THE MARITIME ECONOMY

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THE MARITIME ECONOMY

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MARITIME 2050

Tech remains central to UK's bold maritime vision

Government ambition to be a leading maritime nation relies on technology, but it requires more than just investment to get it right

Rich McEachran

By 2050 global freight demand is expected to have tripled. That's according to this year's *ITF Transport Outlook*, a biennial overview of trends in the transport sector.

Increased demand will undoubtedly lead to busier waters. With this will come heightened pressure on ports and a need to ensure that getting vessels from A to B is plain sailing.

Key to this will be technology, from driverless cranes for loading and unloading container ships to drones for inspection and repair services. And it seems the government agrees.

In January the Department for Transport (DfT) formally launched the Maritime 2050 strategy, a bold vision of what the government hopes the UK's maritime sector will look like 30 or so years from now.

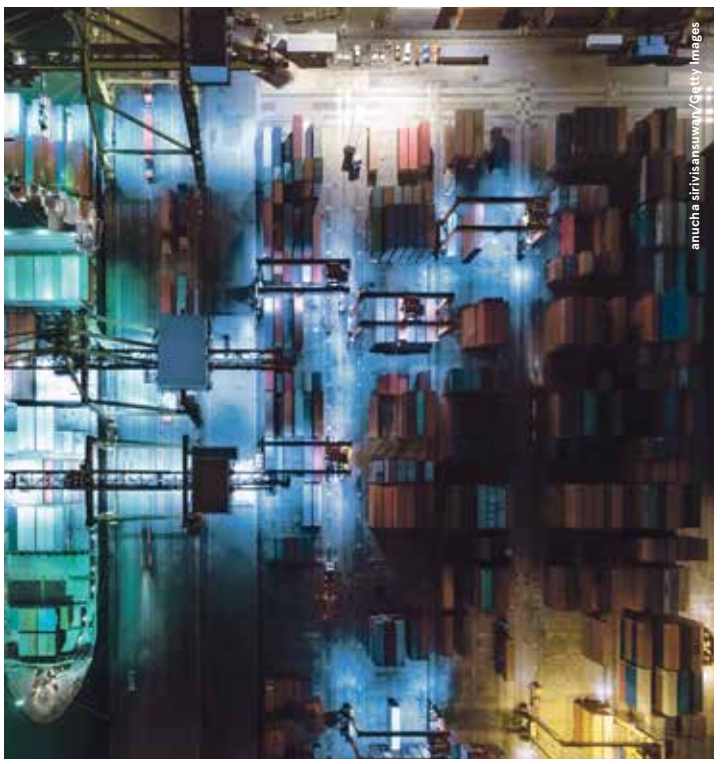
Included in Maritime 2050 are plans to transition to zero-emissions shipping and diversify the workforce. The strategy also sets out commitments to ship automation and remote operation.

Chris Grayling, the then-transport secretary, said at the time of the launch: "This strategy is a clear message to the world: we will continue to be a leading maritime nation for the next 30 years and beyond. We will be at the forefront of emerging technology and seafarer training, and will capitalise on selling this expertise to companies across the world."

Although only accounting for 0.6 per cent of UK GDP and making up 1.1 per cent of UK turnover, maritime plays a crucial role in the UK economy as it facilitates 95 per cent of UK trade, including 25 per cent of energy supply and 48 per cent of food supplies, according to the DfT.

Despite this, a study by the Centre for Economics and Business Research found that the sector is also one of the most exposed to the consequences of Brexit. Given that the UK's shipping industry is heavily reliant on labour from Eastern European countries, it could lead to higher unskilled labour costs.

While it may not be able to compete on lower labour costs, the UK can use its experience, cohesive market position and access to new technology to operate smarter, become more efficient and remain competitive, argues Kelvin Hamilton, technical consultant for collaborative research and development projects at Autodesk. The software firm was involved in the development of the world's first 3D-printed ship propeller.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"External factors such as environmental impacts, trade disputes, movement of people and Brexit are challenging the status quo. The way businesses operate is changing, which calls for more creativity and innovation to not only remain relevant, but thrive," says Mr Hamilton.

So how can the UK maritime sector use technology as a competitive differentiator? According to Richard Baker, chief executive of GeoSpock, a big data company which is partnering with the Baltic Exchange to build the world's most advanced maritime spatial database, it's more than a case of simply investing in fully autonomous systems and equipping machinery with sensors. Only by analysing and acting on the data generated can the maritime sector then optimise supply chains, speed up processes and reduce repair times.

He argues that for value to be realised, government must prioritise data collation. Otherwise any changes brought about by Maritime 2050 are likely to fall short.

"The sector can generate huge quantities of data, from every aspect of the supply chain, from sensors in dispatch warehouses, on board ships, in ports and on trucks. However, this data can end up being siloed with no central pool that companies and the industry as a whole can utilise," says Mr Baker.

"The government, alongside shipping and port authorities, must develop an intelligent database that captures every measurable aspect of the maritime industry. This includes metadata on location, weather, emissions, fuel usage, and journey routes and times."

By having the infrastructure in place to measure activity accurately, government can monitor whether it's on track to meet the objectives set out in Maritime 2050.

Given the economic uncertainty surrounding Brexit, ports will undoubtedly become even more vital to the UK's ability to trade as an island nation. Data and digital transformation present an opportunity to improve efficiencies, but to make the most of this opportunity will require the development of an ecosystem where innovation is able to flourish.

Government is aware of this and one recommendation outlined in Maritime 2050 is to develop the UK's first smart port by 2030. It would pioneer the use of augmented and virtual reality, and also double as an innovation hub, fostering ideas and talent.

Mr Hamilton says the UK could look to the likes of Rotterdam for examples of automation in action. The Dutch city is Europe's largest port by cargo tonnage and has ambitions of becoming the world's smartest port. It's also where Autodesk developed the 3D-printed ship propeller in partnership with the Rotterdam Additive Manufacturing Lab, which is based at the city's Innovation Dock.

"In practice, the port now has the option to print ship propellers on demand, reducing waiting time for repairs and the cost of paying for spare parts to be delivered and stored locally," adds Mr Hamilton.

Mr Baker is cautiously optimistic that the advances put forward in Maritime 2050 can be brought about successfully. He says that even though the sector has been slow to innovate in the past and make the switch from legacy systems, bringing about these changes will be vital for its sustained development.

"Artificial intelligence, blockchain and other technology all have the ability to change maritime in ways the sector may not anticipate," he concludes. "To understand and incorporate the right technologies, the sector needs to find a way to accurately demonstrate the impact of each technology and show how it can be optimised."

INDUSTRY OPINION ABOUT AUTONOMOUS SHIPS

Global survey of industry leaders

Institute of Marine Engineering, Science & Technology 2018

66% believe the adoption of autonomous technology could create a competitive advantage for shipping companies

55% think autonomous technology will create cost savings

85% say seafarers will remain an essential component in the long-term future of shipping

Satellite image of the Strait of Hormuz, that lies between Iran and the United Arab Emirates to the South

GEOPOLITICS

Strait of Hormuz tensions hit trade routes

The impact of ongoing geopolitical tensions in the Strait of Hormuz is already being felt in the cruise industry and could spill over to wider trade if oil prices are affected

Burhan Wazir

A narrow stretch of water less than 100 miles long and 21 miles wide at its narrowest point is currently the focus of intense efforts led by the United States aimed at protecting trade and security in the Gulf region.

The Strait of Hormuz, bounded by Iran, Oman and the United Arab Emirates (UAE), connects the Gulf with the Arabian Sea. The waterway is a key shipping route for oil tankers as approximately one fifth of the world's oil traffic, nearly 21 million barrels a day, passes through the strait.

The channel is equally important to the logistics industry with large numbers of container ships transporting cars, white goods and food to Jebel Ali in Dubai, the busiest port in the Middle East.

In recent months, America and Iran have been engaged in brinkmanship in the aftermath of the US withdrawal from the Iran nuclear deal in May 2018. US President Donald Trump's withdrawal from the deal was followed by renewed sanctions and a new "maximum pressure" strategy on Tehran, which almost culminated in a US air strike on Iranian military targets in June.

The situation has become a microcosm of worsening US-Iranian relations. In July, authorities in Gibraltar and British Royal Marines detained an Iranian tanker on suspicion of carrying crude oil to Syria, in breach of European Union sanctions. Just weeks later, Iranian authorities seized a British-flagged oil tanker.

Then, earlier this month, Iran's Islamic Revolutionary Guards seized an Iraqi oil tanker in the Gulf on suspicion of smuggling fuel. The tanker was reportedly carrying around 700,000 litres of fuel.

"When you look at strategic choke points, the Straits of Hormuz matters most in terms of international stability," says Professor Anoush Ehteshami, joint director of the Centre for the Advanced Study of the Arab World at Durham University. "The crucial element here is its strategic place, which you cannot over-emphasise enough.

"In the case of the strait, there is clear distrust and hostility among the neighbour states. Iran claims monopoly over its security, which means there are significant structural problems the Strait of Hormuz faces. There is no consensus over what a collective approach to its security might look like and countries like Saudi Arabia and the UAE are suspicious of Iran."

The escalating tensions have also impacted ancillary trade sectors such as travel and tourism across the Gulf region. Last month, P&O Cruises announced it will temporarily withdraw from Dubai amid continuing tensions over shipping. P&O says it has cancelled its Dubai and Gulf schedule from October until at least March.

The announcement impacts Dubai which recently released new cruise season figures for 2018-19 which showed a record 51 per cent increase in cruise tourists over the period. Dubai's main Mina Rashid Cruise Terminal welcomed around 850,000 cruise visitors on 152 ships during the year compared with some 560,000 and 110 ships the previous year.

Other international cruise liners, meanwhile, say they will continue to operate in the region. British operator Cunard Line says its flagship vessel Queen Mary 2 plans to dock in Dubai in 2020.

"Escalation of the current situation can be traced back to June when the US was about to strike targets in Iran," says Professor Scott Lucas of the Department of Political Science and International Studies at the University of Birmingham. "Trump immediately flipped when planes were four hours away from their targets and ships had moved into position.

"What you have now is that even if you don't go to a military confrontation, you have a position where you have a political and economic fight to force the surrender of one side. The US isn't going for regime change, but wants to break the economy which would set the conditions for regime change. In response, what Iran is trying to indicate is that the Strait of Hormuz is not only their backyard, but everyone should stay out. They're saying they don't want not only Americans to stay out, but also the British and anyone else."

While the US-led mission in the strait currently partners only with the UK and Bahrain, Australia recently announced a small group of its armed forces will make a "modest, meaningful and time-limited" contribution to the mission. Prime minister Scott Morrison says 15 per cent of crude oil and 30 per cent of refined oil bound for Australia passed through the strait. Australia would send forces to the Middle East to counter "destabilising behaviour", he says.

Following the recent spate of maritime incidents in the Gulf of Oman and the Strait of Hormuz, the International Bargaining Forum designated the waters as a temporary extended risk zone, which means seafarers who are attacked in the zone are temporarily entitled to a bonus and a doubling of compensation covering death and disability.

> **"The crucial element here is the Strait of Hormuz's strategic place, which you cannot over-emphasise enough**

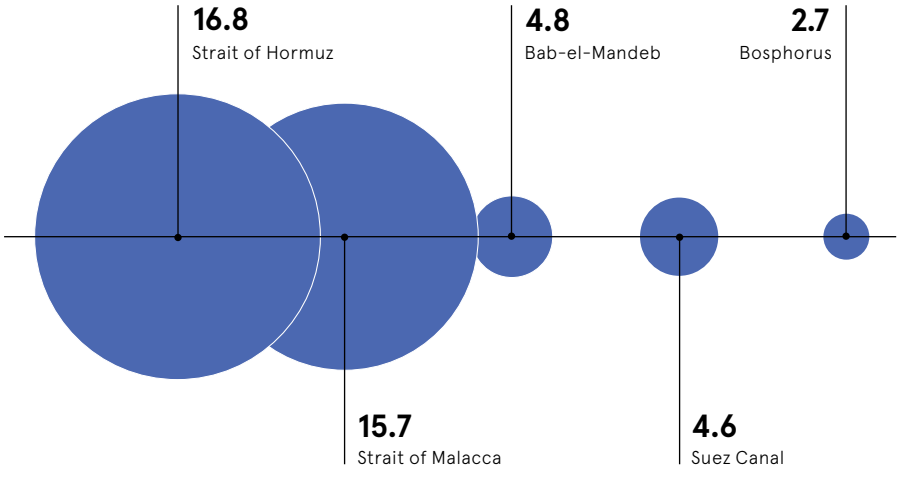
In the coming months, analysts stress an increase in oil prices if the current crisis is not de-escalated through diplomacy. "The biggest problem with the current strategy is it has not provided a safety valve and left Iran no option but to escalate," says Professor Ehteshami. "At the moment, I think it will remain in a kind of cold-war conflict so oil prices will remain where they are. But an unforeseen escalation in the crisis where there is exchange of shots would see oil prices react.

"More recently, the UAE is gently stepping away from the hard line the Saudis have been advocating, which is providing Iran with a ladder to step down from."

Others argue next year's US election may prompt some new diplomatic initiatives. "Trump does not want a war with the 2020 election approaching, but also cannot afford to climb down," says Steffen Hertog, associate professor of comparative politics at the London School of Economics. "I would not exclude a North Korea-type grand gesture, but it would be difficult for Trump to pull this off given the longer path of escalation and the more deeply ensconced anti-Iranian forces in and around the US administration."

WHY THE STRAIT OF HORMUZ IS SO IMPORTANT

Level of seaborne oil transiting possible chokepoints in 2018; million barrels per day



Lloyd's List Intelligence 2019

Shipping steers to a zero-carbon future

As the shipping industry begins a multi-decade journey to reduce greenhouse gas emissions, a combination of digitalisation, business incentives and collaboration is needed to identify the right future fuels and meet ambitious decarbonisation goals

Last year marked a pivotal moment for the shipping industry when the International Maritime Organization (IMO) established a target to reduce the sector's greenhouse gas emissions by at least 50 per cent by 2050. The result has been greater attention from maritime stakeholders about what this transition involves and a growing number who are demanding shipowner action on decarbonisation.

Supporting shipping to address this change is a key focus for Lloyd's Register and this requires strong partnerships.

"Climate change is among the greatest challenges for the safety of our world. All participants in the maritime value chain must collaborate to accelerate the transition to no or low-carbon operating models as society will continue to seek more sustainable transportation," says Nick Brown, marine and offshore director at Lloyd's Register.

