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Emerging risks

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Emerging risks

‘Emerging risks’ sounds ominous to any sector except re/insurance. With a mindset geared to opportunity and a willingness to draw on external expertise, re/insurers have a unique attitude to the as-yet-unknown variables of new technologies, trends and events. Nevertheless, the search for the right data is the ultimate determiner of progress.

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Content editor
Louise Isted

Contributors
Francis Churchill, Michael Faulkner, Ben Margulies, Queenie Shaikh

Production editor
Toby Huntington

Sub-editor
Jessica Sewell

Editorial
Insurance Day,
5th Floor, 10 St Bride Street,
London EC4A 4AD
Email: editorial@lloydslistintelligence.com

How to define an emerging risk: Swiss Re's Raaflaub

Identified sufficiently early, an emerging risk can be more of an opportunity and less of a threat, Swiss Re's chief risk officer, Patrick Raaflaub, says

Swiss Re's annual publication outlining emerging risks, based on the early signals it gathers throughout the year, is meant as a "conversation starter" for the re/insurance industry, according to the company's chief risk officer, Patrick Raaflaub, *writes Louise Isted*.

The latest edition of *Sonar*, released in July, has climate and supply chains as the top emerging risks. Swiss Re defines an emerging risk as a newly developing or changing risk that is difficult to quantify and could have a major impact on society and industry.

In an interview with *Insurance Day*, Raaflaub says: "*Sonar* is a conversation starter for the re/insurance industry with the main goal of understanding and managing emerging risks. We are identifying early signals for specific emerging risks, but also for relevant trends that might lead to specific risks. And, of course, we are interested in starting to understand the potential opportunities for the insurance industry."

Identifying emerging risks

To identify and select emerging risks for its *Sonar* report, Swiss Re "gathers signals and feedback", Raaflaub says, from its employees – underwriters, client managers, risk experts and others. It also works with external specialists and research institutions.

All those signals are assessed and prioritised by the company's "foresight function" at Swiss Re Institute, which works with topic experts from Swiss Re's different business areas.

There are in general two approaches to underwriting emerging risks.

"One is to protect our underwriting from the downside of an emerging risk. This means avoiding, preventing and mitigating its impact. The second is to turn an emerging risk into an opportunity, such as a new product," Raaflaub says.

"For both approaches, crucial steps are to identify an emerging risk in the first place, gain the necessary understanding and knowledge, then take the appropriate action," he adds.

Modelling challenges

According to Swiss Re's definition, modelling emerging risks is "almost impossible", he continues, but that changes with a better understanding of the risk and reliable data.

"Although it is too early to fully model emerging risks, we can assess them – for example, according to their potential impact and time horizon for potential maturation," Raaflaub says.

Risks can be both emerging and systemic, he stresses. "Clearly, there is a big difference in the potential impact of single risks – which might be more random or uncorrelated – and the types of risks that may spread and accumulate in some larger context. Often, we will need to prioritise the big systemic risks if they could affect critical infrastructure or services such as water supplies, transport and telecommunication systems," he says.

When is a risk no longer "emerging" but established?

Raaflaub concludes: "An emerging risk becomes 'mature' when we know enough about it to be able to price and model it. Ideally, we can offer a risk-transfer solution for the risk."■

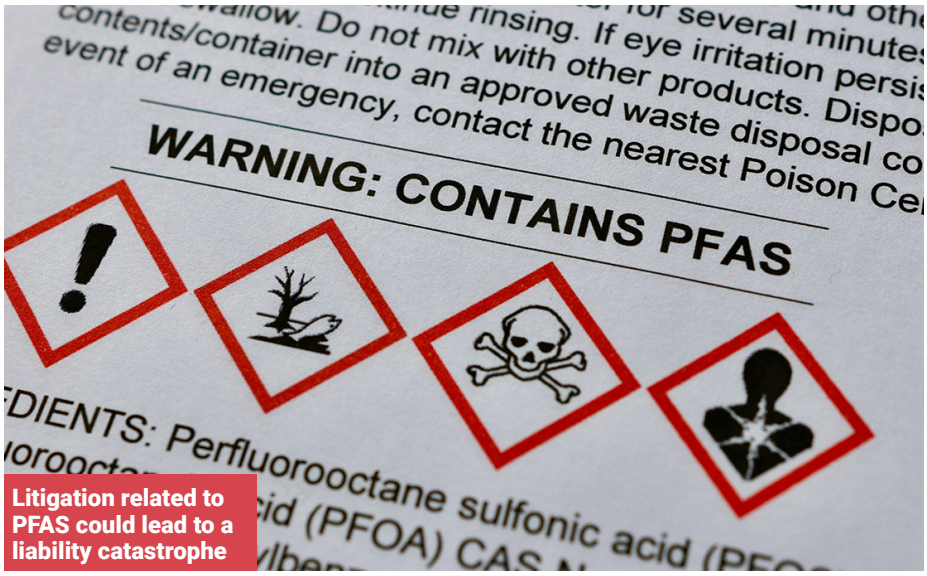
Emerging casualty catastrophe risks challenge risk modellers

Often regarded as 'black swan' events, casualty catastrophes are a major threat to re/insurers. But modelling emerging liability risks presents difficulties for carriers, given their unpredictability and lack of data

Re/insurers face a degree of change and uncertainty that appears to be evolving at an ever-quickening pace, *writes Michael Faulkner.*

Swiss Re's latest *Sonar* report on emerging risks warns of a "poly-crisis" of interconnected and complex new and emerging risks, driven by climate change, geopolitical instability, social inequality, digital transformation, and health challenges.

And this year's Global Risks Report from the World Economic Forum highlighted rapidly accelerating technological change and economic uncertainty in a world "plagued" by the climate crisis and conflict.



Litigation related to PFAS could lead to a liability catastrophe

Justin Long/Alamy Stock Photo

Trying to understand and model emerging risks is hugely challenging for re/insurers. By definition, emerging risks are new and unforeseen so their potential for loss is not fully known and their impact is largely not observable by traditional risk management methods. But an improved understanding of emerging risks can create opportunities for the industry, Swiss Re's chief risk officer, Patrick Raaflaub told *Insurance Day* in a recent interview.

Emerging risks with the potential to create liability catastrophes are arguably the most daunting threat. Such "casualty catastrophes" have become increasingly frequent and severe over recent decades, exposing re/insurers to much more risk than they may have realised and reserved for – asbestos and the 2008 financial crisis are prime examples.

In the case of casualty catastrophes, a single root cause can trigger a chain reaction that can affect multiple lines of business, insureds and even multiple accident years. Carriers may have to pay claims that at first seem unrelated to the event's initial trigger.

Regulators are taking a close interest in these risks. In 2021, the UK's Prudential Regulation Authority told firms to implement forward-looking risk management frameworks for man-made risks. Lloyd's also requires syndicates to model and report against various realistic disaster scenarios that include liability scenarios.

Modelling emerging casualty risks is challenging. The historical record on liability risks is constantly changing and, in some cases, the variables almost seem infinite. These challenges are exacerbated by a lack of data.

Unlike property catastrophes, casualty catastrophes do not follow patterns. Property disasters are largely found in the same regions with little change year on year. Casualty catastrophes, however, rarely arise from the same conditions as their predecessors. In fact, many potential casualty catastrophes are still considered "black swan" events, as Guy Carpenter said in a report Ahead of the curve: understanding emerging risks.

"The data set is vast, and when casualty catastrophe indicators appear, it may be typically too late to take preventive action. Therefore, casualty writers need to be proactive in regards to these unknowns," the Guy Carpenter report said.

The broker urged carriers "to proactively and systematically understand these emerging and casualty exposures and be able to measure the directional impacts they will have on their portfolios' exposures and aggregate limits".

More sophisticated modelling

Despite the challenges, modelling sophistication is improving. Risk modelling firm Praedicat, which launched in 2012, specialises in emerging casualty risks, with a particular focus on mass torts.

The company seeks to identify emerging risks that might give rise to harm and potential liability, and then models the possible financial impacts through commercial chains and industry sectors.

Praedicat has modelled scenarios such as litigation relating to PFAS (per- and polyfluoroalkyl substances), toxic baby food, chlorpyrifos (pesticide) and talc.

It uses a database of "algorithmically identified" emerging risks, together with qualitative and quantitative exposure-based information to assess liability risks.

To monitor and analyse new emerging risk trends, Praedicat's technology platform leverages artificial intelligence and natural language processing to scan millions of scientific and other scholarly sources. Once new risks are identified, quantitative models are created to translate the scholarship into estimates of the risk of loss.

This data is connected to Praedicat's database of more than 100,000 companies, to produce an "actionable" company risk score.

Insurers can look at the impact of risks at a company, industry or portfolio level. The company has a database of tens of thousands of potential risks that it is monitoring.

While availability of data is undoubtedly a challenge, Matthew Lewis, client engagement manager at Praedicat, says in an interview with *Insurance Day* a lack of scientific data to support the modelling is not the main concern. Instead, he highlights the lack of company data – a single, global database of companies does not exist – and clarity in relation to policy exclusions. "There's a lot of ambiguity around coverage and, until it is tested in court, we have no idea if [the harm] is going to be covered or not," Lewis says.

Verisk, another modelling firm, offers an emerging liability loss assessment framework through its Arium platform. The platform focuses on quantifying emerging risks such as PFAS, climate change and opioids. "Our research seeks to address the question of how an emerging risk might translate into systemic losses and how we can construct a model to quantify those losses based on key parameters," the company's senior vice-president for casualty analytics, Eric Gesick, tells *Insurance Day*.

Verisk's analysis incorporates, among other things, relevant litigation trends, the potential monetary damages that prospective plaintiffs could seek, and the legal, regulatory, social and other factors that could either exacerbate or mitigate liability risk, Gesick explains.

Two challenges

Gesick highlights two modelling challenges associated with emerging risks. The first is event definition and the identification of "plausible pathways" through which the risk can materialise in the future. The second is, not surprisingly, limited data.

"Emerging risks are nascent and developing and there is significant uncertainty in how these events may unfold to impact the insurance industry," Gesick says. "Who will the primary plaintiffs and defendants be? Which industries and companies will be targeted? How will current and/or future regulation affect this event? Which, if any, insurance policies will cover potential losses?"

He continues: "To answer these questions and understand how these events may develop, Verisk employs extensive research and consults with industry experts to determine the probable event narrative that serves as the basis for quantification."

On the limited data, Gesick says Verisk looks to finds "supplementary data" that can support quantification of economic losses, such as peer-reviewed academic research, government or non-governmental organisation reports and databases.

The nature of casualty risk means a potential emerging risk can quickly move from being a remote threat to something more urgent, meaning "horizon scanning" is important.

In terms of new emerging risks, Verisk is looking at the expansion of PFAS litigation beyond the US to jurisdictions such as Europe "in anticipation for a future PFAS emerging risk model". It is also expanding its suite of climate change-related scenarios, including for lawsuits alleging that company directors and advisors have mismanaged or failed to disclose material climate-related risks.

Praedicat is looking at issues such as greenwashing and climate liability, among others, Lewis says. "There is a very broad spectrum of risks with varying time horizons of emergence," he says. "The velocity of development of risks varies enormously. Some are very slow burning and never really take off and some will unexpectedly blow up out of nowhere."■

"There's a lot of ambiguity around coverage and, until it is tested in court, we have no idea if [the harm] is going to be covered or not"

Matthew Lewis
Praedicat

Sheltered from the storm: insurance and the macroeconomy

Roman Milert/Alamy Stock Photo

Although insurers have struggled with inflation, the sector is resilient to economic downturns

Macroeconomics, by its very definition, touches every sector of the economy and its primary indicators – GDP, inflation and unemployment – are relevant to virtually every business, from the largest banks to the smallest coffee stall, *writes Ben Margulies.*

Broader economic patterns affect the insurance sector differently – demand for many insurance products does not vary much during economic downturns and insurers are less vulnerable to shifts in credit markets and asset prices than other parts of the financial sector.

However, insurers are only partly insulated from the business cycle. Inflation has been a serious drag on insurers' profits as claims have risen. Low growth limits business expansion. And the shocks that shape the wider economy – the Covid-19 pandemic, multiple potential or actual wars and climate change – have specific costs for insurers.

What follows is a short tour d'horizon of the contemporary macroeconomic picture, with commentary from leading economists and analysts working in the insurance sector.

The big picture and insurance

The near future promises a more stable, if not especially vibrant, economic environment. Macroeconomic forecasts for 2024 and 2025 tend to foresee moderate growth. The International Monetary Fund's (IMF) *World Economic Outlook* report for April 2024 predicted the global economy would grow 3.2% both in 2024 and 2025, the same rate as in 2023. Advanced economies will grow more slowly at 1.7% in 2024 and 1.8% in 2025.

The Swiss Re Institute is slightly more pessimistic. In its July 2024 *sigma* report, it predicted global growth of 2.7% in 2024 and 2.8% in 2025, with the 2024 figures for the US and eurozone at 2.5% and 0.7% (the IMF expects 2.7% and 0.8% respectively).

Insurers are more protected from the business cycle than other parts of the financial services sector. Demand for insurance (or at least some kinds of insurance) is more inelastic than for bank credit or securities and insurers tend to carry large reserves and invest conservatively.

