to have scrubbers installed.

Greener, less carbon-intensive fuels such as biofuels, ammonia, methanol, LNG and hydrogen are becoming increasingly available at the largest ports, but the levels of investment required from a bunkering hub's perspective are significant. Each alternative fuel brings with it challenges relating to costs, availability, safety and restrictions in range due to lower energy density compared to fossil fuels. With no single alternative to heavy fuel oil (HFO) emerging as a clear winner, the need to make the fuels available is a difficult but important imperative.

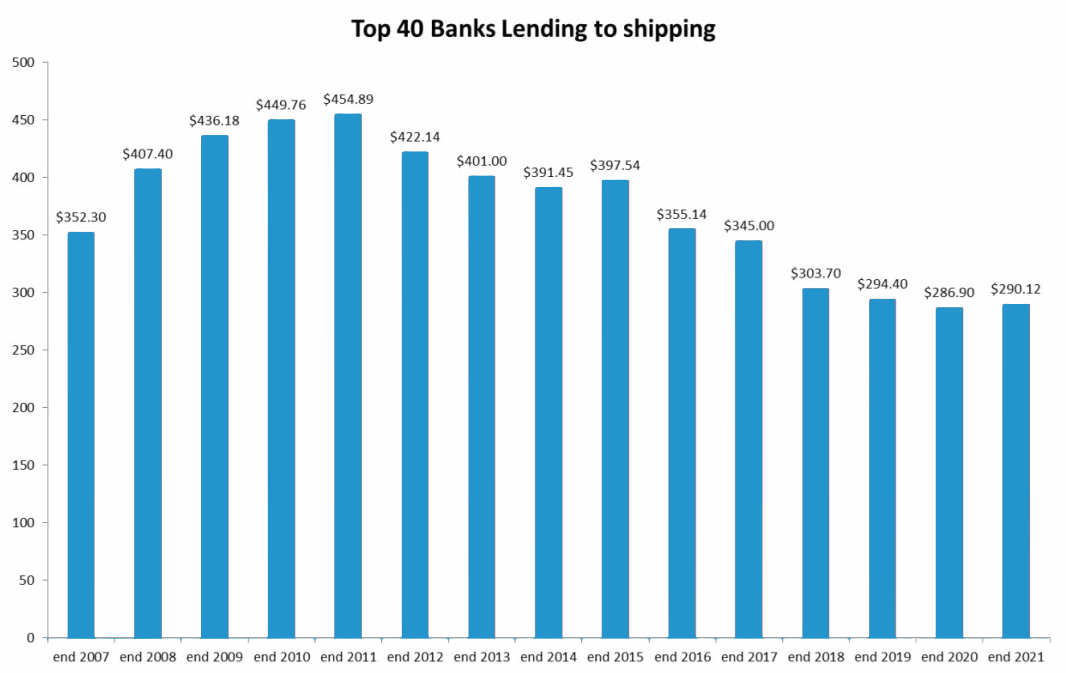
India has set a deadline of 2035 to establish green hydrogen bunkering and refuelling facilities at its major ports in the drive to cut its carbon footprint, according to its shipping ministry.

In Singapore, the Senior Minister of State Finance & Transport, Chee Hong Tat said: "Singapore has made progress in supplying alternative fuels, such as biofuels, to support maritime decarbonisation. 140,000 tonnes of biofuel blends were supplied across more than 90 biofuel bunkering operations".

However, Rotterdam is the furthest ahead with diversifying its supply. With the presence of large-scale biofuel production, storage and trade, the port of Rotterdam is a major biofuel producer for the European market. At the same time, it is emerging as a methanol hub with ship-to-ship bunkering having taken place at the port successfully several times. Currently, around 100kt/yr of green methanol is transhipped via Rotterdam. Hydrogen is being bunkered at the port on a small scale whilst preparations are currently underway to run pilot schemes for ammonia bunkering in 2024.

Challenges and opportunities for ship finance

An overview of the ship finance scene, by Ted Petropoulos, Head of Petrofin Research



The shipping industry is a capital-intensive one and is expected to become even more so, based on our analysis.

Traditionally, shipping has been financed mainly by commercial banks. Additional capital has been provided by capital raised in the public markets, initially in the US and then on a global basis. Over the last 15 years, we have observed a gradual decline in traditional bank financing as a share of the industry's total ship financing requirements to approximately US$400 billion, which accounts for approximately 60% of the total.

The departure of many committed European banks was primarily responsible for the decline, mainly following the 2008 Lehman's financial crisis and increasingly stringent minimum capital ratio requirements of central banks and the Basel Accords since then.

In view of the shipping industry's continuous growth, the industry's increasing financial requirements were covered by leasing companies in the Far East, which included sale and leaseback transactions, and by the development of private equity funds (PEFs). Far East leasing companies primarily consisted of Chinese players often associated with banks and, to a lesser but still important extent, Japanese and Korean leasing. Such leasing was initially focussed only on Far East owners but has increasingly spread out to European and notably Greek owners.

Leasing terms are normally better than ship financing ones, ie longer periods, higher loan-to-value, but often at a higher overall cost.

PEFs have grown enormously over the last 15 years. Being largely unregulated and able to offer more flexible terms, such funds have been increasingly active in traditional ship lending, leasing as well as in providing investment funds over and above finance.

However, PEFs would not normally lend and invest in the same transaction. PEF-related costs are normally higher than leasing but they make up for it via tailor-made terms and/or financing projects that would not fit in the risk profile of banks or leasing companies.

The challenges of ship finance in the next decades

The inherent risks in ship finance relate to changes over the life of a loan or transaction in the vessel's income and/or collateral value. These changes relate to the various market cycles, which in shipping can be very pronounced. Hence, lenders need to assess such risks and offer a loan with terms that are not likely to run into default during a market trough. Lenders consult with market forecasting companies to assist them but also rely on historical data and their own risk/reward appetite.

In order to augment a loan, additional support is provided by a corporate (holding company) and/or occasionally personal guarantees. In addition, liquidity adequacy is examined as to its ability to cope with cash flow issues, in case of market troughs. An owner's performance, management qualities and charters are also determinants of ship finance across all lenders. Interest rate hedging and/or period chartering provide further support, where deemed necessary.

Additional challenges to the ship finance industry

Although market change is the norm in shipping, we have seen lately an exacerbation of such risks.

Aside from the usual market cycles, we have witnessed lately, an increase in geopolitical risks and challenges arising from conflicts, sanctions and restrictions to trade. These rather political risks, have altered the patterns of trade and the demand-supply dynamics of the industry across all sectors. The recent conflict in Eastern Europe is an example with far-reaching consequences.

The COVID-19 pandemic also affected global growth and shipping costs and rendered ship utilisation less efficient. The recent rapid rise in interest rates has also impacted

owners' cash flows and banks' existing loan portfolios, as well as the appraisal of new loans and the survivability of many banks, for example, Credit Suisse.

However, by far the most significant and far-reaching change, which represents an enormous challenge to both the shipping and ship financing industries, has been the

commencement of the transition by shipping towards reduced emissions by 2030, leading up to zero emissions by 2050.

The changes in regulatory emissions and goals have been far-reaching, requiring the shipping industry to adopt various measures. DNB's Jam Ole Huseby pointed out in this year's Norshipping event in Oslo that annual investments in clean energy need to reach US$4.4 trillion annually by 2030 (TradeWinds – 16 May 2023) and the annual investment in the last 5 years was only US$1.2 trillion.

Whereas regulations have been set and additional ones are expected, the required technology is not yet available nor is its cost known. Various devices leading to reduced emissions and reduced fuel consumptions are being investigated, but none so far represent a technological breakthrough. As such, there are heightened risks, as to technological changes and their costs, as well as the risk of obsolescence of the existing overage fleets.

The ship finance industry needs to factor in all the above additional challenges in its lending model. There are also issues related to future charter hires and charterers' views towards eco, non-eco vessels and total eco (reduced and/or zero emission vessels) and whether they will be able to recoup their investment costs without passing the risk on to lenders. The scrubber debate is still an issue.

One major observation has been the overall buoyant shipping markets across all sectors.

Admittedly, some sectors, for example containerships, have subsided but they had been very strong for prolonged periods.

All in all, the industry has been earning robust incomes, which have assisted cash flows, liquidity accumulation and the reduction of leverage, via prepayment of loan facilities.

Consequently, at a time of upheaval, the industry's financial health is solid. It will need to be in order to find the enormous capital required in the future.

A major development has been the emphasis placed by all lenders on financing "green"vessels with low emission/consumption characteristics. The adoption of Poseidon Principles amongst lenders has expanded to 30 top banks. Although,

technology has not matured yet and "green", e.g. alternative fuel vessels, account only for 5.5% of the current fleet and 47.8% of newbuilding orders (Clarkson's World Fleet Register), lenders are keen to expand their Environmental, Social and Governance (ESG) footprint and are willing to offer favourable terms and lower margins for such vessels.

In the offshore sector, vessels built for the wind renewables sector and offering the latest specifications are very much in demand.

There are many PEFs which lend only to green shipping, and it is expected that finance for older technology vessels may become increasingly difficult to obtain.

The opportunities for ship finance lenders

At a time of reduced global bilateral loans, lenders have come to appreciate shipping's vast capital requirements and favourable risk/reward characteristics. The industry has demonstrated good performance with relatively low defaults and owners' ability to meet the challenges over the last decade.

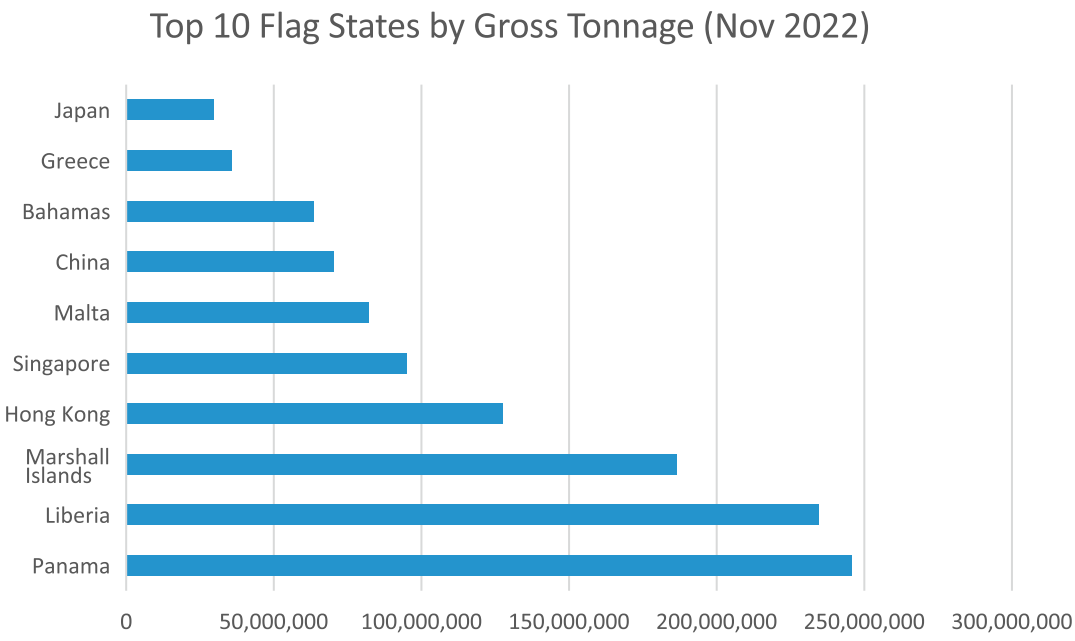
Ship finance has become a global industry, extending to ship finance platforms and other innovations. Owners have ample choice and ability to raise loans. Bank finance still represents the lowest cost source but many owners value the increased LTV offered by alternative lenders, despite the higher cost, as it reduces their capital requirements.

