The Global Maritime Issues Monitor 2018 takes a global look at some of the major issues that are likely to impact the global maritime industry. The report is based on the insight of senior maritime stakeholders from more than 50 countries, and their perceptions on the impact, likelihood, and preparedness on a number of issues potentially affecting the global maritime industry. The report also undertakes deep dives into the emerging trends in digitalization and decarbonization, which have forced the industry to re-examine some of the basic assumptions that have driven traditional risk conventions.

As a result, companies in this sector now need to look afresh at the issues facing the maritime industry. The articles contained in this publication examine some of these crucial issues and aim to provide critical insight into the challenges and opportunities facing maritime companies as they navigate through the profound transformation that is under way.

With the future of the maritime industry uncertain, maritime leaders may have the opportunity to, at least partially, shape it for themselves. Due to the systemic nature of changes the industry is or will likely be subject to, the case could be made for preemptive action and wider collaboration, through which a critical mass of industry actors can come together to sway the outcome in the industry’s favour. The Global Maritime Issues Monitor can in this perspective be seen as a modest contribution to this goal as it gives a partial account of what should be at the basis of any such attempt: a thorough understanding of the current state of affairs.

The Global Maritime Forum, Marsh and IUMI would like to thank those who participated in our survey. We dedicate our special thanks also to the various individuals who have kindly provided their perspective on our findings and whose comments complement our analysis of the results in all three sections of this report.
Foreword

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Global maritime issues map

Global economic crisis
Energy price fluctuations
Changing trading patterns
Geopolitical tension
Air pollution
Cost and availability of finances
Failure or shortfall in infrastructure
Major safety incident
Global economic crisis
Workforce and skill shortage
Terrorism
Transfer of invasive species
Pervasive corruption
Increased piracy
Governance failure
Man-made environmental disaster
Natural environmental disaster
Transfer of invasive species
Invasive corruption
Likelihood vs Preparedness vs Impact

Most prepared
Least prepared

Global Maritime Issues Monitor 2018
Many sectors are currently faced with disruption and the maritime industry is no exception. Emerging issues and opportunities are challenging norms and may be the catalysts that set a new path for the sector. As we enter a period of change, examination will prove a key tool for success, as understanding what issues and opportunities are on the horizon is a useful barometer for preparedness—both for individual players and for the sector as a whole against an evolving and increasingly disrupted global landscape. In this survey, we gained insight into what issues the sector deems most likely to have a significant impact over the next ten years, which issues would be most likely and, importantly, how prepared participants feel the sector is to deal with these issues.

**Economic issues dominate the maritime agenda**

The top three issues deemed to have the highest impact-potential on the maritime sector over the next ten years are 'global economic crisis' (1); 'energy price fluctuations' (2); and 'cyber-attack and data theft' (3). The top 10 list portrays an awareness of the impact of the modern world on the sector, with 'geopolitical tensions' (5), 'changing trading patterns' (4), and 'terrorism' (9) all making appearances. There are also signs of introspection, with 'workforce and skill shortages' (6) and 'cost and availability of finance' (7) ranking highly, but even these lend themselves to the overall impact of an evolving global landscape.

It is interesting to note that traditional environmental issues such as 'air pollution' (8), 'man-made environmental disaster' (11), 'natural environmental disasters' (14) and the 'transfer of invasive species' (15) are absent from the top of the list. Having said that, the issue of decarbonization, as shown in the separate deep dive on this topic, is high on the maritime agenda.

Global Maritime Issues Monitor 2018
The maritime industry does not feel prepared

The survey indicates that the respondents in general perceive the maritime industry to be relatively unprepared to deal with these issues. The highest preparedness score is 3.47 out of 5 and 13 of the 17 issues have a preparedness score of less than 3 - with 3 being the score given to an issue where the industry is perceived as neither prepared nor unprepared. It is also concerning to see that the issues deemed to potentially have the most significant impact on the sector are the ones they are least prepared for.

The issue that those surveyed feel least prepared for is ‘cyber-attacks and data theft’ (1), which is also the issue deemed most likely. Second to this is ‘global economic crisis’ (2), which is deemed the number one most impactful issue. Again, another issue that featured high in the likelihood and most impactful rankings but has a low preparedness ranking is ‘geopolitical tension’ (3). Respondents likewise consider the industry to be relatively unprepared for addressing ‘air pollution’ (4), which is also in the top five in terms of likelihood.

Impact and likelihood strongly correlated

The top three issues deemed most likely to occur within the next 10 years are ‘cyber-attacks and data theft’ (1), ‘energy price fluctuations’ (2) and ‘changing trading patterns’ (3). This top three is closely mirrored by the top most impactful issues, with the issues ranked first, second and third most likely, occupying the second, third, and fourth most impactful in varying order.