Leading the decarbonisation movement for the classification society is Katharine Palmer, global head of sustainability for Lloyd's Register's marine and offshore business. Together with colleagues and experts at the UK's University Maritime Advisory Services, she collaborated on a series of studies, with the latest on low-carbon transition pathways, which assess ways shipping can address the challenges of energy development, vessel design and operational implications relating to the IMO's ambition.

However, despite the regulatory landscape achieving a heightened awareness around carbon emissions, for many a gap remains in understanding how sustainability equals success and what this means for business. Acceptance that sustainability can have a positive business impact beyond compliance is yet to be widely embedded across the sector.

"Several sustainability challenges are being addressed through compliance, but to really move ahead with this, shipping needs to truly understand the sustainability benefits and impacts so they can turn them into something successful," says Ms Palmer.

If the 2050 goal is to be met, the decade between 2020 and 2030 will be the most significant as maritime stakeholders begin to respond to consumer pressure. With uncertainty still lingering around which fuel and technology will be the best route forward, the 2020s will require full-scale pilots and prototypes as well as new policies, standards and rules. It's crucial that zero-emission vessels enter the fleet before this decade has ended.

Batteries in short-sea markets, or if used as hybrids, and on-shore power supply will play an important role in reducing the dependency on fossil fuels. Easy-to-store zero or low-carbon fuels, such as sustainable biofuel and methanol, may also be an attractive solution as existing infrastructure and machinery can be used to ease the transition in the short term.

Once the most appropriate solutions have been identified, the 2030s will be about scaling them up. The evolution of shipping's fuel mix is closely linked to that of the wider energy system, so a clear signal needs to be given to the potential fuel producers.

"We expect a consolidation of what the dominant technologies for use on board will be, and the interactions between end-fuel price, machinery costs and revenue loss will be better understood," says Ms Palmer. "We will start to see ships being designed to store less energy on board and changes to their operating profile to bunker more frequently.

"Although the likelihood of any pathway is difficult to assess, we may experience more than one switch. For example, a growing share of biofuels in the 2020s and ongoing efforts to develop fuels produced from renewable electricity could result in a major shift to electro-fuels in the 2040s and 2050s. By 2050, and beyond consolidation of the market, we expect to see an end-fuel mix dominated by one family of fuels."

Though fuels derived from renewable electricity, such as hydrogen and ammonia, have zero emissions across their whole life cycle, they are currently produced from natural gas which means there are still upstream production emissions. While the IMO's ambitions currently focus on operational emissions, Lloyd's Register's own discussions with shipowners indicate they don't just want to shift the problem upstream. Scalability and cost continue to hold back the transition to zero-carbon alternatives and this needs policy interventions and a fundamental change to the incentives scheme for shipping.

> **"There needs to be a clear direction on which way the fuel transition is going to go so the industry can begin developing the correct supply infrastructure**

Digitalisation will play a key role in getting through these challenges. Embracing new technology and digital applications to change the way businesses in the maritime industry operate is inextricably connected to resolving complex sustainability challenges, though not everybody in maritime sees this.

Technologies that allow data to be managed more effectively allows shipowners to measure efficiency and fuel consumption and emissions accurately, which ultimately enables them to make more informed decisions in creating the right decarbonisation strategy.

"It also underpins improved transparency and disclosure in the supply chain," says Ms Palmer. "Digitalisation enables owners to get data in real time, be more predictive and understand operations to improve efficiencies. However, it will be the desire for change among other stakeholders, including customers and banks, that will influence shipowners the most.

"When technology, commercial and policy perspectives overlap, it creates the right conditions to enable the change. We need technology readiness as well as the safety case. We also need the commercial environment to reward lower emissions and the policy to drive the incentives that enable the transition."

Lloyd's Register anticipates more countries will develop and implement national action plans to address greenhouse gas emissions, with more ports introducing zero-emission incentives to ships operating in their waters. These efforts may be stepped up in 2030 resulting in new incentives and funding to create conditions that support the transition.

Given the current economic viability of zero-emission vessels compared with those using fossil fuels, the market alone will not drive the transition and the industry may need policy interventions and a fundamental change to the incentives scheme for shipping.

Meanwhile, bankers are aligning businesses activities with international climate goals, which involves assessing the climate risk exposure to their portfolios and setting targets to meet decarbonisation goals. This has been seen recently with the introduction of the Poseidon Principles, a global framework for responsible ship finance.

Most importantly, however, there needs to be a clear direction on which way the fuel transition is going to go so the industry can begin developing the correct supply infrastructure. Shipping has a lot of choice and requires a strong understanding about all the fuels that could potentially answer the industry's decarbonisation challenge.

"This will need to be supported by investment in those fuels to ensure sufficient quantities and the required location," Ms Palmer concludes. "The move away from fossil-based fuels will require a completely new infrastructure. This investment will then increase production."

For more information please visit lr.org

Lloyd's Register

TALENT

Driving innovation in slow-moving sector

Maritime recruitment faces a multitude of challenges and obstacles when it comes to propelling the sector into the modern era, but the tide is slowly turning

Virginia Matthews

Top maritime companies are wrestling with some heavyweight issues, particularly when it comes to their potential contribution to environmental damage.

Yet for naval architect Leonardo Zangrando: "The new wave of maritime software startups can add real value by helping operators both to comply with strict international regulations and optimise their use of scarce resources."

As founder and managing director of Startup Wharf, which claims to be the only independent virtual hub devoted to maritime innovation, Mr Zangrando argues that tech entrepreneurs from a wide range of backgrounds bring new ideas and fresh talent to a highly traditional sector.

"Lack of innovation in maritime is a fact," he says, citing the tight margins which can make innovation risky.

While the CO_2 impact of maritime transportation is "actually smaller than that of comparable systems", he criticises the industry for being slow to answer criticism from environmental lobbyists.

Pressure on costs has in the past "pushed some operators to follow less than ethical practices", Mr Zangrando claims. It's this, together with reluctance to embrace digitalisation, that has made it harder for maritime companies to attract the younger, more ethically driven staff they need.

Silverstream Technologies supplies a clean, fuel-saving air lubrication technology to world-leading oil and gas firm Shell and the cruise line giant Carnival Corporation. Founder and chief executive Noah Silberschmidt says: "There is certainly cynicism among top maritime companies towards some of the startups, particularly for those that were promised significant savings in fuel costs, but never received them.

"By being more modest in our forecasts and inviting third-party experts to verify the actual savings, we have in just ten years already successfully broken through this perception barrier."

Solent University's Maritime Simulation Centre was launched in May to provide specialist training for officer cadets, undergraduates and maritime professionals

Mr Silberschmidt's previous career in finance leads him to believe that "financial players are far quicker than maritime operators to accept the help being offered by new software startups".

He also warns that while top maritime companies have shown a willingness to embrace technological solutions, smaller players are more resistant to change and are falling behind.

According to Mark Charman, founder and chief executive of Faststream Recruitment Group: "There is a clear mismatch when it comes to attracting high-calibre recruits to fill jobs in maritime."

While overall candidate numbers are holding up well, "the number of applicants with the right skills and behaviours is not keeping up with demand", he says.

With fewer international candidates willing to work in the UK post-Brexit, Mr Charman believes maritime recruitment "faces an additional challenge around the need for a more globalised workforce".

He says: "It's an old-fashioned sector undergoing change on many fronts and while the startups are well versed in greener tech, many of them are still too niche to dent a sector which simply doesn't move that fast."

Although he notes pockets of progress in forward-focusing maritime education, singling out Solent University's £43-million Maritime Simulation Centre, Mr Charman fears that for many operators, "it may be left up to old sea dogs who have spent their whole lives at sea to teach digital skills they themselves don't possess".

Given that the new generation of recruits "crave work-life balance and want the bulk of their career to be spent ashore", this could also be problematic culturally, he adds.

For Mr Zangrando, limited exposure of the maritime sector to tech entrepreneurs shouldn't be allowed to hamper progress.

"While most shipping entrepreneurs come from within the sector, there is great potential for external software specialists to convert their applications to the maritime space," he says.

Mr Zangrando believes that the number of such startups with innovations which could be tailored to meet the requirements of leading maritime companies is up to ten times the number whose ideas are already being deployed.

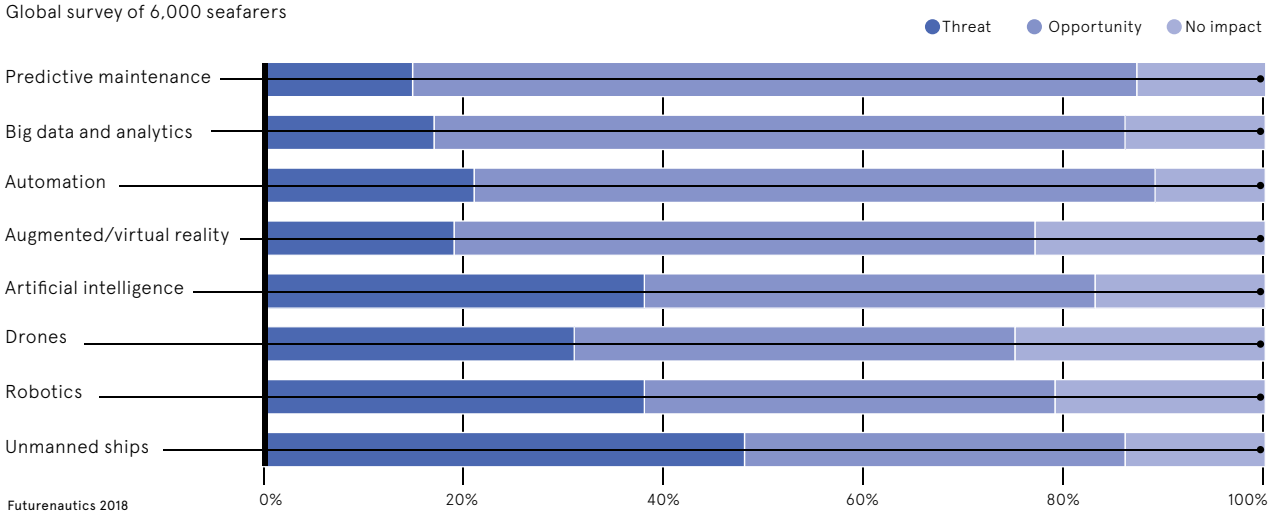
"The issue is that the marine sector is not well known to the public nor to techpreneurs," he says. By signalling more forcefully its willingness to turn to technological solutions, maritime operators can "forge a new relationship with innovators from around the world", he argues.

In terms of talent shortages, Mr Charman notes that the growing demand from top maritime companies for chief digital officers is slowly fuelling a new approach to career development.

"There are signs of change, particularly when it comes to multi-generational teams," he says. "I believe the growing mix of ages, backgrounds and industry experience, as well as more women, will create a more diverse workforce than the maritime sector has ever seen."

TECHNOLOGIES VIEWED AS A THREAT OR OPPORTUNITY

Global survey of 6,000 seafarers



Futurenautics 2018

OPINION

‘Now is the time to step up and turbocharge our coastal communities’

The past three years since the referendum have reminded the British people that the UK is an island, maritime nation. National debate has focused on global trade, and this has positioned the sector responsible for enabling 95 per cent of that trade front and centre.

The engines of our maritime nation are our coastal communities. And while maritime creates hundreds of thousands of high-quality and well-paid jobs around our coast, with £1.6 billion in the pipeline for investment by ports, there is much more that we can do to turbocharge coastal economies.

We have a plan to rejuvenate the fortunes of these parts of the country, and there could not be a better time to get on and deliver it. Taken together, these actions can transform our coastline into a Coastal Powerhouse. Not for some philanthropic reason, but because these parts of the country offer huge growth potential to our industry. Given government’s ambition to rebalance the economy, it’s a win-win.

UK ports invest more than £600 million of private capital each year. We have set out simple changes to planning and development rules that would unlock a further £100-million investment by ports in their communities. While ports invest their own money in their developments, we do need government to invest in connecting ports to manufacturing and population centres across the country, which could inject more than £14 billion into the economy.

Free ports, announced recently by government, could be transformational, but we must ensure that regulatory changes benefit the whole country and maximise UK-wide gain. Close working with industry is key.

Last year, the London-based International Maritime Organization set a legally binding target to reduce carbon emissions from ships by 50 per cent by 2050. This target creates a monumental market for those that innovate low-carbon technologies. That requires intense collaboration between industry and academia, with the UK’s maritime universities and institutes naturally located in coastal communities.

We have recently established Maritime Research and Innovation UK to link these research assets around the UK, and now call on government to provide significant investment to mirror that invested in low-carbon automotive and aviation. Competitor maritime nations in the Far East, Europe and Gulf have their eyes squarely on the prize. The UK must be similarly ambitious.

Just as ports invest their own money, not everything required to transform coastal communities is solely for government to do. Indeed, Maritime UK is leading on two key national programmes: the development of regional cluster organisations to drive growth and strengthen each part of the country’s maritime unique selling point, be it in technology, leisure, renewables, science, engineering or professional services; and a new national careers campaign to attract the next generation into the wide range of maritime careers.