As outlined earlier, uncertainty and geopolitical risks have grown but, thus far, these have been absorbed by the shipping industry without impacting on the quality of loan portfolios.

The outlook for the ship finance industry remains bright, challenging and rewarding.

Flag state administrations evolve

Photo: Shutterstock



Top 10 flag states by deadweight tonnage (end 2022), Source: Lloyd's List Intelligence

A shipping company has a choice when it comes to which flag to fly and the top international flag states compete in areas including service, technical competence, security, recognition and taxation. Shipowners need to satisfy their lender in their choice of flag state: the laws which govern the mortgage over the ship vary from jurisdiction to jurisdiction. Charterers, with an eye on the likelihood of delays through port state control inspections as well as quality control, may favour vessels flying certain flags. Ships under poor-performing flags potentially attract more inspections. Ship managers will be particularly concerned about practicalities such as the speed at which crew documentation is issued or vessel dispensations granted.

The two fastest-growing flag states in 2022 were Liberia and China, which in terms of gross tonnage registered, increased in size by 9.1% and 13% respectively. Panama, which has long been the world's largest flag state, saw its fleet grow, but not as fast as its competitors.

If the trends of 2022 continue, Liberia will become the world's largest flag. However, Panama has announced measures to counter this, such as an update to Law 57, one of the legal frameworks on which the administration of the panamanian fleet is based. The Panama Maritime Authority (PMA) says that this update "contemplates an aggressive and comprehensive international marketing plan, the creation of new departments, reassignment of functions to existing departments or sections and the adoption of new technologies accompanied by the reengineering and reorientation

of the Registry".

The top flag states have traditionally had strengths in different vessel types. Liberia is well known for the size of its containership and tanker fleets, Bahamas is a popular flag choice for the cruise industry whilst the Marshall Islands is prominent in the dry bulk sector, with this vessel type accounting for 35% of its fleet in terms of vessel numbers.

Many of the flag states, such as the Marshall Islands, Singapore and Liberia are marketing themselves as a destination for green shipping and offer incentives and reductions of fees for shipowners who voluntarily exceed environmental regulatory standards set by the International Maritime Organization (IMO).

Many shipping registries are investing in strengthening their infrastructure. The advances in digital technology, enabling for example electronic logbooks and certificates, have meant that registries are implementing significant changes to their operations and improving their customer service.

But the biggest challenges are ensuring that the global fleet continues to improve its safety record and reduces its environmental impact. Flag states, which are responsible for implementing safety and environmental regulations set by the IMO, are at the heart of the big transitions taking place in the shipping industry. New vessel designs, fuel types and technologies need to be approved. On top of this, flags need to enforce international maritime conventions, prevent marine pollution, ensure seafarer welfare, provide vessel oversight and support maritime safety.

But to achieve this, flag state administrations need to employ the right people with the appropriate level of technical expertise and practical experience. Different shipping segments require very different types of skills. For instance, the expertise required for dealing with the construction of a new generation of ammonia-powered tankers is different from the issues facing the superyacht industry.

Strong growth in freight derivatives activity

The latest figures published by the Baltic Exchange show that 2023 is on track to be another strong year for the freight derivatives market. At the time of writing (11 August), dry bulk Forward Freight Agreement (FFA) volumes for the year to date were up 27% from 2022, whilst tanker volumes were up 28% from the previous record-breaking year. Average daily volumes for the year so far for dry bulk FFAs have been 10,882 lots – one lot being equivalent to a day's timecharter hire of a vessel.

FFAs are typically brokered through shipbrokers with specialist futures desks. Companies including Clarksons, SSY, Freight Investor Services, Braemar and Arrow have teams in financial centre such as London, Singapore, Dubai and New York which focus on this market as well as offering access to carbon, iron ore, oil brokerage and other specialist areas. Clarksons and Braemar, both publicly listed companies, have reported growing revenues from their futures desks, with Braemar noting at the end of 2022 that 12% of its revenue was attributable to futures broking activity, up from 3% only five years ago.

Driving freight derivatives trading is the volatility in the physical freight market. Freight rates can fluctuate in the region of thousands of dollars per day as the market assesses vessel availability versus cargo demand. Sentiment can also play a significant role. Shipping companies, banks, investment houses and other institutions seek to manage freight exposure by reducing this risk through hedging or taking positions with an expectation of profiting from the volatility.

Dry bulk FFAs continue to be the most popular and heavily traded instruments, accounting for approximately 75% of the market in 2022. Work still continues in developing other tradeable shipping markets such as LNG, LPG and containers. It is now possible to trade contracts for various gas routes and some of the key Asia/US/Europe container routes. The Baltic Exchange publishes daily benchmarks for key routes with contracts available on a timecharter basis for gas and box rates for containers.

Central counterparty clearing services for the various freight derivatives contracts are available from major derivatives exchanges, such as Chicago Mercantile Exchange (CME), Germany's European Energy Exchange (EEX), Intercontinental Exchange (ICE) and Singapore Exchange (SGX).

Commenting on the figures, Baltic Exchange Chief Executive Mark Jackson said: "So far 2023 was another year of growth for the tanker FFA market and a good performance for dry bulk. Underpinning these volumes are world-class clearing, volatility, trust in the Baltic Exchange's settlement data and increased participation

by owners, charterers and traders. The Baltic Exchange's status as a regulated benchmark provider has helped to create a mature and liquid market".

He added: "Tanker market volatility has largely been caused by the conflicts in the Eastern Europe and volumes jumped significantly after conflict broke out. This was seen across all sizes and sectors from VLCCs down.

"The most liquid dirty route was the VLCC route Middle East Gulf to China (TD3C), but TD20 (Suezmax) contributed volume too. There were good levels of activity on the clean routes with MR TC2, TC14 and the Handy route TC6 all contributing significantly ".

FFA Volumes

(Source: Baltic Exchange)

	Capesize	Panamax	Supramax	Handysize	Total Fuures
2018	476,451	559,342	140,253	2,205	**1,178,251**
2019	532,899	662,878	171,070	600	**1,367,447**
2020	592,519	744,237	225,897	0	**1,562,653**
2021	867,488	1,204,172	436,266	16,095	**2,524,271**
2022	866,884	904,687	416,993	29,685	**2,218,249**
2023 (1st Half)	575,047	610,025	252,074	20,100	**1,457,246**

	Total Options	Clean	Dirty	Total
2018	297,955	125,404	189,322	**314,726**
2019	234,421	171,440	310,005	**481,446**
2020	327,183	225,992	426,776	**655,810**
2021	409,255	167,774	385,761	**553,535**
2022	395,163	236,359	498,613	**734,972**
2023 (1st Half)	321,891	110,402	333,276	**443,678**

London arbitration numbers stand up

Offshore energy boosts LMAA's appointment and reference figures in 2022

London's presence in the top 10 maritime centre in the Xinhua-Baltic ISCDI report rests on its established and highly respected professional services hub. Amongst these are its maritime legal teams, including the over 800 members of the London Maritime Arbitrators Association (LMAA) who, along with supporting members handle nearly 1,700 cases resulting in over 500 awards annually.

The LMAA's 2022 report released in March 2023 reveals that arbitrators reported 3,193 new appointments in an estimated 1,807 references – an increase from 2021 of almost 15% in appointments and 9% in references.

LMAA president David Steward said in a statement that the figures reflect "the huge number of parties worldwide who choose international arbitration on LMAA Terms and Procedures to resolve their maritime disputes, not only in the shipping industry but also in offshore energy and international trade".

Although there were fewer under the Small Claims Procedure, there was an increase in the number of appointments under the Intermediate Claims Procedure (claims between US$100,000 and US$400,000), said the LMAA in the statement, with 58 in 2022, up from 54 in 2021.

In LMAA references, arbitrators published an estimated 420 awards in 2022. The majority of LMAA arbitrations are conducted on documents and written submissions only. 93 awards were made after hearings, in comparison to 77 in 2021, said the LMAA.

Marine insurance round-up

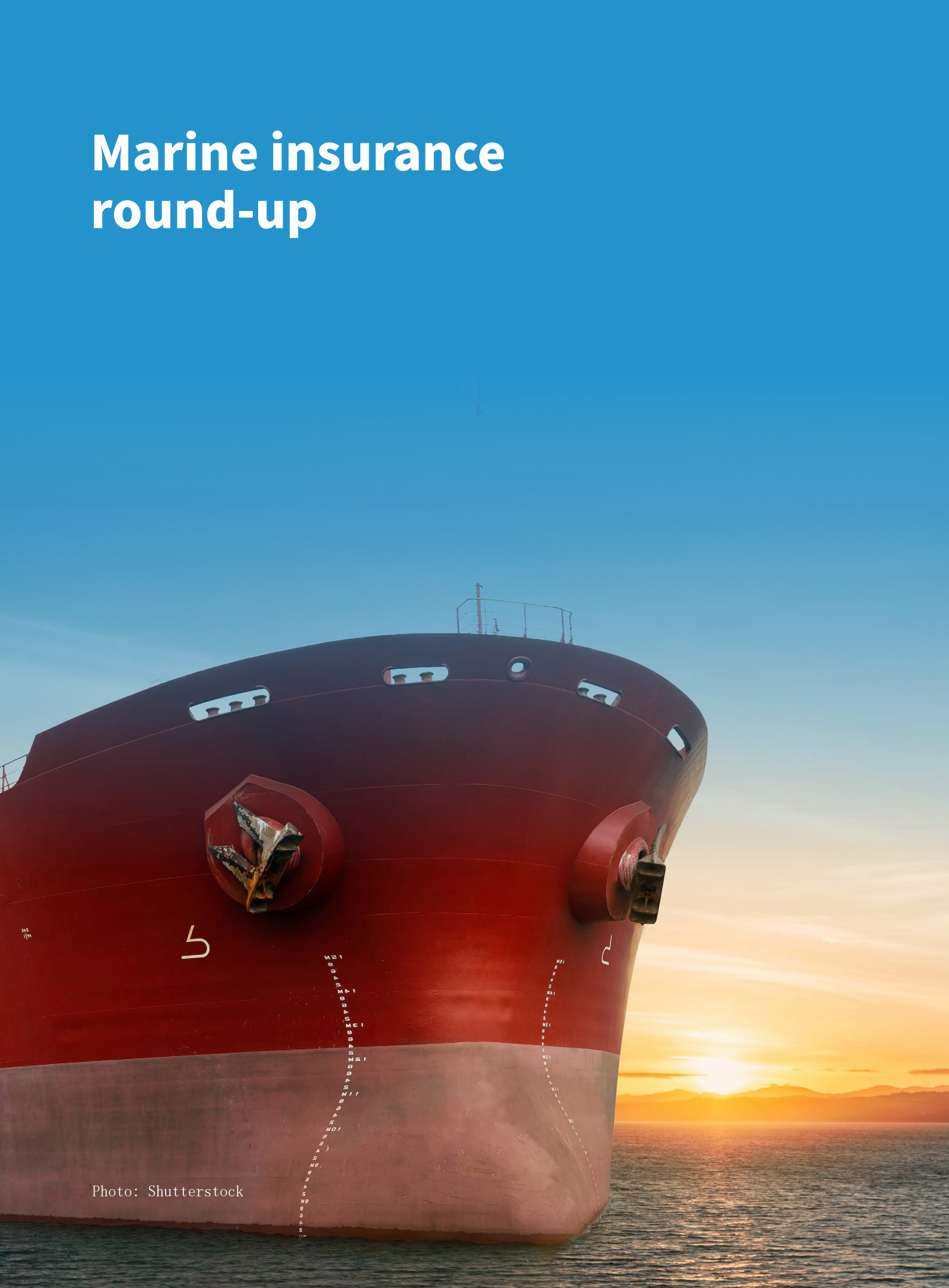


Photo: Shutterstock

Global marine insurance premiums in 2021 reached US$33 billion, up 6.4% on 2020 according to the latest statistics published by the International Union of Marine Insurance (IUMI), which represents the world's hull, cargo and offshore energy underwriters. Premiums were lifted by increased global trade volumes, a stronger US dollar, increased offshore activity, higher vessel values and a reaction to deteriorating results in previous years. Insurers in Europe and Asia, in particular, saw premium growth.