Generally speaking, the impact and likelihood of the issues seem to be correlated, with ‘workforce and skill shortages’ (6) ranking the same way on both scales; and both ‘geopolitical tension’ (4) and ‘terrorism’ (8) differing by only one rank on the respective scales. The issue that most significantly bucked this trend is ‘global economic crisis’.

This issue, ranked number one as most potentially impactful, is positioned at number ten in the likelihood rankings. ‘Air Pollution’ is another example with the issue being ranked on number eight in terms of impact, but number five in terms of likelihood.

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This issue, ranked number one as most potentially impactful, is positioned at number ten in the likelihood rankings. ‘Air Pollution’ is another example with the issue being ranked on number eight in terms of impact, but number five in terms of likelihood.
The issue deemed to have the highest likelihood of occurring in the next ten years is ‘cyber-attacks and data theft’. This is also the third-highest issue with regard to perceived impact (after ‘cyber-attacks and data theft’ is perceived to be the second most related to preparedness – a fact that compounds this issue for the maritime sector.

According to Marsh & McLennan Companies’ Global Risk Center Director Richard Smith-Bingham, a feeling of under-preparedness is ‘cyber-attacks and data theft’. This is a highly pervasive and problematic issue, with Gartner believing that, by 2020, 60% of all businesses with digital operations will have suffered major service failure related to digital issues. Furthermore, hacks are often not detected for several months from the time they occur. IBM has calculated that the mean time to identify a breach as 197 days, and the mean time to contain it a further 69 days. In monetary terms, IBM outlined that “companies that contained a breach in less than 30 days saved over US$1 million, compared to those that took more than 30 days to resolve the issue”.

The recent tribulations faced by A.P. Moller-Maersk – where the container shipping and logistics company was left reinsuring over 4,000 servers, 45,000 computers, and 2,500 applications after it was hit by the NotPetya ransomware attack – are likely to have put the maritime sector on even higher alert with regard to this issue.

In similar fashion, Chinese shipping and logistics company Cosco Shipping Lines was also hit with a ransomware attack, one year after the Maersk incident. While the firm managed to maintain stability in its business operation systems, its terminal at the Port of Long Beach in the US was impacted.

According to Lloyd’s Register CEO Alastair Marsh, “Facing this complex cyber threat landscape requires a shift in mindset. The maritime industry needs to take a more strategic approach to protecting critical assets and business drivers. I am aware that this is a challenge for the industry, especially when it is not entirely clear what they will be defending, and from whom.” He adds that “a good approach is to start by gaining a better understanding of the threats and the vulnerabilities to the wider supply chain. Once an organisation has sufficient knowledge, on who is likely to attack and what they will be targeting, they can then build a scalable security posture that can be continuously adapted to meet the changing threat landscape.”

It is worth noting that the sector can learn from the Maersk and Cosco incidents because both firms have been open about these breaches. Many cyber incidents are not reported publicly and this lack of transparency, in the maritime as well as in other sectors, is a hindrance in progress in tackling the issue.

GLOBAL ECONOMIC CRISIS

The issue deemed to have the greatest potential impact on seaborne trade over the next ten years is ‘global economic crisis’, which is also ranked as second to last in terms of preparedness. The perceived lack of preparedness to withstand a global economic crisis could be related to the different market conditions that the industry has been facing in recent years, which make it difficult to build up the financial resilience to withstand the impact should a crisis occur. In this regard the maritime industry differs from many other major industries, many of which have enjoyed good business conditions in recent years.

An interesting take on the apparent lack of preparedness comes from John Hoolqjapattara, CEO of Donlin LPG. He explains that because shipowners and operators are used to dealing with unforeseeable events, they develop an inherent agility that enable them to deal with crises effectively, even though which might be considered as unforeseeable. In his opinion the best protection against the unforeseen and unforeseeable in shipping, as in other businesses, is a strong balance sheet. The difference in the overall business climate could also help explain why the maritime industry has more focus on economic risk than other industries. According to the World Economic Forum’s Global Risks Report 2018, no economic issues featured in the top five global risks in terms of impact, which was dominated by environmental and technological issues. From 2008 to 2012 however, economic issues dominated the top five, with fiscal crises and asset price collapses as key concerns to the global pool of executives surveyed.