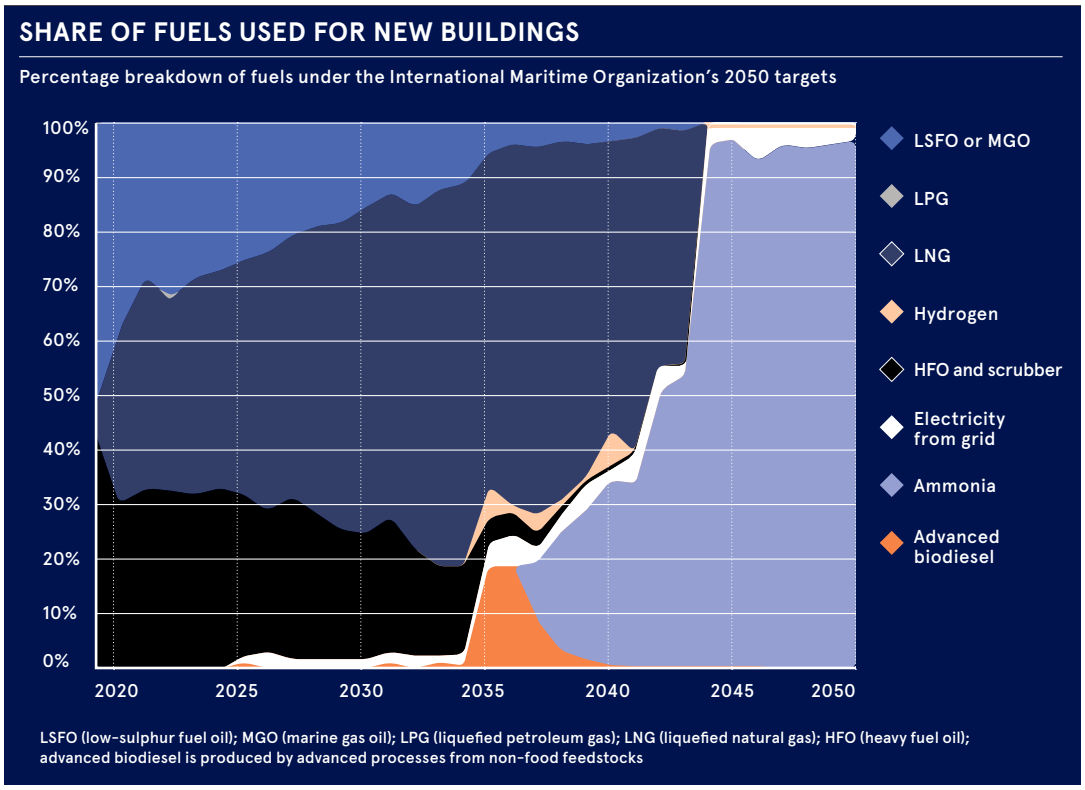
Investing and growing the maritime sector makes smart economic sense, too. Research to be launched at London International Shipping Week will show that maritime is one of Britain’s biggest industries, adding £46 billion to the economy and supporting one million jobs.

Productivity is 42 per cent higher than the national average and for every job directly created by the maritime sector, almost five other jobs are created throughout the economy. Growing the sector in coastal communities, where productivity and other socio-economic indicators often lag the rest of the country, is therefore economically prudent.

Maritime is a sector with huge opportunity and one that other maritime nations are working intensively to gain from. The Organisation for Economic Co-operation and Development estimates that the global maritime sector will be worth $3 trillion by 2030, a staggering doubling in size from current levels.

The good news is that in January government launched Maritime 2050 with a series of ambitious recommendations to realise this potential. Now is the time for both industry and the breadth of government to step up delivery against these recommendations and, in doing so, turbocharge our coastal communities. ●

Ben Murray
Director
Maritime UK



Pathways to a greener future

Forecasting the effects of world fleet decarbonisation options

Meeting International Maritime Organization (IMO) targets for reducing greenhouse gas (GHG) emissions from shipping will take mandatory requirements for individual ships, and other policy measures to support the development and use of new fuels and technologies.

“This is a clear message when we asked our model what would happen when selecting various regulatory pathways for reducing GHGs from shipping,” says Tore Longva, a lead author of the *Maritime Forecast to 2050* and principal consultant at DNV GL’s regulatory affairs section.

Modelling the future world fleet and its emissions

The *Maritime Forecast to 2050,* one of DNV GL’s energy transition outlook 2019 reports, takes its focus from the IMO GHG ambitions and growing external pressure on shipping to cut emissions. It examines how shipping may meet the GHG targets given various potential developments in energy efficiency, logistics and alternative fuels.

Applying the GHG pathway model based on long-term trends, the report projects possible pathways for the world fleet size, fuel mix and CO_2 emissions towards 2050 for the expected transport demand.

The report describes the results for three modelled GHG pathways. Two of them focus on vessel design or operational requirements to achieve IMO ambitions where regulations will be in place for individual ships to incentivise the necessary emissions reduction, but the specifics of the regulations differ.

The first pathway assumes that current ships and those built over the next 20 years will not make a major shift to alternative, carbon-neutral fuels. New builds will have to make a complete fuel shift from 2040 to reach the IMO targets. Under these assumptions, the shipping industry will not have to consider retrofits and fuels compatible with current converters, but continue to design new builds for the most relevant fuel.

In the second scenario, a more gradual improvement is enforced through operational requirements for ships in operation. Drop-in fuels, such as advanced biodiesel and liquefied biogas, are preferred to avoid costly retrofits.

A third, current policies, pathway describes what happens if no further policies are introduced. It assumes IMO will not issue any other requirements beyond the existing Energy Efficiency Design Index and the Ship Energy Efficiency Management Plan.

“In all pathways, we see a big impact of energy-efficiency measures and vessel speed reduction, which can be achieved early in the period up to 2035,” Mr Longva explains. “This is because these measures do not require renewing the fleet. We see emissions peaking in mid to late-2020.”

Without further regulation, a sufficient uptake of alternative fuels to meet IMO GHG targets is not expected unless prices for alternative fuels move to the same level as those for fossil fuels. For the current policies pathway, the forecast projects 670 $MtCO_2$ of emissions in 2050, which is 27 per cent below 2008 levels. In this case, carbon intensity ends at 8.2 gCO_2/tonne-mile, 62 per cent less than in 2008. The results indicate that even with low to moderate seaborne trade growth, IMO’s ambition for a 50 per cent absolute reduction in CO_2 emissions by 2050 is stricter than its 70 per cent carbon-intensity reduction target.

Predicting the future energy mix of the world fleet

In all pathways, liquefied methane has a dominant share of 40 to 80 per cent of the fuel mix in 2050. The primary energy source of the methane varies between fossil sources like natural gas, biomass and other renewables.

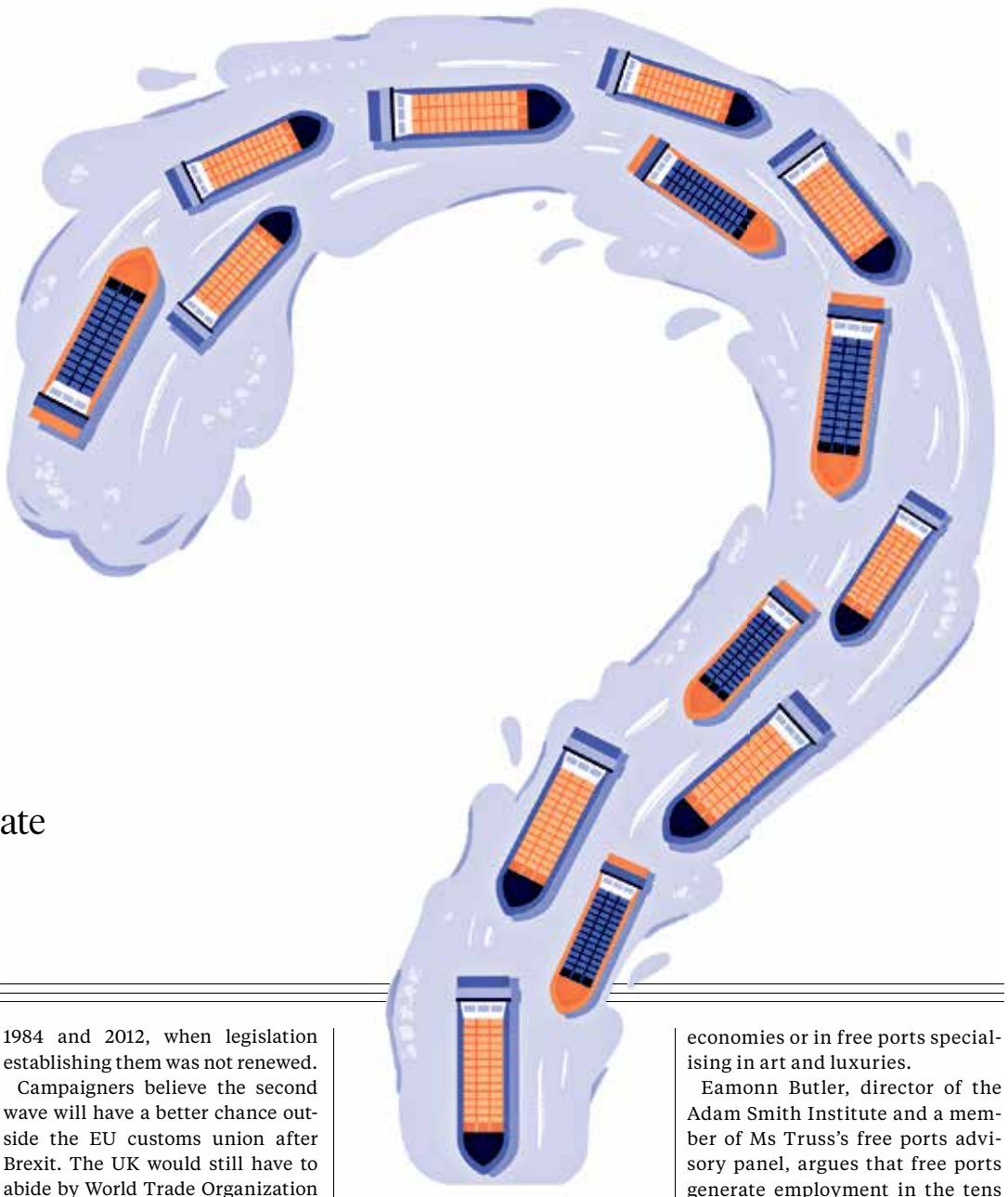
Ammonia is the most promising carbon-neutral fuel option for new builds. Another alternative would be a gradual shift of existing ships relying on drop-in fuels compatible with current fuel converters, such as bio/electro-diesel replacing liquid fuels or bio/electro-methane replacing liquefied natural gas.

Preference for ammonia is due to the lower cost of the converter, storage and the fuel itself compared with H_2 and liquefied biogas/synthetic methane. Carbon-neutral fuels have to supply 30 to 40 per cent of the total energy for international shipping by mid-century if IMO GHG ambitions are to be achieved.

> We see a big impact of energy-efficiency measures and vessel speed reduction, which can be achieved early in the period up to 2035

Download your copy of the latest *Maritime Forecast to 2050* at dnvgl.com/eto

DNV·GL



FREE PORTS

Experts remain divided over free ports

Customs-free ports are commonplace around the globe and have been around for centuries, but proposals to create them in the UK have drawn criticism in some areas

Brian Groom

Boris Johnson's plan to create up to ten free ports in the UK, inspired by similar customs-free zones around the world, to boost trade post-Brexit has had a mixed reception among economists and policy experts.

The government sees these free trade zones at ports and possibly airports as a way to take advantage of opportunities after Brexit on October 31, including trade with the United States and fast-growing Asian markets. Liz Truss, international trade secretary, says they will "onshore enterprise and manufacturing as the gateway to our future prosperity, creating thousands of jobs".

Sceptics warn savings on customs duties for businesses will be modest and that some of the jobs created are likely to be displaced from elsewhere in the UK. Some see free ports as a distraction from maintaining frictionless trade with the European Union, the UK's largest export market.

"Free ports are not a silver bullet; they are another tool in your arsenal to make you more internationally competitive," says Ben Houchen, Conservative mayor of Tees Valley in north-east England, whose championing of free ports in the UK fired Mr Johnson's enthusiasm. Teesport is one of four ports that have expressed interest in bidding, along with Port of Tyne, Milford Haven and London Gateway.

Free ports are an area of a country where goods can be brought in customs free, stored, processed or manufactured and then re-exported, with no tariffs to pay until they enter the domestic economy or are shipped abroad. They usually also include incentives such as low taxes and lighter regulation.

They date back centuries: the Aegean port of Delos was designated a free port by the Romans; in Renaissance Italy, city states such as Genoa and Livorno created similar enclaves. Today there are free ports from Miami to Singapore. Among the best known is Dubai's Jebel Ali, which hosts 7,000 global and local companies.

The World Bank cites reports that estimate the number of special economic zones, of which free ports are one example, at 4,300, though definitions differ and no exact census exists.

America has more than 250 foreign trade zones, fuelled by what is known as tax inversion, whereby parts can face a higher tariff than finished goods. Components are brought in tariff free and used to assemble products that are then subject only to the lower duty when exported to the US. There may be less scope for this in the UK.

The European Union has more than 80 free zones, narrower in scope than others because tax breaks are restricted by state aid rules. There were seven free ports in the UK at various points between 1984 and 2012, when legislation establishing them was not renewed.

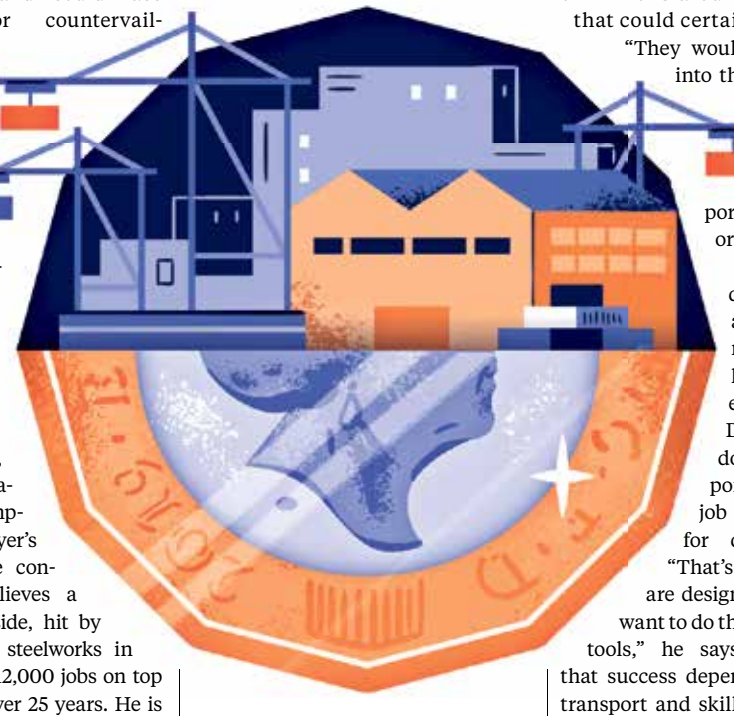
> **Free ports are not a silver bullet; they are another tool in your arsenal to make you more internationally competitive**

Campaigners believe the second wave will have a better chance outside the EU customs union after Brexit. The UK would still have to abide by World Trade Organization rules, however, and could face anti-dumping or countervailing duties if tax breaks were too aggressive.

Tax and regulatory incentives seem likely to be similar to, or more generous than, those in enterprise zones of which the UK already has 61.