Ludovic Subran, chief economist at Allianz, says insurers sell more policies when the economy is growing, just as other businesses see higher sales. Nadja Dreff, senior vice-president at rating agency Morningstar DBRS, says: "In [a] mature insurance market such as the US, Canada and western Europe, the variation

"When the going gets tough, premium growth decouples from the general economic development… that's why insurance is, to a great extent, immunised against liquidity problems, even in a severe downturn, and stays resilient"

Ludovic Subran
Allianz

on insurance demand is mostly tied up to population and GDP growth."

But, Subran continues, "when the going gets tough, premium growth decouples from the general economic development", because individual and business policyholders cannot drop most kinds of insurance. "That's why insurance is, to a great extent, immunised against liquidity problems, even in a severe downturn, and stays resilient."

Jérôme Haegeli, group chief economist at Swiss Re, says the insurance sector is "moderately sensitive" to the business cycle through rises and falls in demand.

However, demand for general insurance may rise when the economy does poorly. "Non-life insurance lines of business are in some ways counter-cyclical, as demand for insurance tends to increase when uncertainty is high or households and businesses feel less secure about the economic outlook," Haegeli tells *Insurance Day*.

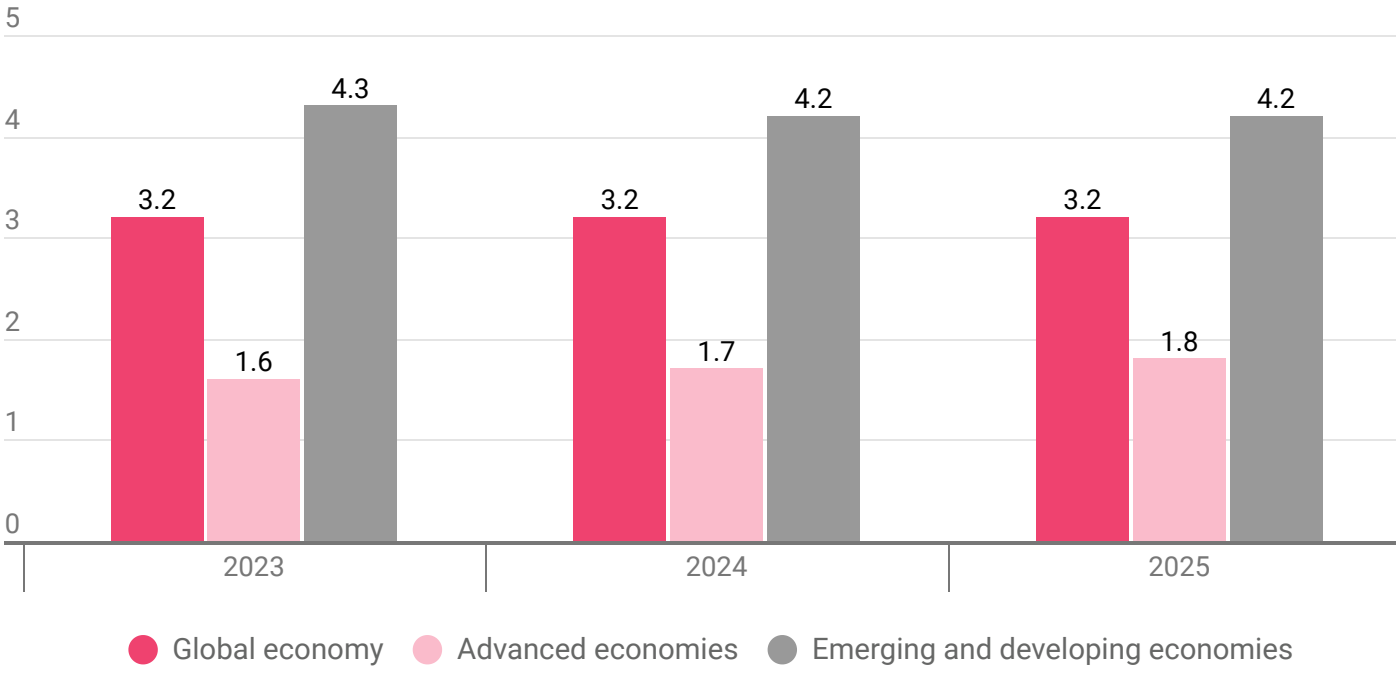
Brandan Holmes, vice-president and senior credit officer at rating agency Moody's, says commercial insurers may be "more susceptible" to business cycle fluctuations, "particularly when firms downsize during an economic downturn". Insurers with geographically dispersed operations or broad portfolios are less exposed, he adds.

Federico Faccio, senior director at Fitch Ratings, agrees insurance "is a bit anticyclical". Life insurers and pensions are more exposed to the business cycle, Faccio adds, since the unemployed do not pay into private pensions and workers may reduce their savings during a downturn.

Faccio says life insurers can benefit during downturns from "some flight to quality" because they are so conservatively governed and resilient. "Essentially they are receiving money because they are seen as safe organisations," he says.

IMF predicts slow but steady economic growth over the next 18 months

Graph: Real GDP growth in world, advanced and developing economies, 2023 to 2025 (%)



Source: International Monetary Fund

Inflation

The early 2020s have witnessed the biggest inflationary shock in 40 years, in large part because the Covid pandemic and the Russia-Ukraine war have so disrupted global supply chains. Year-on-year consumer price inflation reached double digits in the eurozone and the UK in the autumn of 2022, while US inflation peaked at 9.1% that June.

Inflation has eased across the developed world – the IMF expects it to average 2.6% this year and 2.1% in 2025. Swiss Re estimates inflation will average 2.7% in the eurozone, US and Japan in 2024, falling to 2.4% in the US, 2.1% in the eurozone and 1.7% in Japan in 2025.

However, inflation remains a bit above the 2% target set by most central banks in several jurisdictions. The June 2024 year-on-year consumer price index reading for the US was 3%, while the eurozone recorded 2.5%.

Dreff says carriers can usually pass on inflation costs to policyholders, "provided the insurance business cycle is not soft". She says insurers are more concerned about whether "inflation expectations are matched to actual inflation levels" than they are about current inflation readings. "Inflation predictability is more important since it allows the insurers to pass on the cost increases to consumers through higher premiums," she says.

According to Haegeli, disinflation has eased pressure on general insurers by "reversing the spike in claims severity seen in the past two years". This is most pronounced in the two biggest sectors of the property/casualty space: motor and construction.

Subran says the main challenge for the insurance sector was the sudden spike in inflation in the period from 2021 to 2023, caused by supply chain disruptions, Russia's invasion of Ukraine and "very generous fiscal support measures".

Allianz expects "a more constrained, less volatile inflation environment for the foreseeable future", although "inflation might be structurally higher – or more sticky".

Inflation is falling slowly in the US and could resurge more generally, Haegeli says, either because of renewed external shocks or premature interest rate cuts. "Services inflation is still above what is compatible with a return to 2% central bank targets," he observes.

Faccio says insurers do not seem concerned about a recurrence of inflationary pressures in developed countries. In part, this is because they expect central banks to keep policy rates relatively high, but Faccio points out premiums have risen sufficiently to compensate for higher prices. However, in its 2023 report, Swiss Re warned disinflation had not overcome "challenging claims dynamics".

Holmes tells *Insurance Day* "while lower inflation generally benefits the insurance sector", it can also make it easier for customers to reject necessary increases in premiums, "potentially working against insurers". He adds personal and commercial lines insurers have been able to adjust prices to compensate for inflation.

Swiss Re predicts steady growth in insurance premiums in most markets

Table: Top 10 insurance markets by total premium, 2023 to 2025 ($bn)

Country	2023	2024*	2025**	Market share (%)
US	3,227	3,424	3,584	44.9
China	724	812	893	10.1
UK	375	401	420	5.2
Japan	363	370	382	5.0
France	283	292	303	3.9
Germany	245	255	264	3.4
South Korea	186	194	205	2.6
Canada	171	176	185	2.4
Italy	159	165	171	2.2
India	136	149	162	1.9

* estimated ** forecast

Source: Swiss Re Institute

Dreff believes insurers have little to worry about from inflation "as long as there are no surprises in terms of actual versus expected inflation".

Monetary policy

Central banks in advanced and emerging markets have raised their policy interest rates to slow the circulation and expansion of money and thus dampen inflation. In the US, the Federal Reserve raised its fed funds rate from between zero and 0.25% to between 5.25% and 5.5%, with other central banks in developed countries making increases on a similar scale.

These increases mean insurers may enjoy higher returns on some assets, but they also devalue the underlying value of some long-term government bonds. High interest rates also make credit more expensive and dampen investment. This should allow central banks to begin cutting their rates, because central banks in developed countries generally try to steer inflation to a target of 2% annually. The European Central Bank and the Bank of Canada have already lowered interest rates this year, albeit modestly.

In the banking sector, monetary policy is an important determinant of credit capacity – higher interest rates reduce the amount of credit available by making it more expensive. Interest rates do not exercise a similar influence over capital availability in insurance. Faccio tells *Insurance Day*: "If you think about reinsurance or companies that underwrite risks, the capacity they provide has to do with the pricing and to a lesser extent the level of interest rates."

Holmes adds: "Higher interest rates… can enhance insurers' economic capital levels – for example, Solvency II – and boost investment income."

Faccio says high interest rates give insurers the cushion of added investment income. This can subsidise somewhat lower premiums if insurers want to expand market share, although in general insurers in mature markets will maintain fairly strict underwriting discipline. In the end, insurers rely primarily on premiums. "I don't think companies in developed markets heavily rely on investment income," he adds.

Haegeli argues interest rates will probably not return to the unusually low levels of the 2010s. "We expect advanced markets' interest rates to remain higher for longer, with monetary policy normalising rather than easing this year and next," he says, adding services inflation has remained fairly high. "Emerging markets, in contrast, have loosened policy earlier than advanced markets, given more muted inflation pressure and greater headroom to stimulate economic growth," Haegeli continues. Chile, for example, has lowered its policy rate from 11.25% to 5.75% since last year (it has since dropped it to 5.5%).

Subran agrees interest rates will remain relatively high, but at "a level where we don't see major impacts on our business".

Fiscal policy

Since 2010, many discussions of fiscal policy have been dominated by "austerity". This term refers to a government policy aimed at reducing fiscal deficits and public debt by cutting public spending and (perhaps less often) raising taxes.

Austerity policies often struggle to attain these goals, especially during recessions because, by depressing economic demand, austerity may reduce tax revenues, increase social spending and cause increases in debt-to-GDP ratios. In any case, the pandemic and subsequent supply shocks forced governments into expanding deficit spending and taking on more debt.

Some expect these heavy debt loads to force states to adopt austerity anew. EU rules usually limit deficits to 3% of GDP and debt to 60% of GDP, although these rules were suspended between 2020 and 2023. Other states may be compelled to adopt austerity if they cannot easily borrow or devalue their currency or as a condition of loans from agencies such as the IMF.

Subran argues the insurance sector is somewhat exposed to shifts in fiscal policy. While "monetary policy and extreme weather events have a more direct, immediate impact", fiscal policy is a factor over longer terms because of the centrality of the state in investment. Haegeli cautions some of this spending may be announced, but the resulting infrastructure or programmes may never be fully realised.

Haegeli says he expects "fiscal tightening will be a key theme of the coming years as the large fiscal deficits that funded major stimulus during the pandemic and recovery

"Non-life insurance lines of business are in some ways counter-cyclical, as demand for insurance tends to increase when uncertainty is high or households and businesses feel less secure about the economic outlook"

Jérôme Haegeli
Swiss Re

years have to be unwound." He does not expect any major fiscal policy changes in the US before the presidential election in November and its "fiscal deficit is projected to remain high for the next two to three years".

Subran identifies a dilemma – "fiscal discipline should be the order of the day", but states cannot afford it because they must address global warming, cyber security and geopolitical problems. Nor can politicians embrace cuts, as "2024 is an election year", so "there are no serious plans on the table". The Allianz economist expects the US to "muddle through", while he foresees renewed conflict between northern and southern EU member states over spending policies.

Thomas Torgerson, managing director for global sovereign ratings at Morningstar DBRS, does not expect a wave of austerity packages. "Several major economies – for example, the US and France – are likely to need to take actions to reduce structural fiscal deficits in coming years," he says, but few governments will want to take action during a busy electoral calendar.

Faccio says austerity can create opportunities for insurers to provide cover that substitutes public provision. However, he agrees insurers cannot substitute for government action in many policy areas because there is no feasible business model for providing solely private insurance cover.

"There are always discussions about to what extent the insurance industry can substitute services provided by individual states and the answer generally is they cannot in full or they cannot absorb risks that do not imply a solution, which is a core sharing of some of these benefits between the public and the private," he says.

Roman Sigaev/Alamy Stock Photo

Downside risks

According to its 2023 report, Swiss Re sees "(geo)politics playing a dominant role in driving the outlook", mentioning the Middle East conflict and "more assertive industrial policy" among these risks. The re/insurer also warned of general economic sluggishness across many developed and emerging markets.

Munich Re's *Economic Outlook 2024* came to a similar conclusion, saying "risks to the growth outlook are tilted to the downside" and "geopolitics will remain an important risk factor for the world economy".

It also mentions recession and stubborn inflation as potential dangers.

Haegeli cites "recession risk as the major downside macro risk in the near term", alongside a renewed acceleration of inflation. "Lower economic growth and higher unemployment would hinder insurance premium growth and raise corporate defaults," he says.

He is also concerned about political instability, pointing out how divisive politics have become a feature of much of the West. "The potential for higher trade tariffs, violence and less global co-operation challenge insurers' operating environment," he says.

