

THE LEADING MARITIME CAPITALS OF THE WORLD

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METHODOLOGY AND DATA SOURCES

DEFINITIONS

What is the definition of maritime activity?

During 15 years of research, Menon has defined maritime activity as: "All companies that own, operate, design, build or deliver equipment or specialised services to all kinds of ships and other floating units."

What is a city?

We have defined a city as encompassing an area that can be reached within a two-hour drive from the city center. This definition is transparent, reflects actual proximity and is not sensitive to artificial administrative borders.

Survey data

A survey was sent out to approximately 1,600 maritime professionals, i.e. owners, managers and academics from all over the world. A total of 196 answered, giving us a response rate of 12%. Of the 196 respondents, approximately a third were located in Scandinavia, a third in the rest of Europe, while the last third were located outside of Europe. In total, the experts are from 33 countries on all continents. Our analysis of the data shows that there was a certain "home bias" in the assessments, but the analysis also shows that if we had controlled for this bias, the results would not have been heavily influenced.

DESCRIPTION OF DATA SOURCES

Maritime Finance and Law

DEALOGIC
The data for book runners and the mandated arranger table of syndicated marine finance loans was gathered from Dealogic. Dealogic is a platform used by investment banks worldwide. We then sorted the banks according to the location of their maritime headquarters.

WHO'S WHO LEGAL

In each of the city's, we have counted the number of experts in maritime law on the *Who's Who Legal* list of legal practitioners. *Who's Who Legal* has a comprehensive list of experts and firms in over 100 national jurisdictions. It is impossible to buy entry into this publication.

INSURANCE

The International Union of Marine Insurance (IUMI) provided a list of marine insurance premiums paid to insurance companies in each country for hull and cargo insurance. In addition, premiums for P&I clubs are included. The value given to each city is the same as for the country as a whole.

THOMSON REUTERS DATASTREAM

The market capitalization and number of stocks on each stock exchange was retrieved from Thomson Reuters Datastream. We used the Thomson Reuters Business Classification system to classify each company, which was quality assured by Menon analysts.

Maritime Technology

IACS
The International Association of Classification Societies (IACS) has a complete list of ships classified by different classification societies. The fleet registered in each society is allocated to the location of the societies' headquarters. For DNV GL, the number of vessels is split between Oslo and Hamburg according to number of ships classed by GL and DNV before the merger.

CLARKSON DATABASE FOR SHIPBUILDING

The data for the value of ships delivered from shipyards in 2014 was retrieved from Clarkson World Shipyards Monitor.

Ports and Logistics

UNCTAD LIST OF LARGEST PORTS
We used the United Nations Conference on Trade and Development (UNCTAD) list

of the world's largest ports, supplemented by statistics for ports not covered by the UNCTAD dataset.

Shipping Centers

CLARKSON DATABASE
The data for the location of shipowners was retrieved from the Clarkson Research World Fleet Register, the most complete ship database in the world. The data was retrieved and analyzed by a Menon analyst.

VALUE OF WORLD FLEET

Menon has developed a database of every nation's fleets of ships. The value of the vessels is then calculated to give an estimate of the value of each country's fleet, which is the basis for the ranking. The database is developed in cooperation with the Norwegian Shipowners' Association.

OTHER SOURCES

Center for Liveable Cities (2014), *Global Trends in Shipping and Impact on Port Cities* – Series of lectures delivered at the MND Auditorium, Singapore

Economist Intelligence Unit (2013), *Hot Spots 2025 Benchmarking the future competitiveness of cities*

Menon (2013), *Leading Maritime Capitals of the World*

UNCTAD (2014), *Review of Maritime Transport 2014*

World Bank (2014), *Doing Business 2015*

OECD (2015) *Peer review of the Korean shipbuilding industry and related government policies*

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EXECUTIVE SUMMARY



COUNTRIES AND CITIES are to an increasing extent competing to attract the best companies and most talented people. The winners in this race for attractiveness will become the leading maritime countries and cities of the world. This report benchmarks the top maritime cities around the world in four maritime sectors: shipping, finance and law, technology, and ports and logistics. We also present an overall assessment of the cities' competitiveness and attractiveness to maritime companies. The report uses a broad set of objective indicators and builds on a comprehensive survey among 200 industry experts located in 33 countries. As such, the report gives valuable insights into the strongholds of the global maritime industry today.

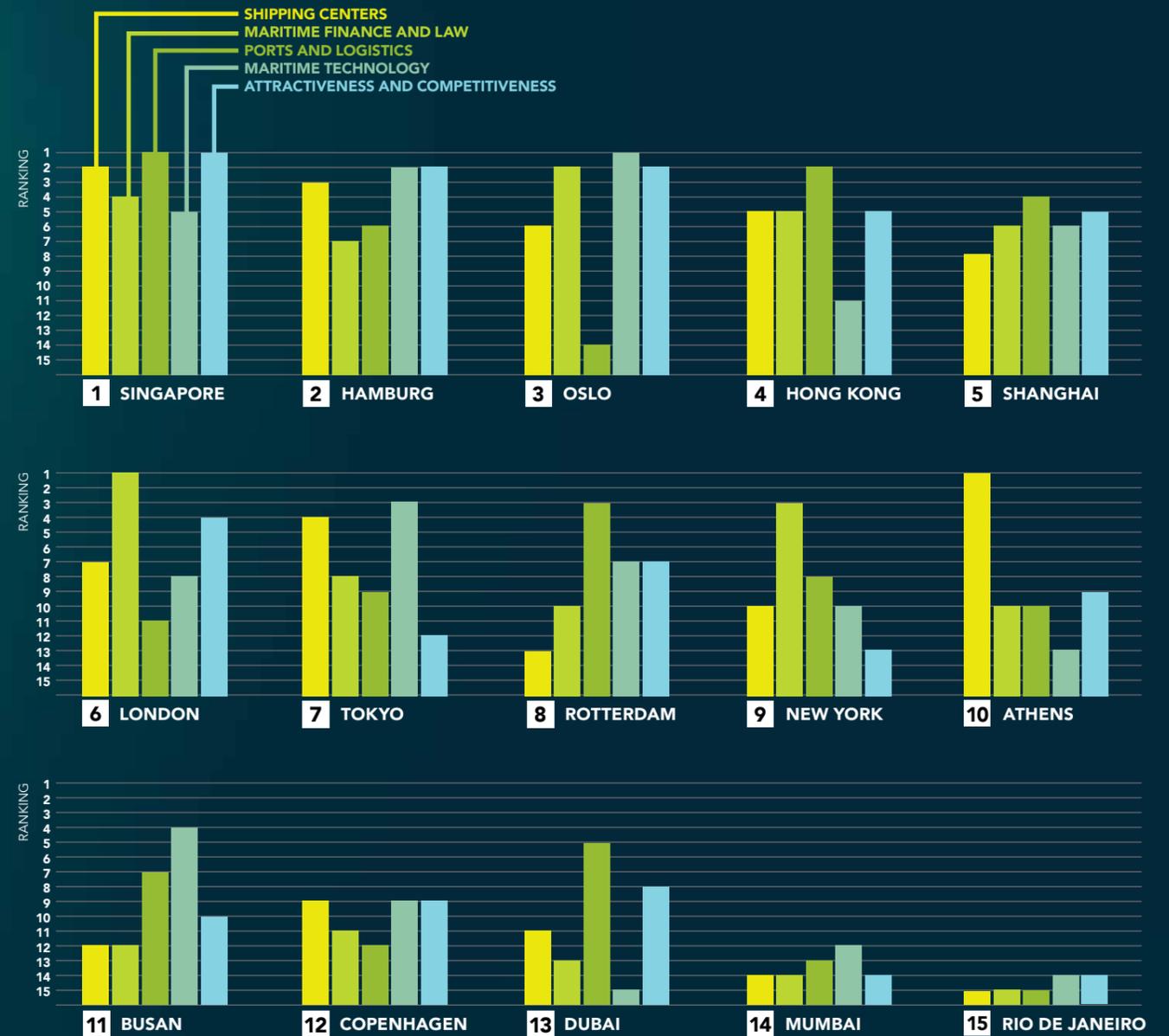
Three years ago, our first report on the leading maritime cities of the world ranked Singapore in first place. This year's report again places Singapore at the top of the list. With its business friendly policies, and being strategically located on the trade route between Europe and Asia, Singapore has gained a position in the global economy few would have predicted 40 years ago. As recently as 10 years ago, Singapore lacked maritime research and education, and the lines between foreign and domestic companies were weak. Today, the city plays a key role in all aspects of the maritime industry.

Hamburg takes second place and Oslo comes third. Oslo has its strengths within maritime finance and technology, but is beaten overall by Hamburg because of Hamburg's importance as a European port city. Both cities, together with London and Rotterdam, are fighting to become the leading city in Europe for maritime activities. London is the world's leading city for maritime finance and law, while Rotterdam's strength lies in port and logistics services.

The increasing importance of China in the maritime industry is evident in the fact of Shanghai joining Hong Kong on the list of top five cities. China is the world's largest trading nation, has one of the world's largest shipbuilding industries and six of this world's ten largest ports are located in the vast country. Hong Kong is challenged as a maritime hub by the strong growth rate of other Chinese cities.

Looking five years into the future, our experts predict that Singapore will keep its position as the global leader, while Shanghai is expected to increase its importance and become the second most important maritime city. The race to become the leading city in Europe is still open, between the big four. Dubai is predicted to take the step from being the leading maritime city in the Middle East to one of the leading maritime capitals of the world. ■

RANK	SHIPPING CENTERS	MARITIME FINANCE AND LAW	PORTS AND LOGISTICS	MARITIME TECHNOLOGY	ATTRACTIVENESS AND COMPETITIVENESS	OVERALL RANK
1	ATHENS	LONDON	SINGAPORE	OSLO	SINGAPORE	SINGAPORE
2	SINGAPORE	OSLO	HONG KONG	HAMBURG	HAMBURG / OSLO	HAMBURG
3	HAMBURG	NEW YORK	ROTTERDAM	TOKYO	-	OSLO
4	TOKYO	SINGAPORE	SHANGHAI	BUSAN	LONDON	HONG KONG
5	HONG KONG	HONG KONG	DUBAI	SINGAPORE	SHANGHAI / HONG KONG	SHANGHAI



THE MARITIME INDUSTRY

– GLOBAL VIEW



IN RECENT YEARS, the world economy has become increasingly integrated. According to Peter Dicken, a British professor of Economic Geography, a “global shift” (Peter Dicken, 2010) has transformed the world economy. The main characteristics of this shift are market integration, strong growth in international trade, foreign direct investments, the emergence of transnational companies and a dramatic increase in interdependence between nations.