For the maritime sector, geopolitical tension – in both the east and west – is likely a reason why ‘global economic crisis’ is deemed to have the largest potential impact on seaborne trade over the next ten years, while concerns about trade patterns being disrupted by new protectionist measures could also be a cause for concern. It was noted that while ‘global economic crisis’ will have the greatest impact, the likelihood of this occurring was deemed to be relatively low with this issue barely making the top 10 most likely issues out of the 17 assessed.

ENERGY PRICE FLUCTUATIONS

It is no surprise that the issue of ‘energy price fluctuations’ is one of the top three issues measured by impact, given the historic symbiotic nature of energy price fluctuations and global economic crises. When it comes to the industry’s perceived preparedness, however, the issue seems to fare significantly better than ‘global economic crisis’, being the issue ranked in tenth place in terms of preparedness.

In addition, around 40% of world seaborne trade – more than 4 billion tons in 2016 – is related to the transportation of energy commodities, whether in the form of oil, coal or gas. This means that energy price fluctuations can have a direct impact on both trade flows and trade volumes. To add to this, Marsh & McLennan Companies’ Richard Smith-Bingham highlights that the maritime industry is particularly susceptible to oil price fluctuations, for both logistical and geopolitical reasons. “Given the high share of fuel to running costs and challenges in passing price rises to cargo customers, the maritime industry is more inherently exposed..."
than many other industries to geopolitically driven oil price fluctuations – notwithstanding hedging opportunities.”

The general feeling among participants in the survey is that there is a strong likelihood that energy price fluctuations will occur, with the issue deemed second in the rankings. This view may be influenced by some of the changing dynamics the energy sector is currently seeing.

One of these important factors is the rise in US exports of energy, which could see the country become a net exporter of energy within the next few years. This is a significant development that could alter global energy trade patterns. Additionally, geopolitical events such as the recent reintroduction of US sanctions on Iran and new or renewed conflicts in energy-producing regions could also significantly impact energy prices and trade flows.

At the same time, reaching the goals in the Paris Agreement on climate change will require significant reductions in global carbon emissions, which would have a profound impact on the future energy mix. There is, however, a great deal of uncertainty regarding the precise effects of this energy transition and how quickly it will occur, since it is both dependent on political decisions and the development of the necessary technologies.

**Changing Trading Patterns**

Around 90% of global trade by volume is carried on ships, which makes it only natural that ‘changing trading patterns’ is ranked high as an issue that is potentially very important for the maritime industry. It does, however, receive the third best preparedness score, indicating that maritime stakeholders are aware of the changes underway.

One of the drivers of changing trade patterns is the continued rise in importance of emerging economies, not least in Asia, which is fueled by broader demographic and economic trends, and supported by significant investments in infrastructure such as those being embarked on in the context of China’s trillion-dollar undertaking, Belt & Road Initiative (BRI).

The only constant is change

The issues Monitor gives an overview of the global risk landscape facing the maritime industry today as ranked by stakeholders from within the broader maritime sector. “Cyber-attacks and data theft” is the issue that has proved to be the most pressing for the maritime industry, showing a keen awareness of the impact of digital technologies, which is explored further in the next chapter, a deep dive on digitalization.

Furthermore, looking at the other top issues, there seems to be a leaning towards economic risk factors, such as ‘global economic crisis’, ‘energy price fluctuations’, and ‘changing trading patterns’. This sets the maritime industry apart from other industries which currently seem less concerned about economic risk. This could be due to the continued difficult business conditions in shipping. Another interpretation, however, could be that the maritime industry is the global economy’s equivalent to a canary in the coal mine, picking up signs of economic risks before they hit the wider economy.

Typical environmental concerns such as ‘air pollution’ and natural or man-made environmental disasters are relatively low on the maritime agenda. This should not be seen as a lack of awareness of global environmental concerns, especially related to climate change, as the deep dive on decarbonization lays out in a later chapter. Another key finding of the survey is that the maritime industry in general considers itself quite unprepared to deal with many of the issues surveyed. From an optimist’s point of view this could be interpreted as a clear sign that the maritime industry has become aware of the risks facing them and is ready to take the necessary steps to address them either through individual or collective actions. Whether this is indeed the case is something that future editions of the Global Maritime Issues Monitor will help shed light on as they track developments in the perceived levels of preparedness.

In addition, future editions of the Issues Monitor might be expanded to include new issues that are arising on the maritime agenda. Industry stakeholders have already pointed to ‘diversity in the workforce’ and ‘ship recycling’ as issues that could be relevant to include in a future survey. But it could also be other issues that seem to arise out of the blue, such as issues that seem to arise out of the blue, since in the maritime world – to paraphrase the philosopher Heraclitus – the only constant is change.
waves of digital transformation

Deep dive on digitalization

The issue we are least prepared for

The issue that we perceive as most likely

The issue that we perceive as most impactful

Global Maritime Issues Monitor 2018

Global Maritime Forum | Marsh | IUMI
Deep dive on digitalization

Global Maritime Issues Monitor 2018
Deep dive on digitalization

Digital technology can be a significant enabler of growth and innovation, though its power is not only to enhance, but also to disrupt. With the exponential digitalisation of our world, it should come as no surprise that digital disruption is one of the burning issues all parts of society are faced with.

