



Global Maritime

Issues Monitor

2019



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Global Maritime Issues Monitor

2019



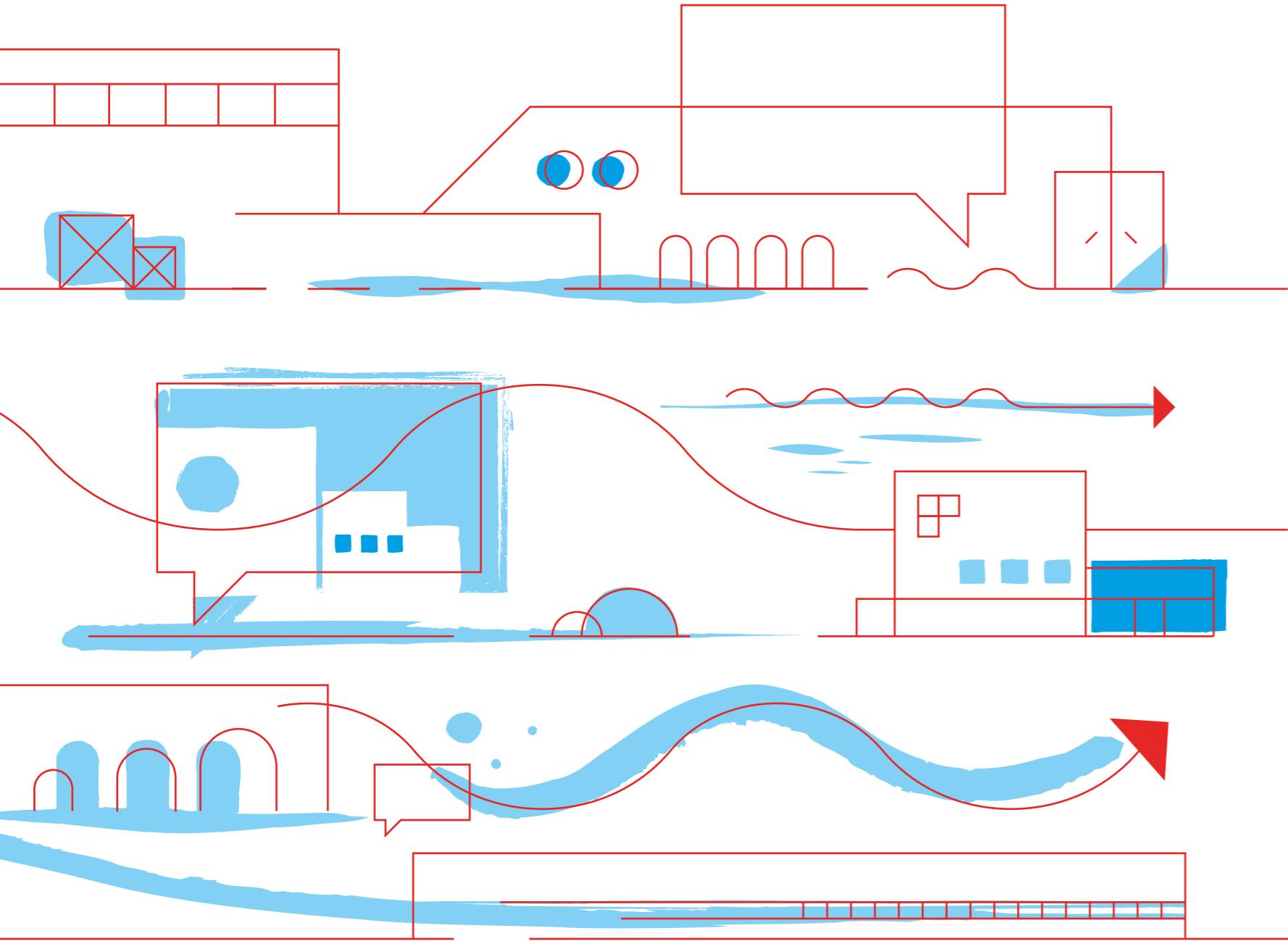
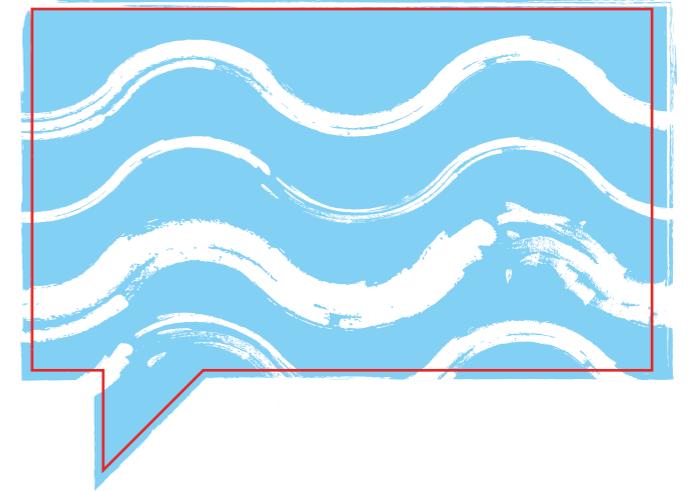


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Critical issues facing the maritime industry

Foreword

Welcome to the **Global Maritime Issues Monitor 2019**. Based on a survey of senior maritime stakeholders from 48 countries and commentary from more than a dozen industry leaders and experts, this report looks at some of the critical issues facing the maritime industry.

In this, the second annual *Global Maritime Issues Monitor*, it's interesting to look at where perceptions have changed in the year since our inaugural survey. Once again, we asked maritime leaders to share their views on the important issues of the day. Which events are most likely to occur? What have the most important developments in the industry over the past 12 months unfolded?

We added some topical issues for our respondents to react to this year. One that was the most concerning was the environment and climate change. These issues were the most prominent, scoring even higher than last year in terms of likelihood and importance. This was no doubt driven in part by another year in which the news seemed to be dominated by reports of record high temperatures, scientific research highlighting increased species extinctions, and discord among individuals, organizations, and countries over how to respond.

The 2019 survey also identified the top global issues identified by survey respondents. We also undertook deep dives into the themes of "Workforce of the Future," and "Getting to Zero," in which we look at issues ranging from gender diversity in the workforce to zero-carbon fuels.

We hope you enjoy the *Global Maritime Issues Monitor 2019*, and that it stimulates conversation in your organization about the issues facing the industry.

The Global Maritime Forum, Maritime Speed of Change, and IUM would like to thank the individuals who participated in this survey and provided their valuable insights. We also thank the individuals who have kindly provided their perspectives on our findings, whose names are listed in the appendix. Finally, we thank all the individuals who have helped us in the production of this report.

Peter Stokes
Chairman

Global Maritime Forum

Marcus Baker
Global Head Maritime & Cargo

Maritime JLT Strategy

Richard Turner
President

IUM

Foreword

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In this, the second annual *Global Maritime Issues Monitor*, it's interesting to look at where perceptions have changed in the year since our inaugural survey. Once again, we asked maritime leaders to share their views on the important issues of the day. Which events are most likely to occur? Which would have the most impact? How prepared is the industry should such events unfold?

We added some additional issues for our respondents to react to this year. One result was that concerns about the environment and climate change rose in prominence, scoring even higher than last year in terms of likelihood and impact. This was no doubt driven by another year in which the news seemed to produce constant reports of record high temperatures, scientific tracts heralding increased species extinctions, and discord among individuals, organizations, and countries over how to respond.

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Peter Stokes
Chairman

[Global Maritime Forum](#)



Marcus Baker
Global Head Marine and Cargo

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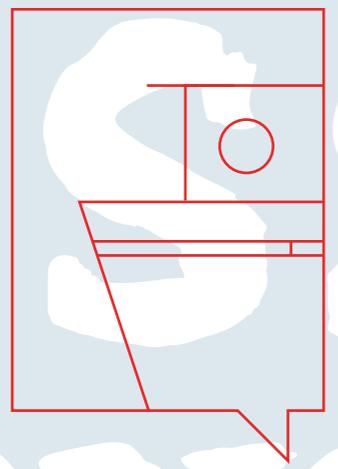
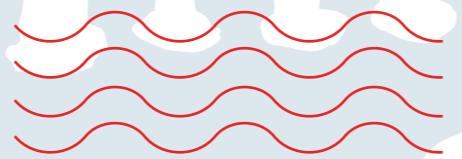


Richard Turner
President

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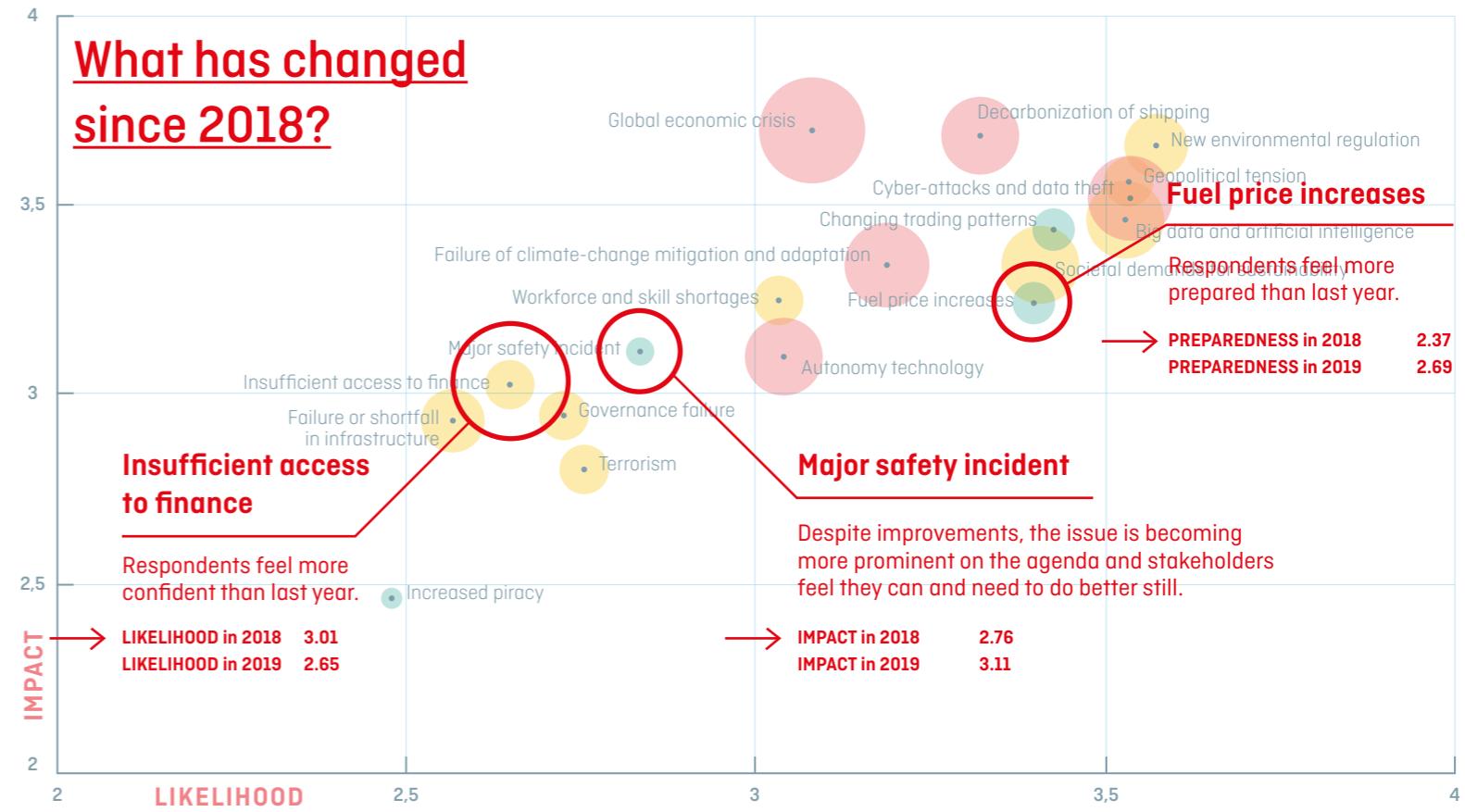
Global maritime issues overview