Transnational companies operate across the entire world, taking advantage of economic differences by locating their business activities in the most attractive locations. This global shift fuels the growth of the world economy, but it also represents a tremendous challenge to

countries. It can no longer be taken for granted that companies will stay in their home countries. To an increasing extent, cities have to compete to attract and retain internationalized firms. In other words, they have to be attractive hosts.

Shipping has always been an international industry. In fact, shipping is the premise for international trade. A central driver for the global shift described above has been the operational and technological development of the shipping industry, which has lowered transportation costs dramatically. This has been vital for increased international trade and the division of labor.

With the emergence of standardized bulk carriers, oil and other raw materials could

be traded globally. Today most shipping markets, not just raw materials carried in bulk, but also specialized segments like cruise, offshore and car carriers, are globalized. Maritime services, however, have, until recently, been relatively national or regional, often located around the ship owning companies. Ship finance was among the first to globalize, while legal services, due to national jurisdictions, have been the most national of the maritime services. English law firms have been the exception. They have branches in shipping hubs all over the world since English law is commonly chosen as the jurisdiction in contracts of trade and chartering.

Today, most maritime services are globalized. For example, the five leading

classification societies class 78% of the world’s ships, and the two largest book runners for ship finance cover one sixth of the global market. Even port operations are globalizing. One of these companies is the Singapore Port Authority (PSA) that was corporatized in 1997. PSA is now one of the world’s largest port operators with operations in many key markets.

Partly due to, and partly as an effect of global markets, maritime companies have also become globalized. For example, the Danish group AP Moller-Maersk, has a worldwide presence in several shipping markets, and a market value of \$49 billion (March, 2015). Recent mergers also include Oslo-based classification and technology consultants DNV with Hamburg-based Germanischer Lloyd. The new merged

entity, DNV GL, is the largest classification society in the world.

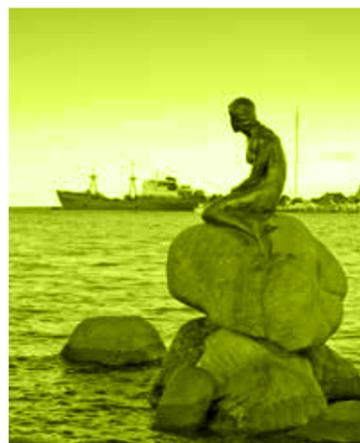
The structure of the companies varies greatly, but the dominant trend is to build corporations around specialized business units with a global reach. The Fredriksen group is a good example of this. The group consists of companies specialized in segments like rigs (Seadrill), crude carriers (Frontline) and dry bulk (Golden Ocean). The location of companies has also been globalized. Value chains are often split up, with headquarters located in financial centers, operating units close to markets and R&D units in knowledge hubs.

Urbanization is one of the strongest global megatrends of this century, with

a clear shift in importance from nations to cities (Moretti, 2012; Quartz, 2015). Strong agglomeration forces induce firms, talents and investors to locate in the large global knowledge hubs. This trend works in favor of city-states, like Singapore, Hong Kong and Dubai, but cities in large countries, like New York, Rio and Hamburg may also retain their attractiveness.

Companies have become more willing to move activity to the most attractive locations, with strong competition among cities to draw and retain them. The attracting factors, the glue that makes companies stay, have changed in recent years. Access to talent and knowledge-based clusters has become increasingly important in the competition. ■

THE LEADING MARITIME CAPITALS OF THE WORLD



TODAY, half the world's population lives in cities, and these cities generate 80% of the global GDP (Economist Intelligence Unit, 2013). Companies are increasingly focusing on city regions when developing their strategies for where to relocate or expand their operations. Population projections show that virtually all growth over the next 30 years will come from urban areas. Every year the world's cities are growing by 60 million people, roughly equal to the current population of the United Kingdom.

often have links to universities and are deeply embedded in the local milieu; for example, in their reliance on specialized local competence. Another important point, following from the fact that firms increasingly split up their value chains, is that cities compete to attract activities – not companies. The winners in the future will be those that are able to attract:

- Science and education
- Owners and headquarters
- R&D – product and technology development
- Financial, legal and other sophisticated business services

City regions are increasingly becoming aware of the international competition and are developing strategies to enhance their attractiveness to highly productive and innovative companies, and to talented individuals. The more mobile the companies, the stronger the competition among cities to attract them. As the maritime industry is global in nature and highly competitive, many maritime companies are mobile entities seeking to take advantage of localization advantages in different countries. This, combined with the maritime industry being a high value-added industry, means that the fight to attract maritime companies is tough. This also implies that it is easy to lose maritime business activities. The gains from winning the location race are hence higher for the less mobile part of the industry.

While many cities are important centers in today's maritime industry, Martin Stopford, President of Clarkson Research, suggests that we might see a future concentration of shipping activity (Center for Liveable Cities, 2014). Stopford predicts the development of two or three global centers characterized as "shipping super cities" – one city in each of the eight-hour time zones (Asia, Europe and the Americas). This will mean that some of today's shipping centers will lose importance to a few global centers that will act as shipping service hubs. Stopford also went further, dividing the cities into cargo port cities and shipping services ports. Port cities, such as Rotterdam and Shanghai are mainly driven by their role of transporting cargo to the regional markets. In shipping service ports, on the other hand, the port is secondary while offering other services to the international shipping industry will be key. ■

Specialized knowledge-based services are probably the least mobile companies in the maritime industry. The reason being that knowledge-based companies

BENCHMARKING BASED ON OBJECTIVE AND SUBJECTIVE JUDGEMENT

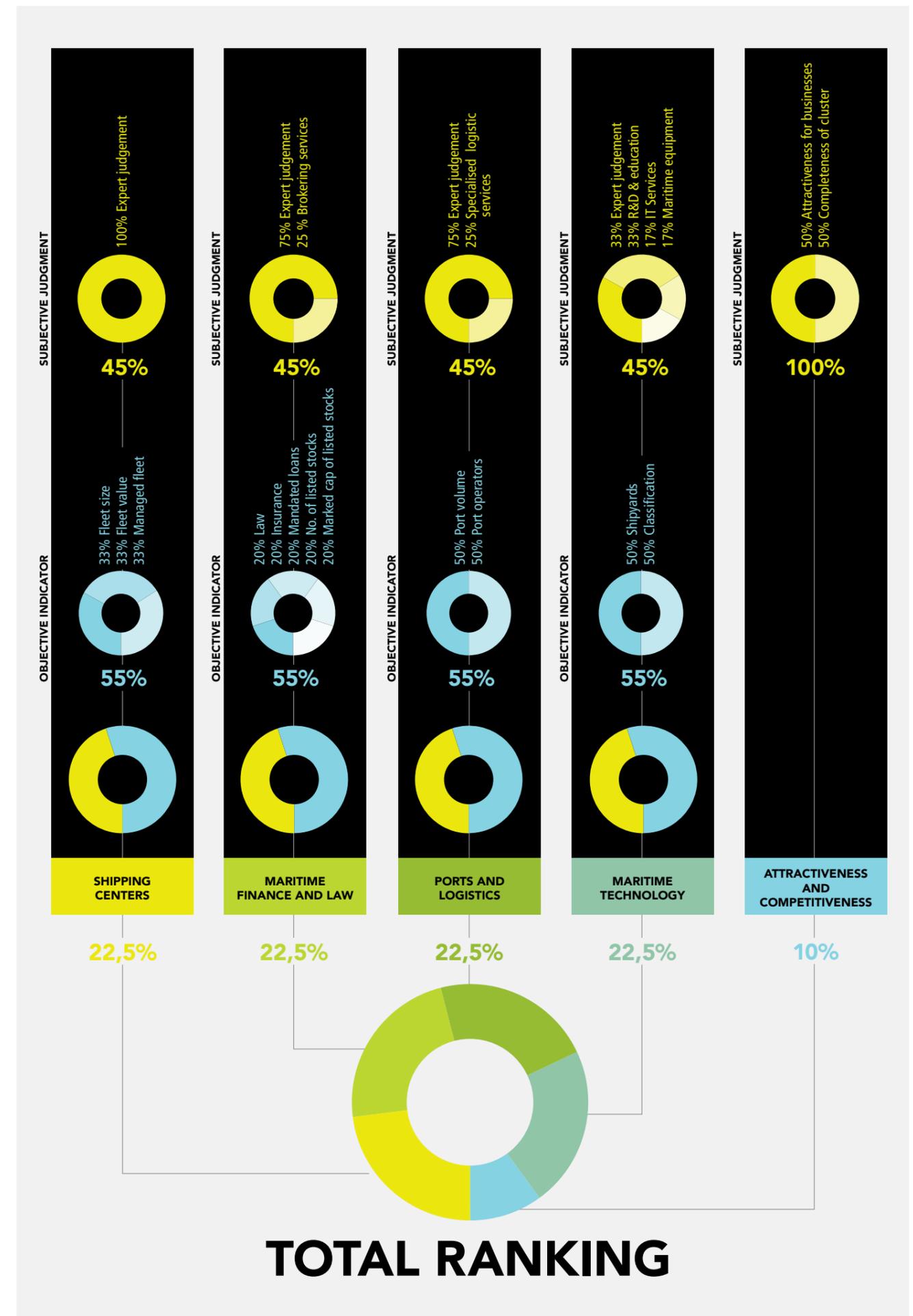
WE HAVE COMBINED objective and subjective measures to assess and benchmark the 15 cities. In total, we have developed 23 indicators to rank the cities. 12 of the indicators are objective, based on widely used measurements utilized in the industry. The remaining 11 indicators are subjective based on answers from nearly 200 shipowners, executives, professors and journalists located in 33 countries on all continents.

There are numerous ways to assess the strength of maritime services in the 15 cities. We have looked for data sources that are widely used and respected in the industry, and even though we have identified limitations in some of them, we have

decided to apply them unchanged. The reason for this approach is that we want to keep the assessments verifiable for others and replicable in the future.