Torgerson says Morningstar DBRS expects geopolitical risks to increase "only modestly", adding the US elections could create instability should the results create doubts about the superpower's role in the world.

Subran's list of major downside risks is perhaps more concise: "Climate change, of course."■

"There are always discussions about to what extent the insurance industry can substitute services provided by individual states and the answer generally is they cannot in full or they cannot absorb risks that do not imply a solution"

Federico Faccio
Fitch Ratings

Can we insure every link in the supply chain?

Insurers can do a lot to promote the resilience of supply chains, but they will remain complicated and vulnerable in a globalised market

Supply chain disruptions have played an outsized role in the global economy since the start of this decade, *writes Ben Margulies.*

sleepyfellow/Alamy Stock Photo

They were a major cause of the inflationary surge that struck both advanced and emerging economies starting in 2021, as the pandemic and then the Russia-Ukraine war created supply bottlenecks, overburdened transport networks and physically closed down or destroyed infrastructure. The ongoing Gaza conflict has created new risks to shipping in and around the Red Sea.

In a presentation in July, Kera McDonald, chief underwriting officer at Swiss Re Corporate Solutions, said "it is estimated within a 10-year timeframe, supply chain disruption could erode close to half a year's profits for corporates". The same month, a faulty software update released by US cyber security provider CrowdStrike caused global IT outages, especially for airlines and airports.

Some observers and business leaders say a shorter supply chain is a stronger one, calling for production to be moved nearer to consumers. Others focus on developing a wider range of suppliers or reviving the practice of keeping bigger inventories on hand.

Insurers are certainly alive to the risks posed by supply chain disruptions. However, as Stephen Smyth, head of marine at SiriusPoint, points out, insurance can only compensate for discrete, quantifiable risks. A supply chain is a complex system, embedded within a network of other complex systems – so, however much insurers may want to make them more robust, there is only so much they can do.

The meaning of resilience

Smyth, who also heads SiriusPoint's Lloyd's syndicate 1945, says any discussion about what constitutes a "resilient" supply chain is complicated by the fact there is no common definition of either resilience or supply chain. Any understanding of the terms will vary from industry to industry and business to business. "They have to understand what the drivers of their supply chain risk are and it will be different for all of them," he says.

Other industry figures are willing to venture definitions, usually equating resilience to the ability to keep production going and quickly recover from stoppages.

International Union of Marine Insurance (Iumi) executive committee member, Matthias Kirchner, cargo committee chair, Mike Brews, and vice-chair, Howard Potter, define a resilient supply chain as one that is able to "quickly adapt to disruptions while maintaining continuous operations and safeguarding its key processes".

"Resilience implies the ability to withstand, respond to and recover from disruptions efficiently. It is characterised by flexibility, agility and robustness," they add.

Ricardo González, director of sectoral and regulation research at Mapfre Economics, gives a similar definition: "A resilient supply chain could be defined as one able to ensure continuity of operations, respond effectively to disruptions and recover to normal performance levels in a short period of time."

González says there are several quantitative resilience metrics, including "time to recovery, inventory levels, supplier risk scores [and] supplier diversification", and adds some insurers and consultants have developed qualitative evaluation tools as well.

Rainer Stark, senior corporate un-

derwriter at Munich Re, says "resilience, as the ability to withstand or quickly recover from unexpected supply chain disruptions, is largely characterised by the availability of mitigation options for the affected companies". These may include keeping ample reserves and using multiple suppliers.

Iain Willis, research director at the Gallagher Research Centre, emphasises the need for "redundancy", meaning having substitute suppliers and supply routes. "You build [resilience] into supply chains to make sure [for] any critical points of failure... you have other choices, you have other supply chain routes or you have diversified suppliers," he says.

Insurtech managing general agent Loadsure describes its role as "insuring the supply chain through its unique holistic freight protection offering". Its chief executive, Johnny McCord, says one way to measure resilience is by the number of resources a company commits to managing risk. "What's most important for us in defining that resilient supply chain is obviously looking at where investment has been made in that active risk management practice," he says.

Risk assessments

The difference between risk and uncertainty is risk can be measured and mapped. Ed Parker, departmental head of special risks at Tokio Marine Kiln, says observers can easily identify a company with a fragile supply chain from loss statistics. "Those that did their due diligence and protected themselves by having a number of potential suppliers find themselves in a strong position from a risk management perspective," he tells *Insurance Day*.

Alastair Blundell, head of general insurance at the British Insurance Brokers' Association, says "a supply chain must be visible and mapped out" – insurers must look past their immediate supply partners. "The supply chain has to be measurable and quantifiable if adequate insurance is to be purchased," he says.

Stark agrees firms must have a global view of their supply chain and all its components. "Knowledge of the entire supply chain at all levels from the raw material to the end product (so-called sub-tier visibility or end-to-end visibility) is a prerequisite for recognising potential bottlenecks and being able to react quickly to challenges," he says.

However, few businesses can do this effectively. Carlos Gomez, head of insurance at Generali Corporate & Commercial, and Pedro Ruano, head of claims, say: "Large companies generally understand who their tier 1 suppliers are, meaning those they buy from directly." But understanding the supply matrix beyond this is "weaker". "Few major companies know the reliance and possible impact of their full supply chain," they say.

"The disruption primarily occurs in that sort of complex, multi-layered supply chain, where production is reliant on multiple suppliers across different locations around the world"

Johnny McCord
Loadsure

Although businesses may map their supply chains differently, Smyth says there is a common method for evaluating operational threats to them. He is referring to the Pestel framework, which examines political, economic, social, technological, environmental and legal risks.

Willis and his team map risks at a macro level before calculating the vulnerabilities faced by a single firm. His approach is to map risk by mapping potential threats, and then the supply infrastructure as a whole, data which he can then apply to assess the weaknesses in a single supply chain.

Where are risks greatest?

Smyth says supply chain risks are universal. "Resilience affects every business sector," he says. Every business and organisation must "plan and then test the plan".

However, some industries are more vulnerable than others. Multiple respondents mention the automotive industry as especially sensitive to supply chain disruptions.

Iumi mentions industries that source parts from multiple international sources, like technology and automotive production; those which rely on "just-in-time" deliveries rather than inventories, like retail; and those where both conditions apply, like some kinds of manufacturing.

González mentions the automotive and retail sectors, alongside energy, construction and food and beverages processing, while Stark says the automotive sector is "the most vulnerable", followed by electronics, pharmaceuticals and chemicals.

Amelia Lorenzo, head of foresight risk and modelling at Swiss Re, says "all sectors with long, complex and global supply chains are vulnerable". McCord agrees. "The disruption primarily occurs in that sort of complex, multi-layered supply chain, where production is reliant on multiple suppliers across different locations around the world," he tells *Insurance Day*.

If production must be co-ordinated among different suppliers providing complementary components – McCord gives the example of a semiconductor for a car alarm – any failure in one part of the system can cause other parts of the production circuit to break down.

How to compensate

There are many ways to reduce supply chain risks. Some experts recommend using multiple suppliers for various components – the "redundancy" Willis mentions. Smyth gives the example of a UK mango chutney producer obtaining all its fruit from Madagascar, which then transports the crop with a single freighter.

The Iumi experts mention a number of strategies companies use to make supply chains more dependable, including contracting with suppliers in multiple countries or regions, increasing inventories of key inputs and the "increased use of automation and advanced manufacturing technologies to make local production more viable".

But McCord points out automation carries its own risks, leaving key production, transport and administrative systems vulnerable to system failures or cyber attacks. He highlights the number of ransomware attacks on manufacturing and logistics concerns and hackers targeting energy company infrastructure.

Diversification may also be problematic, as some materials largely come from one country or supplier. Willis points out the war-torn Democratic Republic of the Congo, for example, provides most of the world's cobalt. He adds global production and trade are often highly concentrated – one-quarter of China's exports are from a single megalopolis: the Pearl River Delta area.

Some observers believe companies will be able to address supply chain vulnerabilities through "nearshoring", which is the practice of either moving manufacturing or obtaining inputs nearer to the home market. This avoids some transport disruptions and allows businesses to avoid potential geopolitical risk – for example, a firm may move production from China because of fears of trade wars or possible conflict with Taiwan.

González says many firms are adopting a "China plus-one" strategy, adding new manufacturing sites without abandoning China altogether. US firms are moving some production to Mexico. "However, this transition faces challenges such as underdeveloped infrastructure and transition costs, including the need for skilled labour and managing the transition from existing suppliers to new ones."

Lorenzo agrees nearshoring is happening due to US-China trade disputes, but this has not had an appreciable impact on the co-dependence of the two global economic superpowers. "Besides, a full disentanglement, if at all possible, would be very costly," Lorenzo adds, saying many potential destinations for firms exiting China are themselves becoming costlier places to produce. That cost, Willis says, means nearshoring or reshoring are more often strategies for very large companies, like automakers or tech giants such as Apple.

Most companies have looked into nearshoring production, Smyth says, and some have moved their production. However, moving production can be enormously costly, given the need for new capital investments, workforce training and the potential that quality could at least temporarily decline. "It's something that I think we will continue to see, but I can't see it being widespread," Smyth adds.

Role (and limitations) of insurance

Insurance is a vital guard against specific adverse events. In Smyth's mango chutney example, should the mangoes go down with the freighter, the insurers can provide cash to purchase more mangoes. What insurers cannot do is cover the myriad contingent and systemic risks that collectively threaten the resilience of a supply chain or the diffuse losses that may – often indirectly – result from them.

Iumi's experts, for example, point out marine insurance is only proof against physical losses. It does not apply "for purely economic losses such as those caused by supply chain interruptions" without some connection to tangible damage to hull or cargo.

Stark agrees insurance cannot provide total protection against a systemic supply chain failure. "If 'sufficient insurance' is taken to mean a full cover for worst-case scenarios, the insurance cannot usually compensate for the full financial impact of such an event," he says.

Some categories of risk are simply beyond what insurers can cover. "For example, cyber war and con-

"A resilient supply chain could be defined as one able to ensure continuity of operations, respond effectively to disruptions and recover to normal performance levels in a short period of time"

Ricardo González
Mapfre Economics

ventional war are largely excluded. Pandemic risk [is] also uninsurable," Blundell says.

Willis says business interruption insurance – which corporations commonly buy – will pay out for prolonged stoppages if there is a direct cause-and-effect relationship between the peril and the stoppage. This is useful when a storm hits a factory.

However, business interruption insurance will not cover indirect perils and supply chain disruption often falls into this category – that is, if a storm knocks out a supplier's factory, tough luck. In those cases, businesses need contingent business interruption insurance, but many companies "don't purchase it because they're not aware of their policy terms as well as they could be", he says.

Willis adds: "I think definitely there's an educational piece there for the insurance industry and for advisers like us."

There is also trade disruption insurance, Smyth adds, but it is very rare, with "very limited appetite in the market". There are almost innumerable ways a supply chain can get tangled, so this kind of cover is "very hard to model".

Thus, broadly speaking, companies will often lack sufficient cover to secure their supply chains. "We don't think in general terms major companies will carry enough insurance to compensate for supply chain disruptions," Gomez and Ruano say. "All markets could be undersubscribed because of the complexity of the supply chain."

Blundell adds a warning: "The gap between 'economic risk' and 'insurable risk' is widening as some supply chains become more unwieldy and new perils like cyber attacks and climate change emerge."

Nudges and whispers

Insurers can encourage their existing or potential clients to fortify their supply chains in a number of ways – through advice, investment and, as in any insurance transaction, through pricing and terms.

Returning to the chutney manufacturer example, Smyth says an insurer might advise it to charter a newer freighter or ship some of its cargo by air. "There's various ways and means and so we can, of course, advise and give our opinion," he says.

Parker also stresses the role of insurers as sources of good counsel. "Insurers need to maintain an open dialogue with clients, share examples of best practice and ensure businesses are aware of emerging threats before they become full-blown risks," he says.

As part of its ambition to provide "holistic freight protection", Loadsure also offers risk management advice to clients. "We want to ensure our clients are aware of their exposures and identify those exposures with them and give them what we refer to as active risk management, first and foremost, supported by the risk transfer mechanism," McCord says.

Lorenzo stresses carriers can employ premium rates and policy terms to influence clients, being stricter with firms that fail to secure their supply chains. "By adding an adequate price tag to the risk, the insurance industry can demonstrate that not investing in supply chain resilience also comes at a price," she says. McCord says Loadsure incorporates risk assessment measurements into its pricing algorithm.

Carriers can tailor their offerings to cover protection gaps. The Iumi experts mention "policies that cover specific supply chain risks such as cyber disruptions or political risks". However, as Willis points out, many corporate clients are unaware of such products.

Insurers can also use their balance sheets and underwriting to buttress supply chains. González says insurers can use the asset side of their portfolios to encourage good supply chain management as well, "prioritising companies that demonstrate strong supply chain resilience" and declining to invest in those that do not. "Ecologically sound investment policies will speed up the march to net zero" and thus mitigate global warming and reduce pressure on supply chains from severe weather, the Iumi experts say.

Gomez and Ruano say insurers can "quantify savings on insurance premium by demonstrating the business has a resilient supply chain in place". Insurers can also provide funding for improvements directly, through "bursaries for improved resilience – that is, technology solutions for supply chain management".