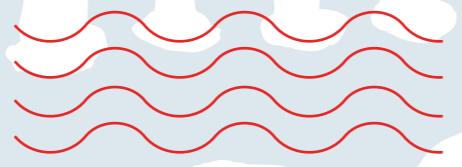
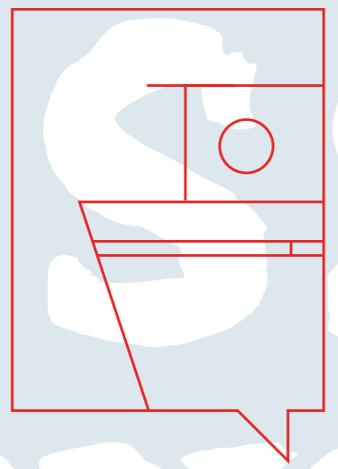
Global maritime issues map



IMPACT vs LIKELIHOOD vs PREPAREDNESS



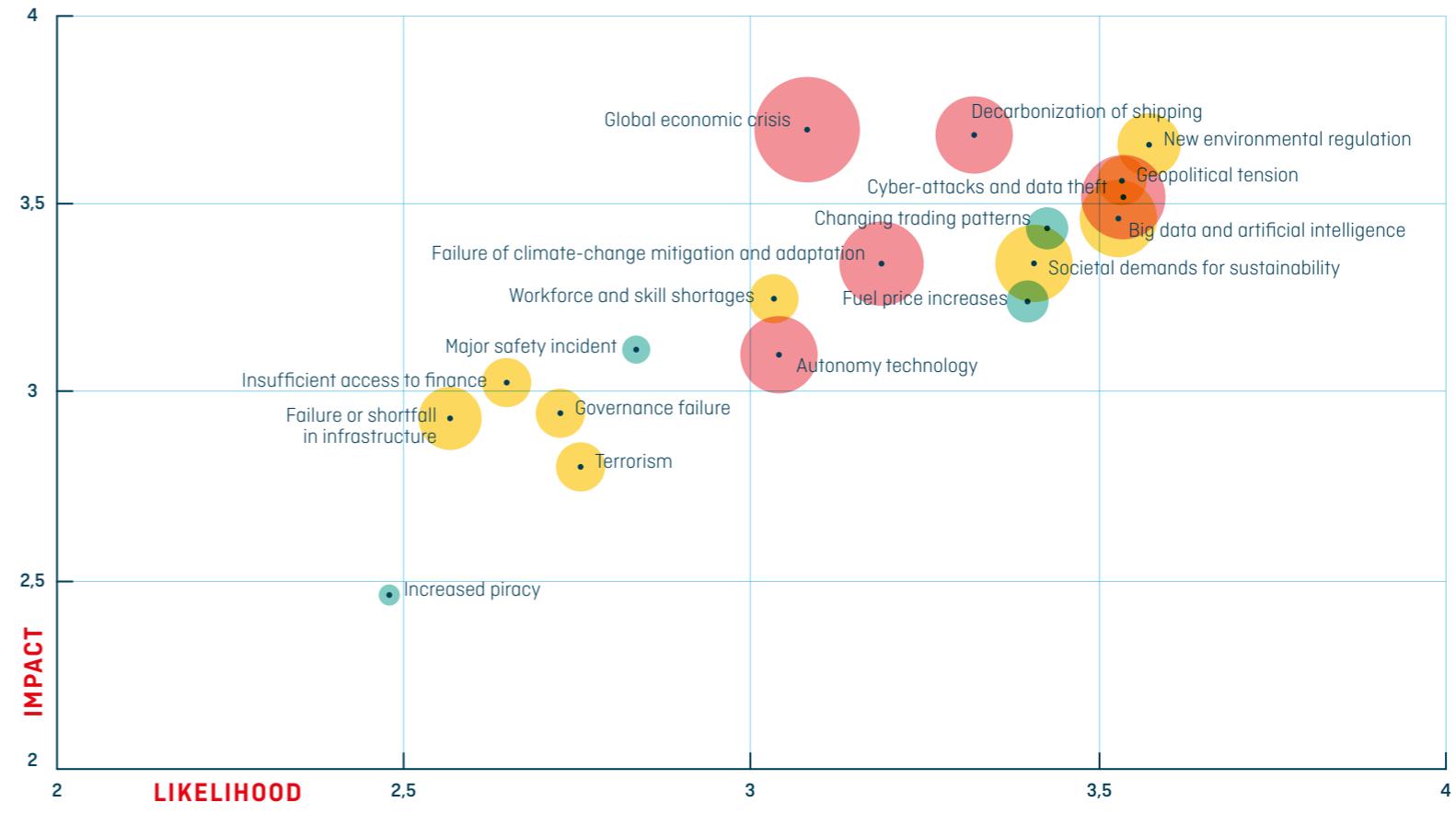
Global maritime issues overview



Global maritime issues map



IMPACT vs LIKELIHOOD vs PREPAREDNESS



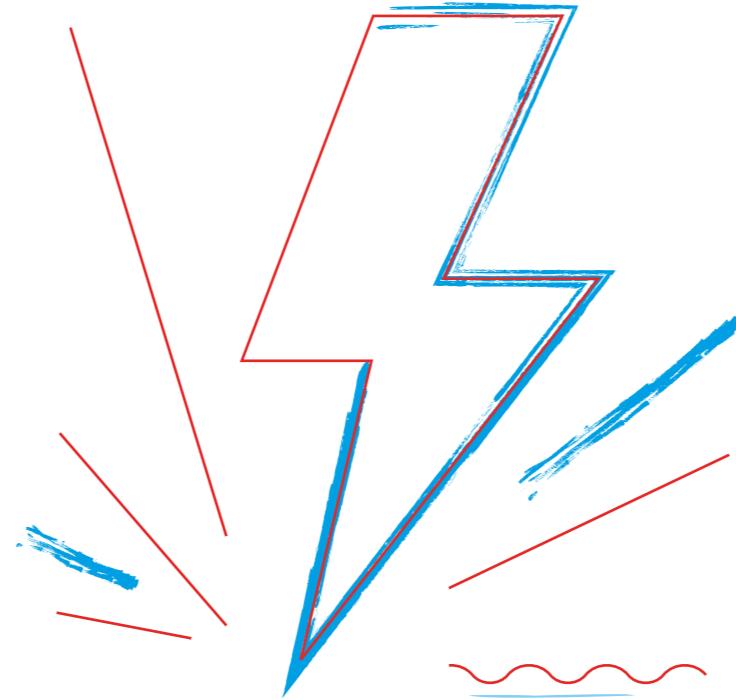
Global maritime issues

With ships that ply all the world’s waters and ports on every coast, the maritime industry is truly global in nature. So it’s to be expected that the issues at the top of mind for global business and political leaders are also top of mind for those in the maritime sector.

This year, our survey respondents cite issues related to global economies, geopolitics, cyber-attacks, and the environment as being particularly pressing. Embedded in these emerging issues are the risks and opportunities from which the sector will set its course.

One key to navigating the right path is to keep an eye on the horizon. It’s important to know what is immediately in front of you, and it’s just as critical to understand the issues that may be around the bend. What is disruptive now may well be the norm in 10 years, when new issues will certainly have arisen.

The survey and analysis presented in this report provide insight on a number of issues, including those deemed by respondents as the most likely to arise in the coming decade and that hold the potential for a high impact. It also looks at how well prepared the sector is to meet the challenges.



Potential impact of environmental issues increases

For the second consecutive year, survey respondents tapped a potential global economic crisis as the issue that will have the greatest impact over the next 10 years.

Environmental concerns were close behind, with decarbonization of shipping at number two followed by new environmental regulation. Interestingly, both of those environment-related issues were newly added as survey choices in 2019. In fact, 2019 respondents chose environmental issues as four of the top 10 in terms of impact, reflecting in large part the growing realization of the severe consequences posed by climate change.

Overall, the top 10 issues for impact in 2019 reflect current events, as seen by the inclusion of not only environmental concerns, but geopolitical tension, big data and artificial intelligence, changing trade patterns, cyber-attacks and data theft, and societal demands for sustainability.

Looking year-over-year, workforce and skill shortages, terrorism, and fuel price increases* all dropped lower in 2019.

What **impact** do you think the following issues will have on the maritime industry over the next 10 years?

1 Minimal impact / 2 Minor impact / 3 Moderate impact / 4 Major impact

RANK	ISSUE	IMPACT
1	Global economic crisis	3.69
2	Decarbonization of shipping	3.68
3	New environmental regulation	3.66
4	Geopolitical tension	3.55
5	Cyber-attacks and data theft	3.52
6	Big data and artificial intelligence	3.47
7	Changing trading patterns	3.44
8	Societal demands for sustainability	3.34
9	Failure of climate-change mitigation and adaptation	3.34
10	Workforce and skill shortages	3.25
11	Fuel price increases	3.24
12	Major safety incident	3.11
13	Autonomy technology	3.10
14	Insufficient access to finance	3.03
15	Governance failure	2.95
16	Failure or shortfall in infrastructure	2.93
17	Terrorism	2.80
18	Increased piracy	2.46

*Note: In the 2019 survey, "fuel price increases" replaced "energy price fluctuations" as an issue.



For some key issues, impact and likelihood connect

When asked how likely certain issues are to arise in the next 10 years, replies correlate closely with respondents' views of impact: three issues — new environmental regulation, cyber-attacks and data theft, and geopolitical tension — are found in the top five for each.

Given that linkage, it's fair to say these issues are firmly top of mind for leaders in the maritime sector. As we'll see in the next section, however, being top of mind does not necessarily equate to being prepared to manage the risk.