This study rests on a ranking model, where the objective and subjective indicators in total are weighted 50% each. We have divided the study into five main indicators, where the four areas of finance and law, technology, ports and logistics, and shipping centers are weighted equally. The fifth area, competitiveness and attractiveness, is based on answers from industry experts and weighted 10%. The ranking model is illustrated together with a description of the individual indicators. ■

MAIN INDICATOR	OBJECTIVE INDICATOR	Description	SUBJECTIVE INDICATOR	Survey question
SHIPPING CENTERS	Fleet size	CGT owned by shipowners registered in the city	Leading centers	Which of the following cities do you consider the five leading shipping centers of the world?
	Fleet value	Share of the city's national value of world fleet		
	Managed fleet	CGT managed by managers registered in the city		
MARITIME FINANCE AND LAW	Law	Number of maritime legal experts in the city	Leading centers	Which of the following cities do you consider the five leading centers of the world within maritime finance?
	Insurance	National collected insurance premium for P&I, hull and cargo		
	Mandated Loans	Value of maritime mandated loans issued from a bank in the city	Brokering	In which cities do you find companies offering world-class maritime brokering services?
	Market capitalization of listed stocks	Market capitalization of listed maritime companies on the city's stock exchange		
PORTS AND LOGISTICS	Port volume	Volume of TEU handled in 2013 at ports in the city	Leading centers	Which of the following cities do you consider the five leading centers of the world for port and logistics?
	Port operators	Volume of TEU handled in 2013 by port operator with headquarters in the city	Logistics services	Which cities have the best offering of specialized logistics services?
MARITIME TECHNOLOGY	Shipyard	Value of ships delivered in 2014 from the nation	Leading centers	Which of the following cities do you consider the five leading centers of the world within maritime technology?
			R&D & education	In which cities do you find the leading maritime R&D and educational centers of the world?
	Classification	Number of ships classed by a class society with headquarters in the city	IT services	In which cities do you find companies producing world-class maritime IT services and IT based products?
			Maritime equipment	Which cities have the best offering of specialized logistics services?
ATTRACTIVENESS AND COMPETITIVENESS			Business environment	Which cities have the most attractive business environment for locating maritime business activities?
			Completeness of cluster	Which cities constitute, in your opinion, the most complete maritime cluster?



SHIPPING CENTERS

SUMMARY



BASED ON THE OBJECTIVE INDICATORS, Athens and Tokyo are the leading shipping centers, followed by Hamburg. However, the experts see it differently. Actually, Tokyo is ranked eighth while Oslo, only number nine on objective indicators, is ranked third. Singapore is ranked highest of all by the experts.

When we combine the objective indicators and expert judgments (weighted 45% and 55%), Athens, Singapore and Hamburg take the top three spots in the total ranking of the leading shipping centers. This is due to their consistency both in the quantitative data and in the experts' assessments. Currently, the German fleet is the third most valuable in the world making Hamburg an important center for shipping. Still, the shipowning community is not very strong. The reason for this being that most of its fleet is financed through KG structures, leaving the individual owners with little control over the fleet.

Athens' strengths lie in an impressively large and strong shipowning community. Hence, the city performs well on both the subjective and objective criteria. Athens is home to the world's largest fleet and has a strong ownership position with more than 700 Greek shipowners located both in Athens and around the world.

Greek shipowners have played a key role in the industry for decades and are expected to retain their position in the coming years.

"Singapore's biggest strength is a business friendly government, while the city's weakness is limited human capital."

— INDUSTRY EXPERT

Singapore's strength lies, to a large extent, in its geographic location with close proximity to important markets. The city is a key marketplace for shipping with an important center for commercial management. Our industry experts rank Singapore highest, while the city scores weaker on the objective criteria, placing it second overall. Of the 15 cities, Singapore is home to the fourth largest fleet, while the second largest fleet is managed from the city. This demonstrates a strength in operational capabilities. One of the industry experts highlights that many foreign owners are located in the city, illustrating Singapore's global attractiveness. At the same time, it could also be a sign of vulnerability, because foreign companies are more "footloose" than domestic companies. ■



EXPERT ASSESSMENT

The two leading cities, according to our expert panel, are Singapore followed by Athens. The industry experts rank Oslo third, six places higher than our objective indicators suggests, while the opposite is true for Tokyo. Besides this, the ranking on the objective and subjective indicators are quite consistent. Tokyo is probably ranked lower by the industry experts because the Japanese shipping environment has a more domestic approach and weaker international links than the other cities. According to the experts, there is a distinction between five top-tier cities and five second-tier cities. In addition to Singapore, Athens and Oslo, Hamburg and Hong Kong are seen as important top-tier shipping cities.

Singapore has a strong position, both commercially and operationally, and is also an important meeting hub for building market relationships and doing deals. Still, many shipowners in the country are not originally from Singapore. An important reason for Singapore's popularity is its stable pro-business environment. In 2015, the World Bank again placed the city first for ease of doing business.

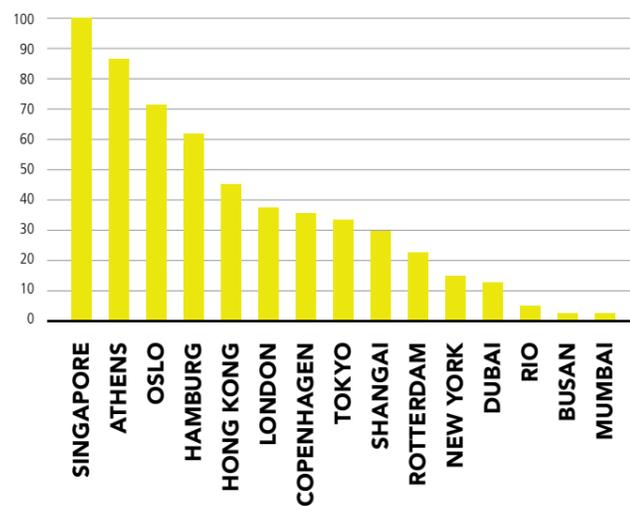
While Athens comes out first on our objective indicators, it is placed second on the subjective ranking. Greek shipowners have been important in the shipping industry for decades and the country used to be home to key industry players such as Aristotle Onassis and Stavros Niarchos. Today, the shipowning environment is still strong, even though many of Greek shipowners are London-based today.

The experts rank Oslo as the third most important shipping center. One of the industry experts highlights that the Norwegian shipowning community is spread out mainly on the west coast, but that Oslo, with its leading financial and advisory services, is a hub for the Norwegian cluster. Norway is home the world's sixth most valuable fleet and has one of the world's largest orderbooks making it an important country for maritime activities.

Hamburg is ranked fourth by our experts. The German fleet grew strongly before the financial crisis, but the current orderbook suggest that its importance will decline over the next year. One of the reasons behind the increased presence of German owners was the development of "KG funds". These funds are owned by thousands of small private investors, where no single person has control. This also means that the shipowning community and the number of key decision makers is smaller in Hamburg than our objective indicators suggest. The experts also rank Hamburg weaker than the objective indicators suggest.

Industry experts' answer to: "Which cities do you consider to be the five leading shipping centers?"

Source: Menon



SHIP OWNERSHIP AND MANAGEMENT

To assess the importance of the world's shipping centers, we have combined three objective indicators with the results from a survey among 200 leading maritime professionals. To be recognized as a leading center for shipping, the cities need to have a certain number of major shipowners located in the city as well as companies with operational and commercial operations. In this report, we have used three indicators to assess this. They will be presented in the following text. According to our objective criteria, Athens is ranked first due to its position as a city controlling and managing the largest fleet. Tokyo comes second, while Hamburg ranks third.

Currently, the world orderbook is dominated by Greek, Chinese, American, Norwegian and Brazilian owners. This suggests that Athens will keep its position as an important ownership city, while the importance of Shanghai will continue to rise. The US fleet is mainly focused on offshore activities and seems to be dispersed in many different cities, making New York less important as a shipping center. The reason why Singapore comes out second is its strong position in fleet management, combined with its strength as a meeting- and entry-point for the Asian market.

VALUE OF WORLD FLEET

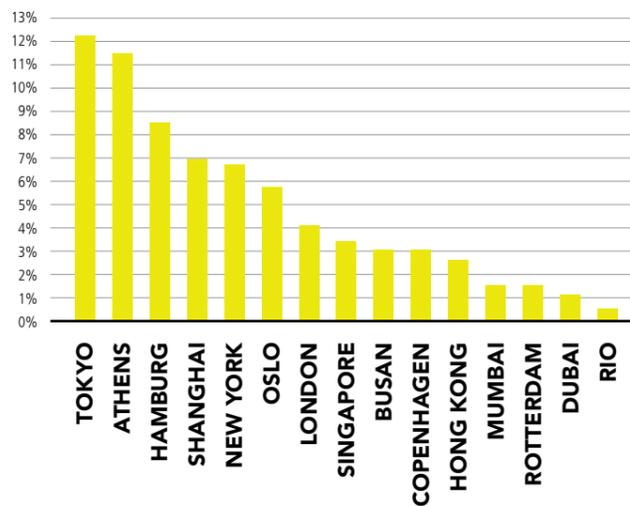
In the figure below, the cities are ranked by total fleet value of the country as a whole. We use market value as a measurement, instead of size of the fleet because the value of the fleet better reflects its economic importance. The world's total merchant fleet is still concentrated in Greece and Japan. However, China is on the move, making Shanghai an ever more important city. In recent years, Germany has increased its market share dramatically, but after the financial crisis in 2008/2009, there has been a shake-out, particularly in the container segment. Still, Europe is the main center for shipowners, with roughly half the fleet being controlled by European owners.

SIZE OF SHIPOWNERS' FLEET

In the figure below, the cities are ranked by the total fleet in compensated gross tonnage (CGT) based in the different shipping centers. We compiled the data from figures for the entire world fleet and assigned the vessels to individual cities based on the location of the owner. Athens comes out first with a fleet of 78 million CGT, followed by Tokyo and Hamburg. By looking at owners located in the city and not the country, hubs like Singapore and Hong Kong will increase their relative importance. This is because national numbers will include several shipping communities located across larger countries.

Share of world fleet value: national figures allocated to cities

Source: Menon



SHIPPING CENTERS

"It is not necessarily the number of ships that says something of a city's status as a maritime capital, it's maybe more important to look at where real decision makers can be found. Hamburg and Oslo are two very different cities when looking at this dimension."

KRISTIN HOLTH
- Head of the DNB Shipping, Offshore and Logistics division

SIZE OF FLEET MANAGED FROM THE CITY

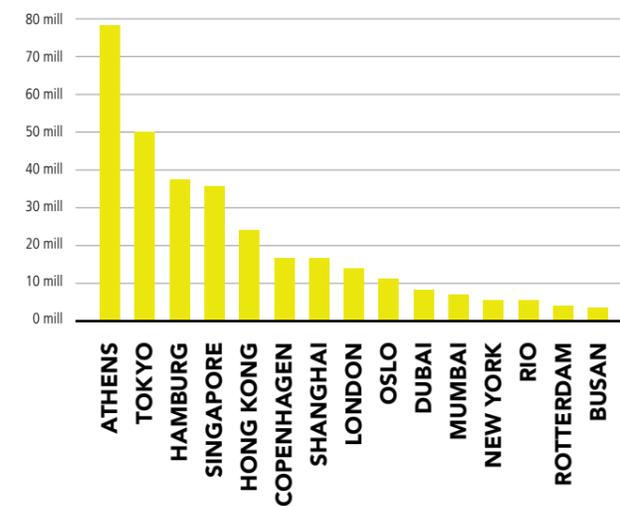
In a global world, and within such an international industry as maritime, ownership and management of companies can easily be split-up to take advantage of specialized local competence in different cities.