More generally, insurers and other financial firms can reduce supply risks by funding infrastructure and green investment. McCord mentions the financial sector plays a major role generally in investing in infrastructure hardening, disaster preparedness and green enterprises and projects.■

"By adding an adequate price tag to the risk, the insurance industry can demonstrate that not investing in supply chain resilience also comes at a price"

Amelia Lorenzo
Swiss Re

The juncture between product and environment

As the concept of environmental liability widens, so too does the scope of coverage

sleepyfellow/Alamy Stock Photo

There is no uniform definition of environmental liability and instead re/insurers must consider the variety of definitions provided by different jurisdictions, according to Ina Ebert, leading expert for liability and insurance law, at Munich Re, *writes Louise Isted.*

Such definitions can be found in public statutory law, civil law or common law and some are broader than others, but they usually require that the causal chain between tortfeasor and victim somehow involves the "environment" – namely, air, soil, water, flora, fauna, biodiversity, local or global climate. Some definitions include indoor air, chemicals released by building materials or fire.

Similarly, the definition of "environmental damage" can vary, Ebert adds. Usually, definitions cover property damage, bodily injury and pure financial loss sustained by a third party. However, damage to land, water, natural resources, protected species or biodiversity might also be included.

"While fault-based liability under tort law is an option in all jurisdictions, many jurisdictions have additionally introduced specific regulation addressing some varieties of environmental liability," Ebert tells *Insurance Day*. Examples are the Comprehensive Environmental Response, Compensation and Liability Act and the Oil Pollution Act in the US or the Environmental Liability Directive in the EU.

Ebert explains: "Such specific regulation usually introduces some form of strict liability or shifts in the burden of proof. It might also broaden the scope of compensable losses, such as to biodiversity or loss of nature, or the scope of available remedies, such as abatement measures or compensatory measures for environmental losses that cannot be restored."

Some jurisdictions, including France, Spain, Italy and the Netherlands, have also introduced pools for certain environmental losses. "Apart from that, thresholds for (potentially) hazardous substances and other limitations regarding their use can vary significantly," Ebert says.

Finally, differences relevant for enforcing liability claims in general also affect environmental liability, she adds. This ranges from the existence of a loser-pays principle, punitive damages or a jury system to provisions regarding litigation funding.

Range of products

Environmental liability can be covered by a broad range of insurance products, Ebert notes.

Especially in less mature markets with no specific market solutions for environmental liability, liability for sudden and accidental pollution incidents could be covered under general liability policies. Certain professional indemnity policies, such as for engineers, could cover planning errors that caused environmental damage. Motor policies could cover environmental damage, like a leakage of fuel.

For mature markets, there is a variety of insurance products available specifically designed for environmental liability risks and adjusted to the specific jurisdiction, Ebert says. These products range from environmental impairment liability site policies to policies for storage tanks, contractors pollution liability and landfill closure/post closure. Some environmental liability policies may extend to first-party clean-up and remediation costs under public law.

Munich Re addresses environmental liability coverage by seeing careful risk selection as of "utmost importance", Ebert stresses.

She explains: "Munich Re aligns and co-operates with expert environmental liability insurers, preferably with established environmental liability portfolios. We require a total or absolute pollution exclusion, with write-

backs limited to named perils and/or a time element for US-exposed risks, and gradual pollution exclusions for non-US risks."

Established environmental liability risks include, Ebert says, the accidental pollution or contamination of (ground)water, air, soil, property or wildlife with hazardous or potentially hazardous substances. This frequently involves landfills, superfund sites, waste incineration plants, chemical or petrochemical plants or refineries, pipelines, oil refineries or mining activities.

Ebert continues: "Both the pollution/contamination and the arising damage can be sudden, as for example when caused by a fire, explosion, collapse or flood. However, if unnoticed, the pollution can also continue over a longer period of time. After the accidental release of carcinogenic substances, it might take decades until the bodily injury caused becomes apparent."

A lesson learned about environmental liability among re/insurers is to avoid hidden pollution conditions and shorten the development time of claims.

"This is not just about uncertainties related to inflation. Requiring a claims-made trigger shortens the latency period and avoids the stacking of multiple policy years for the same loss," Ebert says.

"Methods to measure pollution change, the density of regulation increases, options to link injuries to specific substances improve and legal thresholds for (potentially) hazardous substances are lowered. You have to be able to adjust your policies to this," she adds.

Another lesson would be how crucial precise, unambiguous wordings are when defining what is to be covered, and how to allocate potential losses.

The development of the pollution exclusion is a good example of the difficulties insurers can face in this regard, Ebert says, adding it is also essential to exclude gradual pollution from normal operations.

A third lesson is that some environmental insurance products turn out to be so unprofitable, they are hardly offered anymore, Ebert says, adding that cost cap policies, which cover the over-run of estimated costs for individual remediation policies, would be a good example of this.

Traditional environmental liability risks are limited to a certain region and a recent trend is the attempt to use liability to address threats to society on a global scale. An example of this is climate change litigation.

"While the vast majority of such claims is about raising public awareness or pressuring legislators into action, there is a growing number of claims for some kind of payment," Ebert says. "As far as these claims are based on legal and intended activities, GHG [greenhouse gas] emissions as such, tort law is not an adequate tool, let alone liability insurance," she stresses.

Intentional wrongdoing – such as greenwashing – is also not covered. However, claims based on negligence, ranging from non-compliance with reporting duties to not sufficiently considering the consequences of climate change when designing a product, might be covered. "The complicated, constantly changing, legal framework for these issues and increased public awareness add to the risks involved," Ebert says.

Munich Re is "closely monitoring" all relevant developments to evaluate which actions are needed. For this, it uses its extensive global network of internal experts and external counsel.

Ebert explains: "We check wordings for clarifications that might seem useful. For example, Munich Re promotes climate change litigation exclusions for the general, product and environmental liability policies of large fossil fuel producers and power utilities. It might also become necessary to reconsider the appetite for certain risks. Finally, we ensure that our clients are aware of any emerging risks."

Tighter regulation

Environmental liability is moving in one direction – to a world of tighter regulation – and underwriters must be ready for new claims "cropping up in unexpected places", warns Neil Beresford, a partner at Clyde & Co. A fellow traveller on that journey is the widening scope of this risk.

Beresford has been handling environmental claims since the mid-2000s when, he says, some insurers started issuing "mass market" environmental liability policies. Head of the law firm's global product liability and re-

"Such specific regulation [might] broaden the scope of compensable losses, such as to biodiversity or loss of nature, or the scope of available remedies, such as abatement measures or compensatory measures for environmental losses that cannot be restored"

Ina Ebert
Munich Re

call practice, Beresford has observed the emergence of a "juncture" over the past decade between product liability and environmental liability.

Another "defective" product at the border of environmental and product liability is polyfluoroalkyl substances (PFAS), Beresford continues, adding he has been doing a lot of work on claims related to polychlorinated biphenyls, a group of man-made organic chemicals consisting of carbon, hydrogen and chlorine atoms.

He also has a number of "pure" environmental liability cases now at an international level. He is involved in $7bn of claims in Peru, following the escape of 11,000 barrels of oil in January 2022. As well as overlapping environmental and produce liability, these claims have the "side effect" of requiring careful policy wording for insurers, an area where Clyde & Co is "looking to dabble in".

Directors' and officers' (D&O) liability is "another juncture and increasingly so" for environmental liability. Again, the most obvious example is climate risk. Beresford highlights the legal action getting under way in France, involving the directors of Total and alleged criminal liability arising from environmental torts. Another example, he adds, is the claim brought by ClientEarth against the directors of Shell.

"Environmental liability now overlaps with product liability, D&O and also public liability because, if you take the Peruvian incident, there are several hundreds of millions of dollars of clean-up involved. On top of that there are several billion dollars of alleged liability to fishermen, restaurants, hotels, and people living in the surrounding area," Beresford says. "And because environmental liability insurance is an unusual beast, it creates overlap with first-party coverages such as all-risks property insurance," he adds.

Clyde & Co is working on a claim involving a government Beresford declines to identify, where the firm's client is "responsible for utilities which have become polluted". He explains: "There's an interesting discussion to be had. Is the utility infrastructure 'damaged' for the purpose of a property policy, or does it require clean-up for the purpose of an environmental liability coverage?"

Environmental liability is therefore becoming "increasingly difficult" for insurers to define. The origin of this trend Beresford points to, is the Environmental Liability Directive (ELD) that entered into force in 2007. The directive established a comprehensive EU-wide liability regime for environmental damage based on the "polluter-pays" principle.

"Environmental liability had a clearly defined meaning: it was spills, it was releases, it was pollution, and, in insurance policies, it was built around the idea that environmental liability is something that happens locally," he says.

"Although there are certain basic principles about protecting the environment and that the 'polluter pays', the divergent variety of claims, and the divergence of quantum, really is quite striking"

Neil Beresford
Clyde & Co

Beresford says the big difference between geographically limited liability and public liability was always twofold. "Firstly, environmental liability had a first-party element to it, so it covered your own clean-up as well as your liability to other people. And secondly, it covered long-term incidence, so gradual pollution. Public liability insurance was limited to sudden and accidental events."

The ELD has meant that, over the past 20 years, "everything now has an environmental angle to it".

"In the context of product liability, if NGOs [non-governmental organisations] are suing Big Oil, is that a product liability or is it environmental liability? They are suing in respect of consequences which have a global impact and based upon allegations of a defective product."

The eight plaintiffs in the case against Total are from a range of different countries and are arguing they have lost relatives because of climate change. Notably, their claims are being presented by environmental NGOs.

"Not only has the geographical extent of environmental liability spread out, the substantive nature of it has also expanded because you're no longer looking only at the primary polluter – the guy who empties the hydrocarbon into the aquifer. You're also looking at the manufacturer of the hydrocarbon, which is making environmental liability much more expansive than it was when the ELD came in."

Widening coverage

As the concept of environmental liability widens, the scope of coverage has been expanding outwards. "Now you're seeing policies with all sorts of bells and whistles," Beresford says, pointing to the mitigation costs that accompanied the Covid-19 pandemic.

"Certain policyholders were arguing that Covid was a form of pollution because it contaminates premises, and that daily cleaning was required to effect decontamination. They were

looking to pass off daily sanitation regimes as 'mitigation'."

Other additions for underwriters of environmental liability are business interruption, cargo, contractor's liability and premises pollution liability. "So, the coverage has evolved into being much more complicated than it was when the Environmental Liability Directive was first passed," Beresford says.

As for differences between jurisdictions on what constitutes environmental liability, Beresford says there has been "no real attempt" to harmonise legislation. "When you look around the world, you see just how divergent environmental laws remain."

China's work on environmental regulation is "often underestimated", Beresford stresses, because that country "now has some of the world's strictest environmental laws governing local pollution to air, water and land, as well as very strict enforcement mechanisms".

"Much of that was introduced after the Beijing Olympics, when the smog was a real source of public concern," Beresford explains. "The government introduced a triangular enforcement mechanism where local government, central government and licensed NGOs – think of that, NGOs! – all contribute to environmental enforcement. The three of them supervise each other and make sure nobody takes the foot off the pedal in terms of enforcement."

This means companies and their directors may be held criminally responsible for environmental damage and "10s of 1000s" of them have been prosecuted. China also introduced supply chain environmental liability "before the Europeans did".

The polluter-pays principle is being established around the world, but differences persist between jurisdictions. "One of the more radical claims arising from the Peruvian oil spill is from a consumer regulator. They have presented a claim for $4.5bn, on the basis that 700,000 people living within roughly a 100-km radius of the incident are all consumers of the environment. And therefore, the consumer regulator argues that it has the jurisdiction to bring an action on their behalf, seeking damages for their loss of amenity of the environment," Beresford says.

He also highlights another claim that is being presented by the criminal prosecutor. "They've said, 'You didn't incur the clean-up costs that you should have and so we're going to work out what it should have cost you to do that. We're going to compare our loss with other big events of the last 50 years, and use them as a comparator.'"

He continues: "Although there are certain basic principles about protecting the environment and that the 'polluter pays', the divergent variety of claims, and the divergence of quantum, really is quite striking. Each jurisdiction approaches the valuation of environmental loss in a very different way. That means it's very difficult to have policies which are universally applicable."

As a result, more master local insurance programmes are emerging in environmental liability, which is a trend that got under way in property liability "years ago".

Bildagentur-online/Ohde/Alamy Stock Photo

Beresford explains: "This is where a multinational company has its master policy issued in its home state, and then local policies issued around the world where it does business, to be compliant with local laws, which feed into the master policy. The advantage of doing this with an environmental programme is to ensure that the local policy is properly responsive to local law."

So rather than harmonisation of regulation between jurisdictions, is it more a case that lawyers and insurers are having to offer more bespoke and more localised coverage than they needed to before?

"Absolutely and it's just inevitable," Beresford replies, "because what you see when there's an environmental incident, is that a large number of regulators will want to become involved, and there will be a lot of different claims under different laws from different sources."

Beresford's advice is that underwriters should "engage fully" with the technical nature of environmental liability policies, such as marine and engineering.

"The quality of the consultant first on site makes a huge difference. Claims involving ecology or hydrogeology usually require niche expertise and it is often worth consulting more than one expert," he says.

"Some years ago, we were involved in a large discharge into a UK river, which killed more than 100,000 fish. The original proposals for restocking the river included the purchase and introduction of five million fish. An alternative team of experts was able to design environmental improvements that promoted a natural recovery of the population. This experience shows that there is no 'one-size-fits-all' panel of experts, and it pays to spend time finding the best expertise."

Underwriters must also understand the "local sensibilities" of a claim. "Often, the very last thing you want is

someone turning up with a truck and pump," he adds.