As was the case in 2018, the issue that most significantly bucked the trend of linkage between impact and likelihood was global economic crisis. While ranked number one for potential impact, it came in at number 10 in the likelihood rankings — identical to its rankings last year. Meanwhile, decarbonization of shipping ranked as number two in terms of potential impact, but eighth for likelihood.

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

1 Very unlikely / 2 Unlikely / 3 Likely / 4 Very likely

RANK	ISSUE	LIKELIHOOD
1	New environmental regulation	3.56
2	Geopolitical tension	3.52
3	Cyber-attacks and data theft	3.52
4	Big data and artificial intelligence	3.51
5	Changing trading patterns	3.42
6	Societal demands for sustainability	3.40
7	Fuel price increases	3.39
8	Decarbonization of shipping	3.31
9	Failure of climate-change mitigation and adaptation	3.18
10	Global economic crisis	3.07
11	Autonomy technology	3.03
12	Workforce and skill shortages	3.02
13	Major safety incident	2.83
14	Terrorism	2.75
15	Governance failure	2.72
16	Insufficient access to finance	2.65
17	Failure or shortfall in infrastructure	2.56
18	Increased piracy	2.47

Preparedness remains a key concern

Ranking the potential impact and perceived likelihood of an event is valuable in seeing what issues are on the radar. But perhaps a more important question is how prepared the industry is to manage an issue once it is identified. And here, for the second year running, respondents perceive the maritime industry to be relatively unprepared to deal with the top issues raised in the survey.

Respondents feel the industry is least prepared for a global economic crisis, which is also deemed as having the most impact. In fact, seven of the ten issues considered as having the most impact are among those for which respondents consider the industry to be least prepared.

For many of these issues, it's likely that the maritime industry is not alone in questioning its preparedness. Every sector is grappling these days with issues related to climate change, cyber-attacks, the ongoing technology revolution, and geopolitical concerns.

It's also of interest that respondents consider the industry best prepared for what is one of its unique issues: increased piracy.

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

1 Very Unprepared / 2 Unprepared / 3 Prepared / 4 Very Prepared

RANK	ISSUE	PREPAREDNESS
1	Global economic crisis	2.08
2	Failure of climate-change mitigation and adaptation	2.15
3	Cyber-attacks and data theft	2.16
4	Autonomy technology	2.19
5	Decarbonization of shipping	2.20
6	Societal demands for sustainability	2.21
7	Big data and artificial intelligence	2.22
8	Failure or shortfall in infrastructure	2.30
9	New environmental regulation	2.30
10	Governance failure	2.37
11	Geopolitical tension	2.38
12	Workforce and skill shortages	2.41
13	Terrorism	2.44
14	Insufficient access to finance	2.47
15	Changing trading patterns	2.63
16	Fuel price increases	2.69
17	Major safety incident	2.74
18	Increased piracy	3.05



See **Glossary of terms** on page 34

Top issues

Looking at survey respondents' views regarding likelihood, impact, and preparedness, three key areas stand out: environmental, economic and geopolitical, and digital. Given their prominence, it's worth viewing them in more detail.

ENVIRONMENTAL REGULATIONS TO HAVE MAJOR IMPACT IN COMING DECADE

Important environmental initiatives are underway within the maritime sector, yet shipping must play an even larger role in addressing climate change, largely through mitigating carbon emissions. With its global reach, the maritime sector is a key stakeholder when it comes to both the causes and solutions related to climate change.

Reflecting this, survey respondents said that new environmental regulation is the issue most likely to occur in the next 10 years, while also seeing it as having the third highest impact. This is driven in part by the pending 2020 sulphur regulation, which represents a paradigm shift in fuel requirements — one that may well increase fuel prices.

An encouraging related finding is that respondents are fairly confident in the industry's ability to cope with fuel price increases. The preparedness score for this issue is at 2.69, higher than for 15 other issues in the 2019 survey.

Respondents selected decarbonization of shipping as number two in terms of its impact on the industry. It was also the issue for which they see the maritime sector as being generally unprepared. This is especially significant as the industry will be fundamentally changed by the decarbonization of shipping. Under the International Maritime Organization's strategy, greenhouse gas (GHG) emissions are to be reduced by at least 50% — relative to 2008 — by 2050.

The long-term solution is to switch to net-zero carbon fuels, a transition that will be driven by technological developments, the economic performance of zero-emission vessels, environmental considerations, and the development and implementation of international regulations and policies.

This year's survey included a new issue for respondents to consider: societal demands for sustainability. Respondents placed it quite high on the impact and likelihood scales, and low in preparedness. The interest in sustainability among maritime shippers

has snowballed in recent years, driven by outside pressures and the industry's desire to play a role in the greater good.

One way forward is for individual shipping companies to improve their sustainability practices by setting targets for specific environmental improvements, following ambitious ship recycling standards, improving safety performance, investing in employee training, and expanding workforce diversity.

There is also a need for collaborative efforts involving a coalition of stakeholders across the maritime spectrum, including shipping companies, banks, investors, insurers, and regulators.

Isabelle Durant, Deputy Secretary General of the UN Conference on Trade and Development, says UNCTAD sees the ongoing transformation of the maritime sector in the acceleration of the sustainability agenda. "We are convinced that public opinion and demand for environmental concerns and sustainability will only increase in the future, critically influencing the parameters for maritime transport," she says.

Durant points to UNCTAD'S *Review of Maritime Transport 2019* as concretely showing how new imperatives — such as

the compliance of fuel economy with climate-related emissions and reductions of the sulphur content of ship fuel — shape the context to which the sector needs to adapt. "These are challenging times, but certainly interesting ones," she says. "Our oceans and seas constitute a major environmental public good, which hold a special place in the hearts and minds, as well as in the livelihoods, of people across many different societies and cultures."

GLOBAL ECONOMICS AND POLITICS TOP THE IMPACT LIST

The issue with the most potential impact in the next 10 years, according to this year's respondents, is a global economic crisis. The issue is also considered one that the industry is least prepared for, although it is considered relatively unlikely.

Dr. Ricaurte Vasquez Morales, Administrator of the Panama Canal, agrees that a global economic crisis is a major concern for the maritime industry. And he also agrees that the likelihood is low.

"While this issue is very important to the industry, the probability of a global crisis to occur does not rank high in our possible scenarios," he says. "At this moment, the Panama Canal is more focused on slower

global trade and shifts in trade patterns as a result of the frictions between China and the US, which will also have an impact on the industry."

Otto Schacht, Executive Vice President of Sea Logistics at Kuehne + Nagel, says it's understandable that a global economic crisis remains a top issue, though it could be overtaken in coming years. "The subject of sustainability, zero emissions, and so on is new, and could surpass global economic crisis once we are faced with tougher consumer demands," he says. "It has to be highlighted to the public that sea transport is the most environmentally friendly transport mode. Consider that shipping a laptop by air from Shanghai to Amsterdam versus in a container produces 3000% more CO₂."

Respondents identified geopolitical tension as another leading issue facing the industry, placing it higher on the maritime agenda than was the case in 2018, but also deeming themselves better prepared to face it. This year it ranked as the second most likely, the fourth highest for potential impact, and in the middle for industry preparedness. "We are living through a period of unprecedented geopolitical change, marked by the erosion of 20th century institutions and the norms they uphold, as well as a shift in economic momentum toward 21st century powers," says Meredith Sumpter,

Head of Research, Strategy and Operations at Eurasia Group. "This change has marked implications for the global trade patterns and growth that propel industry activity, as well as for the global alliance structures that have underpinned maritime security, which are now shifting."

The 2008 financial crisis marked the beginning of a once-every-few-generations shift in the global geopolitical landscape, one that could take 20 to 30 years to play out, adds Sumpter. She identifies four key geopolitical risks for the maritime sector as fragmentation of global trade, erosion of international institutions, a shift in alliance structures, and an uptick in government intervention.

"Erosion of international institutions makes it harder to collectively address key global challenges affecting the industry," she adds, pointing to shifts in alliances that could upend traditional security relationships. Such a situation can be seen in the South China Sea and recent events in the Strait of Hormuz, the world's busiest sea route for oil.

As the demand for power and energy drives global economies, interruptions to and the volatility of the global supply chain can manifest in many ways.

Still, it is wrong to conclude that tensions manifesting themselves in the Strait of Hormuz will necessarily be a “quick flash to bang,” says **Julian Macey-Dare**, Managing Director with Marsh JLT Specialty’s Political Risk and Structured Credit Practice. “Significant, longer-term uncertainty and risk is more likely — thwarting growth, investment, and trade,” he says. “Proactively managing risk and diversifying supply chains becomes vital to navigating risk.”

Respondents in 2019 also identified changing trading patterns as an issue likely to occur in the next 10 years, and to have a high impact if they do. This was likely driven by major issues such as trade conflict between the US and China, tensions with Iran, and the increasing importance of emerging markets.

Yee Yang Chien, President and Group CEO of MISC, notes that it’s important to differentiate between fundamental changes in trade patterns from economic and industrial drivers and those induced by trade policies. “We should pay more attention and respond against changes brought about by economic and industrial supply/demand dynamics, which are the true fundamental and long-term drivers,” he says. “Trading policies come and go with changes in the political philosophies of trading nations and, without doubt, will introduce short-term

volatility, but they may not necessarily alter long-term, fundamental trends. A healthy dose of foresight and conviction in views is necessary for one not to be distracted by short-term uncertainty and volatility”

In the current environment, resilience is increasingly important. “It’s about the way the maritime industry positions itself to be resilient and nimble in the face of disruption,” Sumpter says.

ATTACKS ON SHIPPING KEEP THE FOCUS ON CYBER RISKS

Survey respondents this year placed cyber-attacks and data theft as fifth in terms of impact, and third in terms of likelihood and preparedness, no doubt reflecting the maritime industry’s experience with major cyber-attacks in recent years.

In mid-2017, the industry was shaken by a cyber-attack against Maersk, which led the sector to take a deeper look at cybersecurity. More recently, there have been high-profile incidents involving COSCO and Austal, as well as ports such as San Diego and Barcelona.

Richard Smith-Bingham, Director of Emerging Risks at Marsh & McLennan Companies Insights, says that shipping will

always be a target for cyber-attacks due in part to its nature as critical infrastructure. “Cyber-attacks on critical infrastructure are at a high,” he says. “This is compounded by shipping’s vulnerability to geopolitical tension in certain parts of the world.”

The maritime sector’s global scope creates additional issues, Smith-Bingham notes. “By virtue of being international critical infrastructure, cyber-based intelligence exchanges between governments and shipping companies may be weaker than those for fixed, land-bound assets such as power stations and airports.”

Additionally, he says, the increased use of automation and advanced analytical technologies will increase exposure points at a time when the threat is rising.

Much of the promise from new technologies is rooted in big data and artificial intelligence, which 2019 respondents rank as the fourth most likely, sixth in terms of impact, and seventh for how well prepared the industry is.