In the figure below, the city where the manager of the fleet is located is illustrated. The numbers are quite similar to the shipowner statistics, but there are some significant differences as well. While Singaporean owners control a fleet of 36 billion CGT, Singapore is such an important place for the management of other fleets that the figure almost doubles the size when measured in managed fleet. The same is true for Busan, while the opposite is true for Tokyo.

It should also be noted that while New York plays a key role in financing maritime operations, the commercial and operational capacity in the city is weak. The fleet managed from New York is the smallest of all the cities in this study.

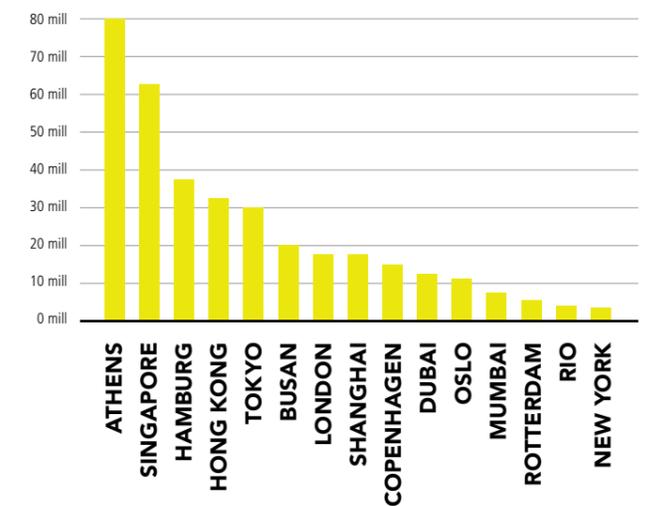
Size of fleet by ship owners located in the city (CGT)

Source: Menon / Clarkson World Fleet Register



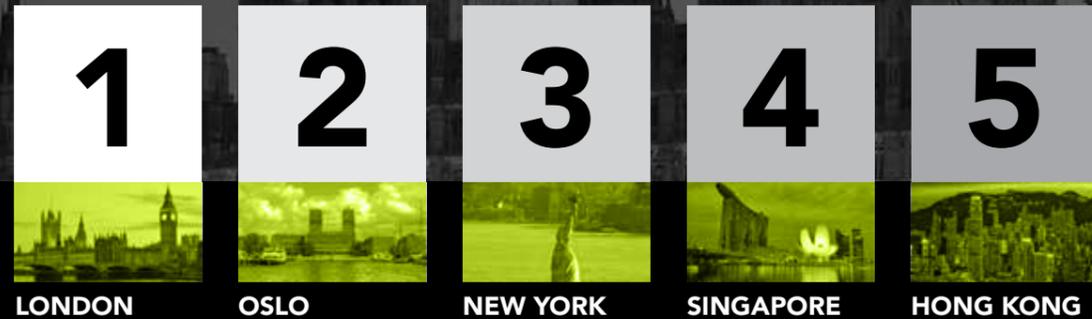
Size of fleet managed from each city (CGT)

Source: Menon / Clarkson World Fleet Register



MARITIME FINANCE AND LAW

SUMMARY



LONDON IS RANKED the leading maritime financial city of the world, due to being placed first by the industry experts and receiving a high score on the objective indicators. London is number one for both law-related services and insurance. The city is home to world-leading institutions, such as Lloyd's for insurance, and English law is the most widely applied in shipping disputes.

New York and London are usually considered the leading global financial cities. However, in our rating, Oslo comes second, above New York, for maritime finance. Oslo's strong position in maritime finance is mainly due to Norway's strong historical position in the maritime industry. The development of world-leading financial services has supported this industry.

Oslo is home to the world's two leading shipping banks, and has a strong position with a maritime-focused stock exchange and leading insurance and brokering entities.

New York is home to the world's largest maritime stock exchange and plays a key role in financing maritime operations. In the last few years, the

importance of private equity in the industry has increased at the expense of traditional shipping banks, and New York-based institutions have played a key role in this development.

"The majority of maritime contracts are governed by English law with dispute resolution in London. The city is also dominant in marine insurance. Several shipowners, flag states, class agencies, brokers, insurers, lawyers and other players have offices in London, creating a vibrant cluster of professionals."

– INDUSTRY EXPERT

According to our industry experts, there seems to be four cities that stand out for maritime finance. In addition to London, Oslo and New York, Singapore also has a strong position in this area. Our industry experts rank Singapore the second most important city. On objective measures, Singapore is only number five, even beaten by Shanghai, particularly due to the strong standing of Shanghai's stock exchange. ■



MARITIME FINANCE AND LAW

EXPERT ASSESSMENT

Maritime activities tie up large amounts of capital. The industry is characterized by cyclical markets, and access to capital will therefore determine the long-term success of many companies. Companies finance themselves by offering bonds, loans and stocks to owners and other financial entities. There seems to be strong consensus among the industry experts regarding the four leading cities for maritime finance and law. London, Singapore, New York and Oslo are the clear leaders.

The experts rank London the most important financial maritime center of the world due to its dominant position, especially in law, insurance and brokering services.

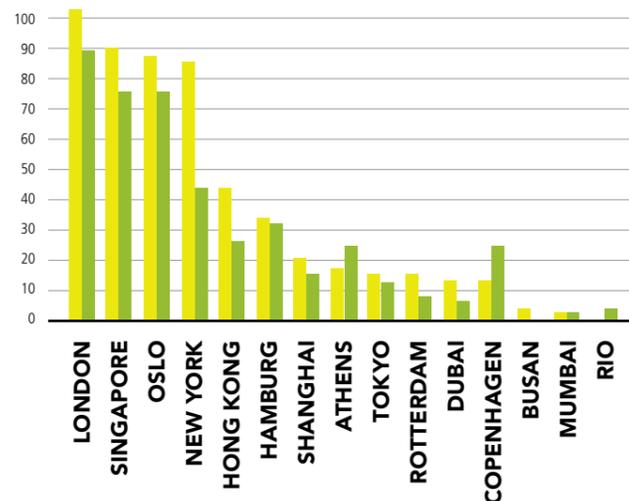
Maritime companies also need services other than those that directly relate to financing the company, which is why marine insurance and legal services are also objective criteria. When asked which cities are home to world-class maritime brokering services, London, Singapore and Oslo were mentioned time and again. In these cities, we find specialized companies such as Clarksons, Simpson Spence & Young, Braemar ACM, Lorentzen & Stemoco and RS Platou (now part of Clarksons).

Industry experts' answer to: "Which cities do you consider to be the five leading centers for maritime financial services?"

Source: Menon

Industry experts' answer to the question "In which cities do you find companies offering world-class maritime brokering services?"

Source: Menon



LEADING FINANCIAL CITIES

Of the five leading cities for maritime finance, all have stock exchanges with key industry players listed in their own cities. New York is by far the largest equity market in the world for maritime stocks, both in number of tradable stocks and market capitalization of the stocks. Oslo and Singapore are second and third when it comes to the number of tradable stocks. This reflects that Oslo and Singapore are attractive markets for registering new stocks. Shanghai has the second largest market capitalization of maritime stocks, followed by Copenhagen. On both these two exchanges, one or two major companies dominate the value of maritime stocks. In Shanghai, China Shipbuilding Industry combined with Shanghai International Port Group, has a combined market capitalization of \$51 bn, while AP Moller-Maersk traded at a total value of \$49 bn on the stock exchange in Copenhagen. That is more than world-leading companies in other industries such as Rolls Royce, Kraft Foods and Yahoo.

"Oslo's strength lies in the totality of the four dimensions. The city has its strongest position in brokerage and shipping financing, maritime law, insurance and technology."

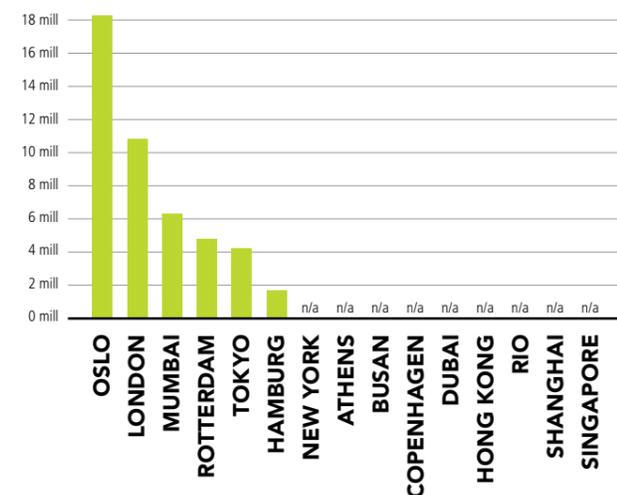
– INDUSTRY EXPERT

BANK FINANCING

While New York and London are rated as leading financial capitals of the world, Oslo and London stand out as the two leading cities for ship finance. Oslo-based DNB and Nordea are the two leading ship finance banks measured in terms of book runner and MLA (Mandated Lead Arranger) portfolios (Dealogic, 2014). This only measures the leading banks in 2014. Many ships are financed by syndicated loans, which reduces the risk for the individual lender. Banks mandate and arrange the loans. Some states have national export credit banks, but most have regular private banks with shipping banks taking the arranger role. Oslo is the most important center in the world for this kind of financing. Both Nordea and DNB have their shipping headquarters in Oslo, with regional offices in the main maritime hubs.