Mr Houchen hopes for enhanced capital allowances, reduced corporation tax and exemption from employer's national insurance contributions. He believes a free port on Teesside, hit by closure of Redcar steelworks in 2015, could create 12,000 jobs on top of existing plans over 25 years. He is talking to manufacturing investors in offshore wind, metals processing, chemicals and automotive supply, all outside the UK, so there would be no job displacement.

Peter Holmes, reader in economics at Sussex University and co-author of a report on free ports for the UK Trade Policy Observatory, is sceptical about economic benefits. "Free ports defer duty and, when duty rates and interest rates are very low, the actual benefit from a free port is tiny," he says.



Dr Holmes acknowledges that tax and regulatory incentives could be more effective, but cites a report by the Centre for Cities think tank about recent enterprise zones. This found that total new jobs were only a quarter of those predicted by the Treasury and one-third were the result of displacement.

The EU has warned that free ports can facilitate money laundering and counterfeiting; some say this is more prevalent in emerging economies or in free ports specialising in art and luxuries.

Eamonn Butler, director of the Adam Smith Institute and a member of Ms Truss's free ports advisory panel, argues that free ports generate employment in the tens of millions around the world and that could certainly help the UK. "They would bring business into the UK that is currently going to other places, even to other free ports such as Miami or Djibouti," he says.

They are frequently cited as a regeneration measure, particularly in northern England, but Dr Butler says he does not see free ports in the UK as a job creation scheme for depressed areas. "That's not what they are designed for and if you want to do that, there are other tools," he says. Experts agree that success depends on quality of transport and skills, as well as lack of customs duties.

A 2016 report by Rishi Sunak, now chief treasury secretary, for the Centre for Policy Studies said free ports in the UK could create 86,000 net jobs, while a 2018 report by construction firm Mace talked of up to 150,000, forecasts seen by sceptics as over-optimistic.

Dr Butler concludes: "All we can do is to look at other places and say where they got it right; they do seem to be generating a good deal of trade and prosperity."

Transforming shipping with geospatial data

Contributing more than £37 billion to the UK economy each year, it's hard to overstate the impact the global maritime industry has on our day-to-day lives

Driven by developments in autonomy, connectivity and digitisation, the maritime industry is undergoing an exciting period of innovation and change.

This was a key focus of *Maritime 2050*, a strategy published earlier this year by the Department for Transport, which sets out the UK's ambition to remain a world-leading maritime nation for the next 30 years.

For many of the recommendations made, spanning trade, technology and infrastructure, the strategy identified a common need for accurate and comprehensive data. And marine geospatial data, detailing the depth and nature of the marine environment, will have a significant part to play.

In the UK, the organisation responsible for collecting, processing and publishing this data is the UK Hydrographic Office (UKHO). First established over 220 years ago, the UKHO has a long history of charting the world's oceans to help mariners navigate them safely. In fact, its portfolio of ADMIRALTY Maritime Data Solutions is currently used by more than 90 per cent of ships trading internationally.

Today, the organisation is using its expertise to enable an even greater understanding of the marine environment, to help those working across the blue economy to make use of the world's oceans in smarter, more sustainable ways.

This includes helping coastal nations to achieve sustainable economic growth by using marine geospatial data to support infrastructure, disaster resilience, resource management, tourism and responsible trade. Closer to home, they are working with UK government to increase the value of publicly held data by making it easier to access and use. And alongside partners around the world, the UKHO is also using its expertise to help the maritime industry innovate.

Supporting ports of the future

Central to the maritime economy are ports, a sector undergoing huge advances in digitisation and connectivity. These advances promise to bring significant operational and environmental benefits to the shipping industry and beyond.

But to realise these benefits, operators and shipping companies need to be able to communicate efficiently ahead of each port call. For example, by sharing more accurate depth information, ships can take on more cargo. Or by sharing information about berth availability, operators can prevent unnecessary early arrivals and allow ships to sail slower, reducing fuel consumption and CO_2 emissions.

However, due to existing processes and contrasting terminology used across the industry, this critical information can be misunderstood and is often accessed at the last minute.

To help address this, the UKHO has been working with partners on the Port Call Optimisation Task Force to create a new universal data standard for all parties involved in a port call. Developed alongside industry leaders, including Maersk, Shell and the Port of Rotterdam, the standard has established a set of uniform terms for critical information such as depths, arrival and departure times.

This will enable port users to communicate more effectively, understand key information for each call and share it quickly across digital platforms. This change will dramatically improve the efficiency in ports, reducing costs and, importantly, given the sector's current sustainability goals, reduce harmful greenhouse gas and local emissions.

"Our partnership with the UKHO is fundamental to the success of our mission to build a safer and more efficient framework for port call communications," says Ben van Scherpenzeel, chairman of the task force. "The UKHO's expertise and network has been vital to ensuring the global industry is aligned. And by working together we've taken an important first step towards realising the benefits of this new data standard."

Setting foundations for autonomous shipping

Another significant development in the maritime sector is autonomous shipping. The possibility of partially or fully autonomous vessels has captivated the maritime industry, promising to be nothing short of transformative.

In fact, the UKHO estimates by 2030 the global autonomous shipping sector will be worth a staggering £111 billion, employing 554,000 people. And key to unlocking these opportunities is ensuring autonomous vessels can use accurate and up-to-date data to navigate safely.

This was the focus of a pioneering research project in which the UKHO recently participated, in partnership with L3Harris and the Maritime and Coastguard Agency. Funded by the Department for Transport's T-TRIG grant, the project identified the future data requirements for autonomous technology and how marine geospatial data can be used to enable the safe navigation of unmanned vessels.

One particular area examined how navigational datasets could be repurposed into smart charts that can be interpreted by a computer, without the need for an on-board crew. In addition to navigational data, these charts could incorporate other key datasets, including tidal information, radio signals, maritime regulations and more.

While there is still a way to go before prototypes are realised, these findings will be an important part of establishing safe and efficient autonomous shipping in the UK.

Making marine geospatial data easier to access and use

As innovation brings new and exciting opportunities, so too does it bring new challenges that require comprehensive marine geospatial data to address. To help, the UKHO is working to increase the data it holds, as well as make it more accessible and valuable for marine data users.

One such example is its ADMIRALTY Marine Data Portal. Launched earlier this year, the portal provides a single platform for users to access and download a wide variety of marine data sets. Continuously expanding, this includes bathymetry, wrecks and maritime limits, as well as the position of offshore infrastructure such as wind farms and pipelines – all of which are essential to decisions concerning the marine environment.

In addition to this, its data science team are also developing new ways to gather and use data to monitor environmental change. This recently involved the development of a new method to help map and monitor changes to mangroves: a tree species found in coastal areas with enormous capacity for absorbing greenhouse gases.

And recognising the increasingly flexible, digital working environment for shore-based users in the maritime industry, the UKHO has established an online version of its ADMIRALTY Vector Chart Service to support a range of tasks, from vessel tracking to accident and emergency incidents.

These are just some of the ways in which the UKHO is using its data and expertise to support international trade and others in a changing world. But alongside good data, fundamental to innovation within the maritime industry are strong partnerships. To help realise the benefits of safe, sustainable and more advanced operations, the UKHO is continuing to work closely with industry and partner organisations to enable technological advancements.

And by making its data more discoverable, interoperable and fit for purpose, the UKHO is proudly supporting the global maritime industry for the future.

Marine geospatial data from seabed to surface

Navigational
Data such as lights, buoys and radio signals that support the movement of shipping traffic

Maritime limits and boundaries
Data depicting territorial limits and exclusive economic zones

Offshore infrastructure
Data showing the location of wind turbines, pipelines, cables and subsea infrastructure

Tidal
Data showing the movement of tidal heights, streams and currents

Marine biology and observations
Data showing the location and type of marine life across the ocean

Ocean profile data
Data describing salinity, temperature of the water and more

Bathymetry and seabed profiles
Data depicting the shape of the seabed

Seabed geology and seabed samples
Data describing the composition of the seabed

For more information please visit admiralty.co.uk/ukho/about-us

ADMIRALTY
Maritime Data Solutions

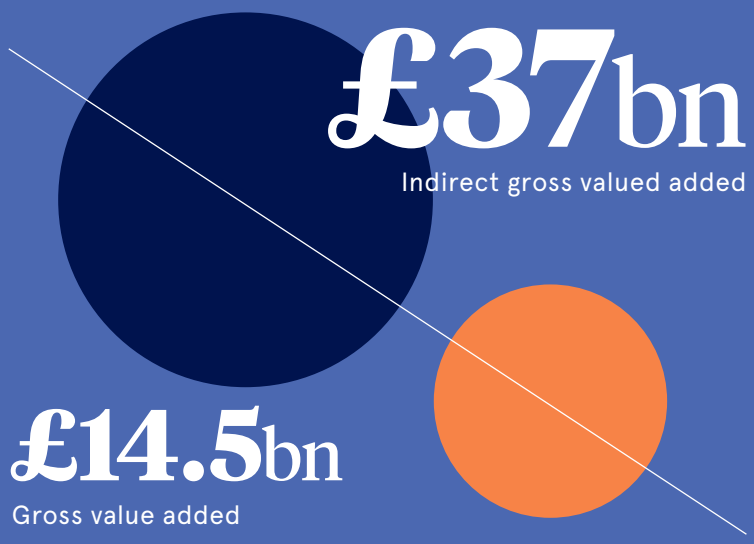
UK Hydrographic Office

UK MARITIME

With over nine tenths of national trade facilitated by sea, the maritime industry is a fundamental element of the UK economy, indirectly responsible for the employment of nearly one million workers

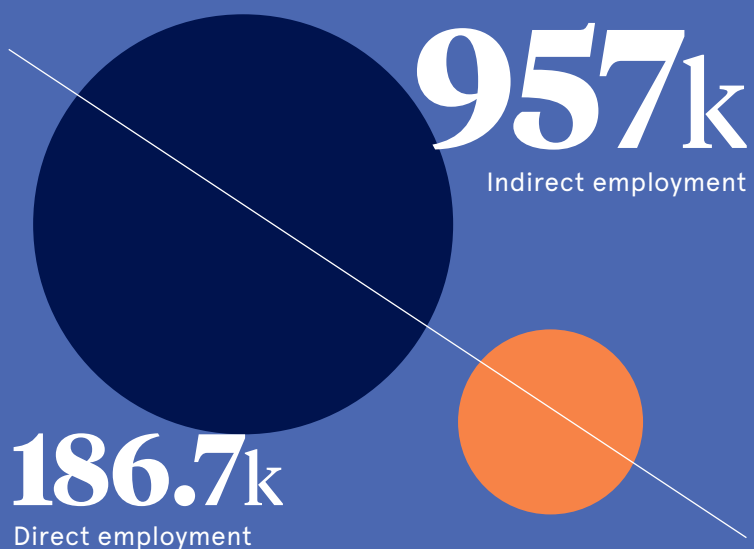
ECONOMIC CONTRIBUTION OF THE UK MARITIME SECTOR

Latest government estimates



£37bn
Indirect gross valued added

£14.5bn
Gross value added



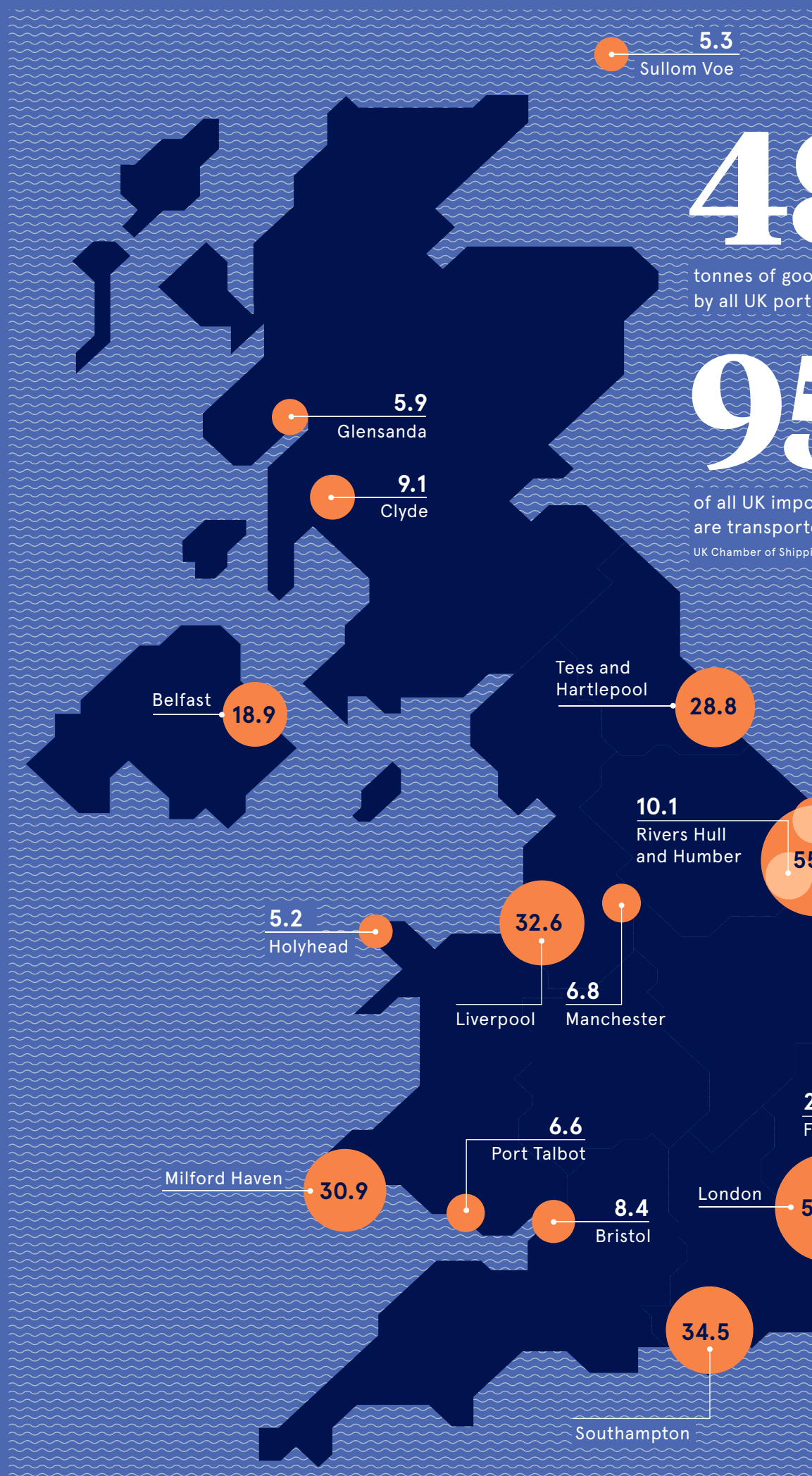
957k
Indirect employment

186.7k
Direct employment

All statistics are from the Department for Transport 2019 unless otherwise specified