Big data and artificial intelligence are positioned to radically transform the entire global supply and logistics chain, notes **Andreas Berger**, CEO of Swiss Re Corporate Solutions. “Within the next 15 years, we expect the global maritime industry to be

fully interconnected, integrated, and digital,” he says. “This will lead to unprecedented performance improvements and efficiency gains. It will also push novel and fully integrated data-driven shipping, as well as data-driven financial and insurance services. In this context, we need to work together to establish data lakes and data protection standards because digital partnerships will help us monetise the benefits of digitisation.”

2019 SEES ATTITUDE SHIFTS IN FINANCIAL, SAFETY, AND TRADE ISSUES

In this, the second year of our survey, it’s worth noting a few issues for which respondents’ views have shifted. For example, respondents showed more confidence in 2019 in some financial areas: This year’s respondents were less likely to view insufficient access to finance as a significant issue, and its score dropped to 2.65, down from 3.01 in 2018.

Michael Parker, Chairman, Global Shipping, Logistics & Offshore at Citi, feels the rise in confidence regarding access to finance can be traced to a number of factors. “First, owners feel that excess capacity is being absorbed. With a view that most freight markets will enjoy stronger earnings in 2020, a better outlook will translate into renewed

investor interest in debt and even equity markets,” he says.

“Second, the unwinding of the distress in the shipping finance sector is near completion, with the banks exiting the sector or reducing their exposure having achieved their objective, leaving a clearer and competitive group of committed lenders focusing on high-quality owners and projects. Third, the challenges of new regulations, such as IMO 2020, the IMO’s commitment to the 50% reduction in GHG emissions, which everyone knows is just a first step, and the broader impact of the ESG agenda on the maritime supply chain are making everyone realize that scale and financial strength are going to be essential.

“For those companies that can manage through these new more complex issues, finance will be forthcoming, and that is why one can see renewed confidence in access to finance from that type of industry participant. For small and medium sized owners, access is there through some banks and the alternative lenders, though at a price.”

Unlike the gain in confidence for financial issues, respondents in 2019 felt that a major safety incident would have a more significant impact than in 2018. The impact score was 3.11 in 2019, compared with 2.76

in 2018, while its likelihood score remained relatively low, just as the year before. It also maintained a reasonably high preparedness score.

However, Alastair Marsh, CEO of Lloyd’s Register, sees three key reasons why maritime stakeholders should be concerned over the likelihood of a major safety incident. “First, there is the inherent risk from new regulations, which often demand changes to ways of working and the use of emerging technologies,” he says. “Second, as vessels become more reliant on increasingly complex and interdependent technology, predicting a failure becomes an equally complex task. There is also the increased risk of cyber-attack, which has the potential to lead to a major safety incident. Third, there are factors that are beyond the industry’s control due to geopolitical uncertainty.”

While safety in shipping has improved over the years, 100 ships are still lost every year, on average, and there continues to be a high number of work-related injuries and fatalities compared to other industries.

Marsh says there are several ways the maritime industry can address these risks and improve its safety performance: “We need to continue to work to assess and model the risks surrounding new technologies, with focus on the cyber threat.

We could equally benefit from looking at other sectors, such as aviation, to see how they have managed the risks associated with rapidly changing technology.”

MEETING THE CHALLENGE

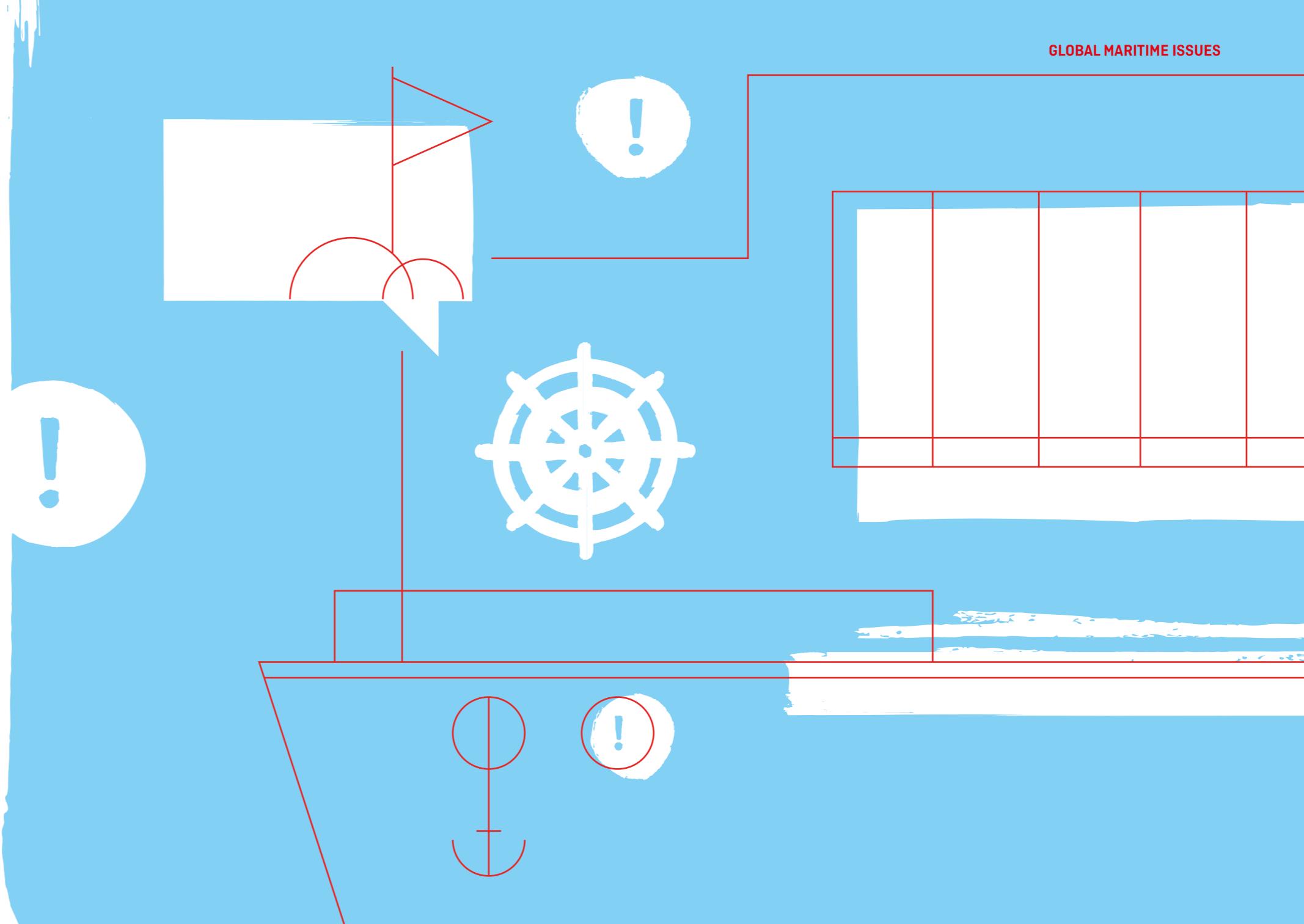
Much of what keeps maritime professionals awake at night involves issues ripped from the headlines of the global media. Cyber-attacks and threats involving data and new technology. An economic crisis and trade wars. Geopolitics in places like the Strait of Hormuz and the South China Sea. Climate change and the reality of limited resources.

Cyber-related threats stayed near the top of the list of concerns in the 2019 survey, and are likely to remain high on the list in the future. Shipping is part of global and local critical infrastructures, which have come under increasing attack over the past few years.

Also maintaining a high level of concern this year are economic and geopolitical concerns. Financial concerns are driven by issues such as the trade tensions playing out between the US and China. Should the global economy stall, the maritime industry will be swiftly impacted. And our survey respondents do not believe the industry is well prepared to weather such a storm.

Environmental issues took a central place in the survey results this year, with some areas that were newly added drawing much concern: decarbonization of shipping, which placed at number two for impact, and new environmental regulation, tallied as third in impact. The lion’s share of concern here was undoubtedly climate change and efforts to decarbonize shipping, which we explore in a deep dive chapter elsewhere in this report.

Perhaps the main takeaway from our look at the top issues of 2019 is the lingering feeling respondents have that the maritime industry is relatively unprepared to deal with them. This has not changed from last year. But rather than be a point of worry, we hope this view of preparedness is taken as a challenge. Our qualitative research indicates that the industry has the power to influence many of the top long-term issues identified, and the expertise and resources to focus on them.