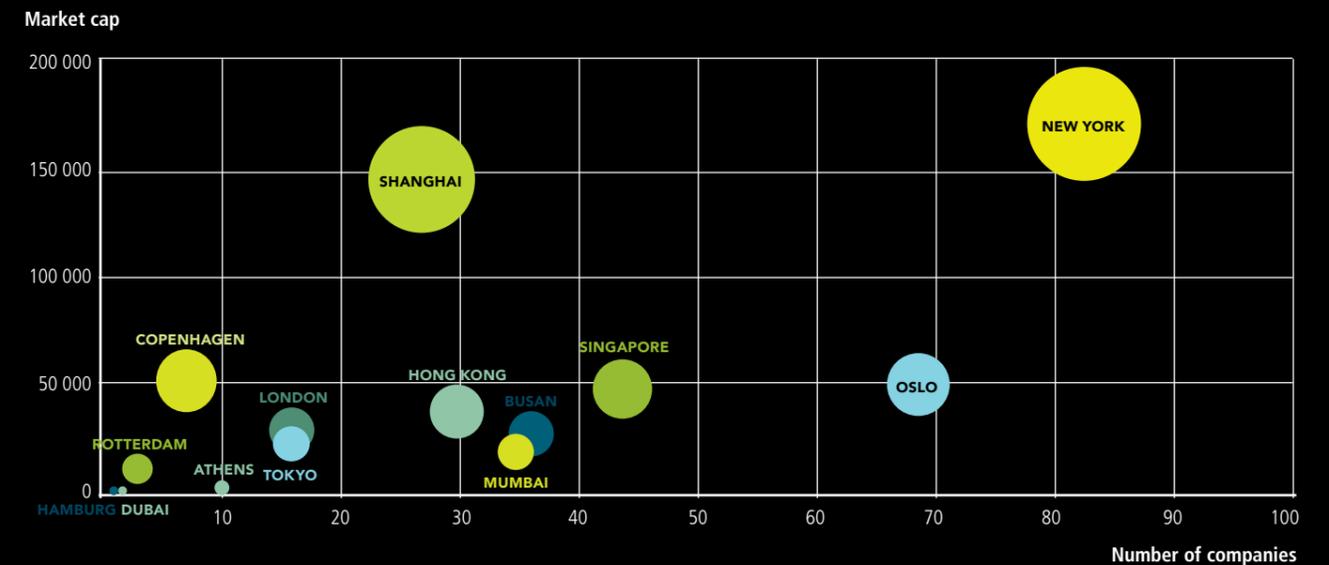
Value of mandated, syndicated loans (2014) distributed on placement of maritime headquarters of the bank (\$ mill.)

Source: Dealogic/Menon



Number and market value (bill. USD) of maritime stocks in the stock exchanges of leading maritime cities

Source: Menon /Thomson Reuters

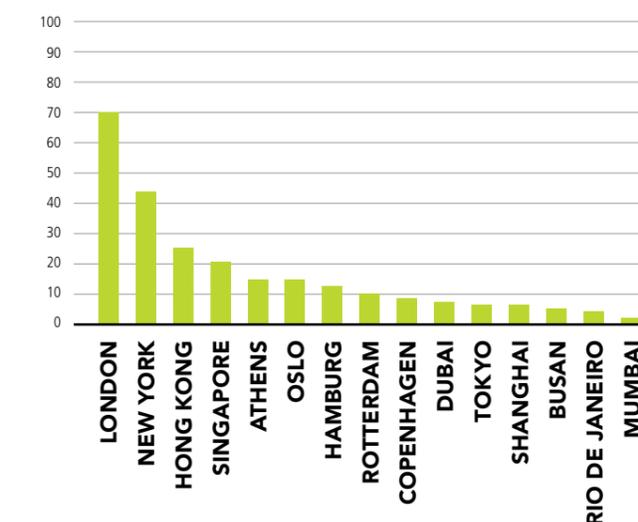


LEGAL CENTERS

It is difficult to find relevant statistics to assess the strength of the cities when it comes to maritime law. The number of legal experts in a city gives an indication of the importance of the city for financial and legal transactions. Strong knowledge centers with many experts also attract more business to a city. London has by far the largest number of legal experts in maritime law (70) followed by New York (43). As already stated, London is the most important center for maritime law in the world, and English law is still the most widely applied in shipping disputes. New York (43), Hong Kong (24) and Singapore (20) follow on the list. The strength of both Hong Kong and Singapore seem to be related to their proximity to commercial operations and access to key industry players.

Number of maritime legal experts practicing in the city

Source: Who's Who Legal

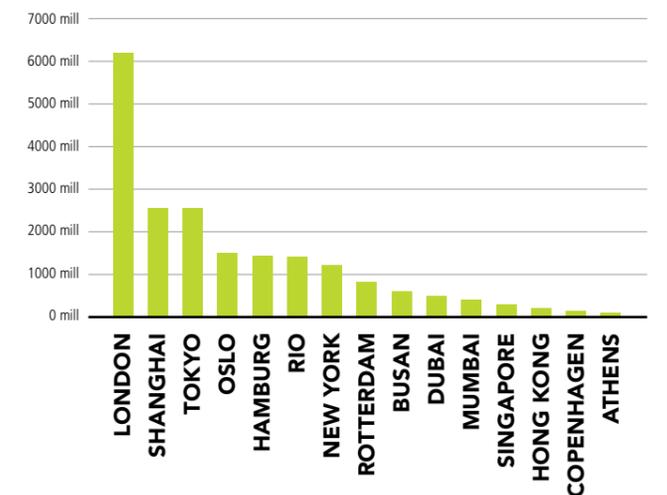


MARINE INSURANCE

Marine insurance is a prerequisite for a functioning shipping market. Large shipping companies transport cargo worth hundreds of millions of dollars every day on large ships that themselves might be as valuable as their cargo. To reduce risk involved in such operations, shipping companies insure both the cargo and the hull of the ship. London was home to the first marine insurance company, Lloyds, and is still today the most important center for marine insurance. The Chinese, Japanese and Norwegian marine insurance markets follow. While the Chinese and Japanese focus on domestic clients, British and Norwegian markets focus on international clients. Norwegian Gard for instance has offices in 14 key maritime markets.

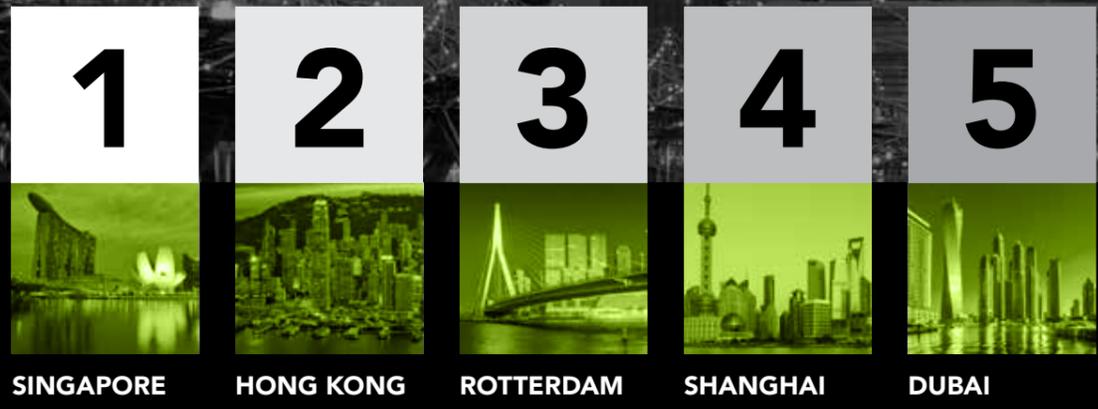
Insurance premiums (\$ mill.) collected in 2013 – national figures allocated to cities

Source: IUMI



PORTS AND LOGISTICS

SUMMARY



SINGAPORE IS THE LEADING CITY TODAY for port services and logistics and comes out on top in both our subjective and objective rankings. In the objective ranking, the large Asian ports of Hong Kong and Shanghai are Singapore's closest contenders. Increasing exports from China have seen Shanghai surpass Singapore as the world's largest port. Singapore's cost level, combined with the growing importance of the Chinese market, might push Shanghai or another Chinese city ahead of Singapore in the future. In Europe, Rotterdam is seen as the leading city, scoring especially high on the subjective indicators.

cities Rotterdam and Hamburg are included. Rotterdam's diverse port, with well-established link to the European continent, is emphasised by the experts. Hamburg is a strong shipping center and is the most important access point to the large German market. ■

"Rotterdam is home to the largest port in Europe and has well developed infrastructure for the ports and inland onward movement of goods."
 – INDUSTRY EXPERT

The objective ranking focuses on the size of the city's port and the size of leading port operators. Since these two indicators by themselves are quite narrow, the subjective view of the industry experts become important to cover other areas that influence the quality of port and logistics services. The industry experts identified five tier-one cities for maritime port and logistics services. Besides the Asian trio of Singapore, Hong Kong and Shanghai, the two European

"Dubai is a fantastic logistics hub, with great infrastructure and port management facilities. It is extremely easy to do maritime business in Dubai."
 – INDUSTRY EXPERT



EXPERT ASSESSMENT

The experts see Singapore and Rotterdam as the world's two leading centers for port and logistics services. Singapore has the benefit of proximity to the Asian market, and, as one of the experts pointed out, has "an excellent legal framework with strong support for industry from the local government."

The ease of doing business in Singapore, combined with the city's effective port, makes our experts place Singapore first in the ranking. Rotterdam is seen as the second most important center for port and logistics services.

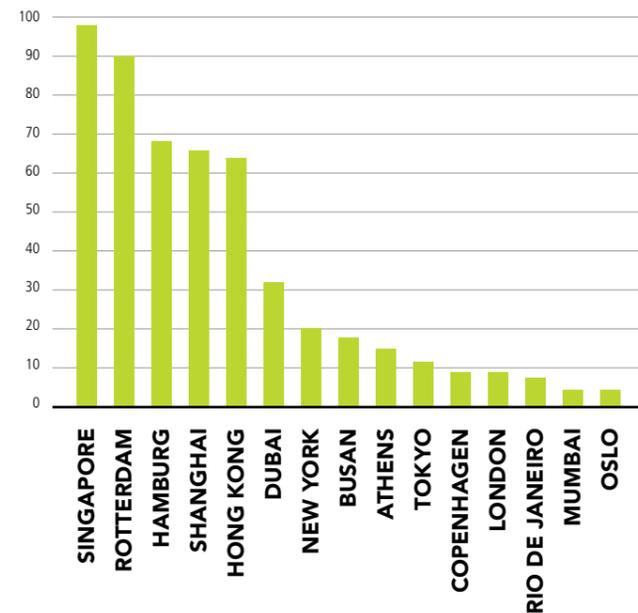
Rotterdam is the largest port in Europe and has the capability to handle the largest container ships. From the city, goods are transported either by smaller ship, trailer or the rail system that is closely linked to the rest of Europe. Rotterdam has several advantages, according to the experts, including "great connectivity, a business friendly maritime environment, stable political milieu, favorable tax legislation and proximity to major ports."

Hamburg, Shanghai and Hong Kong are ranked almost as high as Singapore and Rotterdam. Hamburg is by far the most important German port and one of the biggest in Europe. Eurogate, with its head office in Bremen – an hour away from Hamburg – is Europe's leading container terminal logistics group. Its strong regional maritime cluster positions Hamburg as a leading maritime city of the world.

Hong Kong is ranked fifth by the expert panel. In recent years, Hong Kong's position as a gateway to the world's manufacturing sector has been challenged by the phenomenal growth of nearby Shenzhen and Guangzhou, as well as Shanghai, leading to a reduction in Hong Kong's market share.