The sphere of global seaborne trade is no exception. The maritime industry is looking for ways to apply new digital technologies to conventional and new business models and making headlines with announcements of maritime companies partnering up with tech firms. But, along with its transformative power, digitalisation has also brought its own risks. ‘Cyber-attacks and data theft’ ranks high among global risks in virtually every sector, and as we have seen in the previous section of this report, it is one of the biggest concerns for the maritime industry as well. Technology companies, such as Amazon, Google, Uber, Airbnb, etc., have disrupted many traditional industries by introducing new business models, this assumption could also explain why less importance was accorded to ‘artificial intelligence’ and ‘autonomous technology and robotics’. These are digital technologies where concrete applications in maritime are mostly still in the development phase, which makes them less likely to have a significant impact on global seaborne trade over the next ten years.

This analysis of the situation seems to be confirmed by various stakeholders from the industry.

Christopher Rex, Head of Innovation at Danish Ship Finance, concurs: “The application of big data, Internet of Things and blockchain technology is clearly on its way to upgrade some parts of our daily operation and decision-making process.”

For autonomous technology and AI, he states that they will have a significant impact on the industry, but only in the longer term. Lasse Kristoffersen, CEO of Torvald Klaveness agrees with the high importance of ‘big data’ indicated by our results, with one significant caveat: “I believe that the real value of big data will only be captured in combination with artificial intelligence.” To this he adds that, “over a 15-20-year horizon, artificial intelligence will be the most important technology to create and capture new value.”

Finally, ‘3D printing’, the last digital technology included in the survey, received the lowest impact and likelihood rating, while also figuring among the top three issues the industry feels unprepared to face. Whether barriers to entry into the maritime industry are simply too big or the profit margins too low to attract new entrants, or whether key maritime stakeholders are not sufficiently informed on the potential risks involved, is a matter that merits further exploration.

Richard Smith-Bingham of Marsh & McLennan Companies considers this risk more likely than our results seem to indicate. He suggests that disruption may arise due to “the competitive threat to existing shipping firms facing competition from technology giants that see opportunities in owning more of the delivery value chain, especially the most lucrative parts, and have the data analytical skills, as well as the capital, for market entry.”

No danger of external disruption?

Given the growing influence of data-based companies and the increasing power of data in our society, some might consider our findings regarding ‘increasing influence of non-maritime disruptors’ surprising. The issue was ranked number six out of eight in both impact and likelihood, placing higher only than ‘3D printing’. It is also the issue for which the maritime industry feels the least prepared. Whether barriers to entry into the maritime industry are simply too big or the profit margins too low to attract new entrants, or whether key maritime stakeholders are not sufficiently informed on the potential risks involved, is a matter that merits further exploration.
This view is supported by Christopher Rex, who cautions: “We may soon need to rethink our business models, change our strategic outlook and change the way we earn our money.” He believes that the industry is focusing too heavily on potential shifts in power that result from the merger and acquisition of vessels and overlooking the changes that might arise through the introduction of trading platforms: “Consider a future where the access to customers has been consolidated between a few trading platforms, from which most cargo volumes are fixed. The ownership of the fleet will in this scenario become less important.”

Towards a future of profound change

While this deep dive on Digitalisation has focused primarily on a 10-year horizon and shown that the industry has the opportunity to harness the power of digital technologies in the near future, it is equally important to consider possible long-term scenarios. While there may be increased uncertainty surrounding the more distant future, it is important to consider them now, as later may be too late.

Looking beyond the scope of the maritime industry alone, Ian Goldin, Director of the Oxford Martin Programme on Technological and Economic Change at Oxford University, believes that artificial intelligence and robotics, as well as 3D printing will have an important role to play in the future of the maritime industry: “They will lead to a dematerialisation of economies, localisation of production and massive disruption to job markets and subsequently on economies and politics”.

Christopher Rex echoes Ian Goldin’s comments, but considers it likely that these shifts will start unfolding over the next 10 years: “The introduction of new technologies will change the outlook for seaborne demand by enabling more local or regional production, lower the labour market outlook in emerging markets, reduce inefficiencies in global supply chains, reduce the energy intensity of the global economy and eventually reduce the trade impact per dollar growth.” If these profound changes truly come to pass, they will entail a systemic transformation of the maritime business model.