Beresford illustrates this point with his observation of river pollution claims against farmers in the UK, which show that the first technical question to ask is, what is the background level of contamination?

Homing in on the emerging risks with environmental liability, Clyde & Co classify environmental risks as technical and regulatory.

Beresford explains: "In our view, the most important emerging technical risks are around chemicals, such as heavy metals and PFAS, and end-of-life products, such as solar panels and lithium batteries. Regulatory risks are all around us, but clearly the most important is the green energy transition. This is important because, as legislators, regulators and judges get younger, the direction of travel will favour increasing controls."

But there is more opportunity than risk, he stresses. "As lawyers, we tend to look only at risk, whereas insurers look for the opportunity for risk transfer. For example, when solar energy technology was a new thing, many banks wouldn't lend against it because they didn't know if it would comply with product standards. Some insurers went out of their way to understand the new technology and backed performance guarantees which were a very successful product."

Crucial across sectors

Environmental liability provides coverage for pollution and environmental damage caused by a company's ongoing activities or their liability for past pollution, Emma Bartolo, global segment leader for environmental risk insurance at Scor, tells *Insurance Day*.

This includes both first-party and third-party liabilities, as well as regulatory imposed clean-up or liabilities. Additionally, it covers business interruption, transportation liability, crisis management costs, and more, focusing on pollution and environmental damage resulting from insured operations.

Environmental liability coverage is crucial for businesses across various sectors to manage the financial risks associated with environmental damage and regulatory compliance.

Bartolo explains: "Activities like oil refineries and other heavy industry such as chemical manufacturing may be the first that come to mind – and ensuring that any environmental damages arising from these operations can be mitigated and the ecosystem restored is a great example of why this coverage is so important – but every business can have an impact on their local environment to a greater or lesser extent: supermarkets, hotels, manufacturing and construction projects being just a few examples."

"Environmental liability is a key lever for ensuring the protection and integrity of important ecosystems around the world," she continues, "ensuring not only the rehabilitation of ecosystems in the case of a risk event occurring but also preventing these risks from being realised in the first place."

Most markets now have robust environmental regulations, but the effectiveness of these regulations often depends on the budget and resources allocated for enforcement. For instance, Bartolo points to Europe, North America and parts of Asia having strong regulatory frameworks that are well enforced, whereas in developing countries, such as those in Latin America and Africa, enforcement tends to be weaker because of broader societal challenges.

"The variation we see from one market to the next means the re/insurers must tailor their offering, not only to each industry and their immediate ecosystem but also to the market itself," Bartolo adds.

Scor stays informed of regulatory changes across different markets by collaborating with lawyers in key countries and through long-standing relationships with external risk engineers who specialise in the specific countries where it operates. Additionally, its participation in the International Underwriting Association's non-marine environmental committee helps it stay updated with changes in law, regulation and standards. Monitoring emerging risks, such as PFAS and climate change litigation, and adapting its underwriting process and policies accordingly, is also a critical part of the company's approach, Bartolo says. "This comprehensive strategy enables us to adapt to the dynamic regulatory landscape across different markets effectively," she adds.

Bartolo identifies the three types of environmental liability products. The first is site-based, where specific lo-

"Each business will face different risks and because – importantly – the same type of business may face different risks in different locations based on the unique local ecosystem, there are variations of these products"

Emma Bartolo
Scor

cations are insured against pollution or environmental damage resulting from current or past activities on those sites. This could be, for example, a policy that covers a specific oil refinery or it could be a supermarket, hotel, or other business operation.

Then there are contractor-specific policies, which can be project-specific, such as insuring the construction of a bridge over a set period of time or an annual contractors' policy. It works similarly to construction market policies, covering either annual contractors or project-specific activities. Finally, there are insured business products, a hybrid of the first two.

"Each business will face different risks and because – importantly – the same type of business may face different risks in different locations based on the unique local ecosystem, there are variations of these products," Bartolo says.

Tailored policies

Policies are therefore tailored for each client's needs, dependent on the risk specifics and may combine coverage for site risks, contractors' pollution, and specific coverage extensions for business interruption, transportation liability, crisis management costs, and coverage for non-owned disposal sites.

"At Scor, we work to bring innovative coverage solutions to our clients to better protect them and the ecosystems in which they operate. This means rethinking the role re/insurers can play in prevention and restoration," Bartolo says. For example, Scor recently announced the launch of NatReCo, a nature restoration and conservation insurance initiative that supports ecological restoration projects.

Another example can be seen when Scor, along with its partner Howden, launched a first-of-its-kind carbon-capture facility that covers the leakage of carbon dioxide from commercial-scale carbon capture and storage facilities. Scor is also active in renewable energy, having launched a new offshore renewable energy consortium earlier this year. Bartolo says these initiatives show, through a combination of creativity and technical expertise, Scor can play an active role in helping its partners and clients reach their environmental, social and governance (ESG) goals.

"At its core, environmental liability risks are about pollution," Bartolo says. "It all comes down to the release of contaminants into an environment. This can, of course, be metals or chemicals – and PFAS is a very topical example of that. But what we consider a 'contaminant' also depends on the industry."

In some cases, a substance may already be present naturally in the ecosystem and Scor considers anything which raises this above the background level is pollution. In other cases, the release of water into the local ecosystem can be an environmental liability risk, Bartolo says, even if not otherwise contaminated. Releasing hot water can kill micro-organisms in the environment, she adds, in which case the hot water would be considered a thermal irritant.

With momentum growing around ESG, companies are focusing much more on understanding what their risks are and how to mitigate them. Bartolo stresses the importance of keeping in mind that nearly every business or industry will have an environmental exposure. The question, she says, is how best to mitigate these risks.

"Re/insurers have an important role to play in better understanding these risks and helping our clients to identify preventative measures, in addition to recovery," Bartolo says.

"Scor is deeply committed to addressing both established and emerging environmental risks," she continues, adding the group takes a multifaceted approach, "focusing on offering comprehensive coverage, staying abreast of regulatory changes, and innovating to meet the evolving needs of our clients."

Bartolo notes that PFAS, or "forever chemicals", have garnered significant attention recently because of their persistence in the environment and potential health risks. "We are closely monitoring the science and regulatory landscape to ensure our coverage reflects the latest understanding and protections against these risks," she adds.

"The pervasive issue of microplastics in waterways and ecosystems is another area of concern and is one of the risks included in Scor's Emerging Risk Radar. While pinpointing specific sources can be challenging, we are exploring ways to address this through our policies and industry engagement," Bartolo says.

Phthalates also represent a complex risk that is not yet well understood though these chemicals pose potential health and environmental impacts. Bartolo says the industry is working to understand the implications for clients and how best to incorporate this into environmental liability offerings.

The rise in litigation related to climate change impacts is a growing area of focus and Scor is evaluating how these legal trends may influence environmental liability and how it can support its clients in navigating this evolving risk.

"For these emerging risks, just like other established and better-understood risks, prevention will always be better than mitigation," Bartolo says, adding it is important the re/insurance industry contributes its knowledge of these risks to inform ongoing conversations and support prevention initiatives.

Bartolo concludes: "We continuously adapt our underwriting processes based on the latest information, claims data, and insights from both the insurance and reinsurance sides. Our goal is to respond effectively to the evolving landscape of environmental liability risks, ensuring that our company remains at the forefront of innovation and risk management in this area."■

The evolving carbon insurance market explored

Parametric insurance products, combined with blockchain and artificial intelligence, enable insurers to assess the risk associated with the voluntary carbon market and adjust carbon credit insurance pricing more accurately, Norton Rose Fulbright's James Bateson, Laura Kiwelu, Nicholas Berry and Jess Bruneau write

The voluntary carbon market (VCM) has recently seen rapid growth thanks to its role in achieving net-zero goals.

As many in the insurance industry will know, the VCM enables the offset of greenhouse gas emissions through the trading of carbon credits, which are generated by projects that reduce or remove greenhouse gases. The VCM not only assists in the reduction or removal of greenhouse gases, but also stimulates investment in sustainable development – such as in nature-based solutions or innovative green technologies.

However, as the VCM has grown, so too have the questions regarding its evolution and this has had an impact on VCM liquidity in recent months.

According to Morgan Stanley, by 2050 the VCM is expected to grow to around $250bn, but complex risks threaten its ability to scale rapidly – which is where carbon credit insurance comes in.

There is now growing recognition of carbon credit insurance's fundamental role in the VCM. Tailored insurance products that use parametric – or index-based – solutions, blockchain and artificial intelligence (AI) have emerged to meet the unique requirements of the VCM.

There are two main types of carbon market: the regulated compliance markets – such as the EU Emissions Trading Scheme – and the VCM. The VCM is unregulated and driven by corporates and non-governmental organisations seeking to achieve climate-related objectives.

Carbon market risks

Unlike the compliance markets, where the number of credits are

tanit boonruen/Alamy Stock Photo

strictly controlled, the number of credits that can be generated through carbon projects is directly linked to the metric tonnes of reduced, avoided or removed CO_2 or equivalent greenhouse gases and the prices are determined based on supply and demand in the open market.

This gives rise to a variety of low-frequency and high-severity risks, which can materialise at any stage of a carbon project's lifecycle and can lead to financial losses for investors, potential reputational harm and reduced market participation. Consequently, these risks can undermine the credibility and impact of the VCM.

Investors are more likely to participate in the VCM when they are assured their investments are protected against unforeseen risks, particularly where they are contracting for carbon credits in advance – including through development funding or pre-payment. Such participation is a critical element in establishing a liquid and well-functioning market.

Carbon credit insurance can assist in filling gaps in the risk allocation of carbon credit offtake arrangements, which in turn strengthens confidence among market participants, encourages investment and ensures stability through reducing the uncertainty associated with the delivery of credits generated by carbon projects.

This is achieved by covering financial losses that arise through projects that do not generate the expected amount of carbon credits; providing quick financial relief for projects that are affected by natural force majeure, enabling project recovery and continuity; and covering losses resulting from regulatory shifts or political risk events arising, which in turn helps market participants navigate the changes without substantial financial setbacks.

Carbon credit insurance also ensures buyers are compensated when invalid or fraudulent credits are purchased, maintaining trust and market integrity. It provides coverage against the price volatility of carbon credits, creating a more predictable revenue stream for market participants. It thus provides a safety net for all market participants.

Parametric products

Parametric insurance has evolved as a novel approach to managing the risks associated with carbon projects and is a type of insurance that is triggered by a pre-defined loss event occurring.

As mentioned by Swiss Re Corporate Solutions in its article on parametric insurance, the insurance cover is triggered when pre-defined event parameters are met or exceeded, which is measured by an objective parameter or index.

In practice, this event could be wildfires or floods, for instance, where the parameter or index is the level of precipitation or fire intensity. Once the threshold is met or exceeded, an agreed payout is made regardless of actual physical loss suffered and without the need for lengthy loss assessments.

Parametric insurance is crucial for carbon projects as it provides swift financial support and liquidity, which is needed for the recovery and continuation of carbon projects. Policyholders also have more certainty regarding the coverage. When combined with blockchain and AI, parametric insurance enables insurers to assess the associated risks and adjust the pricing more accurately. This allows market participants to better manage their financial exposure to events that could undermine the effectiveness and profitability of their investments.

The integration of blockchain technology and AI into carbon credit insurance has the potential to transform the market. Blockchain technology provides a decentralised and immutable ledger that records all transactions relating to carbon credits. This transparency helps prevent issues like double-counting and fraud, ensuring each carbon credit is of good quality and verifiable.

The use of blockchain can streamline the verification process by making it easier to monitor the progress and impact of carbon projects. Blockchain also enables digital contracts and transactions to be executed in a secure, transparent and auditable way.

By establishing trusted relationships among all participants, blockchain has the potential to provide a consistent and automatic execution environment, which in turn reduces the administrative workload and ensures prompt payouts without the need for intermediaries.

AI can be used by insurers to assess the performance risks relating to carbon projects by analysing large datasets to predict risks. By leveraging machine learning, insurers can better understand the factors that affect the generation of carbon credits and identify anomalies that are indicative of fraud. This assists in maintaining the integrity of the VCM by ensuring genuine, high-quality credits are traded and priced appropriately.

The integration of parametric insurance, AI and blockchain solutions in the carbon insurance market not only assists insurers by increasing the accuracy of risk assessments and pricing models, but it also protects all market participants through the provision of certainty, credibility, assurance, financial support and liquidity, all of which promote the success of the VCM and its ability to channel much-needed funding into nature-based and innovative technology carbon projects.

This synergy improves market stability, bolsters investor confidence and ultimately paves the way for the growth of the VCM and global movements towards achieving climate-related goals.■

James Bateson, Laura Kiwelu and Nicholas Berry are partners and Jess Bruneau is an associate of Norton Rose Fulbright

Serial defect claims in offshore wind projects will challenge insurers

Zoonar GmbH/Alamy Stock Photo

New technologies and the increasing scale of renewable energy projects will help the energy transition, but will also present a significant risk for the industry, Kennedy's Patrick Foss, Jonathan Embling and Virginia Zarin say

Serial defects in renewable energy projects, particularly offshore wind farms, remain a significant risk for insurers, as the rising demand for clean energy drives larger turbine capacity and rapid technological advancements.

Offshore wind farms comprise a large number of replicated assets (for example turbines and cables), designed, manufactured and installed in the same way across a project site. A design or workmanship issue identified on one asset may mean there is an issue with others. Historic problems with cable protection systems (CPS) are a prime example of a design issue causing serial losses across multiple wind farms.