The positive trend for the ocean hull business, which started in 2021, continued into 2022. Premiums grew by 4.1% in 2021, reaching US$7.8 billion. There was continued rapid growth in the Nordic region and China, but much weaker in the UK (Lloyd's) market, where the decline of recent years continued. Overall profitability increased for underwriters as the cost of settling claims remained low.

"The extraordinarily benign claims impacted both the frequency and the cost in recent years and could achieve the recovery of previous years' adverse results", IUMI said at its Winter Meeting in London earlier this year.

This pattern looks set to continue as the Nordic region, the largest region for hull insurance, more recently reported only a moderate increase in claims in 2022 despite global vessel activity in all areas of shipping returning to pre-pandemic levels.

"Major losses had comparatively little impact in 2022, contributing to an overall benign claims year", said Helle Hammer, Managing Director of Cefor, a Norway-based association which represents Nordic marine insurers.

However, these statistics are derived from standard hull and machinery coverage and exclude war risks. There are currently 58 vessels trapped in the Black Sea as a result of hostilities between Russia and Ukraine, whose value is estimated at close to US$500 million with war risk underwriters holding back reserves to potentially settle these claims in the future.

According to Cefor analyst, Astrid Seltmann, inflation impact stayed comparably moderate but the average cost of individual claims had risen. Container vessels continued to be the most interesting segment to analyse, with a trend differing from other large vessel segments.

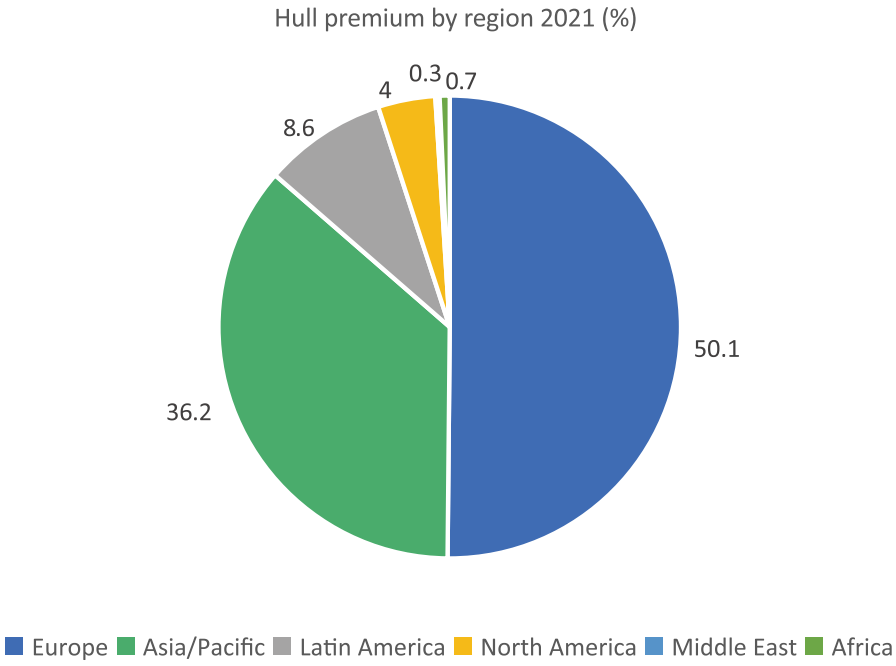
She said: "In line with high demand, the first half-year of 2022 still saw big value increases on renewals but the situation started to reverse during the second half-year. Serious fires also occurred in 2022 but had less impact on hull insurers' costs. Nevertheless, the frequency of claims in excess of US$500,000 remained high, contrary to the bulk and tank segments".

Nordic rises, London declines

When it comes to hull underwriting, the stand-out story of the past decade has been the rise of the Nordic markets and the decline of Lloyd's of London market. Only 10 years ago Lloyd's of London achieved close to US$1.4 billion in premiums and commanded a significant lead over its closest rivals in locations including China and the Nordic region. In 2021, Lloyd's of London wrote less than US$600 million in hull premiums with only a 7.1% market share. However, it should be noted that London's International Underwriting Association (IUA) accounted for 5.8% of the global hull market, bringing the UK's total to 12.8%. The UK remains a highly important marine insurance hub, home to the headquarters of many of the world's P&I clubs, the International Maritime Organization (IMO) and a large broker presence. In 2022 the Nordic market accounted for over US$1.2 billion in gross written premiums.

Part of the reason for the decline of Lloyd's of London has been its drive to improve its underwriting performance. The Decile 10 initiative, launched in 2018, is now part of the standard operating procedure in the 336-year-old insurance market and involves syndicates improving or removing the worst-performing 10% of their books. In 2022, Lloyd's focus on sustainable performance resulted in an underwriting profit across all business lines of US$3.2 billion and a combined ratio of 91.9%, its strongest result since 2015. However, there are now less hull and machinery underwriters in London than ever before, and the impact has also been felt in the cargo and yacht markets.

For a marine insurance market to succeed it needs both access to capital and expertise. For the complex and unique maritime market, this means experts who understand the shipping industry, claims handling and analytics as well as the complexities of the international trading regime. Whilst China has widened the scope of its marine and cargo insurance products, it is still a negligible player in reinsurance and mutual maritime insurance.



Source: IUMI

Cargo market

In the cargo market, there was an increase in premiums for 2021 to US$18.9 billion alongside an improvement in overall loss ratios.

Speaking in September 2022 Isabelle Therrien, Chairperson of the IUMI Cargo Committee said:

"The cargo market has shown growth in 2021 partly due to a rise in the volume of cargo shipped globally combined with the pricing corrective measure still prevalent in that underwriting year. The much-needed correction has yielded favourable underwriting performance. However, the industry is still facing headwinds as the global supply chain remains volatile and is still dealing with the aftershock of the pandemic while now adding inflationary pressures to the mix".

Cargo premiums increased in most markets, with China leading the growth in 2021. China now accounts for 14% of the cargo market, with the UK (Lloyd's of London and the IUA) having a 12.2% market share. With 2021 claims starting at a low level due to subdued activity in 2020, loss ratios continue to improve in all markets.

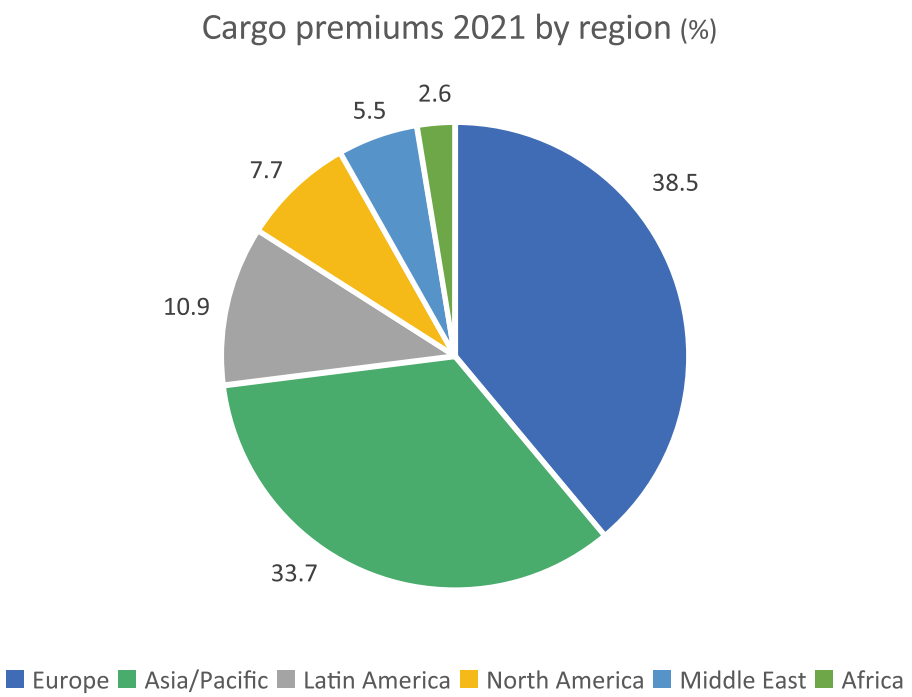
She noted that companies are redesigning and diversifying their supply chains with concepts such as near-shoring, reshoring and friend shoring gaining traction. These developments have the potential to change risk profiles in cargo insurers' portfolios.

Isabelle Therrien added: "The pandemic has shown that factors such as stability and reliability when it comes to supply chains, are key to product availability. Our assureds are now also looking at different logistics, transportation and insurance solutions to manage this constantly evolving risk".

However, speaking at the beginning of 2023 she said: "Global political unrest, the looming risk of a global recession and the economic downturn have impacted the movement of goods globally. Furthermore, shrinking demand and easing congestion continue to push container rates down".

"With lower rates and new vessels impacting the market, container vessels will likely continue to protect their levels and monitor specific trades' capacity concerning demand. This may result in further weakened rates in 2024".

"There is no question that the supply chain continues to evolve and that the aftershocks of the pandemic seem to be lessening. With that, cargo insurers must still be vigilant and focus on properly assessing their risk from a transportation or static risk perspective".



Source: IUMI

Maritime tech confronts today's challenges

Photo: Shutterstock

With booming demand for their products and services, sky-high valuations and large profits, big tech companies enjoyed an unprecedented run in 2020/21. At the other end of the spectrum, investment in early-stage technology rose rapidly. Faced with low interest rates and poor yields, venture capital, sovereign wealth funds and companies looked for opportunities in exciting new start-up ventures around the world.

Fast-forward to 2023, and we see a very different macroeconomic background with changed priorities and a burst tech bubble. The big tech giants have laid off hundreds of thousands of workers and investment in start-ups generally has dropped significantly.

But how has this impacted the maritime tech scene? At this stage, it is difficult to measure precisely. There are thousands of innovative maritime-related businesses at various stages of development offering everything from data to new propulsion systems.

Numerous specialist private maritime tech venture funds such as the Dock, Signal Ventures, Motion Ventures, TecPier, Innoport and Charge work in the same space as state-backed accelerators in Europe and Asia. Shipping companies such as Schulte Group, Eastern Pacific Maritime and CMA, to name but a few, have set up their own new tech investment vehicles offering not only funding but also access to ships as testbeds, data and maritime domain knowledge. For many shipping companies, the route to success lies in investing and supporting funds which identify and nurture the innovators of today who will potentially help them reinvent the way they run their businesses.