DEEP DIVE ON DIGITALIZATION

Ranking of issues for impact, likelihood and preparedness

What impact do you think the following issues will have on seaborne trade over the next 10 years?

<table>
<thead>
<tr>
<th>RANK</th>
<th>ISSUE</th>
<th>IMPACT</th>
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<tbody>
<tr>
<td>1</td>
<td>Big data</td>
<td>3.59</td>
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<tr>
<td>2</td>
<td>Blockchain technology</td>
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<tr>
<td>3</td>
<td>Internet of Things</td>
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<tr>
<td>4</td>
<td>Artificial intelligence</td>
<td>3.28</td>
</tr>
<tr>
<td>5</td>
<td>Autonomous technology and robotics</td>
<td>3.25</td>
</tr>
<tr>
<td>6</td>
<td>Increasing influence of non-maritime disruptors</td>
<td>3.20</td>
</tr>
<tr>
<td>7</td>
<td>3D printing</td>
<td>2.68</td>
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What likelihood of the following issues occurring within the next 10 years?

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<th>RANK</th>
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<tr>
<td>1</td>
<td>Big data</td>
<td>3.54</td>
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<tr>
<td>2</td>
<td>Blockchain technology</td>
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</tr>
<tr>
<td>3</td>
<td>Internet of Things</td>
<td>3.45</td>
</tr>
<tr>
<td>4</td>
<td>Autonomous technology and robotics</td>
<td>3.43</td>
</tr>
<tr>
<td>5</td>
<td>Artificial intelligence</td>
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</tr>
<tr>
<td>6</td>
<td>Increasing influence of non-maritime disruptors</td>
<td>2.98</td>
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<tr>
<td>7</td>
<td>3D printing</td>
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How prepared is the maritime industry to deal with the following issues?

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<thead>
<tr>
<th>RANK</th>
<th>ISSUE</th>
<th>PREPAREDNESS</th>
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<tbody>
<tr>
<td>1</td>
<td>Increasing influence of non-maritime disruptors</td>
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<tr>
<td>2</td>
<td>Artificial intelligence</td>
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<tr>
<td>3</td>
<td>3D printing</td>
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<tr>
<td>4</td>
<td>Autonomous technology and robotics</td>
<td>2.20</td>
</tr>
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<td>5</td>
<td>Blockchain technology</td>
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</tr>
<tr>
<td>6</td>
<td>Big data</td>
<td>2.18</td>
</tr>
<tr>
<td>7</td>
<td>Internet of Things</td>
<td>2.18</td>
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See Glossary of terms at page 23
A journey into uncharted Waters

Deep dive on decarbonization

Global Maritime Issues Monitor 2018

Impact vs Likelihood vs Preparedness
The maritime industry is responsible for the transportation of approximately 90% of global trade while emitting approximately 2.5% of global greenhouse gas (GHG) emissions annually. It has long been recognised as the most cost-effective and energy efficient mode of transport. However, as other sectors decarbonize and trade continues to grow at a steady clip, shipping’s share of global GHG emissions will continue to disproportionately increase, and the maritime industry’s role in addressing climate concerns thus cannot be overlooked.

In April 2018, International Maritime Organization (IMO) member states adopted an initial climate change strategy, under which international shipping must reduce its GHG emissions by at least 50% by 2050. This constitutes a crucial step on the long road towards more climate-friendly seaborne trade, and, as this section of the Global Maritime Issues Monitor 2018 shows, many challenges are yet to be met and overcome.

The IMO identifies four major pathways towards emissions reductions: improvements in energy efficiency, renewable sources of energy, fuels with lower carbon content and technologies to remove emissions released during operations. If the maritime industry is to deliver on the goal of reducing GHG emissions, it must reduce its GHG emissions by at least 50% by 2050. This pathway towards decarbonizing the maritime sector is dedicated. The survey reveals that the maritime industry deems ‘energy efficiency’ and ‘emissions reduction technologies and strategies’ as those issues to have the biggest impact on the sector over the next ten years. Exactly which emissions reduction strategy to choose, however, seems to be uncertain. This lack of certainty could also help explain why the industry considers its general level of preparedness to deal with decarbonization-related issues to be quite low, with the notable exception of the immediately executable actions of improving energy efficiency and adopting slow steaming.

Reducing GHG emissions: which pathway?

Improving the energy efficiency of vessels and deciding on a strategy to reduce GHG emissions are two very important first steps on the path towards decarbonizing the maritime sector. It should therefore come as no surprise that ‘energy efficiency’ and ‘choice of emissions reduction technologies and strategies’ are the two issues maritime leaders ranked as most impactful and most likely to influence the sector in the next 10 years.