BUSIEST PORTS IN THE UK

Major ports by million tonnes in 2018; ports handling over five million tonnes only



48
tonnes of goo
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95
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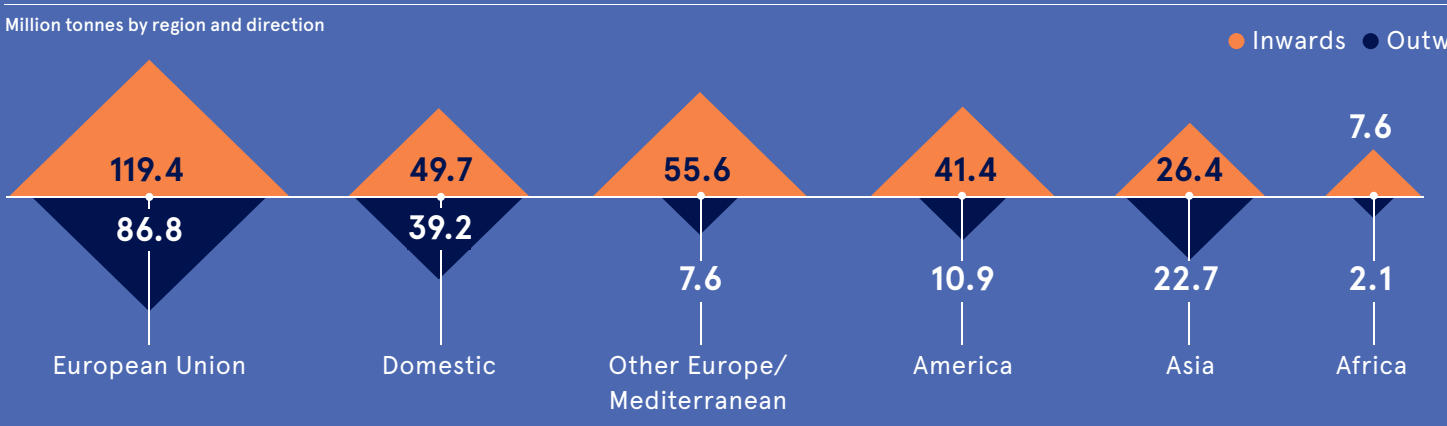
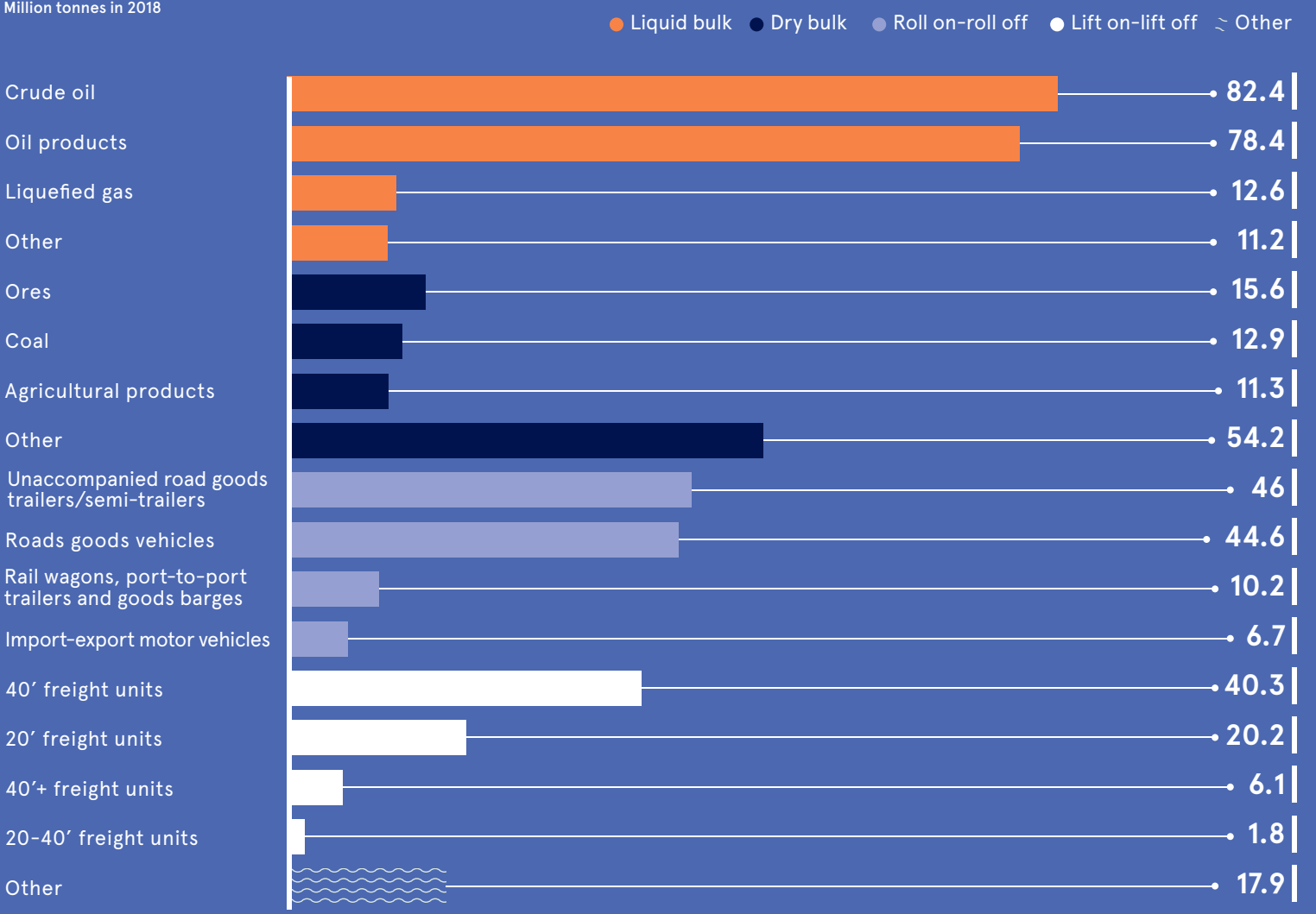
SOURCES AND DESTINATIONS OF UK SEABORNE TRADE

Million tonnes by region and direction



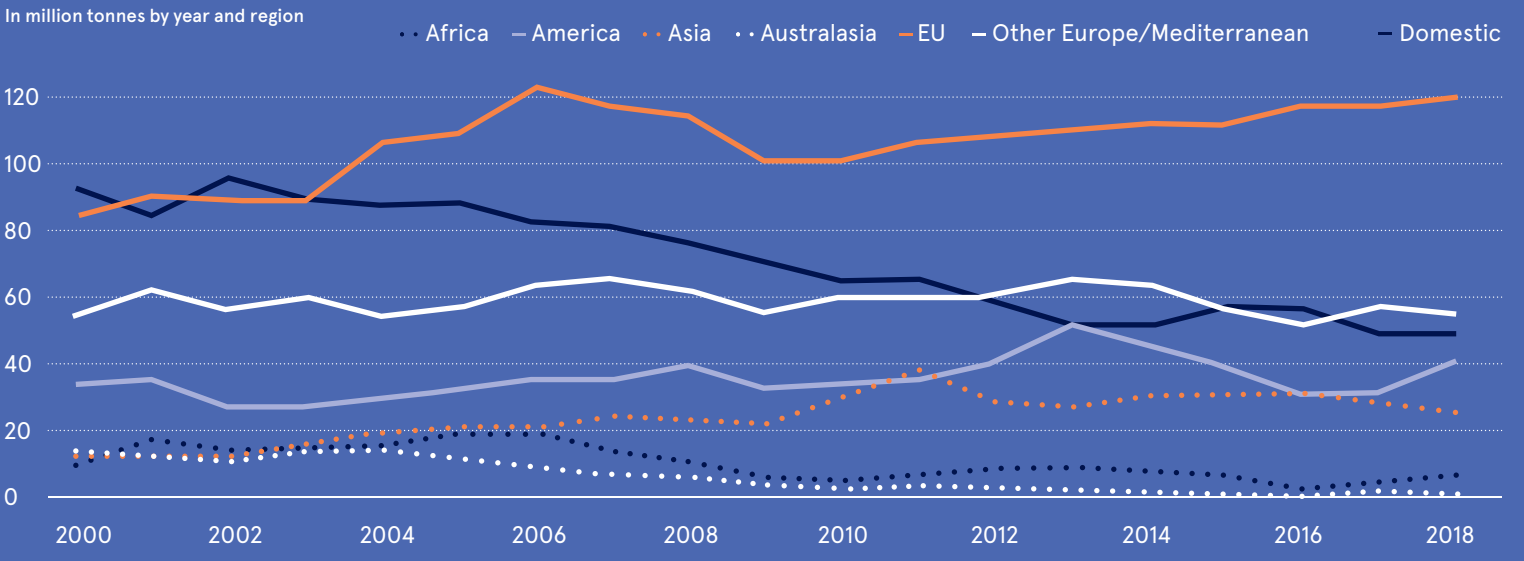
MAJOR PORT TRAFFIC BY TYPE

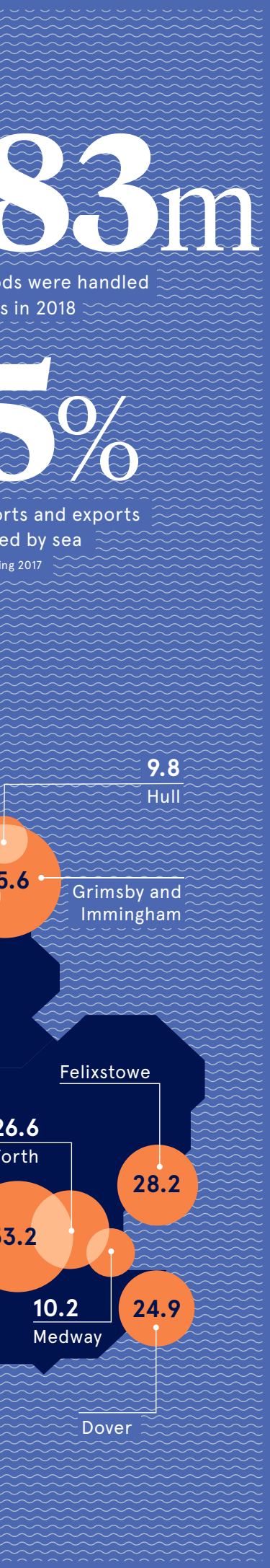
Million tonnes in 2018



INWARD SEABORNE VOLUMES AT UK PORTS

In million tonnes by year and region





OPINION

‘The UK needs trade deals in place, and lots of them, if it is going to recover economically from the negative effects of Brexit’

Pictures of Boris Johnson beaming across a G7 table at America’s President Donald Trump, as both leaders talked up the prospect of a quick and very large UK-US trade deal, showed in no uncertain terms that a special relationship is alive and stronger than ever.

But there is a clear message behind these photo opportunities which is trade remains firmly at the top of the UK government’s agenda. As the UK looks to a future outside the European Union, it needs trade deals in place, and lots of them, if it is going to recover economically from the negative effects of this long, drawn-out issue that is Brexit. And some would argue there is no better place to start than with the United States.

But with more than 90 per cent of everything we consume shipped into and out of our ports, the role played by the international maritime sector is more crucial than ever, driven by a growing partnership between government and industry. The UK needs trade and trade needs shipping. And with the UK’s maritime sector contributing more than £14.5 billion to the country’s GDP, the opportunity for growth is there to be seized.

But how keen and able is London and the UK to grow and strengthen its position as a major international maritime centre? If the international interest in this year’s London International Shipping Week (LISW) is anything to go by, then London is still a force to be reckoned with.

But industry leaders are standing by, waiting to see what the next move is. Can London do what Singapore has done and attract in vast amounts of external investment? Can it encourage shipowners to relocate and run their companies here? Can the UK revitalise some of its forgotten sectors like shipbuilding and harness the juggernaut that is innovation and smart technology, and become a global leader when it comes to smart shipping? The answer to all this is a clear yes.

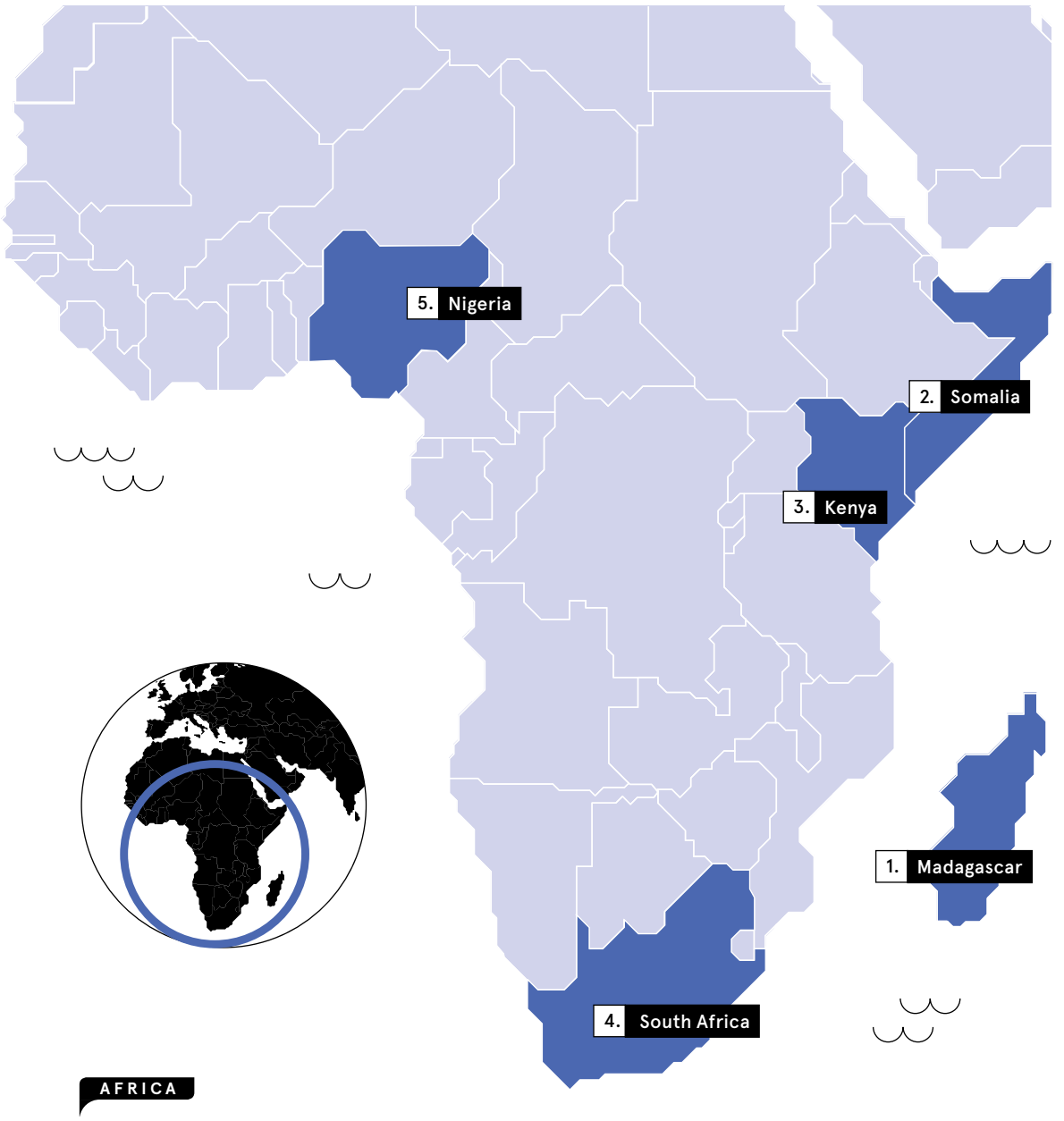
There is a school of thought that says the UK can move freight off the roads and on to technologically advanced coastal ships, built and innovated at our shipyards and equipped with the latest smart technology. Totally autonomous ships they may not be, but they wouldn’t need more than a crew of three or four.