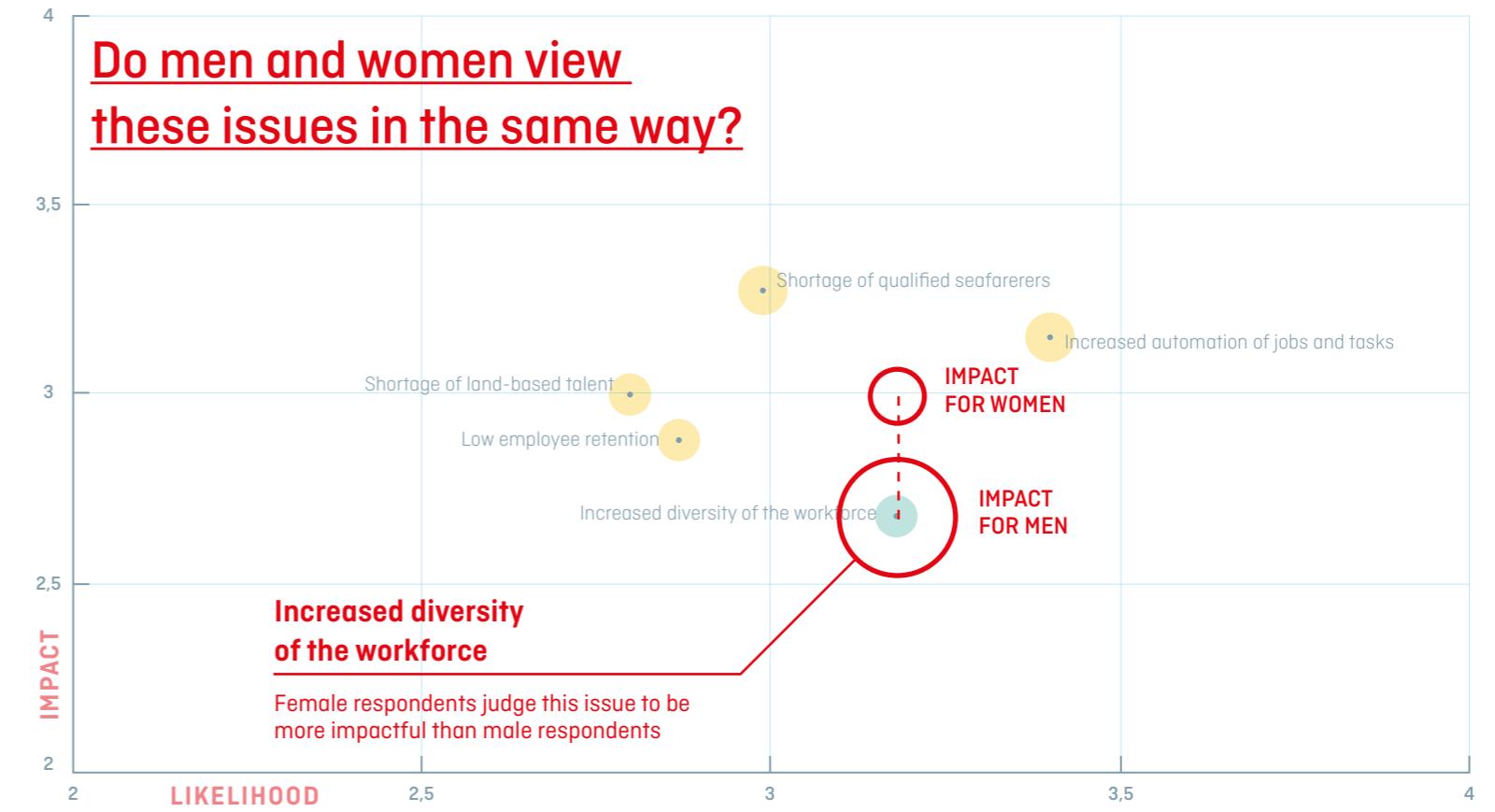


At the heart of maritime disruption

Deep dive on the workforce of the future



IMPACT vs LIKELIHOOD vs PREPAREDNESS

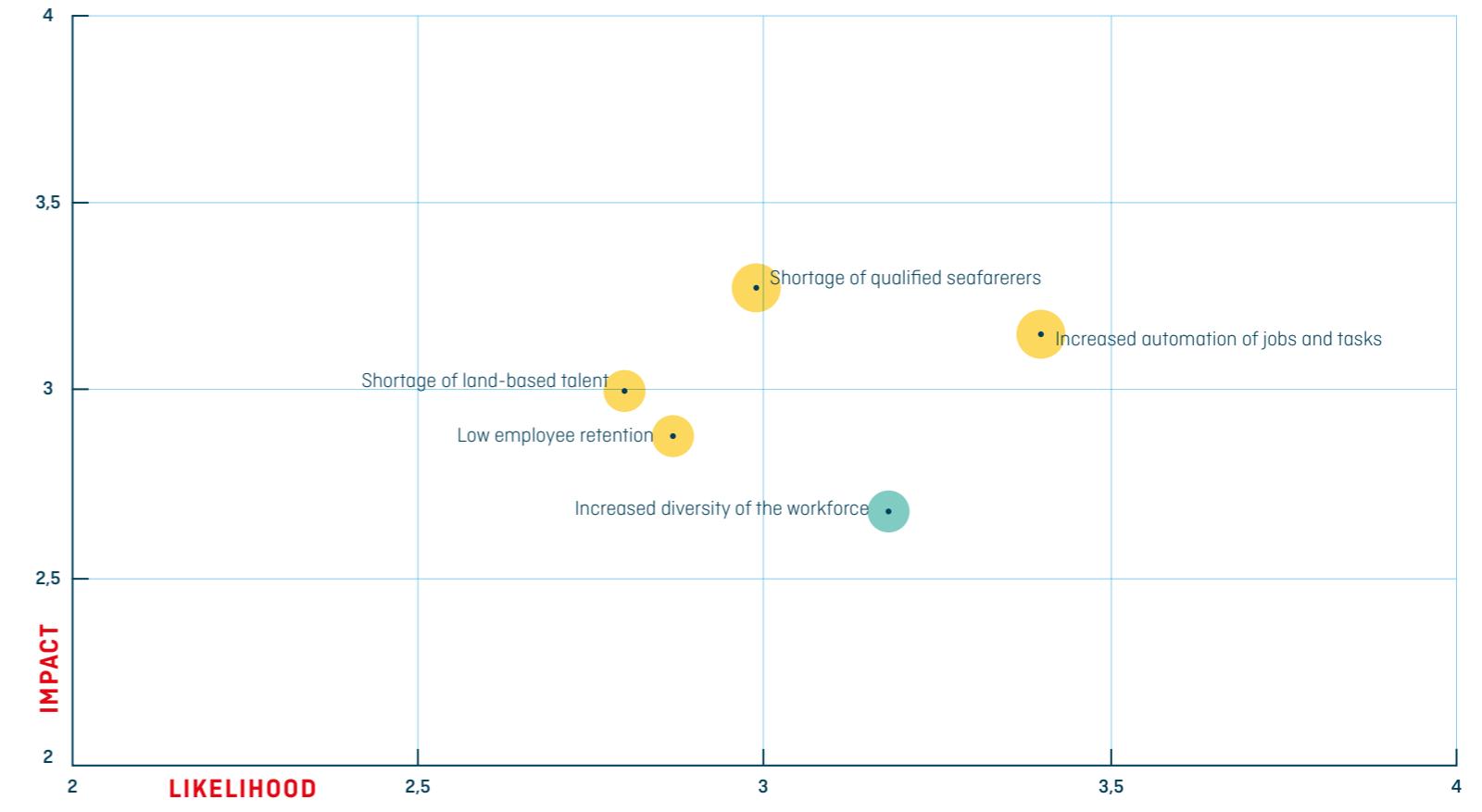


At the heart
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Deep dive on the workforce of the future



IMPACT vs LIKELIHOOD vs PREPAREDNESS



Deep dive on the workforce of the future

Disruption in any industry will affect its workforce, and the maritime sector is no exception. From automation to employee diversity to skilled workers, the industry faces challenges as it shapes its workforce of the future. Overall, survey respondents did not rank workforce-related issues as high for impact, likelihood, or preparedness as they did for other areas. Still, preparedness was not as high as one would like, and it is easy to envision unresolved workforce issues leading to more serious problems in the future.

Maritime industry grappling with automation

The maritime industry is in the early stages of the automation of a number of jobs and tasks, from the relatively mundane to the arrival of fully automated and autonomous ships. In exploring workforce issues through the survey, respondents said increased automation of jobs and tasks is the most likely to considerably affect the industry in the next 10 years. They also considered it to be the most likely to occur — and the one for which the industry is least prepared.

It's clear that the maritime industry, like others, is grappling with digitalization. Automation is a reality, reflected in the likelihood score in the survey. And as the workforce issue with the lowest preparedness scores, it certainly needs to be addressed.

Stephen Cotton, General Secretary of the International Transport Workers' Federation, believes that automation in the industry may be more limited than some proponents might suggest. "The discussion about technology and the future is heavily shaped by a narrative which stresses the revolutionary nature of technological changes, particularly of automation, and its potential impact upon jobs," he says. "However, there is as yet no substantive evidence that such a revolutionary application of automation is occurring in any of our sectors."

Rather than bringing rapid, wholesale transformation of shipping, Cotton says that automation is most likely, in the near future, to come in the form of remote control in ports, harbors, and in niche applications where it will augment human control, not replace it. Still, he says, automation will affect workers, making it critical that they be consulted as changes are implemented.

"New technology must be used to improve the working environment for seafarers, which means secure jobs, decent wages, improved safety and reduced working time and fatigue," Cotton says. "Workers, through their trade unions, must be involved in the introduction of technology at shipboard, company and regulatory levels, with new forums to bring unions, employers and regulatory authorities together. New training and qualification programs must provide for a genuine career path for seafarers, including for on ship and on shore and in the face of industrial change."

Diversity issues center on gender

Amid the industry's many changes, any maritime company that does not focus on employee diversity risks being left behind. For the traditionally male-dominated maritime industry, current questions of diversity center on gender.

Although the number of women gaining education and training in oceans and maritime programs has increased rapidly in the last few decades, their engagement, retention, and promotion to leadership in all areas of ocean activities — particularly the maritime sector — has lagged. This is the case at the seagoing-seafarer level, and also in numerous connected activities in ports and logistics, legal, and other services.

Respondents think it likely that diversity of the maritime workforce will increase, ranking it as the issue second-most likely to occur. But they also think the impact will not be significant, while also feeling most prepared for this among all issues in this section. However, female respondents perceived the potential impact of increased diversity as more significant than male respondents, ascribing it an impact score of 3.00, compared with 2.63 for men.

"There are still too many generalizations that attribute specific skillsets to males and females," says **Ying Ying Lim**, Ocean Transportation APAC Lead at Cargill. "Ultimately, skills are individual and irrespective of gender. Women make up almost 50% of the world's total labor capacity, and most industries have yet to optimize this. What matters is having a balance, and if more women join our industry we will see a more balanced way of looking at things. Diversity — not just in gender but also ethnicity, sexual orientation, physical ability, and so forth — widens perspectives and stimulates success."

Dr. Cleopatra Doumbia-Henry, President of the World Maritime University, points to the recent WMU report, *Transport 2040: Automation Technology Employment - the Future of Work*. The report says that advanced automation technologies are expected to make task profiles more diverse, which will result in the need for a more diverse talent pool to support future maritime industries.

The current shortage of qualified seafarers, increased automation of jobs and tasks, shortage of land-based talent, low employee retention rates, and the need for greater diversity of the workforce will require more women in maritime," Doumbia-Henry says. "Without increased diversity in the next 10 years, the pace of innovation in the maritime industry will be slow, and a closed mindset in maritime business could yield a leadership opportunity to emerging non-maritime players.

Preparation a key to maintaining a skilled workforce

There is a pressing demand for skilled workers and competent innovation leaders in all areas of marine activity. Not only are shippers and others competing with one another, they are in a struggle with other industries for the best talent as many skills in the digital age are easily transferred from one industry to another.

When it comes to the impact of employee shortages, respondents are more concerned about the shortage of seafarers than about the shortage of land-based talent. They also feel less prepared for this change.

However, **Bjørn Højgaard**, CEO of Anglo Eastern Univan Group, says the term "shortage of qualified seafarers" is a "bit of a misnomer. I think what people really mean when they say it's a risk is that they have difficulties finding seafarers with the necessary skills, and that it may take a long time to recruit/train and prep these seafarers for a job onboard."

Another way to frame the challenge, he says, is to look at it in terms of preparation: “You have to prepare years in advance by building a brand amongst the seafarer supply nations and recruit cadets and junior officers to build a pipeline of the people you will need 5 to 10 years ahead. And you have to be attuned to a changing landscape in terms of the skills that are needed in different ranks on different ships, and you have to commit to upskilling your workforce onboard as an ongoing activity.”

At the same time, the industry needs to compete with other industries for talent. Cargill’s **Ying Ying Lim** says that the maritime industry is about to enter a critical decade, driven by change. “We will see opportunities that call for new skills and experiences, so candidates from other industries will bring valuable fresh perspective. We should be thinking about what needs and benefits will be required to attract these candidates and ensure that our industry is qualified to bring the outside in.”

What **impact** do you think the following issues will have on the maritime industry over the next 10 years?