‘Energy efficiency’ was also among the issues with the best preparedness score, which could reflect the fact that the industry has been working on improving energy efficiency for a number of years and is preparing for the implementation of the necessary measures in this field. This seems to be confirmed by our results on ‘slow steaming’, which received the best preparedness score of the section. The ‘choice of emissions reduction technologies and strategies’, on the other hand, is an issue which the industry feels less prepared to take charge of. This could be explained by the fact that none of the competing technologies to non-fossil fuels are currently seen as sufficiently mature or cost-effective.

Adapting to a changing regulatory landscape

When it comes to issues over which the maritime industry does not have direct control, they seem to score relatively high on the impact and likelihood scale. ‘Regulatory uncertainty’ and ‘consequences of climate change to maritime operations’ placed at number 3 and 5 on the impact scale, and 4 and 3 on the likelihood scale, respectively. For both these issues, the industry feels neither prepared nor unprepared.

In response to this result, Hideaki Saito, Chair of the IMO Marine Environment Protection Committee, referred to the IMO’s initial GHG strategy as a “landmark achievement” but noted that the exact measures to support the 2050 goal, as well as frameworks for implementation, are not yet fully decided upon. The process is therefore still ongoing, which could explain why the area of regulation appears uncertain to maritime leaders. Nevertheless, Mr Saito emphasises: “I am confident that the IMO will develop robust international measures to effectively reduce GHG emissions in cooperation with broad stakeholders, and clearly reveal how much GHG emissions reduction has been achieved.”

He is, however, also aware of potential pitfalls on the path ahead: “In order to secure effectiveness in GHG emissions reduction as well as a level playing field in international shipping, which plays an important role in the global market, it is crucial to secure international integrity under IMO’s framework in developing and implementing any measures.” In this context, he warns that unilateral regulatory measures could have a detrimental effect on the sustainable development of shipping.

Addressing the issue of climate change and its consequences to maritime operations, on the other hand, is an even more complex challenge. According to Ian Goldin, climate change “will lead to more...
intense storms, disrupt many ports, and over time lead to ocean rise which is likely to disrupt many ports and perhaps require over time very significant investments in new facilities. It will also change economic competitiveness and trade”. Because of these vast but unpredictable impacts of climate change, this risk might prove difficult to manage.

Finally, ‘navigation of arctic routes’ ranked as the issue with the lowest perceived impact over the next 10 years. This could be due to the continued uncertainty about if and when arctic waters will be readily open for navigation, as well as due to arctic routes’ relevance mainly for trade between specific locations in the northern hemisphere. The industry seems to be well informed of these facts, since the issue received the third best preparedness score of the section.

A look beyond the Global Maritime Issues Monitor

While this deep dive addresses many of the crucial decarbonization issues on the maritime agenda, it does not presume to offer an entirely comprehensive overview of this wide and far-reaching topic. With this in mind, Jan Dieleman, offers an interesting perspective on where the issues Monitor might have overlooked. He states that “the challenge is the sense of urgency to act now and innovate today to accelerate the production and uptake of zero-carbon fuels and technologies to deliver zero-emission vessels in 2030”. He adds that for the industry to increase its preparedness for climate-related risks, it will need to understand and raise awareness of these issues, collaborate and co-create with all stakeholders across the value chain, and demonstrate the business opportunity in taking voluntary leadership action and innovation.

Additionally, Jan Dieleman sees carbon pricing as an important issue as it could bring companies to reduce their GHG emissions: “We are concerned by how the industry might attract outside innovation to develop emissions reduction technologies. Potentially a carbon pricing initiative could incentivise this”.

The challenge ahead

The results of our survey, presented in this year’s Global Maritime Issues Monitor, have revealed to some extent the risks and issues that are placed high on the maritime agenda and how well prepared the industry deems itself to face them. This information allows for the identification of some key areas that need priority action. At the same time, our results, while providing answers to some questions, raise many new ones that it will be challenging to answer.

If we look into the future, it is Ian Goldin’s view that “the industry’s contribution to climate change, although small, will come under growing scrutiny and require over time very significant investments in lower carbon propulsion and the scrapping or heavy taxation of ships that depend on carbon intensive – as well as SOx and NOx – fuels”. Alastair Mars, in turn, is confident that the industry is aware of the scale of this difficult task ahead. However, he states that “the challenge is a sense to develop a new finance.”

What impact do you think the following issues will have on seaborne trade over the next 10 years?