In June 2022, Signal Ventures, the investment arm of the Athens headquartered Signal Group reported that the maritime technology market had grown 18% faster than anticipated pre-pandemic and was on track to reach US$345 billion by 2030. According to Signal Ventures, an estimated US$3 billion has been invested by venture capital since 2020.

The shipping and ports industry is strategically important to governments and companies alike, and even though the tech bubble may have burst, the need to develop efficient, secure and low-carbon supply chains has not gone away. Strengthening global supply chain resilience is high on the list of priorities for many corporations and operational innovations and investments continue apace.

Environmental, social and governance (ESG) is also changing the dynamics of the maritime industry as customers, suppliers and investors demand more transparency.

From financial metrics to emissions, the scope of mandatory reporting is growing with a particular focus on carbon by the European Union (EU) and US securities regulators. The industry has seen a boom in data and clean tech companies offering analysis and monitoring solutions that enable reporting as well as drive efficiencies, reduce emissions, assess decarbonisation progress or optimise operations. Ever stricter regulations will require ever more accurate reporting of everything from carbon emissions to trading patterns, meaning more need for intelligent tech solutions. As ever, the challenge lies in accessing standardised, quality data.

2023 looks set to be a year of consolidation in the maritime data sector with a number of significant mergers and acquisitions having already taken place.

Two of the largest vessel tracking services, MarineTraffic and FleetMon, were acquired by Kpler in February; S&P Global bought UK-based technology firm Tradenet; the long-time developer of live vessel tracker Market Intelligence Network (MINT); in May, leading US maritime software company Veson Nautical purchased ship valuation service VesselsValue; New York-based venture capital firm Communitas Capital has taken a stake in energy analytics company Vortexa and vessel-fixture platform Sea Live has recently bought recap and charterparty management platform MarDocs from Dubai's Marcura as well as Chinsay and Setapp. With countless firms offering similar voyage and chartering optimisation services, it is probable that further consolidation is still to come.

The excitement surrounding artificial intelligence (AI) and machine learning is justified when it comes to the development of autonomous shipping. According to a report [Evan Palmejar & Nick Chubb The Learning Curve: The state of artificial maritime intelligence in maritime, (Thetius & Lloyd's Register, 2023)] commissioned by Lloyd's Register, the integration of AI in autonomous shipping, safety and navigational support systems and vessel optimisation solutions is still at an early stage, but in 2022 was already estimated to have attracted US$931 million of investment. According to the report's authors, this will more than double in the next five years to $2.7 billion. Beyond the ships themselves, AI is changing the way in which chartering operations are undertaken. Companies such as Signal Ocean and Orbit MI are offering tools to make sense of the vast array of information available to chartering teams.

In recent years one of the maritime sector's biggest challenges has been in attracting and retaining talent. For too long it has been seen as a dirty, sunset industry and simply not exciting enough for young, highly educated people. This has manifested itself in not only seafarer shortages but across the shore-based maritime industry.

However, according to some industry pundits, the layoffs elsewhere could have a positive impact on the ability of maritime businesses to attract the best data scientists, coders and software developers who are needed to build the sustainable industry of the future. The long-term challenges facing the maritime industry can only be solved by harnessing the best global talent.

[1] Evan Palmejar & Nick Chubb The Learning Curve: The state of artificial maritime intelligence in maritime, (Thetius & Lloyd's Register, 2023)

Challenging year ahead for P&I clubs

Photo: Shutterstock

What were 13 are now 12. Following the merger of Standard Club and North, there are now 12 members of the London headquartered International Group of P&I Clubs (IG). Collectively these mutual associations insure approximately 90% of the world's ocean-going tonnage. The members share between them their large loss exposures through a group pool and reinsurance arrangements, covering their members for claims up to US$3.1 billion.

The merger is significant, as it comes against a backdrop of rising claims costs, reductions in free reserves and poor investment markets. StandardNorth is now approximately the same size as the Norwegian market leader Gard and both are now twice as big as their nearest rivals Steamship, Skuld, Britannia, UK and West of England. Whether or not further mergers take place in 2023 remains to be seen: in 2016 the UK and Britannia clubs came close to merging but failed to agree on terms. Proponents of further consolidation in the sector point to a more efficient use of capital and therefore lower pricing, whilst opponents fear that smaller shipowners will suffer as the influence of larger owners grows and there is less competition in the market.

Smaller clubs are grappling with the challenge of supporting their members at a time of ever more demands on their services, be it for advice on the complex international sanctions regime, the practicalities of meeting tightening environmental regulations or claims support.

For the 2021/22 financial year, the IG reported an underwriting deficit of US$267 million based on the combined accounts of the principal clubs. However, clubs reported surpluses following rate hikes and an improvement in financial investments. Going forward, investment income from fixed-income investments is expected to contribute more to the clubs' bottom lines due to a higher interest rate environment.

Global credit agency AM Best notes that overall, the policy year 2021/22 was an improvement on 2020/21 which saw a deficit of US$531 million. The combined ratio, a key measure of underwriting profitability, improved to 107% from 117% over the prior year. Technical performance is expected to improve further for 2022/23, helped by the combined effect of general increases and lower pool claims. Ahead of the 20 February 2023 renewal, nine clubs announced that they would apply a 10% increase to P&I premium rates, slightly below those of the previous year, when several clubs applied increases of 12.5%.

Pool claims

Only four insurance claims above US$10 million were entered into the IG pool scheme for 2021/22. This compares with 11 and 16 pool claims in the previous two years.

However, sub-US$10 million claims have been getting more expensive. In 2020/21, pool costs were at an all-time high at just under US$500 million and have led to rate hikes over the previous four renewal rounds. These rises can be attributed to rising repair costs, freight rates and commodity prices. Looking forward, new risks in the form of alternative fuels, and new types of propulsion or autonomous systems on board ships could induce new types of claims.

Despite tough market conditions, the IG renewed its reinsurance contract (GXL) with only a small increase in rates for shipowners. This is one of the largest reinsurance contracts in the world and underpins global trade. The GXL allows IG clubs to offer high levels of free and unlimited coverage for most of the risks they insure. This year coverage for COVID-19, malicious cyber and pandemic risks has been expanded and is now free and unlimited for all claims up to US$650 million, with aggregated cover above US$750 million.

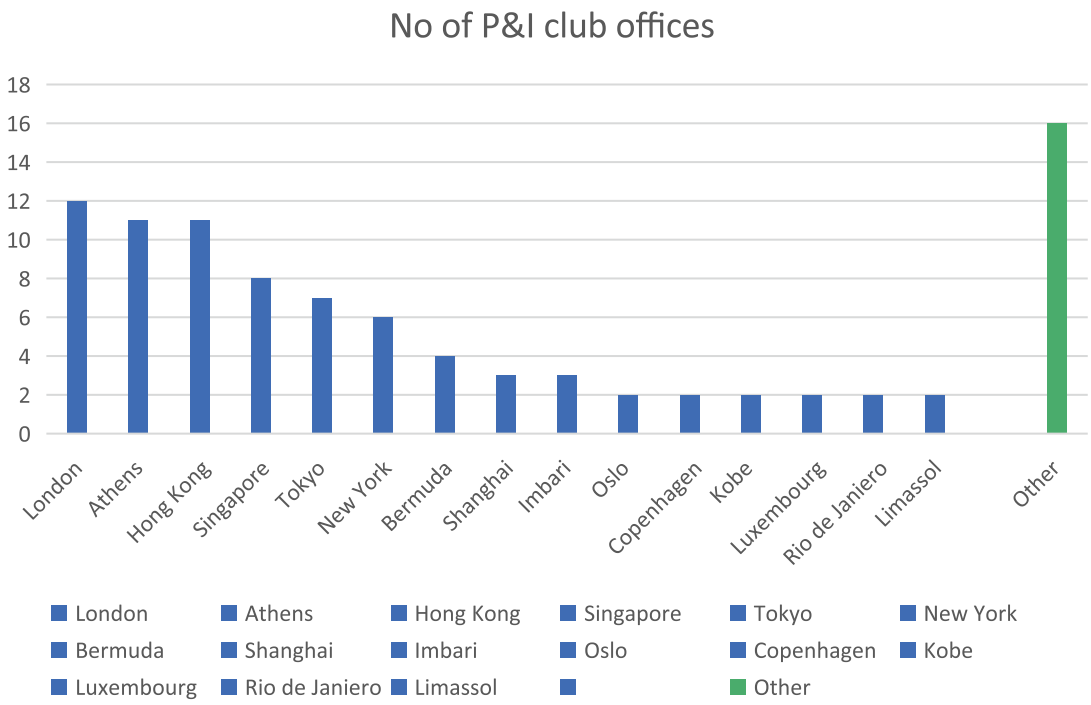
Future fuels

Key challenges in the transition to low-carbon shipping are the insurance and liability arrangements. The IG's 2022 Sustainability Report states that it "recognises the role that its claims sharing (pooling) arrangements and reinsurance programme can play in facilitating industry's transition to low or zero-carbon fuels. The Group Clubs have historically sought to meet and support the needs of shipowners by adapting to changing demands for liability cover and adopting an inclusive approach to cover within the mutual system, with a key objective being how to pool claims arising from particular types of vessels and/or activities. The same approach to pooling will apply to any changing needs from low or zero-carbon fuels and associated P&I risk. The Group will also participate in an industrywide alternative fuels working group in its efforts to understand the availability, practicality and implications of moving to the use of such fuels".

London still global P&I capital

London is still the only city in the world with headquarters or regional offices of every major P&I club. Thanks to its pool of expertise in claims handling, proximity to the insurance and financial services industries, the International Maritime Organization (IMO) presence and good international connections, the UK capital is a critical location. However, the UK's decision to leave the EU has meant that UK headquartered clubs have set up new subsidiaries across the EU including Dublin, Limassol, Rotterdam and Luxembourg. These entities allow the clubs to write risks for members in the European Economic Area (EEA).

Direct face-to-face relationships with their shipowner members have always been important to the clubs. This is reflected in the presence of nearly every club in Athens/ Piraeus and Hong Kong, both critical shipowning centre. Japanese shipowners are all also well served with a strong international showing in Tokyo, Imabari and Kobe. Despite the increase in working-from-home practices, location is clearly still key for the community of P&I clubs.



Note: For recently merged NorthStandard offices, one office is counted per location

Source: International Group of P&I Club member websites (May 2023)

Shipbroking responds to demand for more services

Photo: Shutterstock

Strong freight rates and high secondhand prices across all sectors helped not only shipowners in 2022, but shipbrokers too. Market leader Clarksons, which is listed on the London Stock Exchange, reported strong earnings for 2022, with revenues up 36% to US$604 million. Competitor Braemar also reported its half-year results in August 2022 with a 46% increase in revenue to US$86 million. Given the higher levels of activity across all international shipping segments, it is likely that many of the smaller, privately owned shipbroking houses also enjoyed a good year.

2022 and 2023 have seen a number of significant shipbroking related mergers and acquisitions. These include UK-based Galbraiths tying up with Switzerland-headquartered IFCHOR to create a top five global shipbroking entity with over 300 staff; Braemar's purchase of US tanker broker Southport and opening of a new office in Madrid; SSY's acquisitions of Greek sale & purchase outfit Anchor Shipbroking, a new office in Genoa and a move into the offshore sector via Westshore Shipbrokers; as well as Denmark's Maersk Broker confirming that Seattle-based Naodan Chartering would be fully integrated into its dry bulk operations this year.