1 Minimal impact / 2 Minor impact / 3 Moderate impact / 4 Major impact

RANK	ISSUE	IMPACT
1	Shortage of qualified seafarers	3.29
2	Increased automation of jobs and tasks	3.16
3	Shortage of land-based talent	3.01
4	Low employee retention	2.89
5	Increased diversity of the workforce	2.69

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

1 Very unlikely / 2 Unlikely / 3 Likely / 4 Very likely

RANK	ISSUE	LIKELIHOOD
1	Increased automation of jobs and tasks	3.39
2	Increased diversity of the workforce	3.17
3	Shortage of qualified seafarers	2.98
4	Low employee retention	2.86
5	Shortage of land-based talent	2.79

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

1 Very Unprepared / 2 Unprepared / 3 Prepared / 4 Very Prepared

RANK	ISSUE	PREPAREDNESS
1	Increased automation of jobs and tasks	2.43
2	Shortage of qualified seafarers	2.47
3	Shortage of land-based talent	2.52
4	Low employee retention	2.55
5	Increased diversity of the workforce	2.62

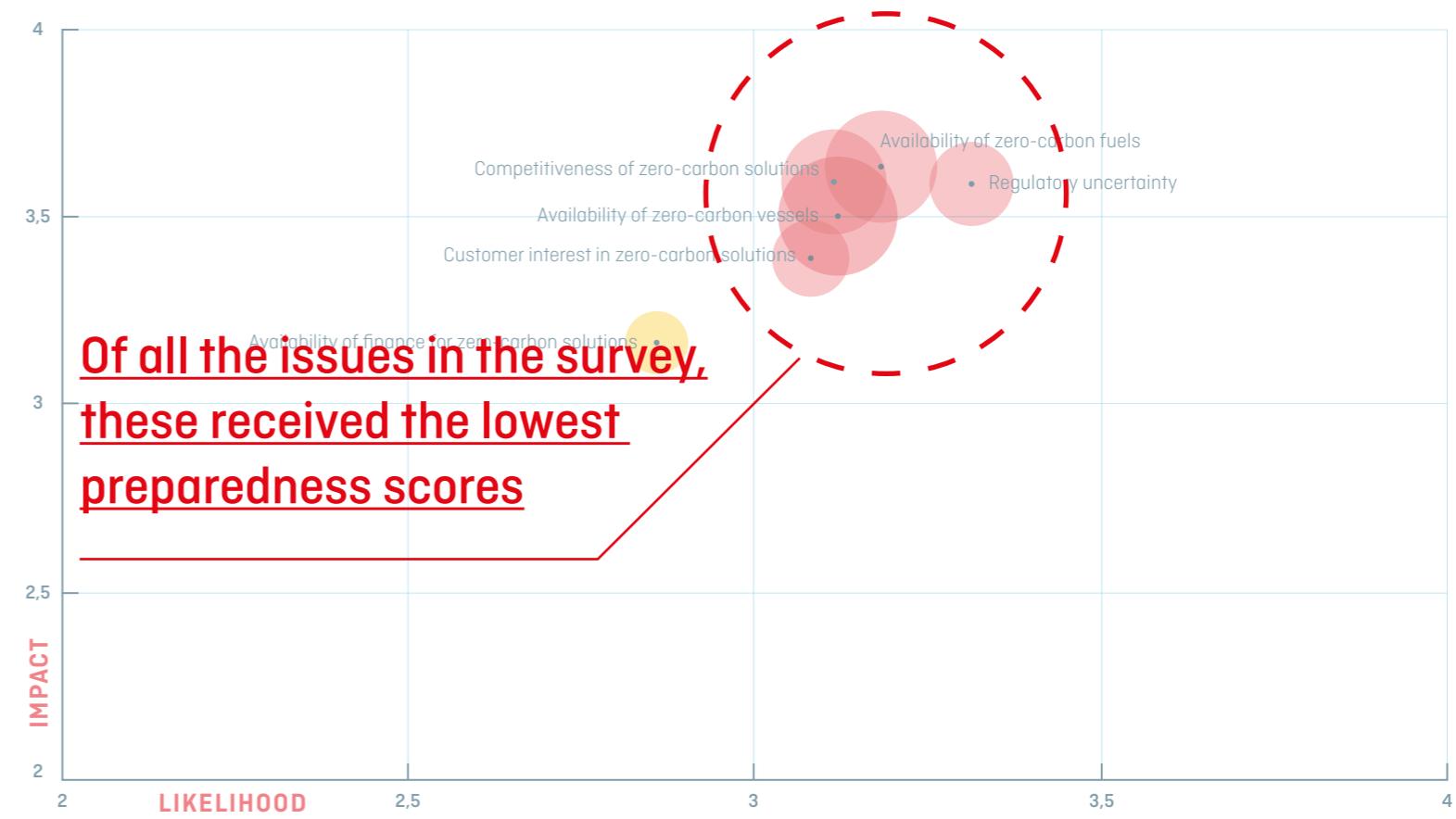
→ See **Glossary of terms** on page 34

Charting
a course in
uncharted
waters

Deep dive on getting to zero



IMPACT vs LIKELIHOOD vs PREPAREDNESS



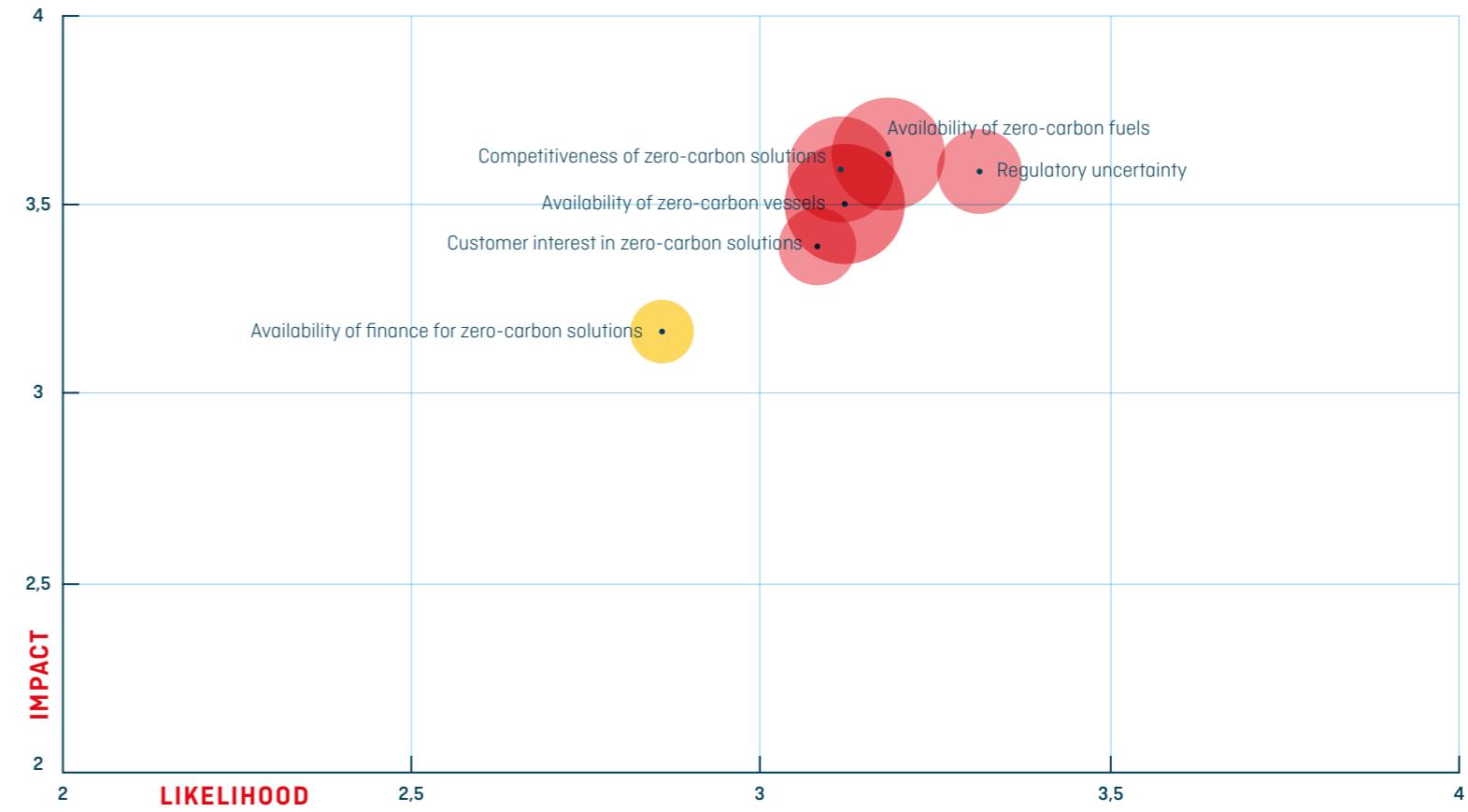
Of all the issues in the survey, these received the lowest preparedness scores

Charting
a course in
uncharted
waters

Deep dive on getting to zero



IMPACT vs LIKELIHOOD vs PREPAREDNESS



Deep dive on getting to zero

Climate change is an increasingly urgent global issue that crosses sectors and geographies. Reducing GHG emissions is at the forefront of many efforts to combat the potentially catastrophic rise in global temperatures, and an area in which shipping has a strong role to play.

Zero-emission vessels/fuels are critical for GHG reductions

In the maritime sector, the IMO's Initial GHG Strategy states that international shipping's total GHG emissions must be reduced by at least 50% by 2050. Improving energy efficiency will not be enough to reach this goal: Commercially viable, zero-emission vessels must start entering the global fleet by 2030, with their numbers radically scaled through the 2030s and 2040s.

Overall, respondents see these issues as having a relatively high impact, and feel generally unprepared for them. Regulatory uncertainty is viewed by respondents as the biggest potential barrier to shipping's decarbonization in the next 10 years, and is also seen as the most likely to occur and is in the top three for potential impact on shipping's transition to zero-carbon emissions. Zero-carbon fuels and vessels are not yet a reality, and their competitiveness with fossil fuels and vessels remains unclear. Regulation could help the industry overcome these barriers, but there is uncertainty around which measures will be agreed on, and how quickly.

Hideaki Saito, Chairman of the Marine Environment Protection Committee at the IMO, notes that the IMO is a "unique body that may establish a robust policy framework on international shipping to

be applied and enforced in a legally binding manner regardless of flags." He points out that the IMO has developed 59 legally binding conventions, which all ships operated today are subject to follow. "Even in terms of climate change issues, I am convinced that IMO can develop robust and effective regulatory framework in the global context."

The survey results strongly indicate that the maritime industry is unprepared for zero-emission fuels and vessels entering the fleet in 2030.