Floating farms are the next frontier for offshore wind, potentially enabling increased clean energy production and transition away from fossil fuels. However, at present they involve nascent design concepts and limited operational experience. Combined with severe weather conditions in deepwater locations and difficult assembly and repair logistics, the potential for design issues to give rise to claims in these projects is significant.

As with all claims, understanding the root cause of a serial loss is crucial to determining policy response. For example, a turbine blade malfunction may be caused by faulty workmanship in the tightening of bolts connecting the blades to the nacelle, but it could also be due to defective design or material choice.

Some key coverage issues arising in the context of serial defect losses under construction all risks (CAR) and operational all risks (OAR) policies are set out below. As always, the background facts, specific wording and the law/jurisdiction that applies to the policy will determine the relevance of these issues and how they should be determined in any given claim.

To access the main coverage under a typical CAR or OAR policy an insured must show there has been damage to the insured property within the policy period.

Adverse physical change

Under English law, there must be an adverse physical change in the condition of the property, impairing its value or usefulness, to constitute "damage". Property that is merely in a defective condition is not "damaged".

However, the way damage is assessed can vary between jurisdictions. Recent US decisions (see *South Capitol Bridgebuilders v Lexington* (2023) and *Archer Western v Ace* (2023)), have considered that prop-

erty created in a defective condition can constitute physical damage.

In serial defect cases, it is important to identify whether each affected asset has in fact been damaged, for the purposes of policy cover, and when the damage occurred, to understand which policy year it potentially falls to.

Exclusions may operate to limit cover for serial defect losses. For example, offshore wind CAR policies typically use the London Engineering Group clauses, which provide differing levels of cover for damage caused by defects in design, workmanship or materials. Of course, such clauses will only be relevant if the design or workmanship has been "defective". In this regard, it is important to recognise that defective design may not necessarily require negligence.

Aggregation

If multiple assets are damaged by the same design or workmanship issue, one must consider the extent to which the losses can be aggregated. Aggregation determines how many excesses/deductibles an insured must bear, and how many limits of indemnity are available to the insured. Policies often provide that deductibles and coverage limits apply "per occurrence". The definition of "occurrence" can differ but usually groups together all losses arising out of a single "event".

Other jurisdictions may differ, but under English law whether something is an "event" is generally considered by applying the unities test: something that happens at a particular time, at a particular place and in a particular way. When dealing with serial defect losses, the cause of loss can often be a defective design decision. Can a defective design be an "event"?

In *Sky UK Limited and Mace Limited v Riverstone Managing Agency* and others the court held that a decision not to apply temporary weatherproofing over "cassettes" installed on a timber roof (which led to water ingress and damage to the individual cassettes) was a single event.

The court reasoned there is no legal principle to the effect that a decision can never be an "event" (similar considerations have arisen in a number of Covid-19 related insurance cases). The case is under appeal, but whether losses stemming from a defective design can be aggregated will be highly dependent on the facts and wording of the particular case.

Further, whether damage caused by repeated instances of defective workmanship, rather than a single design decision, can be aggregated is again fact-dependent. There is however English case law suggesting individual acts of defective workmanship would not amount to a single "event".

Serial loss clauses

Steps to mitigate exposure to serial defect losses include incorporating serial loss clauses (SLCs) in policies, which typically provide a sliding scale of indemnity based on the number of losses sustained.

Previously, SLCs were often quite limited in scope. For instance, they might only apply to property supplied under the turbine supply agreement and be confined to the property damage section of a policy, but not to the business interruption (BI) or delay in start-up (DSU) sections.

More recent LMA wordings (LMA5587 and LMA5588) apply to all property and BI/DSU losses as well as property damage. Notably, the LMA SLCs also apply a deductible per each "loss amount", defined as loss of or damage to each individual item of insured property.

One issue to consider with SLCs is the order of losses when applying the sliding scale of indemnity. If the order is determined by reference to the dates on which the loss/damage occurred, it may not always be straightforward to determine when a particular item of property suffered damage.

Policies will often specify the insured must pursue their contractual rights under any warranties or guarantees in respect of defective assets before looking to the policy for cover.

Further, if a serial defect claim is indemnifiable under a policy, insurers can consider the extent to which their outlay might be recoverable from the party responsible for the relevant defect. Their ability to do so will depend on the terms of the policy (CAR policies are usually composite policies insuring all contractors/subcontractors with wide waivers of subrogation in favour of insured parties), and the terms of the relevant contract.

Serial defect issues are likely to continue occupying insurers both at the underwriting and claims handling stages. The London market is responding with updated wordings and clauses.

New technologies and the increasing scale of renewable energy projects will undoubtedly help the energy transition with the wider benefits that this will bring, but will also pose challenges for risk managers, brokers and insurers for many years to come.■

Patrick Foss is a partner, Jonathan Embling a senior associate, and Virginia Zarin an associate at Kennedys

In serial defect cases, it is important to identify whether each affected asset has in fact been damaged, for the purposes of policy cover, and when the damage occurred, to understand which policy year it potentially falls to

Joachen Tack/Alamy Stock Photo

Spyware-on-sea: how insurers can protect maritime infrastructure

Cyber attacks on the global merchant fleet are rising and shipping companies need better defences and bigger insurance policies

Throughout human history, a key fact has shaped economies at every level: it is usually easier to move large cargoes by sea than over land, *writes Ben Margulies.*

The invention of the aeroplane ended most long-distance marine passenger services, but ships still dominate cargo movement – according to the World Bank, more than 80% of all goods travel to market by sea.

The result is a vast lattice of maritime infrastructure. According to the UN Trade and Development (UNCTAD), there were 105,500 vessels displacing at least 100 gross tonnes in January 2023. *Lloyd's List* counts more than 7,000 ports and harbours worldwide and the company maintains a database of 95,408 owners and operators.

Colossal, decentralised and increasingly digitalised, the global maritime transport industry is highly vulnerable to cyber attacks. Hackers, ransomware operators and other malefactors can interfere with navigation, cripple corporate operating systems, steal protected data and damage physical infrastructure.

Although insurers have been in the marine line longer than almost any other sector, cyber insurance is relatively new and the market remains fairly shallow. While cyber attacks on maritime targets are becoming more frequent, marine operators may be insufficiently protected from them, both in terms of their countermeasures and their insurance cover.

Increasingly cybernetic

Robert Dorey, group chief executive of managing general agent (MGA) Astaara, says "the proportion of IT dependency [in the maritime sector] is growing generally and there is increasing connectivity between IT and 'operational technology'".

Some parts of maritime operations, like communication, navigation and cargo tracking, rely almost entirely on digital systems, Dorey says. Dry bulk carriers increasingly use electronic bills of lading. At sea, vessels use automated systems for navigation, maintenance and engine control. On land, some ports have automated cargo-handling cranes and logistics firms can use IT for inventory management and security.

Digital technology also handles the interface between ship and shore. Svante Einarsson, head of maritime cyber security Advisory at Norwegian classification society DNV, says: "The International Maritime Organization [IMO] has mandated cyber

"The proportion of IT dependency [in the maritime sector] is growing generally and there is increasing connectivity between IT and 'operational technology"

Robert Dorey
Astaara

risk management of electronic data and systems onboard vessels."

Tom Scriven, principal strategic consultant at Google-owned cyber security firm Mandiant, says the growing extent of digitalisation "further adds to the complexity of the situation by increasing the attack surface area".

Shipping and port operators, like all other businesses, are likely to make even more use of information technologies in the coming years. *Yara Birkeland*, a Norwegian vessel that began sailing in 2022, is intended to be the first fully autonomous, uncrewed cargo vessel.

The need to cut greenhouse gas emissions will also require more use of technological solutions. In its Review of Maritime Transport 2023, UNCTAD said the maritime sector would need to use IT more extensively to reduce its carbon footprint. For example, digital technologies can improve modelling of fuel use and make port management more efficient. Einarsson says IT applications also reduce the risk of accidents.

A crescendo of cyber attacks

The maritime sector has already experienced high-profile cyber attacks. The Maritime Cyber Attack Database (MCAD), a record kept by a research group at NHL Stenden University of Applied Sciences in the Netherlands, has counted more than 160 cyber attacks on marine targets since 2001. MCAD includes attacks on warships as well as civilian vessels.

James Pearce, account executive for financial lines at re/insurance broker Gallagher, tells *Insurance Day* cyber attacks have become increasingly frequent since the start of this decade. "There was a reported 400% increase in maritime cyber attacks during 2020 and a 900% increase in attacks targeting ships and port systems over the previous three years," Pearce says. "Major seaports have reported an average of 10 to 12 cyber attacks a day."

Tom Walters, partner at global law firm HFW, says "attacks on vessels remain rare or are certainly going unreported". However, cyber attacks on shipping and land-based infrastructure are becoming more common, he indicates. Scriven agrees cyber attack numbers on shipping sector targets are rising, although this may be a byproduct of "growing awareness and stricter reporting requirements".

Cyber assailants are a mix of private criminals and state agents. Stephen McCombie, professor of maritime IT security at NHL Stenden and leader of the MCAD research team, tells *Insurance Day* cyber attackers fall into three main categories: "traditional cyber criminals", who also attack other sectors; "sea pirates and smugglers", who have adapted their traditional activities to cyberspace; and governments and those working on government contracts, who may use cyber attacks for spying or in geopolitical and regional conflicts.

"There is a broad range of threat actors, ranging from bored teenagers to [a] sophisticated professional organisation that may have political motivations," Walters says, adding finding a culprit can be difficult.

Individual attacks can cause millions of dollars – or even hundreds of millions – in damage. Participants in a 2023 survey of industry professionals conducted by consultancy Thetius and its partners, including HFW, reported each cyber attack cost them an average of $550,000. For ransomware attacks,

"There was a reported 400% increase in maritime cyber attacks during 2020 and a 900% increase in attacks targeting ships and port systems over the previous three years"

James Pearce
Gallagher

respondents said the average payment was $3.2m.

At the higher end of scale, Danish shipping giant Maersk suffered $300m in losses after its IT systems were infected with NotPetya ransomware in June 2017. In January 2023, ransomware operators struck DNV itself, affecting perhaps 1,000 vessels that use its ShipManager software.

Across the maritime sector, cyber attacks could cause billions in damage. In 2019, the Cyber Risk Management (CyRIM) consortium, which includes Lloyd's and Aon, published a report describing three cyber attack scenarios in the Asia-Pacific region. In the worst-case scenario, involving 15 Asia-Pacific ports, CyRIM calculated a maliciously introduced virus could cause almost $110bn in total losses. The scenario planners estimated insurance would only cover about 8% of these losses.

Scriven neatly sums up the overall impact: "Generally, cyber attacks on the maritime sector are low-frequency but high-impact events."

Regulatory response

The IMO adopted new guidelines governing the management of cyber risk in 2017, which came into effect at the start of 2021. The IMO resolution stipulates "an approved safety management system should take into account cyber risk management in accordance with the objectives and functional requirements of the ISM [International Safety Management] Code". The IMO urged national regulators to incorporate cyber risk considerations into its regulatory oversight.

The International Association of Classification Societies (IACS) has built upon the IMO resolution, passing new standards for assessing the cyber readiness of ships and ship's equipment, which came into effect at the start of 2024. The new IACS regulations "are designed to increase resilience across the industry by requiring cyber security to be factored in, from the initial design stage for new vessels and throughout their operational lives", Walters says.

National and regional regulators have also introduced new requirements for shipping operators. Dorey tells *Insurance Day* the US Securities and Exchange Commission now obliges listed companies to inform it of cyber breaches and make annual cyber readiness reports.

"European marine operations with more than €10m of revenue and with more than 50 employees will be captured from October 18, 2024 under NIS [Regulation] 2 with more onerous requirements to manage cyber risk," Dorey adds.

The first line of defence is you

Marine operators have at least two lines of defence against cyber attacks: their own cyber security systems and their insurance cover. Neither is necessarily sufficient.

In the Thetius survey, published in the 2023 report *Shifting Tides, Rising Ransoms And Critical Decisions*, 67% of respondents said their businesses had spent at least $100,000 on cyber defences, up from 44% in 2022. However, 44% in the 2023 survey replied "they have no idea about how much their organisation invests in cyber security management each year".

McCombie believes maritime operators should devote more attention to cyber threats than they currently do. "I think there are limited budgets and often physical security is seen as a much higher priority," but this is changing as cyber attacks become more frequent.

For the carriers that seek to protect shipping, the problem may not be lack of concern but limited information. "I think it is challenging for insurers to assess the likelihood and impact of a maritime cyber attack due to limited data available," McCombie says.

Walters also mentions cost pressures. "Shipping is an industry based on slim margins where operating costs are closely scrutinised," he says, so companies will only implement inexpensive forms of defence like staff training.

"I think there are limited budgets and often physical security is seen as a much higher priority. I think it is challenging for insurers to assess the likelihood and impact of a maritime cyber attack due to limited data available"

Stephen McCombie
NHL Stenden

"Until there is an example of physical damage to a vessel and/or a claim being brought in the High Court relating to the vessel's (un)seaworthiness, cyber security will not become a top priority for owners and operators," Walters argues.

Einarsson mentions the sector must overcome "outdated systems, lack of cyber security awareness and the evolving nature of cyber threats".

"While significant progress has been made, continuous investment in cyber security training, technology and best practices is essential," Einarsson continues.