But the big change impacting shipbroking is the growing client expectations for research and technology, especially given the impact of carbon emissions on freight pricing. This goes hand in hand with carbon advisory services as ships over 5,000 GT will be included in the world's largest emissions trading scheme, the EU's ETS (Emissions Trading Scheme). It means that shipowners and charterers will have to factor in the cost of their emissions in their voyages. Under the scheme, which starts in 2024, any company with ships trading in the EU/EEA will be required to surrender emission allowances corresponding to a certain amount of its greenhouse gas (GHG) emissions emitted over a calendar year. 100% of emissions for intra-EU trade will be covered and 50% for vessels departing from or arriving in the EU. Allowances can be purchased on the open market via the European Energy Exchange (EEX). Shipbrokers have been busy setting up their own carbon desks or building partnerships with existing carbon brokerages. Further international emissions trading schemes can be expected.

As Clarksons managing director Andy Case notes in the company's annual report: "The needs of participants to predict, record and analyse emissions data in order to reduce their footprint on an ongoing basis has never been higher, which means that the services offered by our broking, research and technology teams are in high demand".

It is the pressure to invest in added value services which can put small and mid-sized brokerages under strain and is helping to drive the wave of acquisitions and mergers

in shipbroking.

The shipbroking sector is currently investing in a second round of digital technologies. The first round saw progressive brokers invest in AIS data, fixture and process management software as well as post-fixture commercial voyage management systems. The shipbroking industry has long recognised that simply matching ships and cargoes is not enough. Now the opportunities of machine learning and algorithm technologies are being exploited by more and more brokers as partnerships with tech firms are developed or in-house expertise built.

By speeding up manual processes, harnessing and scaling the information at their fingertips, shipbrokers are able to add significant extra value to shipowners and charterers.

Shipbroking expert Michael Darby at UK recruiter Faststream confirms this is being reflected in shipbroker hiring patterns: "The increased demand for analysts has risen over the past year and we anticipate this trend to continue. These individuals can offer tremendous value to employers. Be that through economic forecasting or their ability to strategically gather crucial information about the market so that brokers can make more informed decisions with their fixtures".

Autonomous shipping: a step closer?

The race is on to develop ship technologies enabling fully autonomous vessels to cross the world's oceans safely. The industry is still some way from this, but China's launch last year of Zhi Fei, an autonomous, electric container feeder ship on a short-sea route between Dongjiakou and Qingdao, shows what might be possible for larger vessels on longer voyages in the future.

Other recent projects of note include South Korea's Hyundai Heavy Industries testing of its own system on board Prism Abicus, a 180,000 Cbm Liquid Natural Gas (LNG) carrier for the industry's first transoceanic autonomous voyage; the entry into commercial service of Norway's Yara Birkeland, a self-propelled zero-emission electric container ship transporting mineral fertiliser from a production plant in Porsgrunn, Norway for export from Brevik; and Japan's Mitsubishi Shipbuilding collaboration with Shin Nihonkai Ferry for fully autonomous ship navigation systems on a car ferry in Japanese coastal waters.

"This test demonstrated the world's first fully autonomous navigation system, on a 222-metre ferry, with autonomous port berthing and unberthing using turning and reversing movements and high-speed navigation of up to 26 knots", Mitsubishi said in a statement.

In addition to navigation for ocean-going vessels, systems are being developed which are able to dock and undock ships.

The new vessels can operate autonomously thanks to the ability of their systems to integrate artificial intelligence (AI), big data, and sensors safely and effectively under challenging conditions. Whether or not the industry one day becomes fully automated, it is clear that automated and digital systems on board are already able to support crew on the bridge and in the engine room allowing them to concentrate on tasks that require greater levels of attention or judgement.

However, for autonomous or automated shipping to take off, progress is needed not only on the technical side but also on the highly complex international legal and regulatory framework. Without global regulations, a fully autonomous ship, or indeed a ship with automated systems on board, will be unable to trade internationally.

There has been significant progress in 2022. Last year the London-based International Maritime Organization (IMO) published a roadmap for the development of a Maritime Autonomous Surface Ship (MASS) Code.

The roadmap envisages the development of a goal-based instrument in the form of a non-mandatory Code, with a view to adoption in the second half of 2024 as the first stage. The challenge lies in the impact that the Code will have on other IMO

conventions, including Safety Of Life At Sea (SOLAS).

The IMO also notes that integrating new and advancing technologies in the regulatory framework "involves balancing the benefits derived from new and advancing technologies against safety and security concerns, the impact on the environment and on international trade facilitation, the potential costs to the industry and finally their impact on personnel, both on board and ashore".

With the technology and standards developing at such a fast pace, there is still work to be done on defining the new terminologies which will underpin the international regulations. For example, in an era which could see vessel systems supporting crew decisions or vessels which are controlled remotely from shore or indeed operate fully autonomously, there needs to be clarity in the meaning of basic terms such as "master", "crew" or "responsible person".

On a commercial level, the rise of autonomous shipping opens up new questions for determining carrier liability under the Hague Rules for maritime casualties as well as posing new issues for insurers.

One Sea, a trade association representing many of the leading commercial manufacturers, integrators and end-users in this sector, says that it is "essential that there is absolutely no ambiguity around definitions and regulator expectations on implementation. There needs to be a collective understanding between the industry and regulators based on agreed terminology".

The challenges for autonomous shipping which lie ahead are not just developing the technology, but ensuring that the framework encompasses the needs of all stakeholders.

Energy transition enablers

From new fuels to green corridors, shipping's decarbonisation pathway emerges

Photo: Shutterstock

Shipping's de-coupling from carbon marches steadily on. As an industry, its targets are stipulated by the International Maritime Organization (IMO) which calls for shipping to reach net-zero greenhouse gas (GHG) emissions by 2050. Central to this objective are the IMO's new operational and technical emissions reduction regulations, which rate ships according to their efficiency levels.

To make a real impact on GHGs, shipping needs to move away from fossil fuel bunkers and the most recent IMO Maritime Environment Protection Committee (MEPC 80) requires a commitment to the uptake of these fuels by 2030. Leading fuels identified to help meet these industry targets include ammonia, hydrogen and green methanol, amongst others, with ammonia emerging as a forerunner as a long-term solution.

To help guide the fuels debate, IMO's Marine Environment Division launched in March the Future Fuels and Technology for Low- and Zero-Carbon Shipping Project (FFT Project), to provide member states with technical analysis related to the feasibility of pathways to shipping decarbonisation. The project, which will run until 2025, consists of three main phases:

- A study of current and projected global uptake and distribution of low and zero-carbon marine technology and fuel
- Identification of the regulatory mechanisms required for safe handling and training
- Promotion of technological cooperation, pilot projects and organisation of outreach activities especially between developed and developing countries.

Despite the lack of certainty surrounding the emerging fuels landscape, an increasing number of shipping companies have taken bold next steps and placed orders. According to shipbroker, Clarksons, 44% of the 2022 newbuild orderbook is capable of being alternatively fuelled, which the company said was a "record share" compared to previous years.

Meanwhile, the industry continues to presume that the future fuels network will ultimately be a mix of bunkers options. Maersk is one company that is hedging its bets and investigating more than one fuel. Green methanol is said to be the company's favourite – so far it has ordered 19 vessels that can be powered by the fuel, all of which are scheduled to be delivered in 2025. Last year, it announced a partnership with six companies to enable supplies of green methanol ahead of the new vessel deliveries. Carbon-neutral green methanol is produced either from biogas/biomass or renewable hydrogen combined with captured carbon dioxide.

It also announced this year an MoU with US classification society, ABS and ship management company, Tote Services, amongst others to establish green ammonia

ship-to-shore bunkering on the US east coast port of Savannah.

The world's largest container line operator MSC, meanwhile, reaffirmed its "commitment to embrace alternative fuels" at the World Ocean Summit in March. Claudio Abbate, VP of Maritime Policy and Government Affairs at MSC, told delegates that fuel flexibility and maintaining a range of fuel options is important as what appears to be potentially viable or mainstream today may not be in the future. The Swiss-based operator has more vessels on order than any other company, including a January order for 10 LNG-fuelled, ammonia-ready vessels, scheduled for delivery in 2025-26.

Green corridors

As technology and expertise to support future fuels continues to emerge, and shipping continues to invest and align itself with the options available, so too will a landscape develop that an increasing number of players can buy into.

Green corridors, which received a boost at last year's United Nations Climate Change Conference (COP 26) when the Clydebank Declaration was announced, are one way to augment green shipping availability between regions and countries and further stimulate investment.

"They're about creating the right environment for the development and deployment of zero-emission shipping – fuels, technologies, infrastructure, business models, even rules and regulations – that will be needed for the long-term transition to a zero-emission sector", said Jesse Fahnestock, Head of Research and Analysis at the Global Maritime Forum in a United Nations website article.

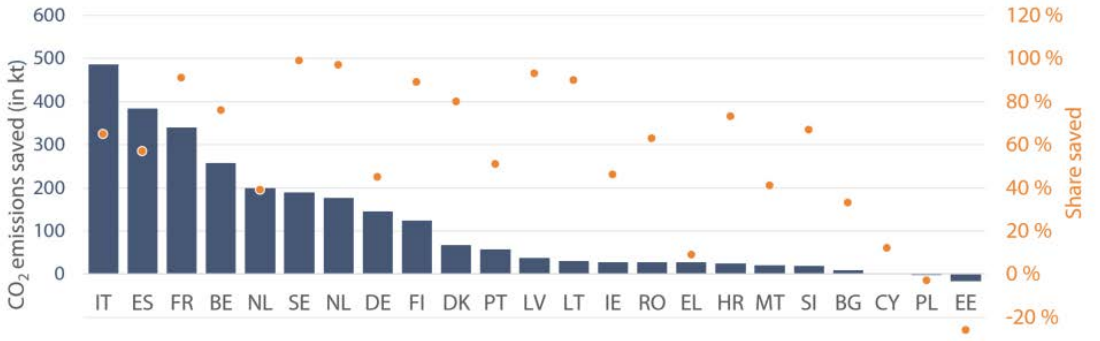
Green corridor announcements to date include between the ports of Los Angeles and Shanghai; Los Angeles, Long Beach and Singapore; and, Los Angeles, Tokyo and Yokohama. Further, in March a consortium announced plans to explore options to develop corridors between South Africa and Europe, and the UK has also announced plans to partner with the US, Norway and the Netherlands. Partners on the Dover to Calais/Boulogne route recently announced a programme of work to electrify maritime traffic in the Channel. A study to develop an ammonia-powered shipping network between West Australia and East Asia means that carbon-neutral transport of iron ore shipments could be a reality, at least in part, by 2028.

Opportunities for green shipping corridors linking to Canada are also being explored and in June a report on the potential impacts on the country was produced by engineering consultancy Arap, Oceans North, Vancouver Maritime Centre for Climate and Lloyd's Register Maritime Decarbonisation.

Meanwhile, the Clydebank Declaration – a set of intentions announced at COP26 to promote the creation of green shipping corridors through cooperation between countries, and also between countries and the different actors in the sector – has 24 signatories.

Europe targets ship emissions

Figure 1– Amount of CO_2 emissions saved (absolute and relative) in coastal Member States, by using OPS



Data source: Stolz et al., 'The CO2 reduction potential of shore-side electricity in Europe', *Applied Energy*, Vol. 285, March 2021.