London’s role as the world’s number-one professional services centre remains even more important than ever. Shipping is changing and the influence of maritime clusters around the world is more acute than ever before. Athens may have the shipowners, Singapore the charterers, traders and port infrastructure, Oslo the innovation and Hong Kong the route to the giant Chinese market. But they all need London with its decades of influence and expertise if they are to grow. And London needs them in equal measure.

The theme for LISW19 is International Trade in a Changing World, which cannot be more relevant post-Brexit, but it also reflects the proliferation of other geopolitical factors now affecting the flow of global trade. These include trade disputes, protectionism, sanctions, shifts in energy production and consumption, climate change and environmental regulation.

Whereas previous LISW events have focused mostly on shipping industry issues, the aim of LISW19 is to demonstrate and prove that London and the UK are open for business as an international trading partner. ●

Sean Moloney
Co-founder of London International Shipping Week
Director of Shipping Innovation



AFRICA

Africa’s blue economy: five maritime nations poised for growth

Dubbed as the ‘new frontier of African renaissance’, the maritime industry has huge economic potential across the continent and five countries in particular are poised to benefit

Jon Axworthy

1 Madagascar

With a 5,500-kilometre coastline, Madagascar’s potential to benefit from a blue economy is huge. This was identified by the Malagasy government in 2015 when it determined that a clearly defined set of blue-economy principles could be the way to jumpstart economic development in the country.

Historically, the majority of the population has focused on agriculture to earn a living, but the island is perfectly placed to profit from maritime transportation as it sits in a prime position on the Indian Ocean trade route that links Australia, Asia and the Middle East.

From shrimp fisheries in the West to deep-sea ports, mining and container shipping in the East and South East, the potential in the world’s fourth biggest island has recently been identified by Chinese investment, which has pledged $2.7 billion to projects that range from shipyards and fisheries to aquaculture.

The latter industry is of particular interest to many investors and non-governmental organisations (NGOs) as it’s a way to work with coastal communities to develop sustainable sources of income.

A good example of this is the seemingly humble sea cucumber which is found in abundance in the waters around Madagascar and has a market value of around €860 a kilogram, particularly in China where it is seen as a delicacy when processed and dried.

With the help of British NGO Blue Ventures, 700 local people have been trained to work as sea cucumber farmers in the waters around the island’s Bay of Assassins. Thousands have been bred, farmed and sold, which has

not only allowed locals to raise their standard of living, but also ease the pressure on other marine species and increase the island's blue-economic growth further.

2 Somalia

"Somalia potentially stands to gain the most from a robust and sustainable blue economy," President Mohamed Abdullahi Farmajo claimed last year.

The president's positive forecast is surely based on the fact that Somalia boasts approximately 3,000 kilometres of coastline and an ocean territory that stretches around 120 kilometres off shore.

Thanks to monsoon winds which enrich Somali waters with nutrients and food, the country's ocean resource is bountiful. However, the threat of piracy has curtailed a booming ocean economy as many foreign vessels, from industrial longliners to rillnetters, have been forced to avoid Somali waters.

But an increased international naval response and presence off the Horn of Africa means Somalia's fisheries-based economy is on the increase and proving to be one of the country's most prominent blue-economic resources.

And there appears to be plenty of room for sustainable growth, according to the One Earth Future *Stable Seas Maritime Security Index*, as long as the focus switches from top-of-the-food-chain fish, such as sharks, tuna and marlin, and concentrates on the smaller pelagic fish, like the Indian oil sardine.

The index predicts these shoals could be harvested at four times the current rate. This is backed up by the Secure Fisheries' report *Securing Somali Fisheries*, which says there are plenty of opportunities to take advantage of the export market for these fish species.

Crucially for the country, the *Maritime Security Index* also reveals that Somalia is in a very strong position when it comes to sustainability and resilience to climate change, which means the country is free to invest in its ocean economy without having to worry about first undoing the damage caused by years of overfishing.

3 Kenya

Somalia's southerly neighbour has a blue economy that currently contributes only 2.5 per cent to its GDP, but there are untapped resources in the country's expansive 200,000-nautical-mile exclusive economic zone (EEZ).

Kenya lies within the lucrative tuna belt and it's estimated that there are between 150,000 and 300,000 tonnes of fish swimming throughout the EEZ, which is why one of the most pressing blue-economy principles of the Kenyan government is increased investment in the sustainable development of its tuna resources.

Encouraging Kenyans to eat more fish is also vital for food security and a healthy ocean economy as currently the average Kenyan eats just 4.6 kilograms of fish a year, well below the African average of 10 kilos annually. However, with a concerted effort concentrating on availability and education, it is hoped the country could boost this average well beyond current consumption and compete with the global average of 20 kilos a year.

In addition, Kenya has the option to look inland to blue-forest habitats, such as mangrove forests, where carbon is stored and there is a unique financial gain to be had as blue-carbon markets offer economic incentives to manage these resources sustainably. The Blue Carbon Project in the southern part of Gazi Bay is expected to generate up to 3,000 tons of CO_2, which would inject almost $12,000 a year into the local community in the form of carbon credits sold on the voluntary carbon market.

4 South Africa

Phakisa means hurry up in Sesotho, one of the official languages of South Africa, so it's no surprise that the strategy put in place by the South African government to grow a sustainable blue economy is called Operation Phakisa.

The initiative is targeting four key areas of blue-economic growth: marine transport and manufacturing; aquaculture; offshore oil and gas; and, ultimately, marine protection. The government estimates the oceans bordering South Africa on three sides, giving it a coastline almost 4,000 kilometres long, have the potential to add R177 billion (£9.6 billion) to GDP and create more than one million jobs by 2033.

These ocean economy estimates are primarily predicated on the growth of domestic shipping, as the country sits on one of the busiest trade routes in the world. However, from the approximately 13,000 trade cargo ships that visit South African ports every year to deliver imports and export local produce and minerals, only a handful are registered under the South African flag.

This means the local economy isn't benefiting from the healthy and profitable shipping industry right on its doorstep, which is why moves are being made to grow the country's domestic ship registry. But the number of South African-flagged ships is only expected to reach half a dozen by the end of the year.

However, this will have some knock-on effects on maritime employment. Most notably it will enable South African-born seafarers to complete the cadetship berths they need to receive their qualifications and start benefiting from the ocean economy. Operation Phakisa is also providing training for these ratings and officers that will see the number of South African-born seafarers swell to 12,000 by the end of the year.

5 Nigeria

Of the blue-economy sectors available to the Nigerian government, including aquaculture, deep-sea development and seafarer training, it is perhaps shipbuilding and repair yards that have the potential to provide employment for millions, as well as food security and GDP growth.

Lack of investment in shipbuilding and repairs has forced Nigerian maritime operations to look elsewhere for these services, and the country's blue economy has been haemorrhaging capital and lost labour potential to foreign nations for years.

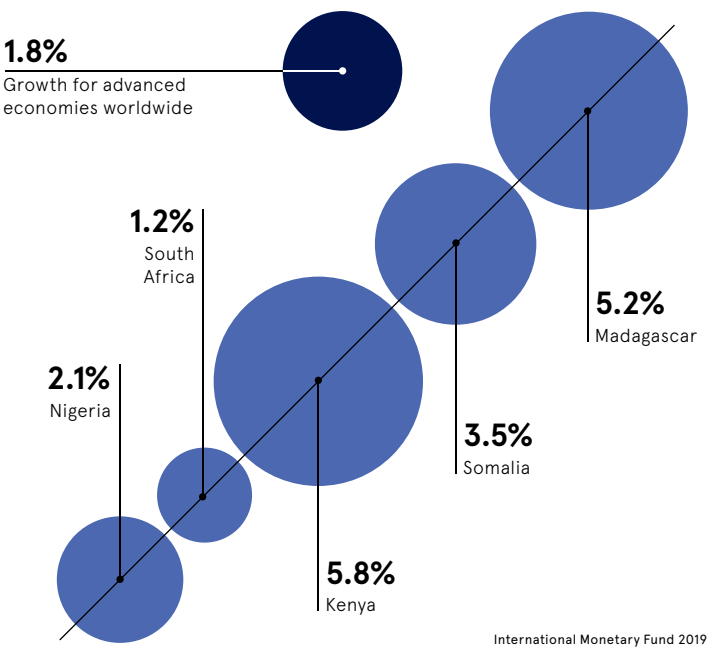
Developing new infrastructure like this, as well as investment in deep-sea ports and intermodal transport, has become one of the most pressing blue-economy principles of the federal government in an attempt to drive growth in the ocean economy.

However, there is a booming demand in Asia for the scrap metal that shipwrecks provide and recovered vessels are fetching healthy sums on the international market. A concerted marine salvage programme would not only begin to provide fresh revenue, but would also kickstart the process of cleaning up the coastline.

More capital is being lost because foreign carriers, who are benefiting from Nigerian oil production – Nigeria is the world's 16th-largest oil producer – dominate the country's shipping industry. This is why government programmes are underway to establish a national carrier, funded by the private sector, which will ensure oil export revenues stay in the country and are not lost with every foreign ship that leaves a Nigerian port.

ECONOMIC GROWTH OF THE FIVE NATIONS

Projected real GDP change in 2019 (constant prices)



International Monetary Fund 2019

It's time to think Humber

ABP's ports on the Humber offer much more than a solution to any post-Brexit disruption across the Calais-Dover route. They offer a greener, more resilient option to UK trade, irrespective of the Brexit outcome, says Simon Bird, ABP Humber director

01 Port of Immingham

02 Hull Container Terminal

03 Green Port Hull

ABP is the UK's leading port operator. Some £150 billion in trade, around a quarter of all Britain's seaborne trade, passes through our 21 ports, spanning Scotland, England and Wales, every year. And we are committed to making sure all our ports are ready to keep trade flowing post-Brexit. Thanks to constant investment in infrastructure, equipment and people, our ports on the Humber are robust alternatives to Dover, where the risk of potential disruption is greatest.

Since 2016, ABP has invested more than £250 million across our network of ports, with around £50 million being spent on the Humber to expand our container facilities in Immingham and Hull.

In addition, we are working with the government, customers and partners, and co-operating closely with other European ports to keep trade moving efficiently. Since 2017, the number of shipping services connecting Hull and Immingham to ports on the Continent has increased by more than 30 per cent, comprising new services from Amsterdam, Ghent and new deep-sea feeder services into the Port of Hull.

However, beyond the solutions that the Humber can offer in the event of disruption in the Channel, there are wider benefits of using these strategically resilient locations in the North.

The Humber's proximity to many of the UK's main centres of manufacturing and distribution means our ports can better facilitate European Union trade and offer more resilient access to export markets. A further advantage of greater use of ABP's Humber ports is that it enables a significant reduction in distances travelled by heavy goods vehicles (HGVs) on Britain's roads, therefore offering an opportunity to improve safety and cut CO_2e emissions to help tackle climate change.

Research by the University of Hull Logistics Institute found that by using the Humber instead of Dover, the average reduction in distance travelled to locations in the central east-west corridor of the UK, destinations such as Leeds, Doncaster and Manchester, was 178 miles, with an average cut in journey times of 5 hours 10 minutes and an average saving of 458 kilograms of CO_2e per load.

The study demonstrates that moving just 10 per cent of cargo from the Port of Dover to the Humber could save around 100,000 tonnes of CO_2e every year when servicing these locations. Studies also outlined potential benefits to HGV and driver utilisation, helping to alleviate driver shortages while improving driver welfare and potentially relieving pressure on congested road infrastructure in South-East England.

Put simply, the Humber Ports are not merely an alternative to Dover, they provide a quicker, cheaper and greener solution to trading logistics.

Crucially, the Humber Ports already have the infrastructure needed to facilitate the shift away from Dover and other ports in the South that could face disruption in a changed customs environment. This is hardly surprising given that the Humber is already the UK's busiest trading gateway. Humber Ports handle more than 58 million tonnes of cargo between them each year worth approximately £75 billion and include the Port of Immingham, which is the UK's largest port by tonnage.

The strength of the Humber Ports does not just lie in the volumes they handle or the outstanding infrastructure they offer; strength also comes from the diversity of cargoes they handle and sectors they support.

Outside the area, it is probably not well known that the Humber Ports play a pivotal role in the UK National Infrastructure because more than 10 per cent of the national energy supply is met with resources that come through the Ports of Immingham, Hull and Grimsby.