Dubai is ranked sixth by the experts; a middle position between the five top cities and the rest. Dubai is a regional maritime center with a clear ambition of increasing its presence in the industry. In the Dubai Strategic Plan (2007–2015), transportation and storage have together been identified as one of the six building blocks for future growth. Currently Dubai's port, its status as an important logistics hub and, to a certain degree, its pro-business environment are its strengths as a city for maritime business activities.

Industry experts' answer to: "Which cities do you consider to be the five leading centers for port and logistical services?"
Source: Menon



SPECIALIZED LOGISTICAL SERVICES

The increasing size of modern cargo ships and increasing world trade puts pressure on ports to become larger and more automated. All around the world, ports are upgraded and modernized to comply with today's standards and to lower the cost of transportation. The shipping industry's ability to deliver reliable logistics services at a low cost is a prerequisite for the modern world economy. Many companies rely on supply chains that stretch over vast distances, even continents. It is important for cities that companies can locate themselves there and carry out complex, highly specialised logistical services.

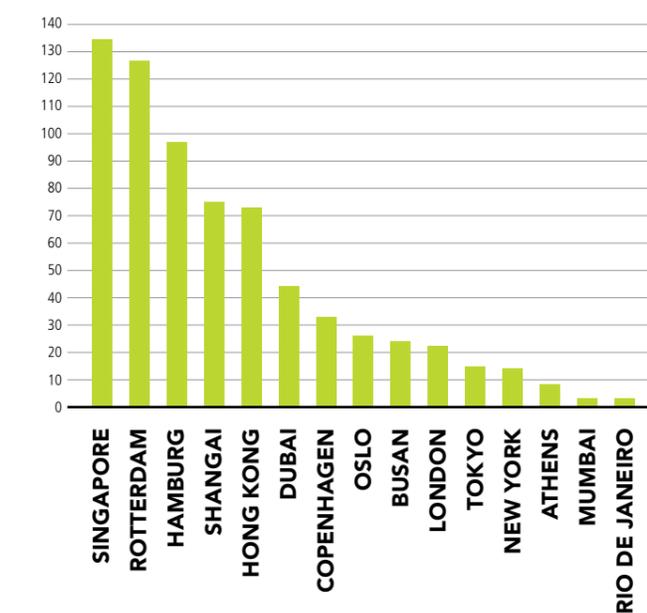
The industry experts point to Singapore and Rotterdam, followed by Hamburg, as the leading cities for highly specialised services. It is not surprising that Singapore, one of the world's busiest ports, is on top. Rotterdam and Hamburg are also the largest ports in the European economy, and much of Europa's external trade is organized by companies located in these cities.

PORT VOLUME

The world's largest ports are found in south-east Asia, with Shanghai, Singapore and Hong Kong being the three largest. While the port in Shanghai play a key role in supporting the manufacturing industry in the larger region, Singapore and Hong Kong are more important as transshipment ports. Earlier, Hong Kong experienced a lot of direct trade, but the cargo mix has changed in the last decade, so that transshipments now make up 75% of its total annual output. If we also included ports outside the 15 cities we are examining, the importance of China as a center for world trade would be even clearer. Six of the world's ten top container ports are found in China.

The largest ports after Shanghai, Singapore and Hong Kong are found in the United Arab Emirates. Dubai's Jebel Ali together with the other port in the UAE handled a total of 18 million TEU in 2013. Dubai and the surrounding region is not a manufacturing hub like some of its Asian counterparts. Instead, Dubai plays a role as a transit hub strategically located in the middle of Europe and Asia. The city is still making large infrastructure investments to cement its status as a one of the leading transport hubs of the world.

Industry experts' answer to: "Where can you find world-class specialized logistics services?"
Source: Menon



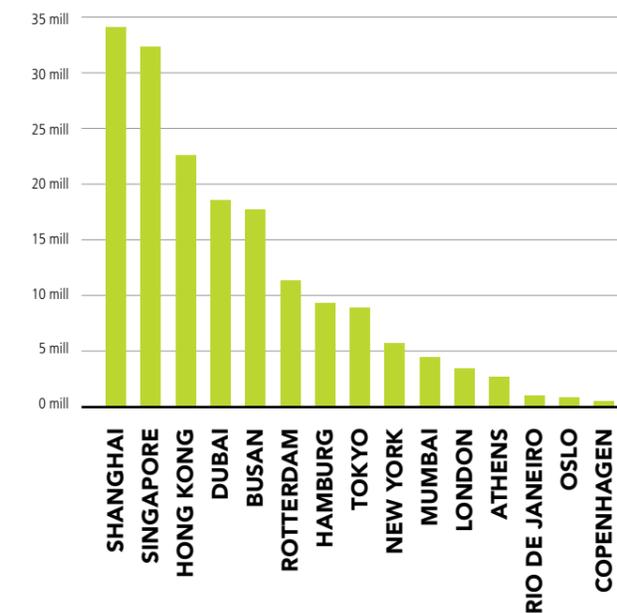
Ports generate activity that plays a key role in a maritime cluster. In recent years, ports have become technologically complex to increase their efficiency and to handle the rising amount of trade and larger container ships. The strength of the export economies of China and other Asian countries means that four of the five top ports are located in south-east Asia. Singapore and Shanghai were the largest ports in terms of volume of TEU in 2013, but Shanghai is the fastest growing port and surpassed Singapore as the world's largest in 2011.

Port cities are at the frontline of globalization, with approximately 90% of external trade volume transported by ship and loaded and unloaded at world ports. In a study by the OECD, it was concluded that well-run ports produce many economic benefits such as lowering the cost of trade, increasing value creation, job creation and attracting related maritime services. To get the best economic benefit from port operations, port cities must facilitate an increase in the maritime services offering and take advantage of possible spillover effects for industrial development.

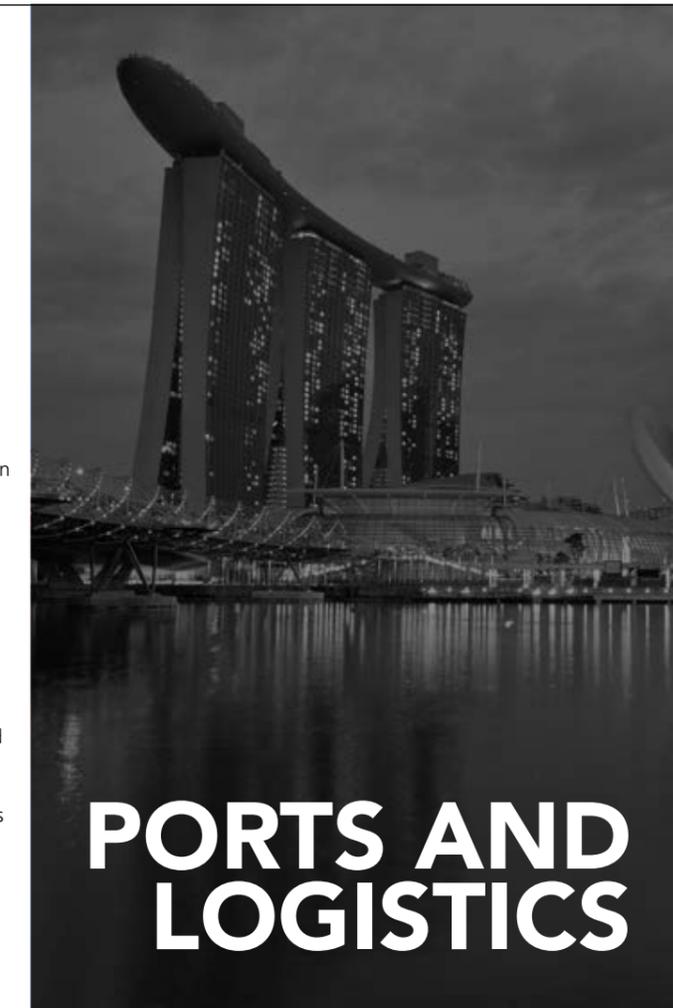
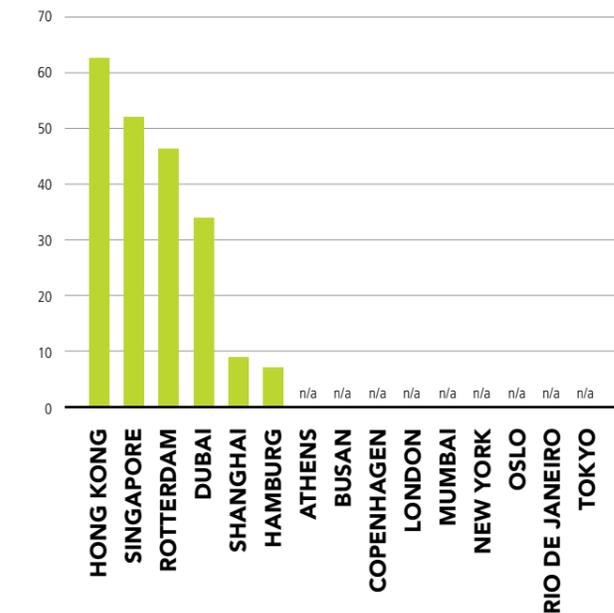
PORT OPERATORS

As part of ever-increasing specialization, the largest and best port operators are branching out to operate new ports. The Singapore-based PSA, owned by the Singapore government, is the world's largest port operator and has operations on many continents. However, Hong Kong comes out on top as the largest port since both HPH and COSCO Pacific's headquarters are located in the city. Rotterdam comes in third place, much due to APM Terminals, a subsidiary of the Danish maritime giant AP Moller-Maersk. Several port companies have operations all over the world. For example, DP World, Dubai's state owned port company, operates maritime terminals in 31 countries on all continents. The ranking below only includes the ten largest operators in the world.

Volume of TEU handled in city ports in 2013
Source: UNCTAD/Menon



Largest port operators in the world by headquarters
Source: Drewry Maritime Research



SUMMARY



MARITIME TECHNOLOGY

“Oslo and Copenhagen are frontrunners, with strengths in marine technology and fuel efficiency; their weakness is the cost of those high-end products/solutions.”
 – INDUSTRY EXPERT

THE STANDING OF maritime technology and competence is hard to grasp by objective indicators. Ideally, we would use measures of R&D, education, innovation and availability of talents and highly skilled personnel. Some of these indicators are available, but they are usually on country level and are not industry specific. We chose to rely on two indicators that are technology intensive: classification and shipbuilding. In addition, we asked the industry experts several questions linked to maritime technology to complement our objective sources.