Changes to one regional requirement will also have an impact on shipping. The European Union (EU) is introducing a set of proposals to bring EU policies in line with climate goals – namely to reduce GHG emissions by at least 55% by 2030 and aim for climate neutrality by 2050. Known as 'Fit for 55', the new proposals are interlinked and have implications for ports, ships of 5000 gross tonnage (GT) or over, maritime fuels, fuel infrastructure, emissions trading and energy taxation.

One aspect of the Fit for 55 package aims to reform the current EU Emissions Trading Scheme (ETS) and extend it to maritime transport. The reform follows the 'polluter pays' principle – from 2024, ships travelling between two EU ports will pay a carbon tax on 100% of its emissions and 50% tax on carbon emissions if the voyage starts or

ends at a non-EU port.

The new proposals will also require container and passenger ships to hook up to on-shore power for all electrical needs whilst alongside at a major EU port as of 2030 and all other ports by 2035.

Rules targeting the gradual reduction of GHG emissions will also be introduced.

Timeline – some forthcoming IMO and EU emissions reduction regulations

July 2024 – IMO: Heavy fuel oil (HFO) ban in Arctic Sea

Sept 2024 – IMO: Deadline for all vessels to comply with Ballast Water Management Convention

2030 – uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources to represent at least 5%, striving for 10%, of the energy used by international shipping

2030 – EU: Containerships and passenger ships at major EU ports to use on shore power supply

2034 – EU: Ships fuel mix to have at least 2% of specific renewable fuels

Hard to abate: shipping's emissions reduction debate

Photo: Shutterstock

At the most recent International Maritime Organization (IMO) Maritime Environment Protection Committee (IMEPC) meeting which ended in July this year, IMO agreed to review the short-term measures put in place in 2018 to help the industry meet its greenhouse gas (GHG) emissions reduction obligations.

The Carbon Intensity Indicator (CII) only came into force in January this year but has already received considerable pushback from the industry.

It has been fraught with controversy since it was announced in 2018, along with the Energy Efficiency Existing Ship Index (EEXI) and Ship Energy Efficiency Management Plan (SEEMP).

Critics argue that CII, as it currently stands, is significantly impacted by factors beyond the control of charterers' and owners' control, including weather conditions, voyage distance, port call turnaround times and charter agreements. Intercargo, the association that represents dry bulk shipowners, explained at the end of last year that ships with longer travel distances can produce more emissions but have a better CII rating when compared with vessels travelling shorter distances and producing lesser emissions.

The IMO has listened to these concerns and now MEPC will review the current regulations and associated guidelines by 1 January 2026.

In the meantime, the current rules have revolutionised the relationship between the shipowner and operator, as both parties will have a vested interest in ensuring a vessel operates at maximum efficiency levels.

International shipowner association BIMCO explains that the "MARPOL Carbon Intensity Regulations will impact timechartering as we know it today. Although the owners and the charterers have different roles in a timecharter context, the nature of the CII regime itself cuts through that traditional relationship, such that it will inevitably require both parties to come together to collaborate and cooperate so as to seek to reduce the carbon intensity of ships' operations on an ongoing basis".

Shipowners, charterers and industry associations, including BIMCO, however, have been vocal about the predicted, if unintended, fallout these new rules will create.

Meanwhile, EEXI, the second emissions-reduction measure introduced with CII, is for ships built after 2013 and an earlier regulation, the Energy Efficiency Design Index (EEDI), governs ships built post 2013.

However, whereas the EEXI is a 'once in a lifetime' measurement related to the technical design of a ship, the CII is concerned with the operation of a ship and

measurements (the actual annual operation achieved) are taken on a yearly basis. Vessels are then rated A, B, C, D or E (where A is the best) and this rating is recorded in the vessel's individual Ship Energy Efficiency Management Plan (SEEMP). Importantly, the thresholds for these ratings will become increasingly stringent each year.

The new rules affect all vessels within the global fleet of 5,000 GT or more, and marine technology company Wärtsilä estimated in March last year that if the industry were to take no action, by 2024 - only one year after the regulations came into force - more than half of the world fleet will be non-compliant, falling into categories D and E.

There are a number of recognised emissions-saving options available and whilst investment decisions can be made by owners to support efficient sailings, vessel operation decisions are made by the charterer. And here lies the intersection of interests.

The ongoing impact of the new regulation will result in commercial implications for vessel owners who will ultimately be impacted by the operational performance of their vessels. Critics argue that the CII score can limit a vessel's operating options, restrict charter options and reduce the value of the vessel. For example, high-profile companies that have made commitments to Environmental, Social and Governance (ESG) strategies will likely insert clauses into their charterparty contracts that will allow only higher-rating vessels to carry their cargoes.

Further, the CII does not currently differentiate between different states in a voyage. Activities such as 'empty legs' – sailings where the vessel is in ballast en route to pick up another cargo, anchorage and weather conditions are not accounted for, although according to ship classification society, DNV, "certain exemptions or corrections, such as in cases of adverse weather conditions or extended time in port, are under discussion".

Dry bulk carrier operator Oldendorff is one company that has voiced its concerns. It said in an announcement in December last year that the "CII formulas in the regulation are not holistic, can be gamed and there are many real-world instances where strict adherence and focus on the CII rating letter grades will do more damage than good". Many owners and operators are trying to increase fleet productivity by reducing empty legs, explained the German-based operator, but CII penalises this activity as more fuel is required when a vessel is laden, whereas this is the type of energy-saving operation which should be rewarded.

So who is responsible for a vessel's CII rating?

The vessel owner is responsible for calculating and submitting the CII rating, however, the rating itself is a joint concern between owner and operator – the owner being responsible for the condition of the vessel and energy-saving technology, with the charterer influencing the CII through speed and route selection and other voyage management decisions.

Meanwhile, BIMCO has created a new charter party clause to help address some of these challenges. It has been met with opposition from owners and operators including Maersk, MSC, Oldendorff and Trafigura. The 23 organisations that signed the open letter, claim the clause makes the charterer responsible for the vessel's energy efficiency performance.

Slow sailing an option?

At its core, CII aims to promote vessel efficiency, which can be influenced by a number of measures including optimised sailing routes, reduced waiting times at port and anchor, hull coatings that help reduce friction, stronger planning around port congestion and ensuring vessels remain in good condition.

CII ratings are based on fuel consumption, and like other modes of transport, ships use less fuel when lower (or optimal speeds) are employed. Slow steaming has therefore been hailed as the solution to improve many vessels' CII scores.

Operators and owners have been busy investigating the advantages of slow steaming and the impacts on their fleets. Amongst those in favour of it are Eagle Bulk's chief executive John Michael Radziwill and Paul Wogan who was CEO of GasLog Partners until early 2022.

Whilst it is true that slow steaming is better for fuel and vessel emissions, it creates inefficiencies in other ways.

In September last year, ship analysis platform VesselsValue suggested that CII would lower global tanker fleet capacity by 15 VLCC equivalents by causing slow-steaming and more recycling of tankers to comply with the regulation.

Meanwhile, shipbroking company Clarksons has also cautioned the industry about the reality of slow steaming. It argues that that "CII improvement potential as a result of speed reduction can be grossly overestimated and that it will not necessarily improve CII ratings".

Lead analyst, Jon Leonhardsen at Clarksons says that the "reason for the misconception is that calculations are based on textbook speed-consumption curves which have an exponential growth across an entire speed range. However, if you factor in all of the consumers of a ship and the variables of real-world sailing conditions, the curve becomes less exponential (or flatter) at lower speeds".

For its part, IMO plans to review the CII regulation and possibly update it by January 2026. It will consider corrective actions, enhanced enforcement measures and data collection provisions, amongst other items.

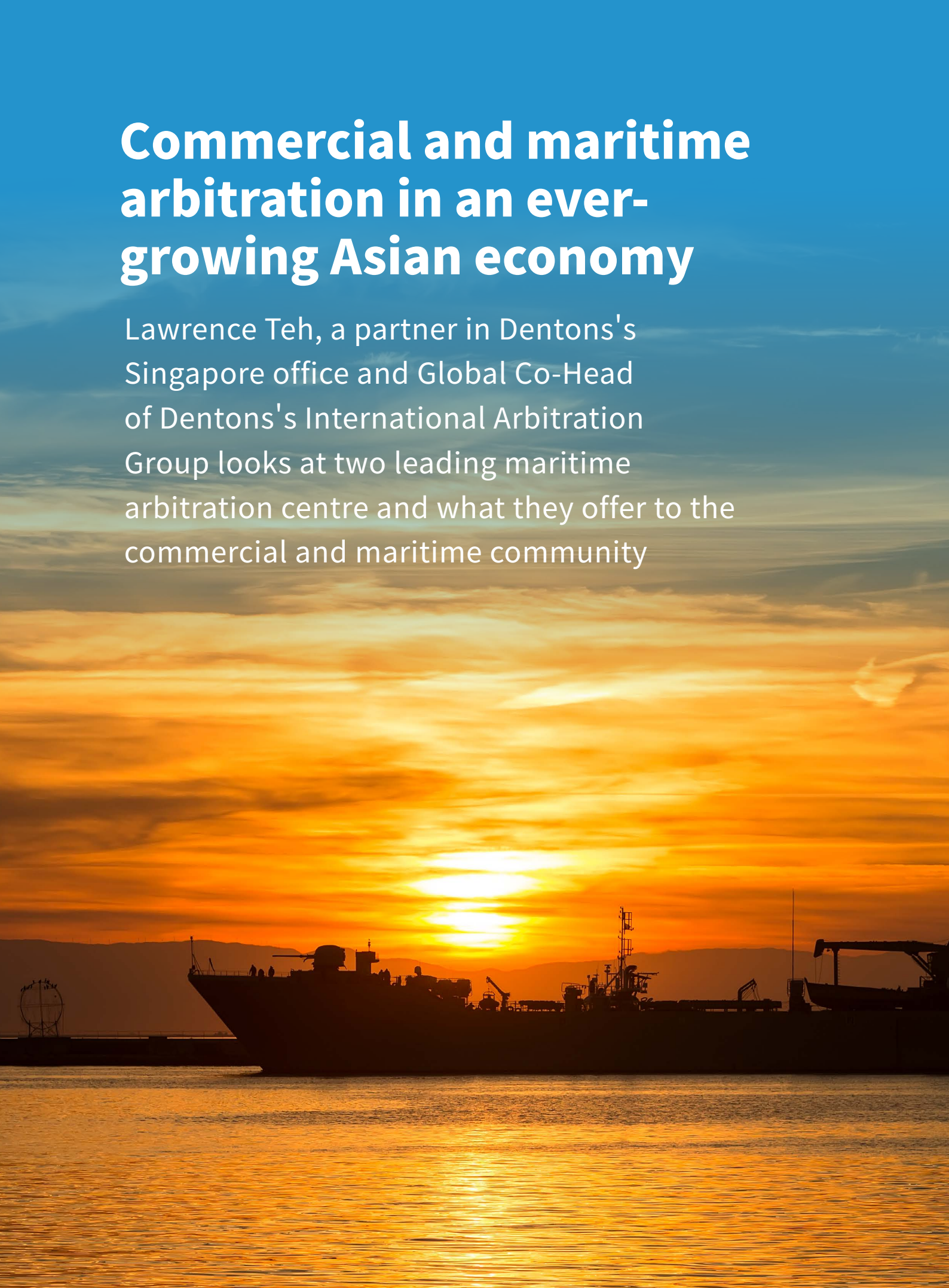
Whilst IMO undergoes the review, it remains a case of 'suck it up and see', and for all the industry's verbal resistance, many operators are working to find solutions that fit their fleet. There is near unanimous agreement, however, that to achieve a good CII, one size does certainly not fit all.