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<tr>
<th>Rank</th>
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<tbody>
<tr>
<td>1</td>
<td>Energy efficiency</td>
<td>3.54</td>
</tr>
<tr>
<td>2</td>
<td>Choice of emission reduction technologies and strategies</td>
<td>3.49</td>
</tr>
<tr>
<td>3</td>
<td>Regulatory uncertainty</td>
<td>3.33</td>
</tr>
<tr>
<td>4</td>
<td>Non-fossil fuels</td>
<td>3.25</td>
</tr>
<tr>
<td>5</td>
<td>Consequences of climate change to maritime operations</td>
<td>3.23</td>
</tr>
<tr>
<td>6</td>
<td>Slow steaming</td>
<td>3.08</td>
</tr>
<tr>
<td>7</td>
<td>Alternative propulsion technologies</td>
<td>2.85</td>
</tr>
<tr>
<td>8</td>
<td>Navigation of arctic routes</td>
<td>2.60</td>
</tr>
</tbody>
</table>

What likelihood is the following issues occurring within the next 10 years?

<table>
<thead>
<tr>
<th>Rank</th>
<th>Issue</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Non-fossil fuels</td>
<td>Very likely</td>
</tr>
<tr>
<td>2</td>
<td>Consequences of climate change to maritime operations</td>
<td>Likely</td>
</tr>
<tr>
<td>3</td>
<td>Alternative propulsion technologies</td>
<td>Moderate</td>
</tr>
<tr>
<td>4</td>
<td>Regulatory uncertainty</td>
<td>Minimal</td>
</tr>
<tr>
<td>5</td>
<td>Choice of emission reduction technologies and strategies</td>
<td>Minimal</td>
</tr>
<tr>
<td>6</td>
<td>Non-fossil fuels</td>
<td>Likely</td>
</tr>
<tr>
<td>7</td>
<td>Navigation of arctic routes</td>
<td>Unlikely</td>
</tr>
<tr>
<td>8</td>
<td>Slow steaming</td>
<td>Insufficient</td>
</tr>
</tbody>
</table>

How prepared is the maritime industry to deal with the following issues?

<table>
<thead>
<tr>
<th>Rank</th>
<th>Issue</th>
<th>Preparedness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Non-fossil fuels</td>
<td>Very prepared</td>
</tr>
<tr>
<td>2</td>
<td>Consequences of climate change to maritime operations</td>
<td>Prepared</td>
</tr>
<tr>
<td>3</td>
<td>Alternative propulsion technologies</td>
<td>Prepared</td>
</tr>
<tr>
<td>4</td>
<td>Regulatory uncertainty</td>
<td>Prepared</td>
</tr>
<tr>
<td>5</td>
<td>Choice of emission reduction technologies and strategies</td>
<td>Prepared</td>
</tr>
<tr>
<td>6</td>
<td>Non-fossil fuels</td>
<td>Prepared</td>
</tr>
<tr>
<td>7</td>
<td>Navigation of arctic routes</td>
<td>Unprepared</td>
</tr>
<tr>
<td>8</td>
<td>Slow steaming</td>
<td>Unprepared</td>
</tr>
</tbody>
</table>

Global Maritime Issues Monitor 2018
Methodology

The Global Maritime Issues Monitor 2018 is based on an annual survey, which this year was conducted from 8 May to 15 June 2018. The survey questionnaire was completed by senior maritime stakeholders from the Global Maritime Forum and Marsh’s multi-stakeholder networks. The survey sample was made up of board members, c-suite and functional decision makers from the private sector, alongside government and civil society representatives. The sample represents a diverse network of maritime stakeholders from 52 countries.

The survey questionnaire asked respondents to rank a series of global maritime issues on their potential impact to seaborne trade, the likelihood of different events occurring over the next 10 years and the maritime industry’s preparedness for these events. The survey questionnaire looked at 17 general maritime issues and sought to understand specific priorities in digitalization and decarbonization, with two deep dives containing seven and eight issues in each respective field.

The responses from the survey were coded numerically to allow for comparisons. Arithmetic mean scores were calculated for each of the issues and were used to rank the issues in terms of likelihood, impact and preparedness. Relevant stakeholders have been asked to comment on the survey findings to contextualise the data used in the Issues Monitor. The results of the survey were used to produce impact vs. likelihood vs. preparedness charts and provide supplementary evidence used throughout the Global Maritime Issues Monitor.
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What country is your organization headquartered in?

- 17% North America
- 52% Europe
- 19% Asia
- 7% Australia/Oceania
- 3% South America
- 2% Africa

Which role best describes your current position?