Price and availability present barriers to low-carbon fuel adoption

Still, **Lord Adair Turner**, Chair of the Energy Transitions Commission, says the group is convinced that transitioning to zero-carbon in shipping by mid-century is feasible. "This profound transformation needs to be undertaken now, and significant progress made in the next 10 years, but it will require more time to reach the net-zero objective globally," he says. "In the short term, any new vessel should either be run on zero-carbon fuels, or have the potential to be run on zero-carbon fuels with minimum retrofitting as soon as the price of these fuels comes down, probably in the early 2030s. Retrofitting of the existing fleet can also be anticipated."

A major barrier to preparedness, he says is the price differential between heavy fuel oil and low-carbon fuels such as biofuels, hydrogen, and ammonia. "But the industry should anticipate that this price differential will shrink, as carbon prices increase and the cost of low-carbon fuels comes down," he says.

To speed up the progress of this transition, he says, the debate within the industry over which technology option will prevail needs

to play out. "Building up confidence in the feasibility of different technology pathways in real-world operation is essential to prepare the ground for deployment at scale. These initial efforts will need to be underpinned by coordinated action from leading global ports to incentivize use of low-carbon fuels and structure the appropriate fuel provision infrastructure, as well as by a tightening of regulations."

The survey results indicate that the availability of zero-carbon vessels may be a major barrier to shipping's decarbonization within the next 10 years. It ranked high both in perceived impact and likelihood of occurring, and received the lowest preparedness score of the survey.

Similarly, the availability of zero-carbon fuels had among the lowest preparedness scores of the section.

At the end of January 2019, Lloyds Register, in collaboration with UMAS, published *Zero-Emission Vessels: Transition Pathways*, which evaluated solutions that are both in line with a decarbonization trajectory and are realistic technologically. By identifying technologies with the best chance to compete in a more dynamic marine fuels market, the study identified three possible pathways:

- The first is based on large-scale availability of renewable electricity, with electric fuels consequently the dominant fuels in shipping. The majority of the fuel mix would come from technologies including hydrogen and ammonia produced through electrolysis, e-methanol, and improved energy storage.
- The development of biofuels is a second path, assuming that a fundamental change in large areas of land use is acceptable and sustainable. Bio-gasoil and bio-methanol could cover a major share of shipping's fuel mix.
- Thirdly, energy could be supplied through a mix of electric fuels, biofuels, and hydrogen and ammonia produced from natural gas, with carbon capture and storage (CCS).

The results also indicate that the competitiveness of zero-carbon solutions is seen as a major barrier to shipping's decarbonization over the next 10 years. To be widely adopted across the maritime industry, zero-carbon solutions must be commercially viable compared to traditional fuels. This will require technological innovation and maturation, which can reduce the cost of alternative fuels and zero-carbon technologies, as well as policy measures that can help bridge the remaining price gap. Whether this will happen in time to achieve the IMO targets is a concern.

Developing policy and financial solutions

Ian Parry, Principal Environmental Fiscal Policy Expert at the IMF, says that two critical policies are needed in order to overcome the competitiveness barrier to the deployment of low-emission technology into maritime fleets. "One is an aggressive research and development program administered by the IMO, to develop technologies and lower their costs," he says.

"The other policy is a tax on the carbon content of maritime fuel, or fuel levy, which would level the playing field between technologies with different carbon intensities, thereby providing incentives for clean technology adoption. The tax could be collected by an IMO-administered fund, should be applied globally and could be ramped up progressively over time in line with other pricing schemes."

The survey highlights another important barrier to shipping's decarbonization in the next 10 years: customer interest in zero-carbon solutions. Zero-emission fuels and solutions are currently more expensive than traditional fuels, making it difficult for ship operators to use unless customers are willing to provide economic incentives, for instance in the form of a price premium.

An outstanding question in this regard is whether customers of the maritime shipping industry are prepared to pay a premium for shipping services with lower greenhouse gas emissions, or provide other forms of economic incentives for shipping companies that are first movers in this field.

“We know that governments and end consumers are increasing their interest in sustainability across the entire value chain,” says **Jan Dieleman**, President of Ocean Transportation at Cargill. “This is putting pressure on our customers and, like us, they’re facing new challenges surrounding reporting. They’re starting to realize that reducing GHG Protocol Corporate Scope 3 CO₂ emissions can have a positive impact, but as to whether they’re ready to pay a premium to do so, it’s still early days.”

Respondents feel most confident about the availability of finance for zero-carbon solutions, which mirrors the industry’s generally increased confidence in its ability to obtain finance. This could be because financing is starting to be seen as an incentive for shipping’s decarbonization, partly because of the Poseidon Principles — the self-governing climate alignment agreement among financial institutions, which in 2019 collectively represent a bank loan portfolio to global shipping of approximately \$100 billion, around 20% of the global ship finance portfolio.

Financing the unprecedented technology transition in shipping, including zero-carbon fuels, will require significant investment, says **Paul Taylor**, Global Head of Shipping and Offshore at Societe Generale. “Ship owners will look to their banks and for government intervention to bridge the gap, including incentives for investment,” he says.

“One of the longer term impacts of the Poseidon Principles will be that greater liquidity will be available to finance more efficient vessels. Signatory banks will be eager to support their clients

regarding the financing of zero-carbon vessels as banks and ship owners seek to comply with 2050 IMO targets. Zero-carbon solutions will be required from 2030 if these targets are to be met. It’s everyone’s responsibility to be part of the solution.”

Taylor notes: “I am surprised that there is not greater confidence in the availability of financing for zero-carbon solutions. I strongly believe that this will be a strong focus of shipping financiers, and that liquidity will be available for the right project.”

Despite the overall low preparedness scores the issues in this section received, decarbonization of maritime shipping and its energy value chains is not impossible. “Even the International Energy Agency has been surprised by the pace of the energy transition over the past decade,” says Lord Turner. “Drastic cost reduction in renewable electricity, battery, and electrolysis for hydrogen production are reshaping the energy supply globally. Deployment at scale in other sectors than shipping (for instance road transport) is likely to drive further cost reductions. The shipping industry could be surprised by how fast new low-carbon fuels might be available. A wind of change might also come from consumers: The buyers of maritime logistics services are under pressure from their own customers and investors to clean up their supply chains.”

Nevertheless, a transition of this magnitude within the given timeframe will require close collaboration and deliberate collective action from all parts of the energy system. The good news is that global industry players are starting to wake up to this challenge. In conjunction with the UN Climate Action Summit in September 2019, Global Maritime Forum, Friends of Ocean Action, and World Economic Forum announced the Getting to Zero Coalition — a powerful alliance representing senior leaders within the maritime, energy, infrastructure and finance sectors, supported by decision-makers from government and IGO’s. The Coalition aims to have commercially viable zero-emission vessels operating along deep sea trade routes by 2030.

What **impact** do you think the following barriers will have on the industry’s decarbonization over the next 10 years?

1 Minimal impact / 2 Minor impact / 3 Moderate impact / 4 Major impact

RANK	ISSUE	IMPACT
1	Availability of zero-carbon fuels	3.63
2	Competitiveness of zero-carbon solutions	3.59
3	Regulatory uncertainty	3.58
4	Availability of zero-carbon vessels	3.50
5	Customer interest in zero-carbon solutions	3.39
6	Availability of finance for zero-carbon solutions	3.16

What is the **likelihood** the following barriers will hinder the industry’s decarbonization within the next 10 years?

1 Very unlikely / 2 Unlikely / 3 Likely / 4 Very likely

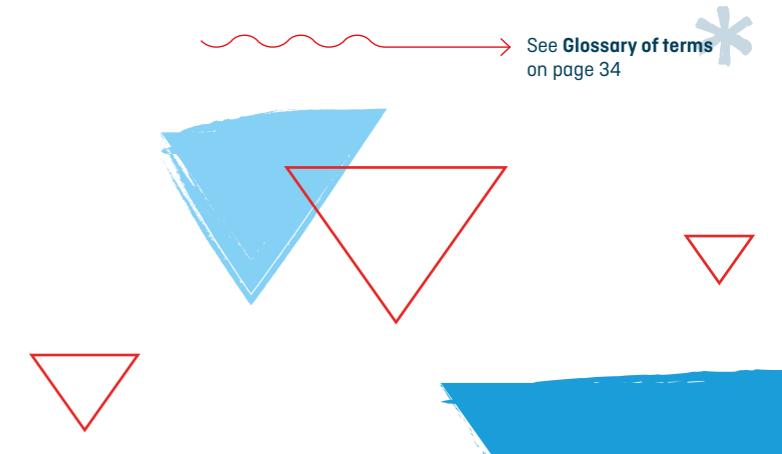
RANK	ISSUE	LIKELIHOOD
1	Regulatory uncertainty	3.31
2	Availability of zero-carbon fuels	3.17
3	Availability of zero-carbon vessels	3.11
4	Competitiveness of zero-carbon solutions	3.11
5	Customer interest in zero-carbon solutions	3.07
6	Availability of finance for zero-carbon solutions	2.85

How **prepared** is the maritime industry to overcome these barriers?

1 Very Unprepared / 2 Unprepared / 3 Prepared / 4 Very Prepared

RANK	ISSUE	PREPAREDNESS
1	Availability of zero-carbon vessels	1.90
2	Availability of zero-carbon fuels	1.94
3	Competitiveness of zero-carbon solutions	1.96
4	Regulatory uncertainty	2.15
5	Customer interest in zero-carbon solutions	2.20
6	Availability of finance for zero-carbon solutions	2.30

See **Glossary of terms** on page 34



Methodology

The *Global Maritime Issues Monitor 2019* is based on a survey conducted between 29 May and 23 June 2019. The survey was completed by senior maritime stakeholders from the Global Maritime Forum and Marsh JLT Specialty's multi-stakeholder networks. Respondents included 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 46 countries.

Respondents ranked 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 looked at 18 general maritime issues, and sought to understand specific priorities in workforce-related issues and decarbonization, with two deep dives containing five and six issues in each respective field.

The survey responses were coded to allow comparisons. Arithmetic mean scores were calculated for each issue and used to rank them in terms of likelihood, impact, and preparedness. Relevant stakeholders were then asked to comment on and provide context for the findings. The survey results were used to produce impact vs. likelihood vs. preparedness charts and to provide the supplementary evidence used throughout the report.

In 2019, we changed the preparedness scale from the 5-point scale used in 2018 to a 4-point one, aligning it with the impact and likelihood scales. Any comparisons between 2018 and 2019 results on industry preparedness made in this report have been done using 2018 results recalculated to a 4-point scale.

Survey population

What organization type do you represent?

6%
ACADEMIA
/NGO/MEDIA

7%
GOVERNMENT

6%
PORT/TERMINAL
INFRASTRUCTURE

4%
CHARTERER

15%
MARITIME
SERVICES

38%
SHIP-OWNER
/OPERATOR

5%
CORPORATE
SERVICES

2%
FREIGHT FORWARDER &
SHIPPING CUSTOMERS

17%
OTHER

Which role best describes your position?