> **We are committed to making sure all our ports are ready to keep trade flowing post-Brexit**

Coal and biomass arrive on the Humber and are stored in ports on both banks of the estuary before making their way to major power stations such as Drax. The Port of Grimsby has become the largest hub in the world for supporting the offshore wind sector. Hull also plays a major role in offshore wind with the blade manufacturing facility run by Siemens Gamesa in Green Port Hull. In addition, around a quarter of all of the UK's oil comes through the Port of Immingham heading for local refineries and then out to supply fuel for vehicles across the country.

The Humber Ports provide critical support to the agricultural and construction sectors nationwide in terms of handling animal feeds and fertilisers, bricks, timber, pumice and aggregates.

The automotive sector makes very considerable use of the Humber Ports with more than 800,000 cars coming into the UK through either Grimsby or Immingham every year, making them the biggest import ports for cars in the country. Cars are stored in huge car parks across the port estates before being transferred to dealers or delivered straight to buyers.

The expanding container businesses, as well as the large enterprises of roll-on/roll-off services that operate out of both Hull and Immingham, play pivotal roles in supplying the UK economy with food, clothing, medical supplies, electrical goods and materials for manufacturing.

Another exciting aspect of the Humber is the large availability of land that makes the region such an interesting proposition as a solution to the UK's economic challenges and the drivers for trade. Opportunities such as the 453-acre development site to the eastern end of the Port of Hull are an enticing prospect for manufacturers and distributers.

The combined impact of all these factors means the Humber Ports touch just about every part of the economy and the quality of life for UK citizens, and they are hugely rich in potential for further growth.

Dialogue among both traders and governments in recent times has often focused on short-term alternatives to the problems associated with Brexit-related congestion at ports such as Dover. However, the Humber Ports not only offer those short-term alternatives, but a long-term advantage in terms of efficiency, costs and environmental impact to traders throughout the UK and EU.

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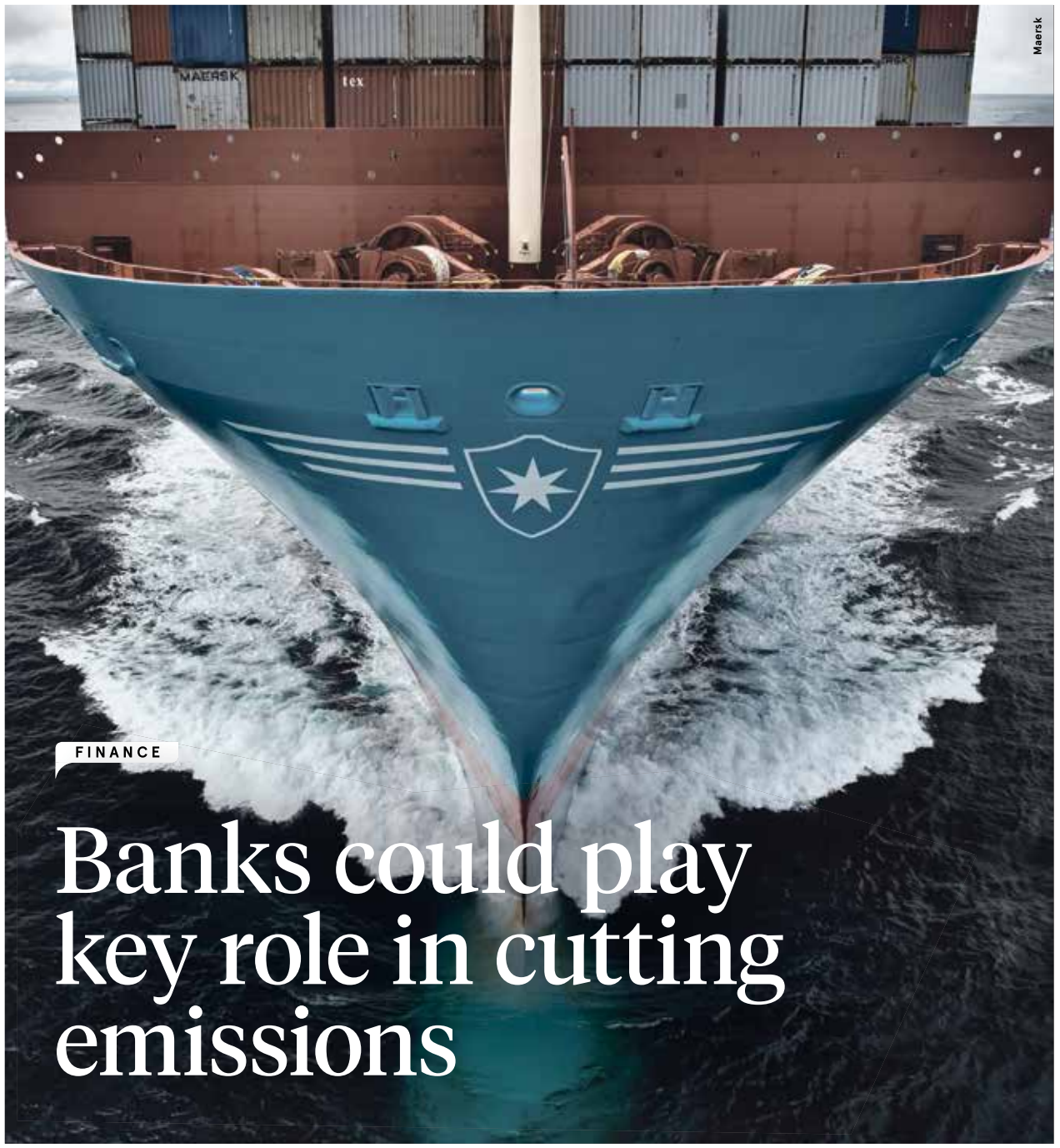


FINANCE

Banks could play key role in cutting emissions

Financial institutions now have a framework for assessing the environmental footprint of their ship finance portfolios, but there are a number of stumbling blocks to overcome before it can make a meaningful impact

Jon Axworthy

Legend has it that in an attempt to appease Poseidon and gain favour before one of his campaigns, Alexander the Great sacrificed a four-horse chariot by driving it into the sea. Now another sacrifice is being made in Poseidon's name as the major shipping banks pledge to inform all their future lending decisions on environmental factors and the reduction of shipping emissions.

The 11 founding signatories, which include Citi, Société Générale and DNB, have called their initiative the Poseidon Principles and see it as the next logical step in a sequence of events triggered by the International Maritime Organization's (IMO's) target to reduce shipping's greenhouse gas (GHG) emissions by at least 50 per cent by 2050.

One of the founding architects of the principles is Michael Parker, Citibank's global industry head of shipping and logistics. "Banks will take environmental issues such as emissions into consideration when making decisions on what to finance or refinance," he explains. "This will influence owners who have relied on relatively high leverage and the ability to refinance vessels well within their current useful life."

The principles break down into an assessment of climate alignment, accountability, enforcement and transparency, which means the signatories will make their climate alignment scores public every year.

Over 19 months in the making, the principles haven't been developed by the banks in isolation and major players in the industry itself, such as A.P. Møller - Mærsk, Euronav and Lloyd's Register, were also involved in their inception.

The banks involved currently represent approximately $100 billion in shipping investments, which is around 20 per cent of the global ship finance portfolio, so their influence shouldn't be underestimated.

Shipping giant Maersk is trialling the use of a biofuel blend made of cooking oil which is carbon neutral

> **It won't be possible for shipping to become carbon neutral if we don't find a different fuel or a different way to power assets**

However, it's hoped that the industry's other major lenders and export credit agencies, including Asian banks, will become signatories by the end of the year.

Of course, climate alignment with the IMO's target or the Paris Agreement, which is pledged to hold global warming well below 2C, can only be achieved with collective action on behalf of the banks to tackle shipping emissions.

"The challenge to the principles will come if a large proportion of existing lenders decline to join and thereby decline to support the IMO's emissions objectives," says Mr Parker, who is also acting chair of the Poseidon Principles Association.

"Ultimately, charters and consumers will make it very unlikely that two global fleets will exist, one financed by banks who sign the Poseidon Principles and one that is financed by those willing to finance less efficient and high-emission vessels."

The current portfolios of the banks also represent a challenge, as these will need to be renegotiated or phased out completely to green the assets progressively and reduce shipping emissions.

"As much as the principles are about assessing decisions that have yet to be made, they're also about assessing decisions which have already been made," says Mr Parker. "All signatories have existing legal and contractual commitments in their portfolio, so there will be a gradual process of adjustment as new deals are done and loans that might once have been refinanced are no longer refinanced."

This is a cause for concern for some owners, known as shipping's "squeezed middle", as green shipping will almost certainly mean those who are currently operating older, carbon-dense tonnage may not make it to 2050.

The importance of the principles for a shipping industry powered by bunker fuel can't be overestimated. A residue from crude oil, bunker oil is cheaper but dirtier than petrol or diesel. This means that, at present, international shipping emissions contribute 2 to 3 per cent of global GHG emissions, equivalent to Germany's output.

However, for the principles to remain relevant, there need to be some dramatic advances in green ship technologies.

"It won't be possible for the shipping industry to become carbon neutral if we don't find a different type of fuel or a different way to power our assets," says John Bang Kornerup, Maersk's climate change adviser and head of sustainable strategy. "In the next ten years, we need some big breakthroughs. Massive innovative solutions and fuel transformation must be found and implemented up to 2030."

Research and development is the cornerstone in achieving the IMO's 2050 target, says Mr Kornerup. "Cargo owners, investors, regulators, researchers and technology developers must collaborate and develop innovative solutions that help the industry tackle the number-one sustainability issue in the world," he says.

50%

reduction in shipping's greenhouse gas emissions by 2050, under the International Maritime Organization's targets

11

large, international banks have signed up to the Poseidon Principles

$100bn

shipping finance is currently provided by these banks

20%

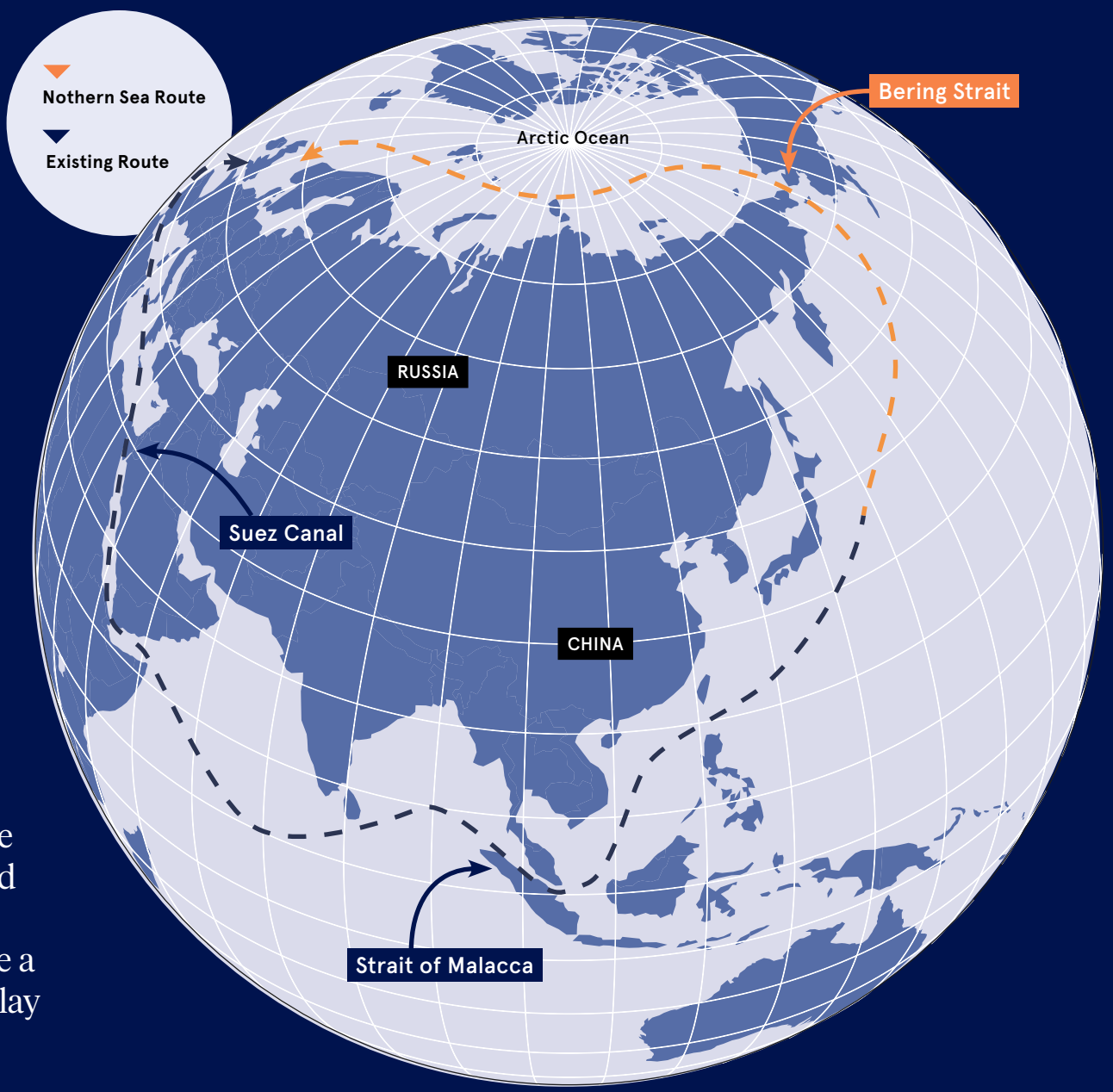
of global ship finance portfolios are held by the banks involved in the Poseidon Principles

In the race for green fuel, nothing is off the table: biofuels, hydrogen, electricity, or even wind or solar power. Maersk, for example, has been trialling a 20 per cent biofuel blend based on used cooking oil, which is carbon neutral and on a life-cycle basis is around 85 per cent better in CO2 terms than traditional fuel.

"The success of the trial has pushed us to offer decarbonised container transport to around a dozen clients who are focused heavily on sustainability," adds Mr Kornerup.

Currently, the Poseidon Principles contain no specific targets for the individual banks to achieve climate alignment, but they are undoubtedly a catalyst for change and their success has wide-reaching implications not only for shipping emissions, but for other industries under pressure to reduce the carbon footprint of their businesses.

"The Poseidon Principles will ultimately succeed or fail on the ability of banks to encourage owners to order the right vessels and to scrap less efficient vessels sooner," Mr Parker concludes. "The measure of success is whether or not a modern efficient global fleet is delivering global trade."