Insurers themselves can help marine operators better understand their vulnerabilities and improve their defences. "Brokers and insurers often conduct risk assessments to identify vulnerabilities in a company's cyber security infrastructure," Pearce says. They may also offer training and help with drafting countermeasures and recovery plans.

Einarsson mentions several services insurers can provide, including threat surveillance and evaluations of potential and risk and cyber security defences.

"We are seeing a consistent uptick in demand for marine CY [traditional cyber] cover as the awareness of cyber threats and how they can impact all areas of businesses continues to increase"

Andy Maher
Gallagher

The second line of defence is insurance

Andy Maher, head of cyber and technology at Axis's London office, says "cyber coverage is not included in a standard marine policy as per a 2020 Lloyd's mandate". Lloyd's required insurance providers to specify whether their policies included cyber attack protection that year.

Standard marine insurance carries "malicious cyber exclusions", Dorey says. The standard exclusion, known as CL380, stipulates a policy will not "cover loss, damage, liability or expense directly or indirectly caused by or contributed to, by or arising from the use or operation, as a means for inflicting harm, of any computer, computer system, computer software program, malicious code, computer virus or process or any electronic system".

Protection and indemnity (P&I) clubs do offer "mutual cover", which extends to cyber attacks but does not cover war or terrorism, Dorey continues, while "fixed-premium P&I cover will have malicious cyber exclusions contained therein". Walters highlights "politically motivated cyber attacks" may fall outside existing categories of marine coverage, including war risks policies.

In any case, "traditional marine insurers have no skill sets to manage the unique cyber exposures and aggregation challenges", Dorey believes, whereas cyber insurers will examine a client's defences and ability to recover from cyber incidents.

Insurers have developed specialised cyber products for shipping, Pearce says. These trigger in cases of physical damage or business interruption and provide for "incident response" services. Maher says shipping companies tend to seek dedicated "cyber security property damage" policies to cover the gap created by the cyber exclusion in standard policies.

"However, we are seeing a consistent uptick in demand for marine CY [traditional cyber] cover as the awareness of cyber threats and how they can impact all areas of businesses continues to increase," Maher adds.

Walters notes that Astaara and Beazley are offering cyber cover specifically for the marine sector. Dorey says his MGA's offering is "unique in offering risk management/loss prevention services within the insurance product; and independently of insurance".

Axis introduced its present marine cyber offering, which is a property policy, in 2020. "Our marine cyber cover provides one aggregate limit that can be shared across both areas of cyber coverage [property and traditional cyber], so the customer selects the areas they want to cover," Maher adds.

But despite the availability of these policies, Einarsson says "many maritime sector businesses still lack sufficient cyber coverage".■

"There is a broad range of threat actors, ranging from bored teenagers to [a] sophisticated professional organisation that may have political motivations"

Tom Walters
HFW

Flight to quality: cyber risks in aviation

Denis Kalinichenko/Alamy Stock Photo

The CrowdStrike incident serves as a stark reminder not all cyber or technology loss events are deliberate, Hive Underwriters' Bruce Carman says

The systemic CrowdStrike downtime event on July 19 highlights a critical, and often overlooked, aspect of the aviation industry: its profound reliance on sophisticated IT infrastructure.

While the consequences of the incident are still unfolding, its immediate impact on global IT operations underscores the significant vulnerabilities that come with digital interconnectedness. In an industry where efficiency and precision are paramount, such disruptions can have cascading effects, grounding flights, stranding passengers and creating a ripple of operational chaos across the globe.

IT infrastructure in aviation

Modern aviation is heavily dependent on advanced IT systems for nearly every aspect of its operations. From booking and ticketing, to air traffic control and in-flight communications, digital systems are the backbone of the industry.

These systems are designed to create efficiencies, streamline operations and enhance the overall passenger experience. However, they also expose the industry to significant risks, acting as single points of failure. These can sometimes be triggered by oversights or accidents, but also can be exploited by malicious actors. The CrowdStrike incident serves as a stark reminder that sometimes cyber or technology events are simply mishaps, but mishaps that point out critical vulnerabilities within the system.

The aviation sector's critical role in global connectivity and national security makes it a prime target for cyber attacks. Malicious cyber threats are at the forefront of industry concerns, with the potential to disrupt operations, compromise sensitive data and endanger passenger safety. A survey by the Cyber and Emerging Risks Study Group (CERSG) of the International Union of Aerospace Insurers underscores the urgency of addressing these emerging risks, while leveraging technological advancements to safeguard the future of aviation.

Re/insurers in the CERSG survey ranked cyber risk as third among the top threats to the aviation sector over the next five years, behind geopolitical stability and war. For 2024, the most urgent risks for aviation operators and airports are air traffic control issues, war/malicious acts, and GPS spoofing.

GPS jamming and spoofing are sophisticated cyber attacks that interfere with aircraft navigation systems, potentially leading to mid-air collisions or deviations from flight paths. Recent incidents have highlighted vulnerabilities in the aviation sector's reliance on satellite navigation, necessitating robust countermeasures. The US Federal Aviation Administration and other regulatory bodies are, increasingly, focusing on developing and implementing technologies to detect and mitigate such threats.

Artificial intelligence (AI) technologies are enhancing risk assessment models, providing more accurate and timely insights into potential threats.

Machine learning algorithms can analyse vast amounts of data to identify patterns and predict future risks, enabling proactive measures. For instance, predictive maintenance systems powered by AI can monitor aircraft health in real time, reducing the likelihood of in-flight failures and enhancing overall safety.

However, AI systems can be targeted by cyber criminals to manipulate input data to deceive the algorithms, so the development of robust AI security protocols is essential to ensure the integrity and reliability of these systems.

Horizon scanning

Over the next five years, the aviation sector must navigate a spectrum of threats, including geopolitical instability, increasing catastrophic events and the persistent challenge of a global recession. The CERSG survey highlighted several key cyber risks that demand immediate attention from aviation operators and airports.

Upgrades to air traffic control systems: modernising air traffic control systems is critical to enhancing operational efficiency and safety. Legacy systems are increasingly vulnerable to cyber attacks and upgrading to more secure, advanced technologies is imperative.

Mitigation of malicious acts: the threat of geopolitical conflicts and targeted malicious acts poses significant risks to aviation operations. Comprehensive risk management strategies must include contingency planning and collaboration with international security agencies.

Countermeasures against GPS spoofing: developing and implementing technologies to detect and counteract GPS spoofing is crucial. This includes investing in alternative navigation systems such as inertial navigation systems and enhancing satellite security.

Reduction of attritional ground incidents: ground incidents, including runway incursions and ground handling errors, represent significant safety risks. Implementing AI-driven surveillance and monitoring systems can help reduce these incidents by providing real-time alerts and automated responses.

Effective airspace management: the rise of unmanned aerial vehicles and electric vertical takeoff and landing aircraft, necessitates advanced airspace management solutions. Integrating these new technologies into existing air traffic frameworks while ensuring safety and security is a complex challenge.

The industry must invest in advanced cyber security infrastructure, which includes adopting cutting-edge technologies, such as blockchain for secure data transactions, quantum encryption for enhanced communication security and AI-driven threat detection systems.

Effective cyber security requires collaboration between all stakeholders, including aviation operators, insurers, regulatory bodies and technology providers. Joint efforts in sharing threat intelligence, developing industry-wide standards and conducting regular cyber security drills can enhance the sector's resilience.

Amid these challenges, the aviation insurance industry is poised to seize substantial opportunities, particularly via the strategic application of AI. AI's potential to refine policy wordings, enhance contract analysis and bolster risk management is immense. Moreover, it promises to revolutionise underwriting processes, leading to more accurate risk assessments and streamlined claims processing. AI can analyse large data sets to identify trends and correlations traditional methods might overlook. This enables insurers to develop more precise risk profiles and tailor coverage options to specific needs.

Continuous adaptation

The dynamic nature of cyber threats necessitates continuous monitoring, adaptation and updating of policies. Regulatory frameworks must evolve to address emerging risks and organisations must remain agile in their cyber security strategies. Regular audits, vulnerability assessments and incident response planning are vital components of a robust cyber security posture.

In this increasingly complex landscape, knowledge-led underwriting is crucial. For insurers, the ability to understand and anticipate emerging risks is important. This involves leveraging technological advancements like AI, as well as cultivating a deep understanding of the unique challenges in the aviation industry. Insurers must engage in continuous education, stay updated on the latest trends and threats and build strong relationships with industry stakeholders.

By adopting a data-driven, proactive and strategic response to emerging cyber risks, insurers can develop more effective policies that cater to the specific needs of aviation clients. Knowledge-led underwriting empowers insurers to offer tailored coverage, optimise risk management strategies and provide invaluable insights that help aviation operators mitigate risks. This approach ensures insurance products evolve in tandem with the changing threat landscape.

The CrowdStrike incident serves as a reminder of the vulnerabilities inherent in the aviation sector's dependence on IT infrastructure. Whether through malicious attacks or inadvertent failures, these events expose critical points of failure that can disrupt global operations. By addressing these vulnerabilities head on and investing in robust cyber security measures, proactive monitoring and risk management strategies, the aviation industry can safeguard its operations and ensure operational continuity in the face of evolving threats.■

Bruce Carman is chief underwriting officer at Hive Underwriters

The future reality of artificial intelligence

AI as an emerging threat has the potential to form its own insurance product, but also to reshape elements of existing products

Earlier this year, an employee in the Hong Kong office of a multinational company made transactions worth a total of HK$200m ($25m) after receiving instruction from their chief financial officer (CFO) during a video call, *writes Francis Churchill.*

The executive was one of several faces the employee recognised on the call. The problem was it was a scam. None of the other attendees – including the CFO – was real. All their images and voices were deepfakes – digital clones created using generative artificial intelligence (AI). The story, first published by the Hong Kong national broadcaster RTHK, sounds like something from a dystopian future, but it highlights real concerns about new cyber threats posed by generative AI.

For cyber insurers, AI has the potential to create a new risk landscape. AI can help write new malicious malware, speed up phishing emails operations and act as a tool to test attacks against anti-malware technology.

"We will see some attacks we've never seen before using AI because the limit is the imagination," Mauro Marongiu, technical head of cyber underwriting at managing general agent Alta Signa, says.

Among these risks, deepfakes are one of the most important new phishing threats to emerge from this technology, Marongiu argues, because not only do they make it hard to know what is, and what is not, real, but they also represent an evolution of an existing threat, rather than something brand new.

"To me, the landscape is changing a lot, but the attacks remain the same categories… it's like a game of cat and mouse; the tools are different, but the approach is the same," he says. "Today we are talking about AI, tomorrow we will probably be talking about some new technology, so it's important to

chombosan/Alamy Stock Photo

have good governance and good processes to manage all this stuff."

All technology is a double-edged sword, but AI has, arguably, offered more potential than any recent innovation to alter society both for better and for worse.

"There's no question any of these tools that are going to be developed in the tech space are inevitably going to be looked at by bad actors," David Grigg, executive managing director leading on US cyber reinsurance at Aon, says. The Hong Kong scam is "an incredible story and you've got to admire the graphic capabilities of that particular hacker", he adds.

Class action threat

But, for Grigg, the bigger AI threat comes from elsewhere. What he worries about, particularly in the US, is how AI might drive a new form of class action lawsuit.

Imagine a hacker gains access to a massive data set of personal healthcare information – not unlike the recent Change Healthcare hack – while an unrelated hack exfiltrates a set of email addresses and phone numbers. AI and complex machine learning could allow these two disparate data sets to be cross-tabulated in different ways, giving bad actors the ability to target millions of individuals with small ransom demands. "At $50 for each occurrence, little numbers add up to big ones," Grigg says.

Aon's threat intelligence teams have already seen evidence of hacks targeted at individuals, threatening to release their medical data unless they send small sums of Bitcoin for the hackers, who even provide step-by-step instructions on how to set up a Bitcoin wallet. These individual ransom attacks may not be insurable events in their own right, but the third-party damages and contention expenses associated with a class action lawsuit could become expensive for insurers.

A source who spoke on condition of anonymity said if exfiltrated data from a large US corporate is driving these ransom attacks, the US plaintiffs' bar is "always looking for ways in which to assemble a class and make a run at a large corporate and their insurers".

"The landscape is changing a lot, but the attacks remain the same categories... the tools are different, but the approach is the same"

Mauro Marongiu
Alta Signa

Selim Cavanagh, director of insurance at AI provider Mind Foundry, also raises concerns about class actions, but not from data breaches. He highlights the use of AI for medical screening. These are powerful tools that can have real diagnostic benefits.

For now, there is always a human in the loop, but a time may come when these tools are no longer monitored and AI is making the decision. If an error is introduced into the AI and it fails to identify hundreds or even thousands of cases of cancer, that becomes a medical malpractice lawsuit potentially covered by insurance, Cavanagh says.

"All these things are potentially going to happen and people are beginning to talk about it. Will it be covered under existing exposures? Is it additional exposure and, if so, have we priced for it?" he says. "This is where insurers have to work really closely with their customers. What's really happening [with the AI tools]? Is there a hand-off? What's the double check? If there's a systemic problem in there, how are you getting to that quickly?"

Data poisoning

Threat actors can also hack or manipulate a business's own AI tool in an attack called data poisoning. Any tool that uses machine learning is vulnerable to this type of attack, where bad actors infect the data sets used to train algorithms or AI models to change their output. "You have to verify if the data set you're using to train your AI system is good or not," Marongui says.