Oslo is ranked as the world leader when it comes to maritime technology, followed by Hamburg and Tokyo. One of the most important technology companies in the Norwegian cluster is DNV GL with its head office in Oslo. DNV GL is one of the world’s leading maritime R&D companies, as well as the world’s largest ship classification society. Norway is also the largest shipbuilder in Europe measured in value of vessels. The Norwegian capital only has a few leading technology companies, but the Norwegian maritime industry as a whole delivers some of the world’s leading equipment and services. Oslo’s importance for maritime technology is therefore more a testament to the Norwegian cluster as a whole, then to Oslo’s position alone.

Hamburg is ranked second for maritime technology. It received the highest scores from the experts, while it comes out fourth on the objective

indicators. Germany is an important center for the development of maritime equipment with companies such as Caterpillar Marine Power Systems and Man located here. According to a recent study developed for the European Commission, Germany is the most important producer of maritime equipment in Europe.

Japan and Tokyo take third place. The shipyards in Japan had the third largest deliveries in 2014, and Japan is home to the world second largest classification society, ClassNK. Tokyo takes first place on the objective criteria, but is ranked eighth by the experts, probably due to the domestic approach of the Japanese industry. In fourth place we find Busan, the hub for shipbuilding in South Korea. Busan is ranked second on the objective criteria mainly because of the importance of the shipbuilding industry in the country.

Singapore is fifth in this ranking, mainly due to low scores on the objective criteria. The industry experts rank Singapore third, while the objective criteria place Singapore eighth. The industry experts highlight that the city’s weaknesses are a limited base of human capital and the increasing costs of hiring local and foreign expertise. Still, Singapore is focusing on increasing its R&D spending, especially within maritime activities related to oil and gas. If activity related to FPSO conversions and the building of mobile offshore units (MOU) had been included in the statistics, Singapore would have been ranked one place higher. ■



MARITIME TECHNOLOGY

EXPERT ASSESSMENT

Singapore is ranked as the world's leading maritime technology center by our experts, followed by Oslo, Hamburg and Busan. Hamburg and Oslo both have a strong R&D center and a highly advanced maritime equipment industry. Busan is probably ranked fourth due to the strong shipbuilding industry in the region. Singapore is highly ranked in all the parameters for maritime technology, but is not number one in any of them.

Singapore's high ranking is due to the city being a meeting place for buyers and sellers without companies having to be located there. Singapore also seeks close cooperation between public-funded institutions and private companies. The Maritime and Port Authority of Singapore (MPA), established the Maritime Innovation and Technology Fund in 2003 as a way to promote R&D in Singapore. The fund was extended and topped up in 2013.

KNOWLEDGE CENTERS – R&D AND EDUCATION

High labor costs have forced the Norwegian and German maritime industry to become technologically advanced. Close links between education centers, shipowners and manufacturers is the key to being a strong maritime center for research and development. The closely knit Norwegian maritime industry gives Oslo an advantage and from Oslo you can easily connect to other centers in Norway.

Hamburg is the center of gravity for R&D in the German maritime industry. Since 1965, the city has been home to the Center for Maritime Technologies,

and its predecessor Forschungszentrum des Deutschen Schiffbaus. The center's goal is to promote cooperation between various players in industry and the academic world, universities and government agencies.

MARITIME EQUIPMENT

The maritime industry often demands specialized equipment to handle conditions at sea. Increasingly, environmental regulations create new niche markets for maritime equipment. A recent example is the coming regulations on ballast water treatment, which has created a completely new market for ballast water treatment systems.

The panel of experts point to Hamburg and Oslo as the places to go for world-class specialized maritime equipment. Germany and Norway both have a long tradition of producing maritime equipment and a high level of cost. This has forced the German and Norwegian maritime equipment suppliers to deliver innovative and advanced equipment with a high level of added value.

SHIPYARDS

At shipyards, the demands from design and industry standards are put into action. Modern ships are a mosaic of parts from numerous subcontractors that become high tech industrial assets for their owners. Assembling ships is a technologically and logistically demanding operation. Some shipyards build the entire vessel in one location. For more technologically advanced ships, it

is more common for hull construction to occur in low cost countries before outfitting is done in countries with more highly skilled labour. Shipyards are often surrounded by maritime equipment companies that supply them. These companies are therefore considered vital for the completeness of a maritime cluster.

Gyeongnam, the region surrounding Busan, is the center for the South Korean shipbuilding cluster. The area has deep waters free from sandbanks and the major shipyards here focus on high value-added "mega-ships" such as container ships, VLCCs and LNG tankers. China is the world's second largest ship manufacturer in value, but is not as technologically advanced as the South Korean shipyards. Japan, with its large domestic market, is in third place. Tokyo's low ranking by our expert assessment indicates that the Japanese shipbuilding industry is not very important for the global market.

Norway and Germany are the two largest shipbuilders in Europe. The Norwegian industry focuses on highly advanced offshore vessels that can be used for construction and well intervention. The data does not include offshore rigs used in the oil and gas industry. A single rig can cost several hundred million dollars and if incorporated in the figures below, would have increased the value of deliveries from the three major rig building countries: China, Singapore and South Korea. In addition, the UAE's numbers would have increased based on deliveries from their yards.

"Hamburg is called the 'Gate to the World' for good reason. It is strong in almost every maritime sector, except for shipbuilding."

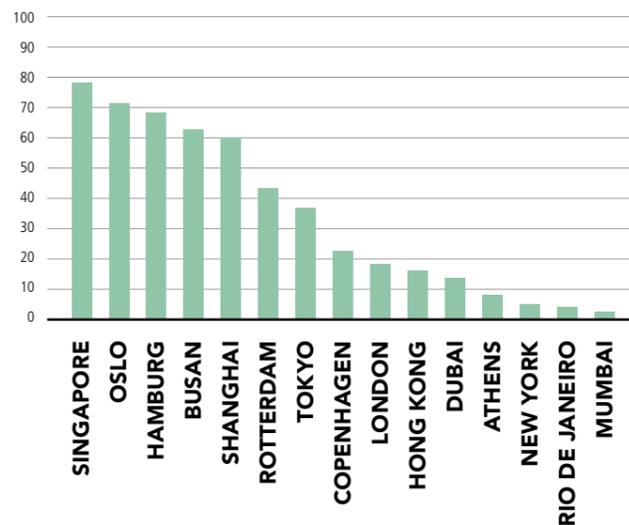
– INDUSTRY EXPERT

"One of Shanghai's strengths is its proximity to major shipbuilding activities. Lack of new technology and marketing strategies are seen as the city's weaknesses."

– INDUSTRY EXPERT

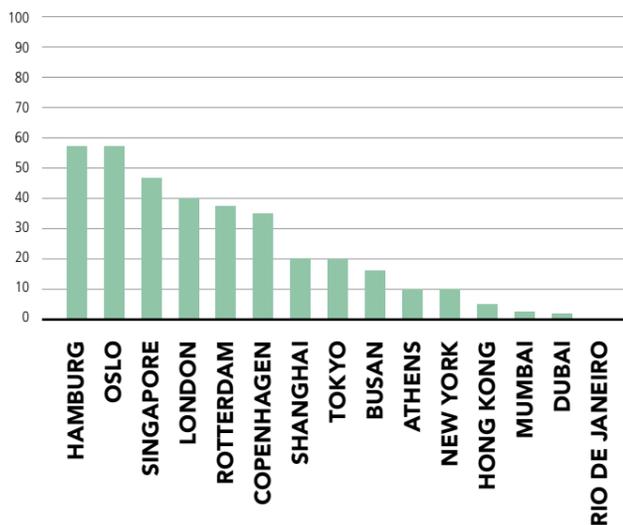
Industry experts' answer to: "Which cities do you consider to be the five leading centers for maritime technology?"

Source: Menon



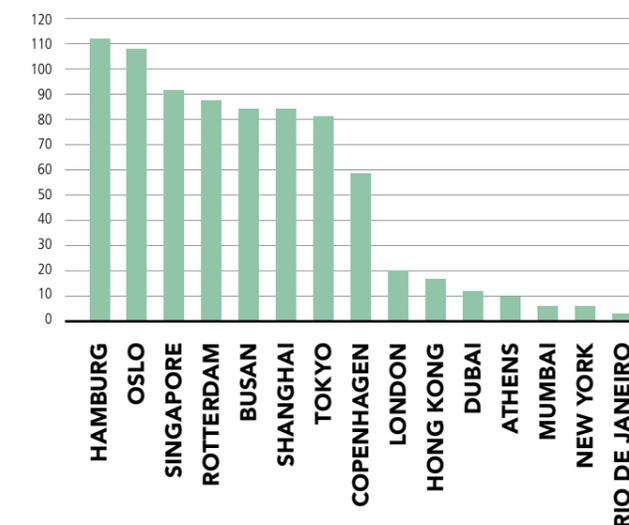
Industry experts answer to: "Where can you find the world's leading maritime R&D and educational centers?"

Source: Menon



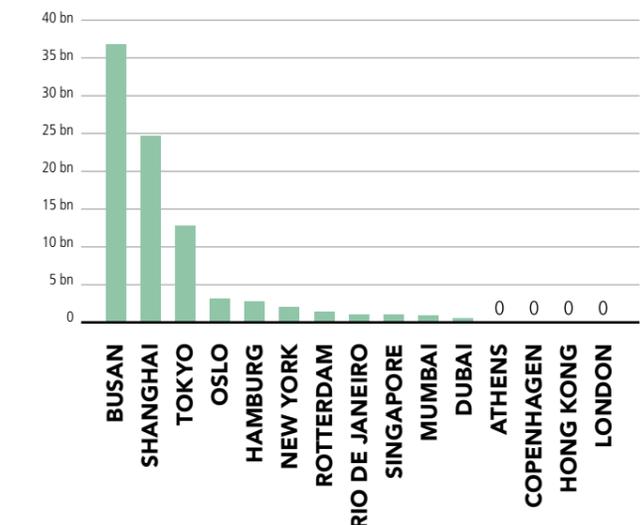
Industry experts answer to: "Where can you find companies producing world-class specialized maritime equipment?"

Source: Menon



Value of ships delivered from shipyards in 2014 (\$bn.) – national figures allocated to cities.