16% BOARD MEMBER

35% CHIEF EXECUTIVE

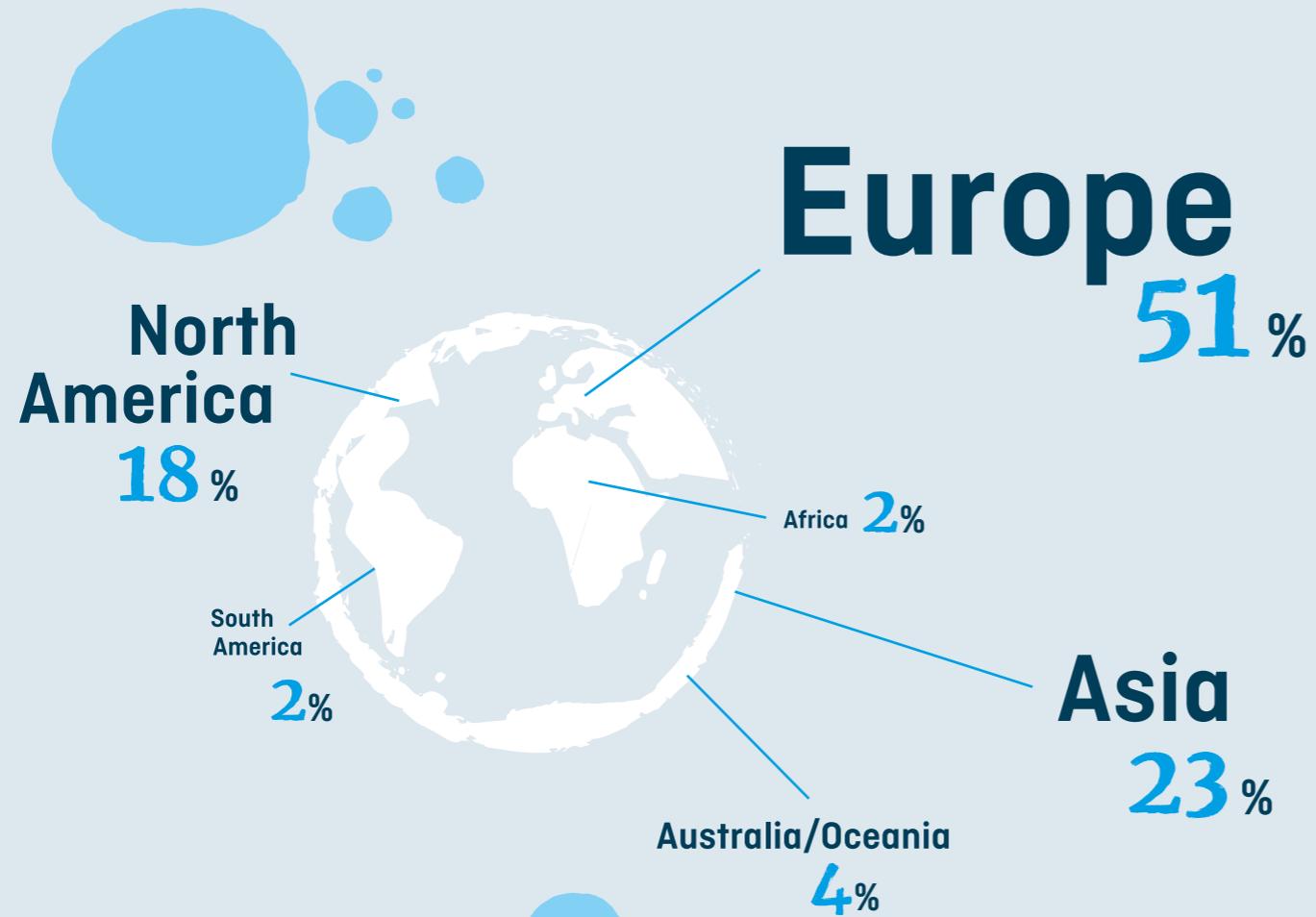
30% FUNCTIONAL

3% GOVERNMENT

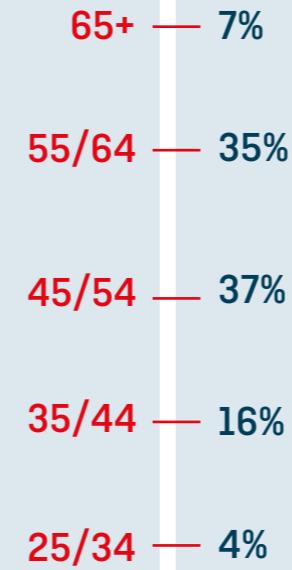
16% OTHER

0 15% 30% 60%

What country is your company headquartered in?

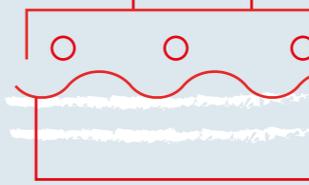


What is your age?



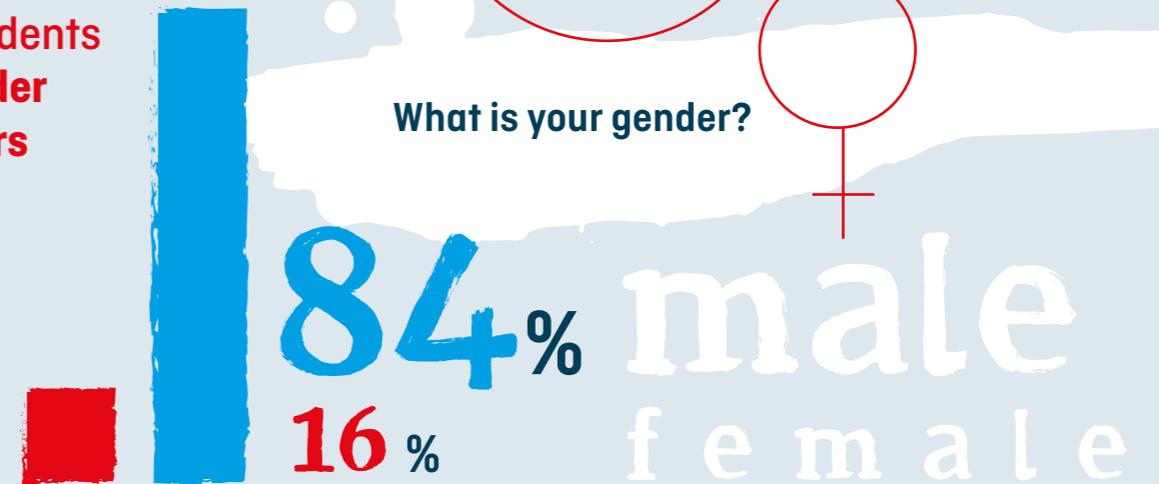
46

is the average age of the survey respondents



4% of respondents are under 35 years of age

What is your gender?



The survey is dominated by male respondents

{ Global issues }

ECONOMIC ISSUES

Changing trading patterns

Changes to the maritime trading landscape and supply chain which will have an impact on global trade (for example: One Belt One Road, deindustrialisation, near-sourcing).

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.

Fuel price increases

Increases in fuel prices leading to economic pressure or uncertainty for the maritime industry.

Global economic crisis

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

Insufficient access to finance

Inability of the maritime industry to attract sufficient finance for long-term investment.

GEOPOLITICAL ISSUES

Geopolitical tension

A bilateral or multilateral dispute between states that escalates into economic, military, cyber, societal, or other conflict.

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.

Terrorism

An unlawful use of violence and intimidation by individuals or groups with political or religious goals which inflicts human or material damage.

ENVIRONMENTAL AND HUMAN HEALTH ISSUES

Decarbonization of shipping

The various consequences to the maritime industry resulting from pressure – regulatory, competitive or societal – to reduce the use of or eliminate fossil fuels within shipping, and replace them with fuels and/or technologies that do not emit greenhouse gasses.

Failure of climate-change mitigation and adaptation

Adverse consequences to the maritime industry resulting from the failure of governments and businesses to enforce or enact effective measures to mitigate climate change, protect populations and help businesses impacted by climate change to adapt.

Major safety incident

An unintended event within the maritime industry that severely disturbs normal operations and has vast irreversible consequences on human life and/or the environment (for example: explosion causing loss of life, oil spill).

New environmental regulation

Efforts to minimize the maritime industry's negative impact on the environment (for example: SOx and NOx emissions, ballast-water discharges, ship recycling) through new regulation (excluding regulation pertaining to the decarbonization of shipping).

SOCIETAL ISSUES

Societal demands for sustainability

Rise in demands for organizations to act responsibly with regard to the environment, society and the economy (for example: preservation of biodiversity, diversity and inclusion, circular economy).

Workforce and skill shortages

Shortages in the maritime industry's workforce, either in size, type, skill, or experience, both at sea and on land.

DIGITAL ISSUES

Autonomy technology

Technology that is able to perform tasks without human interaction (for example: unmanned ships, autonomous ports).

Big data and artificial intelligence

The process of collecting large amounts of data and using artificial intelligence to interpret it, learn from it, and apply these learnings to specific tasks and goals.

Cyber-attacks and data theft

Attempts by hackers to damage or destroy a computer network or system causing economic impact and the exploitation of private or official data.

{ Workforce of the future }

Increased automation of jobs and tasks

Changes to workforce needs – either in number or competencies – due to automatization of tasks (for example: autonomous or semi-autonomous ships, digital trading platforms, use of big data and AI).

Increased diversity of the workforce

Increases in the diversity of the maritime industry's workforce in terms of gender, nationality and ethnicity across all levels of employment.

Low employee retention

Inability of the maritime industry to retain its qualified seafarers and land-based talent, for instance due to concerns over working conditions and possibilities for career development.

Shortage of land-based talent

Inability of the maritime industry to attract top talent for land-based jobs in competition with other industries due to its image and low visibility among the general public.

Shortage of qualified seafarers

Insufficient numbers of seafarers with the right skills and competencies entering the industry workforce.

{ Getting to zero }

Availability of finance for zero-carbon solutions

Inability of the maritime industry to attract sufficient funding for investment in zero-carbon solutions.

Availability of zero-carbon fuels

Lack of confidence that sufficient quantities of sustainably produced non-fossil fuels, such as fuels generated with the use of bio mass or renewable electricity (for example: bio gas, hydrogen, ammonia, battery power), will be available, and that it will be possible to access them where needed.

Availability of zero-carbon vessels

Difficulties in developing and implementing the technologies needed for safe, efficient and dependable zero-carbon vessels.

Competitiveness of zero-carbon solutions

Inability of zero-emission fuels and vessels to compete economically with fossil fuels and vessels.

Customer interest in zero-carbon solutions

Unwillingness on the part of the customer to pay a premium for zero-carbon services, especially during the early stages of the industry's decarbonization.

Regulatory uncertainty

Lack of clarity in the regulatory framework governing the sector's decarbonization and/or in the policy measures used to incentivize it.

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