Some operators also paint a positive picture. LNG carrier, Cool Co, which operates a combination of owned and managed vessels, said in its 2022 ESG report that it sees good collaboration with charterers essential to optimising vessel performance. "Charterers direct the vessel route, speed and choose the fuel consumed. The resultant emissions of a vessel are therefore substantially under their control". In 2022 the company commenced a pilot initiative with a selection of charterers to make them aware of the implications of their choices. "The objective being to encourage better decision making".

Cool Co shared emissions data together with routing, speed management data and fuel mix suggestions "to reduce operationally driven emissions. Further, we are in the process of including the CII in the charter party as a mutual goal for vessel environmental performance".

Commercial and maritime arbitration in an ever-growing Asian economy

Lawrence Teh, a partner in Dentons's Singapore office and Global Co-Head of Dentons's International Arbitration Group looks at two leading maritime arbitration centre and what they offer to the commercial and maritime community



Asia's vibrant economies are driving a substantial amount of commodity trading and, with that, substantial shipping activity. Asia's share of global Gross Domestic Product (GDP) is said to be over 45% and likely to exceed 50% by 2030. Asia continues to build cities, maintaining its already substantial importation of raw materials and commodities. These cities, in turn, generate an export trade from the manufacture of goods and also generate an increasing import trade from rising business and consumer expenditure, all of which is carried mostly by ship. These commercial and shipping transactions have, as their by-product, disputes that need to be resolved in a meaningful and efficient way, giving rise to a demand for arbitration services and for a selection of arbitral venues appropriate to the transaction or dispute.

London has attracted and continues to attract a large number of maritime law disputes not least because of the trust reposed by the maritime and commercial community in English commercial law and English arbitral processes. English awards, on the whole, offer extensive reasoning that the maritime and insurance community find useful in business and forward planning. The most recognisable arbitral organisation in maritime arbitration is the London Maritime Arbitrators Association (LMAA).

In recent years, Singapore has become a popular choice to seat international commercial arbitrations. Singapore sits geographically at the centre of Asia and is close to China and India, two of the dominant players in Asian and global trade. It operates in English and is known for its transparency, efficiency and adherence to the rule of law. In a recent study of international arbitration centre, Singapore and London were ranked jointly as the most favoured seats of arbitration around the world. Singapore's dedication to the rule of law and its open-architecture system of arbitration (allowing non-Singapore qualified practitioners and arbitrators to arbitrate in Singapore with little to no restriction) provides the commercial certainty and predictability that the trading world desires. The fact that many practitioners and arbitrators are based in Singapore and Asia also promotes the sense that they understand cultural differences between parties to a transaction, whether it is a difference between parties from different parts of Asia (a Continent of about 30% of the Earth's land area, comprising about 50 countries and a population of about 4.7 billion) or differences between parties further apart geographically.

All businesses wish their cases in arbitration to be understood. Sometimes an inability on the part of counsel or the arbitral tribunal to appreciate cultural norms in a certain part of the world might make the eventual award in arbitration feel like

counsel and the tribunal have not truly appreciated the facts and how the parties have dealt with one another. What Singapore endeavours to offer continually, I believe, is a place of arbitration that parties, wherever they are based in the world, trust and where they feel comfortable arbitrating.

Singapore's regular appearance at the top of the world's maritime centre also promotes its attractiveness as an arbitral centre where there exists a full maritime ecosystem and the technology to handle complex maritime disputes. The most recognisable arbitral organisation in this respect is the Singapore Chamber of Maritime Arbitration (SCMA) whose processes are similar to those that take place in London maritime arbitration. SCMA has made good progress over the last decade in attracting maritime arbitrations both regionally and internationally in a whole range of maritime disputes ranging from charterparty and cargo disputes to commodity and commercial disputes, to disputes arising from shipbuilding, ship conversion and offshore construction. Future trends in commercial and maritime disputes will involve traditional commercial and shipping issues, but they will also contain questions of decarbonisation, Environmental, Social and Governance (ESG) -compliance, new forms of "ships" and transportation and the use of technology and artificial intelligence (AI) in commerce and shipping. Arbitration centre may in future be defined by their ability to handle such disputes and to grow with the changes that the world is already experiencing at a rapid rate.

Lawrence Teh is a supporting member of the LMAA and a board member of the SCMA. In addition to his work as counsel, he is also appointed to arbitral tribunals in arbitrations around the world.

Smaller ship owners are an opportunity for Chinese lessors

Time in the market has built competence and opened up options, says Erlend Sommerfelt Hauge of ship finance platform oceanis

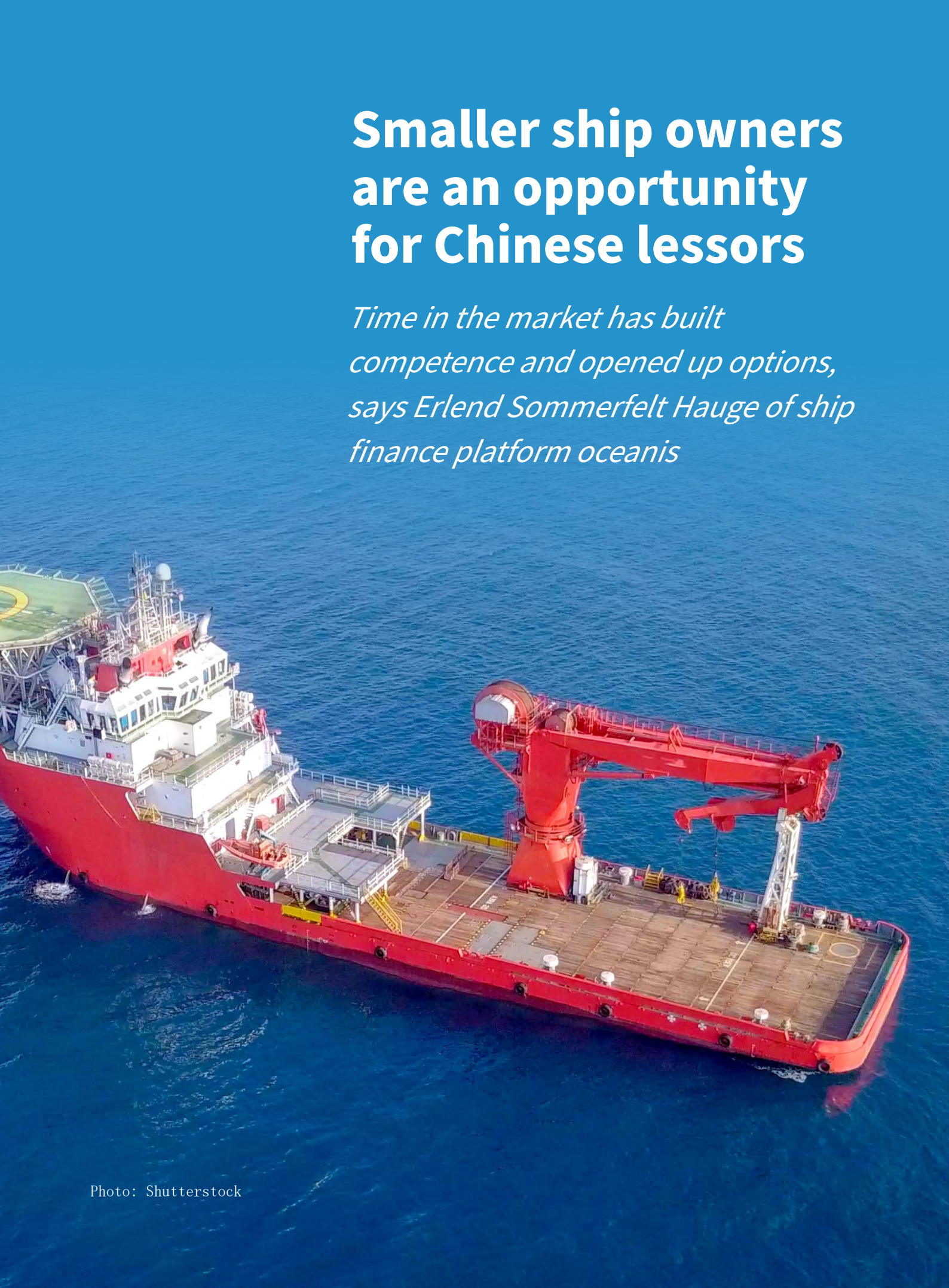


Photo: Shutterstock

Chinese leasing has seen tremendous growth during the past decade. While this expansion has often come at the expense of Western banks, to a larger extent, it has been a result of capitalising on the struggles faced by Western banks and the mounting regulatory obstacles. Owing to tighter regulatory constraints and strategic shifts, Western banks have moved their focus towards the largest shipping groups locally in the West.

Larger European shipowners primarily secure financing from major corporate banks, relying on guarantees from holding companies, in addition to some sporadic non-recourse financing. European ship ownership, however, is highly fragmented; a majority of vessels are under the ownership of small and medium-sized shipowners who control fleets of fewer than 20 vessels each. This creates an imbalance between the supply and demand for financing in the region.

The Chinese shipping industry has grown substantially over the years, both in terms of numbers and expertise in assets, industry knowledge, and sophistication. Chinese shipyards are now engaging in more technically advanced segments, demanding deeper expertise. The leasing houses, coming from both shipbuilding and financial backgrounds, are following a similar trajectory of continuous advancement. This should come as no surprise, considering that China is arguably one of the most influential shipping nations, both in terms of supply and demand.

As Chinese lessors amass more industry expertise and become more cyclical aware, new business prospects will present themselves. In the years following the exodus of major banks, the space of limited or non-recourse lending to Western shipowners has become crowded with different lenders. These include numerous local banks, some of which are specialised niche banks with deep industry knowledge and cyclical awareness, as well as less regulated yet more flexible, and expensive, alternative creditors.

Chinese leasing, offering higher leverage than banks but with lower pricing than alternative lenders, has captured a significant market share and is in high demand among Western shipowners. These debtors are well-acquainted with the lending products provided by Chinese leasing, being sale and leaseback structures, typically with purchase obligations at the end of the financing tenor.

Western lenders, especially major banks, are influenced by a different zeitgeist and political influence compared to Chinese financial institutions. This introduces further opportunities. In the Western world, the ongoing ethos of transitioning away from coal, oil, and gas as energy sources is perhaps the most defining trend. Recently, energy security has resurfaced as a national or regional objective, after arguably being disregarded for too long. However, the paths to energy transition and energy security are not always compatible.

To balance the projected demand for oil and gas with supply, the oil and gas industry must ramp up investments in production. This trend has already begun and is expected to continue for years. Existing production infrastructure needs further investments to to be adequately maintained, and new resources need to be discovered and developed to sustain the living standards in the West that people have grown accustomed to, given our heavy dependence on these commodities. This trickles down into significantly enhanced cash flows for supply companies and longer charter commitments from the relevant end-users of the tonnage.

Like flexible alternative lenders who, in the past year, could pick and choose the best offshore owners and projects to support, this opportunity also extends to Chinese leasing companies. This includes Chinese leasing firms that entered the offshore supply cycle later, lending against a series of offshore supply vessels delivered on the eve of the last boom cycle in 2013.