- 36% Chief Executive
- 32% Functional
- 18% Other
- 9% Board Member
- 5% Government
- 8% Corporate Services
- 5% Charterer, Freight Forwarder, and Shipping Customers
- 10% Ship Owner/Operator
- 9% Port/Terminal Infrastructures
- 11% Opinion Leaders
- 18% Maritime Services

Global Maritime Issues Monitor 2018

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GLOSSARY OF TERMS

Global issues

Air pollution
For example: the emission of SOx and NOx from ships and the consequences for human health and the environment.

Energy price fluctuations
Fluctuation in energy prices leading to economic pressure or uncertainty for the maritime industry.

Governance failure
Inability of regional or global institutions to resolve issues of economic, geopolitical, or environmental importance.

Pervasive corruption
Corruption that is so pervasive that it is accepted as the way to do business.

Terrorism
The development of systems able to perform tasks normally requiring human intelligence, for example: applications that reduce fuel consumption.

Blockchain technology
Utilising open-source peer-to-peer software which is totally decentralised and the management of all transactions takes place collectively by the network.

Governance failure
Inability of regional or global institutions to resolve issues of economic, geopolitical, or environmental importance.

Cost and availability of finance
Increase in the cost of finance to maritime businesses influenced by availability, security, credit, and rating.

Shortages in maritime workforce
In the absence of growth for the maritime industry.

Cyber-attacks and data theft
An attempt by hackers to damage and the exploitation of private or official data.

Energy price fluctuations
Fluctuation in energy prices leading to economic pressure or uncertainty for the maritime industry.

Failure or shortfall in infrastructure
Failure to adequately invest in, upgrade, and/or secure transportation infrastructure, leading to loss of economic activity, pressure, or a breakdown with system-wide implications.

Political tension
A bilateral or multilateral dispute between states that escalates to economic (for example: trade/currency wars, resource nationalisation) military, cyber, societal, or other conflict.

Geopolitical tension
A bilateral or multilateral dispute between states that escalates to economic (for example: trade/currency wars, resource nationalisation) military, cyber, societal, or other conflict.

Global economic crisis
A significant downturn in the global economy resulting in a lack of growth for the maritime industry.

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Governance failure
Inability of regional or global institutions to resolve issues of economic, geopolitical, or environmental importance.

Increased piracy
An increase in the practice of attacking and robbing maritime businesses at sea or on land.

Major safety incident
Any occurrence that is associated with the operation of a ship and affects, or could affect, human health.

Man-made environmental disaster
A catastrophic event regarding the environment due to human activity, pressure, or a breakdown with system-wide implications.

Natural environmental disaster
A catastrophic event regarding the environment due to human activity, pressure, or a breakdown with system-wide implications.

Risk of damage to maritime operations
For example: increased risk of damage to maritime infrastructure, navigational hazards, etc.

Consequences of climate change to maritime operations
For example: increased risk of damage to maritime infrastructure, navigational hazards, etc.

Conflict of climate change to maritime operations
For example: increased risk of damage to maritime infrastructure, navigational hazards, etc.

Decarbonization

Alternative propulsion technologies
The outlook for electric and hybrid vessels, winch assistance, etc.

Choice of emission reduction technologies and strategies
Uncertainty on the maturity and competitiveness of different potential emission reduction technologies and strategies.

Blockchain technology
Utilising open-source peer-to-peer software which is totally decentralised and the management of all transactions takes place collectively by the network.

Consequences of climate change to maritime operations
For example: increased risk of damage to maritime infrastructure, navigational hazards, etc.

Energy efficiency
The role of measures (design/operations/technologies) to reduce energy consumption.

Slow steering
The role of slow steaming as a measure to reduce energy consumption.

Global Maritime Issues Monitor 2018

Digitalization

3D printing
The process of printing a three-dimensional object.

Artificial intelligence
The development of systems able to perform tasks normally requiring human intelligence, for example: applications that reduce fuel consumption.

Transfer of invasive species
The transfer of non-indigenous species from one region to another through a ship’s ballast water tanks, leading to invasiveness and environmental problems.

Workforce and skill shortages
Shortages in maritime workforce size, type, skill, and experience.

Blockchain technology
Utilising open-source peer-to-peer software which is totally decentralised and the management of all transactions takes place collectively by the network.

Consequences of climate change to maritime operations
For example: increased risk of damage to maritime infrastructure, navigational hazards, etc.

Energy efficiency
The role of measures (design/operations/technologies) to reduce energy consumption.

Slow steering
The role of slow steaming as a measure to reduce energy consumption.
The creation of the Global Maritime Issues Survey 2018 is due to a close collaboration between three partners. We would like to thank:

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