NORTHERN SEA ROUTE

Opening the Arctic waterways for business

As the polar ice caps continue to recede at record levels, China and Russia could take advantage as the Northern Sea Route opens up. Whether this would be a strategic trade move or a geopolitical play remains to be seen

James Gordon

Donald Trump's recent clumsy attempt to buy Greenland, the world's largest island, was mocked by many on Twitter. But his interest in the semi-autonomous country within the realm of Denmark was not as absurd or preposterous as millions of keyboard warriors made out. After all, Greenland is a territory rich in minerals and is strategically located between North America and Europe.

But for many Arctic watchers, it wasn't really about Greenland. Rather it was about announcing America's intentions to gain a strategic foothold in the Arctic and take advantage of the polar sea routes which are fast emerging as the Arctic ice cap starts to recede.

However, America is a relative latecomer to the region. Russia, and China got there long ago and have already announced their intention to build the critical infrastructure needed to support the Northern Sea Route, which connects north-eastern Asia with northern Europe via Siberia.

Dr Marc Lanteigne, an expert on the politics of the polar regions, says that in the absence of two consecutive US administrations showing interest in the route, Russia and China's relationship "has often been viewed as a marriage of convenience with China supplying the money and Russia leading on logistics, but relations between the two states in the Arctic are getting closer".

He thinks the United States' failure to adopt an active and coherent policy in the Arctic is a mistake. The Northern Sea Route may not be the most crucial objective in China's ambitious Belt and Road strategy, but it is important for Chinese economic interest and relations with Russia.

"China knows that the potential for shipping is profound. A vessel heading for Europe from Shanghai could cut several thousand kilometres off the southern route by using the Arctic waterway instead, which would represent a huge cost-saving," says Dr Lanteigne.

But making this Arctic run has its challenges. "China has been very vague as to where the Northern Sea Route begins and ends," he says, adding that navigating the channel is far from easy, very expensive and only possible for three to four months of the year.

Until stopover stations are built, such as a potential deep-water port at Arkhangelsk, north-eastern Russia, few ships can make the journey. He says that only 27 ships, many of them cargo and research vessels, took the route in 2018. So why is China prepared to invest so much money into developing the Northern Sea Route?

Dr Lanteigne explains: "Both China and Russia are prepared to play the long game. They know that sea ice is retreating at record levels and in 20 or 30 years the route will become much more useable. As an added contingency measure, in addition to the ports and railways they wish to develop, both are investing in ice-hardened liquefied natural gas container ships and state-of-the-art icebreakers. Russia has more than 40 of them while China owns two icebreakers. America, in contrast, has just one capable of polar missions; it is over 40 years old and is in a state of disrepair."

> **A vessel heading for Europe from Shanghai could cut several thousand kilometres off the southern route**

But not everyone agrees that this potentially more expedient route will rival long-established waterways such as the Panama Canal. Andrew Holland of the American Security Project believes that the cost of shipping is relatively insignificant when


Stephen B. Goodwin / Shutterstock

New pathways and possibilities

The Northern Sea Route, which links northern Europe to north-east Asia, is just one of three passages that Arctic countries and a host of non-polar nations are looking to exploit, according to Dr Marc Lanteigne, expert in Arctic security.

"Up until 20 years ago, the North-West Passage, a trans-Arctic waterway claimed by Canada as internal waters, would have been seen as impossible to breach. Now, however, with global warming making an impact, a handful of cruise ships have begun using the route for a few months of the year. In two decades' time, we could see it being used more extensively," he says.

But the most lucrative route, says Dr Lanteigne, is the central Arctic route, which currently is a "purely hypothetical passage".

"If the ice caps continue to melt, in theory it would be possible to send a ship right through the heart of the North Pole in summer, which would be the most time-efficient and cost-effective route by far," he says. "Whether any of these routes will rival the Panama Canal in 30 years' time is the question of the hour and one that no one can answer."

it comes to exporting goods. He adds that it is certainty that commercial operators most value.

"The Arctic is not a predictable environment. Conditions can be hazardous, even in the height of summer. Therefore, while shippers may send oil, natural gas and coal this way, they probably won't risk transporting assembled goods for the just-in-time manufacturing market through the Arctic any time soon," he says.

Both Dr Lanteigne and Mr Holland think China and Russia's actions are as much motivated by geopolitics and national security as they are by global trade.

Mr Holland says: "The Chinese are most interested in the Northern Sea Route, not to export goods, but to import them. China is particularly reliant on hydrocarbon shipments. It knows too that in a time of conflict, the US Navy could easily close the Strait of Malacca, which would strangle its economy."

But in peacetime, however fragile it may seem, Dr Lanteigne says it is the Russian-Chinese alliance calling the shots.

"The Russian government has also decreed that any shipper using the route must declare its intention to do so 45 days before passage, present a cargo manifest and allow a Russian observer on board," he says.

"Furthermore, because this sea route is within Russian waters, Russia is saying that under the UN Maritime Law of the Sea, it has exclusive rights to develop the area. America disputes Russia's claim and has referred to Russia's policy around the Northern Sea Route as illegitimate."

So who's right and who's wrong? Professor Andrew Serdy, a maritime law expert at the University of Southampton, says as the vast majority of the route is in Russian internal and territorial waters, international law is on Russia's side.

He explains: "The US argues that the Northern Sea Route is a series of straits used for international navigation. Contrary to other nations, the US also interprets the word 'used' to mean 'usable'. Therefore, it believes this means a different regime applies, one more favourable to navigation in the law of the sea. As this passage has not been utilised until now except under Russian control, though, it doesn't come under that special regime. Therefore, this gives Russia the right to control the Northern Sea Route as part of its own territory."

Whether America is prepared to let Russia and China continue to press home their advantage is another question. Over to you Donald.

Yuri Smityuk\TASS via Getty Images

The Kapitan Khlebnikov icebreaker in the Chukchi Sea, which lies between north-east Russia and Alaska

Commercial feature

Technology brings transparency in shipping

As transparency becomes a critical success factor for the shipping industry, technology will enable the operational and financial oversight needed to make the right decisions at the right time

Shipping is the lifeline of international trade and remains vital to the global economy. Despite the rapid technological evolutions transforming the business landscape in the last two decades, the relationship between shipping agencies, vessel owners, operators and charterers has changed very little in this time.

Firstly, that relationship is as important as it's ever been. Agents are crucial to looking after and protecting the interests of the principal and arranging services when vessels are in ports around the globe. Secondly, agents procure and source services on the principal's behalf, which can result in strained relations when transparency is lacking and information is not shared well.

The growing cost pressures on the shipping industry since the financial crisis have placed further strain on relationships. Agency fees have reduced, increasing the dependence on alternative revenue streams such as volume commissions or rebates from vendors. This has only served to make principals less trusting of agents, resulting in a desire to reduce their fee even further during the next negotiations.

"Vessel operators struggle to get a good overview of what's going on in the local port at any given time and rely on the agent to be their eyes and ears in the port. As such, critical business decisions are taken based on information provided by an agent," says Frank Olsen, chief executive of Inchcape Shipping Services.

"From a transactional point of view there is a historic lack of trust and it's exacerbated by the very nature of the business. The principal is a long way away from the port and relying entirely on the agent's ability, willingness and enthusiasm to communicate timely and accurately as the port call progresses.

"The main thing you need when your vessel is in port, and this has never changed, is information. You need to know what's happening at the various stages of the port call so you can make decisions to limit your costs, change your plans, save time or do other things to enhance your own and your customer's business. If you don't have transparency over the physical operation and financial process, you can't trust that process or improve your decision-making."

> **"You can see what's going on with your vessels in as much detail as you want, when you want and how you want**

Historically, the choice of an agent has been based on local reputation and relationships, rather than any global criteria. Over the last 20 years, however, governance and compliance have become more important to large shipping companies, with an agent's compliance with regulations often swaying selections. Agents with global scale may also be able to offer a better value proposition.

Though these layers of compliance and scale are becoming increasingly significant, it is technology that is set to drive the most differentiation among shipping agents as it provides principals with unprecedented transparency across their shipping activities. Inchcape is currently rolling out its industry-leading operating system Optic that captures all financial, time and events data from each port and allows owners to access the information in real time on their smartphone or tablet, in their enterprise resource planning system or via a web-based dashboard.

"You can see what's going on with your vessels in as much detail as you want, when you want and how you want, port call by port call, vessel by vessel or at a higher level of aggregation if you're only interested in certain elements across a wider fleet or in certain locations," says Mr Olsen. "It's a broadly real-time granularity of what's going on with your assets and your cargo at any particular moment in any particular geography."

By capturing data from more than 70,000 port calls worldwide each year, Inchcape is able to benchmark operations, costs and performance metrics to enable principals to optimise their fleet utilisation and reduce port related costs.

Inchcape also keeps an up-to-date database of all commercial port and berths through a system called World of Ports, providing companies with a comprehensive global port, terminal and berth marine assurance tool to aid the vessel-to-berth compatibility process. All ports and berths are geofenced and linked to AIS (automatic identification system) data. This provides visibility over vessel movements, port congestion and berth availability.

Combining the operational data from Optic with the World of Ports information enables ship operators to get a unique overview of ports, vessels and cargo status. This allows for better voyage planning and call optimisation.

"That will have huge implications on how fast your vessels steam to the next port or how much time is spent idling outside the port," says Mr Olsen. These are critical decisions both in terms of reducing emissions and improving voyage profitability.

Technology will no doubt underpin transparency in the future of shipping. Access to live information puts control and oversight in the hands of vessel operators, creating trust and closer collaboration with the port agent. Reducing costs will continue to be important in the shipping industry, so the ability to drive operational efficiencies through unprecedented access to information will be a major differentiator.

"We are deploying technology to provide the transparency which will create trust and partnership between the principal and agent," says Mr Olsen. "Phone calls and emails are no longer sufficient. You need to see it yourself, know what's going on and be able to interact on your terms based on the criteria that you set to make changes when they are needed."

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Royal Caribbean's Symphony of the Seas in Malaga

The deck of Symphony of the Seas

Royal Caribbean

CRUISE SHIPS

Megaship arms race only just beginning

Changing expectations and demographics of cruise passengers have fuelled demand for vast liners offering countless on-board experiences, and competition is starting to heat up

Felicia Jackson

A few feet short of the Empire State Building, Royal Caribbean's Symphony of the Seas is the world's tallest and largest cruise ship with 18 floors and room for more than 6,000 passengers. With 24 pools, the tallest water slide at sea at 10 storeys high, robot bartenders as well as activities such as zip-lining, ice-skating and rock-climbing, it's the latest salvo in the global cruise industry's campaign to win the hearts and minds of a rapidly expanding cruise market.

Increased demand from China and Africa is opening new markets; changing demographics mean the industry must attract younger customers; experience seekers are looking for new destinations; and the variety of on-board activities is exploding. The expansion in mega cruise ships is the most visible sign of the battle for passengers, driven by economies of scale and new technologies.

"Demand from consumers has exceeded supply," says Alastair Pritchard, head of Deloitte's Transportation, Hospitality & Leisure practice. "As new ships arrive we're likely to see a tipping point where cabin supply will exceed demand, so the market is going to get a lot more competitive."

Capacity growth is clearly underway, with 120 new cruise ships already committed with a pipeline out to 2027, with an investment value of around $65 billion.

James Brown, partner Haynes and Boone says: "there has certainly been an arms race to build bigger and more 'impressive' vessels and to refit vessels that may only be a few years old to ensure that they continue to appeal to consumers."

Silversea's Silver Spirit, for example, was cut in half in 2018 to add further capacity by way of a new, expanded midsection, making her the first luxury ship to be lengthened in this manner.

What matters for the global cruise industry is to find new passengers and get them on the right ship. According to IRN Research, nine out of ten of those taking a cruise will cruise again within 12 months. And so matching the right passenger to the right experience means they are very likely to book again.

Innovations in technology have ensured that passengers have an improved digital experience as well, such as MSC's own voice assistant Zoe, or upgrades to on-boarding, facial recognition, interactive screens, and app-based tools and navigation – all weapons being deployed in the battle for customers.

It's not just digital experiences that are being upgraded. While some lines offer the all-in-one multi-generational experience, there are other forms of experience to be explored. New players are entering the market with niche vessels and innovative concepts capable of shaking up the industry and fostering innovation, both in terms of technology and the overall cruising experience.

Richard Branson's Virgin Voyages is a fleet of ships designed with environmental responsibility in mind, while the Ritz Carlton Yacht Collection's new build, dubbed the "anti-cruise ship", is aimed at providing a more bespoke service.

Mr Brown says younger generations, such as generation Z, are "typically regarded as being 'experience focused' rather than 'acquisition focused', and the cruising industry has responded by offering experiences such as music festivals at sea to capture some of this part of the market".

The exploration section of the industry has not been immune to innovation too, with cruises offered to the Galápagos Islands, to view the Northern Lights, and even the Arctic. Scenic's Eclipse, for example, provides a nearly 1:1 staff ratio carrying just 200 guests into polar waters, with helicopters and submarines to explore.

> **We're likely to see a tipping point where cabin supply will exceed demand, so the market is going to get a lot more competitive**

Juha Koskela, managing director of ABB Marine and Ports, says: "Travellers who venture into remote destinations, such as the Arctic and Antarctica, are likely to be passionate that the environment is left unspoiled."

But this is an issue for traditional cruises too. Ports of call for the global cruise industry, including Amsterdam, Dubrovnik, Barcelona and, of course, Venice are calling for more control of the mega cruise ships polluting their waters.

It has been reported that the city of Venice has taken steps to direct the very largest cruise ships away from the main lagoon, directing the vessels to other terminals. While environmentalists see the global cruise industry as responsible for pollution, particularly the release of large quantities of sulphur dioxide, supporters argue that the industry is being proactive and even unfairly blamed. When a cruise ship delivers 4,000 visitors to a city that already has 50,000 it may not help, but it's not the cruise industry's sole responsibility.

There are technical solutions for these challenges, from apps assessing the busiest parts of the city, the staggering of arrival times, seeking new ports or building infrastructure for new ports, as well as liquefied petroleum gas fuel to minimise impacts on environment, even removing single use plastics.

"The harbours could be partially moved from the immediate proximity to cities," says Mr Koskela. "However, one of the key solutions here is the shore connection technology that can enable zero-emission port stays for cruise vessels."

The megaships are leading the charge in the global cruise industry, with MSC sailing 13 megaships, Royal Caribbean 10 and Carnival – through P&O, Princess and other brands – running multiple giant ships. Getting the customer pitch right, however, will be the key to long-term success.

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