Lending to the offshore supply sector has significantly declined since OPEC and US shale producers ended the previous bull market in 2014, flooding the oil markets in their battle for market share.

European lenders are are struggling to return to this market for two reasons: firstly, the fear of further losses despite conditions being structurally stronger than those faced a decade ago, with almost no vessels on order and a healthy capex budget from oil majors; secondly, ESG (Environmental, Social, and Governance) regulations are causing many banks to to forego oil and gas projects, favouring vessels in the dry bulk and container sectors or even exiting the shipping industry altogether in favour of less evidently carbon-intensive sectors.

The gap this creates is attractive. Not only does the strong market provide an arena for fixed cashflows, which can provide lower volatility to lenders than comparable investments in the shipping sector, but it is also one in which higher pricing is found. Hence, the withdrawal of European lenders from offshore financing has potentially created yet another avenue for Chinese lessors to capitalize on.

The Western small and medium-sized shipowners, along with the offshore supply sectors, both represent opportunities for Chinese leasing, as the existing financing options are often costly or restricted in some manner - given that they do not stem from major banks - and many lenders lack the necessary expertise. Consequently, Chinese lessors are strategically positioned to provide capital to a segment that is underinvested and, in a broader sense, to smaller shipowners.

As Chinese lessors spend more time in the market they will develop an enhanced understanding of the cyclical nature of different sectors, and ultimately move more quickly to take advantage of opportunities earlier.

Appendix 1

Methodology for International Shipping Centre Development Index

1. The General Rationale

The research process for the Xinhua-Baltic International Shipping Centre Development Index consists of 7 steps:

Step 1

Theoretical research on index: Collate and study relevant literature to achieve a comprehensive understanding of the theoretical foundation of international Shipping Centre 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 is jointly developed by the China Economic Information Service and the Baltic Exchange, which is authenticated by an expert committee.

Step 3

Data collection and processing: Initial data for indicators is collected through two channels: China Economic Information Service and the Baltic Exchange. This data has then gone 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 is constructed. Subsequently an index is computed using the model.

Step 5

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

Step 6

Organise an expert team to ascertain the scientific foundation of the research and confirm the final result.

Step 7

Announcement of index results.

2. Index System

Table 1 Indicator system and associated weightage for Xinhua-Baltic International Shipping Centre Index

Primary Tier		Secondary Tier
Name	Weight	Name
Port Factors (A1)	0.20	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)
Shipping Services (A2)	0.50	Ship brokerage services (B_7)
		Ship engineering services (B_8)
		Shipping business services (B_9)
		Maritime legal services (B_{10})
		Shipping finance services (B_{11})
General Environment (A3)	0.30	Government transparency (B_{12})
		Extent of e-government and administration (B_{13})
		Customs tariff (B_{14})
		Ease of doing business index (B_{15})
		Logistics performance index (B_{16})

A_1 Port Factors
This refers to the infrastructures of the port city and the throughput of various types of cargo.

A_2 Shipping Services
This refers to the level of shipping services provided by the port city.

A_3 General Environment
This refers to the business and economic environment together with government policy measures to support the development of the port city.

B_1 Container throughput
Source of data: China Economic Information Service Database

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. The computation unit is “10,000 TEU”.

B_2 Dry bulk cargo throughput
Source of data: China Economic Information Service Database

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”.

B_3 Liquid bulk cargo throughput
Source of data: China Economic Information Service Database

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”.

B_4 Number of cranes
Source of data: Drewry

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

B_5 Total length of container berths
Source of data: Drewry

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 berths, pontoon berths and anchorage berths.

Berthing facilities are 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”.

B_6 Port draught
Source of data: Drewry

The 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 refer to water depth statistics of the deepest container berth in the port.

B_7 Ship brokerage services

Main source of data: The Baltic Exchange

An important component of shipping services, shipbrokers provide professional agency, brokerage and consultancy services covering a gamut of industries including transportation, insurance, financial and commerce, which facilitate shipping development.

In this report, shipping brokerage services is assessed based on the number of shipbrokers in each port city.

B_8 Ship engineering services

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

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 professionals on advanced applied technologies to enable them to navigate vessels.

In this report, ship engineering service are assessed based on the number of shipping companies available in the port city. Services offered by ship engineering companies include ship engineering, repairs, quantity surveying and ship classification.

B_9 Shipping business services

Main source of data: Lloyd's List

A shipping company may manage its own vessels or vessels commissioned by other owners. In this report, shipping business services consist mainly of the following three indicators: the number of ship management companies operating in the port city, the number of branches of top 100 container shipping companies and top 100 bulk carrier companies.

B_{10} Maritime legal services

Main source of data: London Maritime Arbitrators Association, Singapore Chamber of Maritime Arbitration, Society of Maritime Arbitrators, Legal 500, Chambers

In this report, the overall level of maritime legal services is assessed from the two perspectives of maritime arbitration services and 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 are assessed based on the number of arbitrators located in international arbitration centre in London, Singapore and New York. The number of partners in law firms is assessed based on data from the Legal 500 Law Firm Index, Chambers and law firm websites.

B_{11} Shipping finance services

Source of data: Marine Money, International Union of Marine Insurance (IUMI)

The scope of shipping finance services cover four areas: namely ship financing, capital settlement, maritime insurance and maritime financial derivatives.

Ship financing includes syndicate loans, debt capital markets and equity capital markets. Maritime insurance refers to insurance taken out 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 and P&I 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. Shipping insurance services are assessed based on maritime insurance premiums associated with each port city. To derive this figure, the total ship and cargo insurance premiums for each country is calculated and then allocated to each port city based on their respective port’ s cargo throughput.

B_{12} Government transparency

Source of data: Transparency International

Government transparency related to 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 conduct of public officials, civil servants, administrators, are transparent. Reports can also be made against them so that they would be held accountable for their conduct. This is the most reliable way to prevent corruption.

B_{13} Extent of e-government and administration

Source of data: United Nations e-Government Development Database

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.

B_{14} Custom tariff

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

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

B_{15} Ease of Doing Business Index

Source of data: World Bank Database

Economies are ranked on their ease of doing business, from 1 to 189; 1 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 the Doing Business ranking by the World Bank.

B_{16} Logistics performance index

Source of data: World Bank Database

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 a shipment reaches the recipient within the expected delivery schedule. The index ranges from 1 to 5; a higher score means better logistics performance. The data is 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.

3.Data Processing

Data for secondary indicators required for the Xinhua-Baltic International Shipping Centre Development Index is mainly sourced from authoritative organisations such as the United Nations, Drewry, and World Bank.

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 is normalised – through relative processing to make its statistical variables dimensionless – before using it in index computation.

The raw data is divided into two categories: The first comprises indicators with score values ranging from 1 to 100. This category of indicators is used directly for computation. The second category comprises indicators with absolute score values. These indicators are 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, $m = 1,2,\cdots,6$, $m = 1,2,\cdots,6$, $\bar{x}_{l,mi}$ is sample mean of each sampling of the m-th indicator, $a = 500$ =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, the indicator's quantile is computed for each city.

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

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

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 $\phi(\ )$ 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 an 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 6 basic steps:

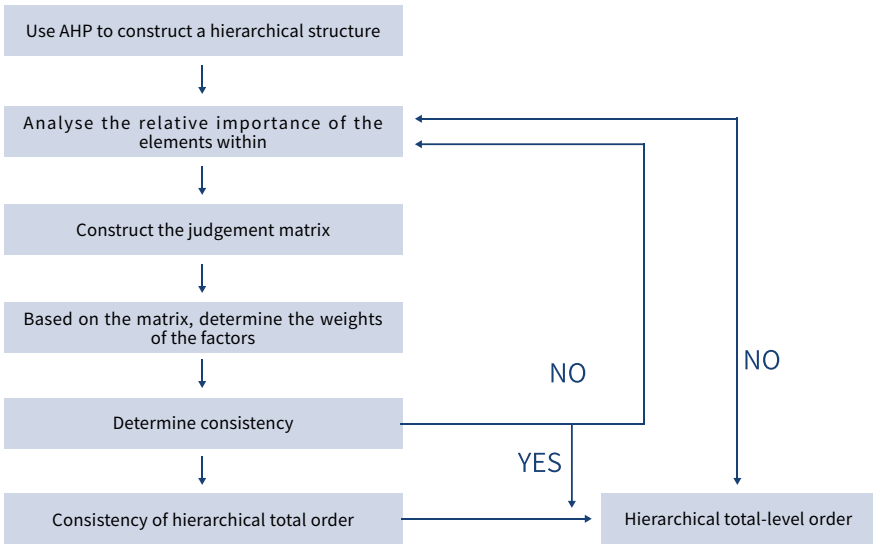


Figure 5 Basic processes of AHP algorithm

(1) 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.

(2) 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.

(3) 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.

(4) 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, $W = \left[w_1, w_2, \cdots, w_n\right]^T$, then we have : AW=λW

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.

(5) Hierarchical 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 $a_1, a_2, \cdots, a_m$, a_j are obtained, then the results of single-level order for $B_1, B_2, \cdots, B_n$

corresponding to elements in the current level are . Now, if B_i is not linked to A_j, then b_{i^j} =0, and total-level order is achieved.

(6) 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 RI_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

Dear experts,

Greetings! China Economic Information Service and the Baltic Exchange have embarked on a joint research to develop the Xinhua-Baltic International Shipping Centre Development Index. The aim is to produce an objective, impartial and scientific review and assessment of the competitiveness of

cities with international Shipping Centre. The main purpose of this questionnaire is to obtain some fundamental information regarding weight assessment for analytic hierarchy process (AHP). Your response is of utmost importance to this research. Therefore, we sincerely seek your support to fill out the questionnaire carefully. Thank you for your support!

(1) 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 j 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):

Technological innovation capability (A)	B_1	B_2	B_3
Innovative output capability (B1)	—	3	5
R&D capability （B2)	—	—	2
Innovation management capability (B3)	—	—	—

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).

(2) Scoring by experts

1. Scoring for primary indicators

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（A1）	—		
Shipping Services（A2）	—	—	
General Environment（A3）	—	—	—

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 (A1)	B_1	B_2	B_3	B_4	B_5	B_6
Container throughput (B1)	—					
Dry bulk cargo throughput (B2)	—	—				
Liquid bulk cargo throughput (B3)	—	—	—			
Number of cranes (B4)	—	—	—	—		
Total length of container berths (B5)	—	—	—	—	—	
Port draught (B6)	—	—	—	—	—	—

(b) Please fill in the value of importance between the secondary indicators (B_7-B_{11}) with respect to the primary indicator (A_2). Shaded areas need not be filled.

Shipping Services (A2)	B_7	B_8	B_9	B_{10}	B_{11}
Shipping brokerage service (B7)	—				
Ship engineering service (B8)	—	—			
Shipping business service (B9)	—	—	—		
Maritime legal service (B10)	—	—	—	—	
Shipping finance service (B11)	—	—	—	—	—

(c) Please fill in the value of importance between the secondary indicators (B_{12}-B_{16}) with respect to the primary indicator (A_3). Shaded areas need not be filled.

General Environment (A3)	B_{12}	B_{13}	B_{14}	B_{15}	B_{16}
Government transparency (B12)	—				
Extent of e-government and administration (B13)	—	—			
Customs tariff (B14)	—	—	—		
Ease of doing business index (B15)	—	—	—	—	
Logistics performance index (B16)	—	—	—	—	—

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