Source: Menon / Clarkson World Fleet Register





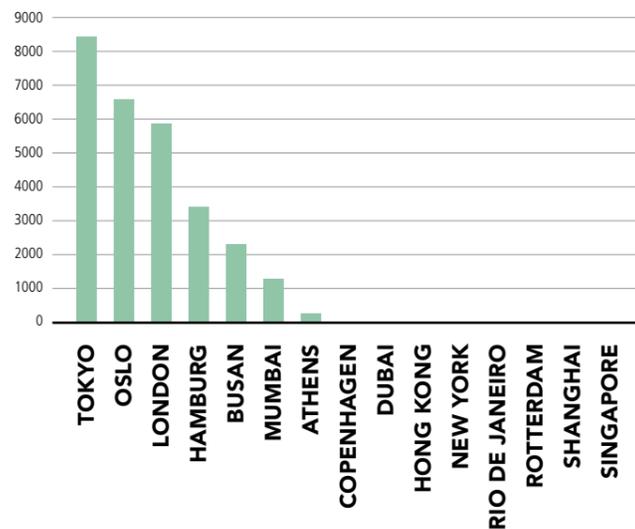
CLASSIFICATION

A classification society is a non-governmental organisation that establishes and maintains the technical standards for ships and offshore structures. The societies are important technological R&D centers as they certify technological changes in constructions. Classification societies play a vital role in quality assurance in the maritime industry. The largest societies have an international presence as this has become a prerequisite for serving the global industry.

DNV GL, which is a merger of Norwegian DNV and Germany's Germanischer Lloyd, is the largest class society in the world in terms of number of ships classed. Even though DNV headquarters is in Oslo, we chose to split the number of ships between Oslo and Hamburg due to the fact that there is a large classing office still in Hamburg. ClassNK (Nippon Kaiji Kyokai) is the Japanese class society and is the world's second largest. Lloyd' Register's headquarters are in London and its history goes back to 1760. Lloyd's Register places London in third place in our ranking of classification societies.

Number of ships classed by societies headquartered in the city

Source: Clarkson World Fleet Register/Menon



COMPETITIVENESS AND ATTRACTIVENESS

IN ADDITION to the four main maritime areas already presented, this study also includes a last major indicator: competitiveness and attractiveness. This indicator is based solely on the views of the industry experts. Because it is a purely subjective measurement, we have weighted this indicator less than the four main indicators.

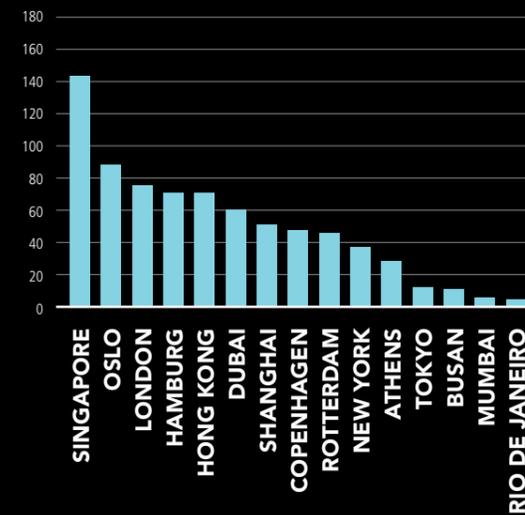
Singapore stands out as the city seen as most competitive and attractive for the maritime industry. Singapore is ranked as the clear number one for the most attractive business environment as well as for the most complete maritime cluster. Several of the industry experts highlight the stable regulatory framework and the willingness of the government to support the industry. This is also

seen through the World Bank's annual study of ease of doing business, where Singapore comes out on first place.

Oslo is ranked second, quite closely followed by London, Hamburg and Hong Kong. It seems the experts agree on Singapore as the leading maritime city, while the other cities have clearer strengths and weaknesses that are weighted differently by the respondents. When asked which cities that have the most complete maritime cluster, Singapore stands out again, followed by Hamburg, Rotterdam, Oslo and Shanghai. The combination of the two questions ranked Singapore first, followed by Oslo and Hamburg. London is ranked fourth, followed by Shanghai and Hong Kong. ■

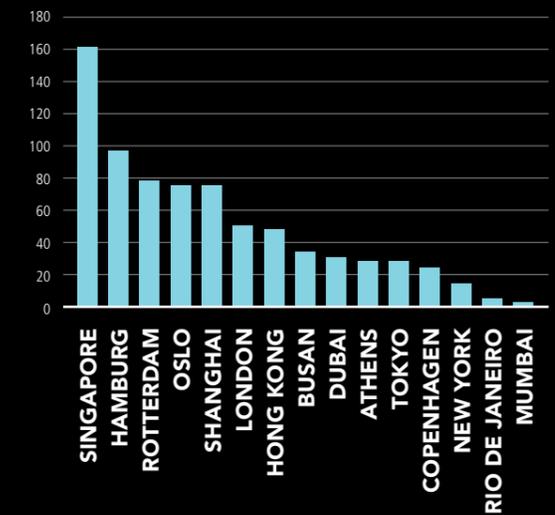
Industry experts answer to: "Where are the most attractive environments for locating maritime business?"

Source: Menon



Industry experts answer to: "Which cities have the most complete maritime cluster?"

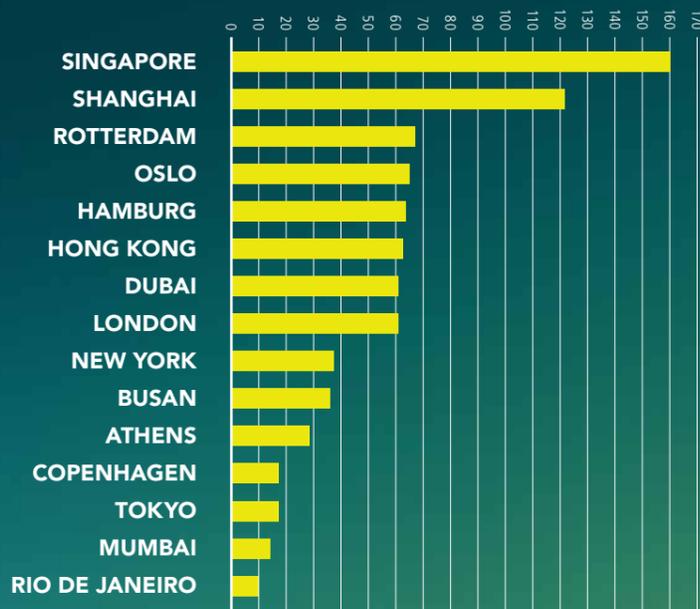
Source: Menon



THE LEADING MARITIME CITIES OF THE FUTURE

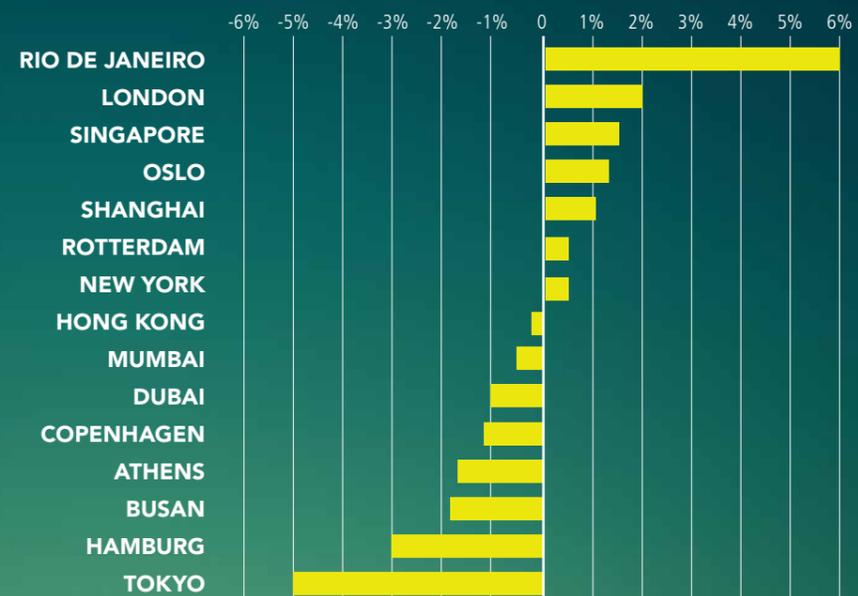


Industry experts answer to:
 "Looking forward five years from now, which cities will be the five leading maritime centers of the world?"
 Source: Menon



Share of the world's orderbook (contract value) compared with the current share of the world fleet. National figures allocated to cities.

Source: Clarkson World Fleet Register/Menon



AS PART OF THIS STUDY, we also asked the experts to make predictions about the leading maritime capitals of the world in 2020. The figure above shows which cities the expert panel predict will be important five years from now.

There seems to be a clear consensus among the experts that Singapore will remain the most important city in 2020, while Shanghai is expected to become the second most important. Shanghai's increased importance is related to the growing influence of the Chinese economy. China has the world's second largest economy and its export-oriented business environment is dependent on

the trade of goods. The fact that the two cities that are expected to become the most important centers for the industry are located in Asia, says something about the changing center of gravity in both the world economy and the maritime industry. Manila and Jakarta are two other cities in the region that are growing in importance. The Philippines, for instance, surpassed its European competitors to become the fourth largest shipbuilding nation in 2014 (based on fleet size).

The experts seem to be more in doubt when it comes to selecting a clear third most important leading city as they

ranked six cities almost equally in this place. However, the city they believe will increase its importance the most compared to today's situation, together with Shanghai, is Dubai. One of the experts highlights that the city is developing quickly, while another points to a strong political will from the local government to increase Dubai's presence in the industry. Dubai is today an important trading center and is becoming the preferred city for maritime activity in the region.

In Europe, there are no cities that stand out as leading global cities going forward. Rotterdam, Oslo, Hamburg and London

are ranked almost equally. All four might win the race to become the leading maritime city in Europe – or they might continue to increase in specialization, with Rotterdam the logistics center and London the financial center.

The orderbooks of shipping companies give an objective glance into the future of maritime capitals. The graph above compares the value of the national fleet with the orderbooks of owners located in the same country. It thus gives an indication of the future development of the leading maritime cities. The figures reveal that Rio de Janeiro will increase in importance as a shipping center.

While Brazil currently controls 1% of the world fleet, the orderbooks of Brazilian shipowners total \$22.5 bn, or 7% of the world's orderbook. These orders are mainly related to drillships and other offshore ships. However, with the current offshore market situation in mind, it seems likely that a share of the orderbook will be cancelled or postponed. Still, Brazil's position within the industry is set to rise due to the large investments in offshore oil and gas activities.

It is interesting to see that there are smaller differences in the current orderbooks of the other key players. The only outlier is Tokyo and, to a certain degree,

Hamburg. Japanese owners took delivery of 9% of the world total in 2013 and 7% of world deliveries in 2014. This is well below their 11.5% share of the current world fleet. This suggests that Japanese owner will play a less important role in the industry going forward. The same is, to a certain degree, true for Hamburg. German owners have increased their presence in the industry in the last decade, but it seems likely that the financial crisis, combined with weak interest in KG funds, have reduced willingness to invest further in the industry. Owners in Greece, China, the US, Norway and Brazil had the largest orders at yards at the beginning of 2015. ■