Modern malware tools are an example of this vulnerability. Many of these services now use machine learning and behavioural analysis to differentiate malicious attacks from normal network activity – if bad data is introduced, they could learn to overlook certain attacks. The answer is to constantly verify the data being used and the outputs of AI models being used, but this is not always done. The problem becomes compounded when insureds start using third-party software they do not have oversight of.

The rollout of cloud computing is comparable to how the risks are developing in AI, Daniel Carr, head of cyber underwriting at Ariel Re, says. Fifteen years ago, all companies were running their own big, expensive data centres. Cloud computing created efficiencies and opened computing power to businesses that did not have the ability to invest in their own expensive data centres, but it also moved the day-to-day risk management further away from the business.

"You may be concerned about the risk of running everything in the cloud, but it's a 10th of the price – do it yourself for 10 times the price and you're not competitive any more and, to some degree, you end up with a bit of an arms race into technological adoption," he says. The same is true of AI – businesses are focusing on rolling out the technology to stay competitive and are then addressing the downside risks afterwards.

For insurers, the implications could be stark. Comparisons are often drawn to "silent cyber", which plagued the industry before the standalone cyber market started to mature. In a similar way, AI risk could rear its head in all sorts of lines of business, from directors' and officers' liability to professional indemnity and beyond.

"It's analogous to the whack-a-mole game. A threat's popped up in healthcare, so let's hit that mole on the head and add an exclusion, but then, all of a sudden, the threat pops up in the restaurant industry and the focus moves"

David Grigg
Aon

Generative AI exposures

The first question for carriers, Cavanagh says, is what lines are likely to be more heavily exposed to risk relating to the use of generative AI. Cyber is an obvious risk, especially with the spectre of deepfakes, but other, less obvious, lines will also be at risk, as more businesses use AI in their operations.

Then comes the question of whether this risk needs to be separated out into its own line of business or if it should be priced into existing lines. One benefit of creating a dedicated AI line of business is it will allow the market to wrap in the governance and risk-control infrastructure alongside the insurance product, much like how the cyber market has started to evolve.

"I didn't think cyber worked as a product until it was wrapped around with technology and consulting vendors and repackaged to say: this is how you deploy and work and essentially mitigate risks that are coming from cyber," Cavanagh says.

Carr believes AI risk needs to be integrated across different lines of business. "I think the market, to some degree, gets too bogged down in what the current structure is and where best to think about certain new exposures," he says. "The insurance industry quite often gets into a bit too much of a turf war around [where risks should sit] but the bigger balance sheet reality is, who knows the most about it? Are we analysing and assessing the risk appropriately? Are we thinking about the gaps that maybe we don't know yet?"

AI as an emerging threat has the potential to form its own product, but also to reshape elements of existing products and, ultimately, that is a marketing and distribution consideration, Carr says. "It's bringing volatility around what's well understood and all the structures that are there, but it isn't fundamentally changing the structure of a product or the methodologies or the approaches," he says.

Where the market seems to agree is excluding AI risk is not the answer. "It's really hard to define what AI is, so to exclude it is difficult," Cavanagh says. "You might end up excluding everything because AI will be everywhere... so I don't see that happening."

For Cavanagh, the right approach will be to find the right risk price in each line of business. "If we create specific cover which looks at the externalities, whether it's the loss of intellectual property or someone getting hurt because a machine has gone wrong, at least that will attract the right risk control governance and help to make sure they are deploying and using AI correctly."

"Most of AI risk does stay in the IT realm, but not all of it, because how it's used, and where it's used, are as important as the core technologies"

Selim Cavanagh
Mind Foundry

Exclusions are not the solution

Exclusions are a kneejerk reaction to the changeability of the AI landscape, Grigg says, and a poor solution at that.

"It's analogous to the whack-a-mole game," Grigg says. "A threat's popped up in healthcare, so let's hit that mole on the head and add an exclusion, but then, all of a sudden, the threat pops up in the restaurant industry and the focus moves. I don't think that sort of approach is a viable solution – we need to be more disciplined and strategic."

The challenge instead is how to underwrite these risks profitably. "Insurers are in the business of helping insureds conduct their business in a profitable manner. Just adding exclusions to me seems like we're not properly addressing the underlying risk," he says.

One of the responses is to fight fire with fire and roll out AI, machine learning and big data in a more affirmative way. The technology could, for example, have a hand in monitoring and processing intelligence from the dark web – the secretive side of the internet where a lot of illicit activity takes place – to help more rapidly assess and identify potential attacks. "Can we be using these tools to help us almost like a weather forecast?" Grigg asks.

There are limitations to how this information can be used, however. As Grigg points out, many insurers still lack simple, easy-to-use communication platforms for notifying their insureds, let alone notifying them of emerging AI threats. But the concept is good and is one national security services are already embracing.

There are a handful of cyber managing general agents already using AI tools to actively monitor for threats, but most cyber insurers use third-party software to create a snapshot of an insured's cyber threat at the point of renewal. AI could help make constant monitoring more cost effective than the way many insurers currently deploy this sort of technology.

Policy wordings

The other approach is a more old-fashioned look at policy wordings. "I think the lessons learned from silent cyber must be applied for silent AI. The main difficulty here is understanding what [future] scenarios could be because, for sure, we will not consider every scenario that could happen," Marongiu says.

"If we take the parallels from silent cyber, the only way to change the system is to use both technology and wordings," he adds.

There is another element of risk management AI can learn from cyber, which is far from technology-driven, Cavanagh says. This aspect is more about how businesses organise their workplaces to eliminate risky behaviours systematically.

"The cyber bit effectively combined several things – a massively evolving market with huge risk profiling, with technology vendors and consultants who brought all that together to create a really effective risk control framework founded on technology, but also the behaviours of the organisation.

"That's a really amazing evolution and you can absolutely see AI being the next thing. Most of AI risk does stay in the IT realm, but not all of it, because how it's used, and where it's used, are as important as the core technologies," Cavanagh says.

While AI brings novel risks, the primary threat remains phishing emails, Grigg says. Even in the Hong Kong case, reports suggest the targeted employee was initially sceptical of the email about the secretive payments. It was only after she was on the video call that the deepfakes convinced her the instructions were legitimate.

"It can be a long process, but it comes down to making sure everyone in your family and your organisation is attuned to the issue associated with emails and links and PDFs and photos in emails," Grigg says. "I do think the best line of defence is pretty old-fashioned – addressing individual behaviour."

Despite the challenges posed by AI risk, Cavanagh has an optimistic view on the sector's ability to handle the cyber threat. "There's no button you can push that automatically builds a spear phishing campaign or breaks into a system," he says.

"There are a lot of tools cyber criminals have that make them better at it, but they still have to do all the work... it's still a massive manual enterprise to attack an organisation."■

"The insurance industry quite often gets into a bit too much of a turf war around [where risks should sit] but the bigger balance sheet reality is, who knows the most about it? Are we analysing and assessing the risk appropriately?"

Daniel Carr
Ariel Re

Still waters run deep: the Arctic Ocean from all sides

There are few topics as complex for re/insurers as the Arctic Ocean, and understanding the risks that geopolitical, environmental and commercial interests create means observing where they overlap and diverge, *writes Louise Isted*.

Here, we look at the topic from all sides by speaking to four Arctic experts – the ambassador, the insurer, the mariner and the professor.

They are: Morten Høglund, chair of the Arctic Council; Neil Roberts, head of marine and aviation at Lloyd's Market Association; Duke Snider, chief executive of Martech Polar Consulting; and Philip Steinberg, UArctic chair in political geography at Durham University.

They are followed by polar explorer and conservationist, Pen Hadow, who explains why marine re/insurers and protection and indemnity clubs need to align their advisory services and business strategies, respectively, with the prevention of risks to biodiversity in the Arctic Ocean.

Arctic Council overcomes challenge of suspended collaboration with Russia

Norway's chairship of the Arctic Council navigates geopolitics to address environmental issues

Morten Høglund faced the most challenging period in the Arctic Council's history when Norway took over as chair of the intergovernmental forum in May 2023, *writes Louise Isted*.

Seven of the council's member states had suspended collaboration with the eighth member – and outgoing chair – in March 2022, following Russia's invasion of Ukraine.

The Arctic Council consists of eight Arctic states – Canada, Denmark, Finland, Iceland, Norway, Sweden, Russia and the US – and six indigenous permanent participants. The chairship of the council rotates between the states, with each holding the position for two years at a time. The council's founding document – the Ottawa Declaration of 1996 – stipulates decisions require the consensus of all eight.

The question soon emerged from outside the council, therefore, what could the forum achieve without its largest geographical stakeholder? Russia covers 45% of the geographical Arctic, has waters that shipping routes rely on and produces climate data that research needs. The seven released a joint statement announcing the limited resumption of their participation in project-level work that did not

involve Russia. The projects that resumed had been previously approved by all eight at the 2021 Reykjavik ministerial meeting.

However, at the 13th meeting of the Arctic Council, transitioning the chairship from Russia to Norway, all eight Arctic states reaffirmed their commitment to safeguard and strengthen the council. Norway has since worked with all of them on finding ways to resume the council's work especially at the level of its working groups.

In an interview with *Insurance Day*, Høglund stressed that it was always Norway's intention to work with all eight Arctic states, including Russia.

He outlines how the interruption to political-level meetings has affected the council's progress with its environmental goals. Notably, he says "decision-making has continued through written procedures". These include Russian stakeholders.

"Over the past 12 months, the chairship has held regular consultations with all eight, hosted meetings with all six permanent participants and engaged extensively with the six working groups and the expert group on black carbon and methane to ensure work advances," Høglund says.

"Maintaining this level of co-operation and co-ordination with all Arctic Council stakeholders has been a big achievement for Norway during this challenging time," he continues, "and ensured some of the most urgent issues continued to be addressed through the working groups and through, for example, the Norwegian chairship's wildland fires initiative."

Strategic planning delayed

Nevertheless, Høglund admits some work, such as the implementation of the council's 10-year strategic plan that was adopted in 2021, has been delayed and strategic planning has "not advanced at the usual pace". The pause to official meetings has required working groups and their secretariats "to find new ways of operating", he adds.

New guidelines in August 2023 enabled the working groups to resume their efforts to advance project activities. This included "written procedures", such as proposing new projects, and collaborating with the council's observers and external experts. In February this year, there began a gradual resumption of official working group meetings but in a virtual format. These virtual meetings have included Russia.

"Their ability to meet virtually is vital in advancing projects that respond to rapid climate change and tackle some of the most important and urgent challenges in the Arctic," Høglund says. "From that perspective, the working groups aim to deliver on their projects at the end of this chairship cycle."

The most recent report on the impacts of climate change by the Arctic Monitoring and Assessment Programme working group (Amap) is from 2021. It says the Arctic is warming faster than any other place on the planet and at least three times faster than the global average.

"The extension of sea-ice has been almost halved since 1978, with an area the size of India lost. There has also been a dramatic loss of land-fast ice, in particular from the Greenland ice sheet"

Morten Høglund
Arctic Council

"The extension of sea-ice has been almost halved since 1978, with an area the size of India lost," Høglund says. "There has also been a dramatic loss of land-fast ice, in particular from the Greenland ice sheet, which is another major source of the current sea level rise."

The Amap report also describes the impact on societies in the Arctic, such as a reduced hunting season in Greenland owing to unstable sea-ice, and an increased frequency of wildfires, particularly in North America and Russia, that affects Arctic ecosystems and wildlife. Moreover, respiratory disease caused by soot particles are causing thousands of premature human deaths every year in the Arctic.

This year Amap is working on its latest update, which Høglund says is expected to be presented at the 14th meeting of the Arctic Council next spring.

Carbon and methane

According to the taskforce on short-lived climate forcers, air monitoring stations have detected a reduction in black carbon, but the opposite trend is true for methane, which comes mostly from oil and gas production. Høglund says existing legislation would "most probably" lead to a reduction in black carbon of 37% for Arctic states and 52% for Arctic Council observer states by 2050 on 2015 levels. For methane, Amap estimates a 13% increase for Arctic states and 25% for Arctic Council observer states by the same date.

Recent and ongoing work on black carbon includes an update to the Arctic Contaminants Action Program's "studies platform" and a new Canadian Arctic community-based monitoring pilot project in Cambridge Bay.

Another project is the expert group on black carbon and methane's task to develop a biennial summary of progress and recommendations based on the national reports it receives. The expert group's latest report, from 2021, says the Arctic states were "on track" to reaching the collective goal of reducing black carbon emissions

by 25% to 33% on 2013 levels by 2025, Høglund says. "Rising methane emissions, however, is a concern that needs to be addressed further," he adds, and the expert group is working on its fourth summary report that will be delivered next spring.

Wildland fires are a growing and critical concern, with the summer of 2023 breaking new records for the circumpolar Arctic. Høglund says of the more than 1,000 active wildfires across Canada, 230 were in its northern territories. The council's wildland fires initiative is an "important offering for our climate's future", Høglund says, "and aims to identify knowledge gaps and share best practices within and outside its network."

He continues: "The start and end of a wildfire season is becoming increasingly difficult to pinpoint due to the extended duration of fire seasons and the occurrence of underground fires, known as zombie fires, which continue to burn even throughout the winter. These factors blur the traditional start and end dates, making it challenging to define a specific wildfire season. As climate change progresses, fire seasons are expected to become longer and more unpredictable."

An electronic compendium of the council's wildland fires projects will "make information more accessible, raise awareness and promote understanding of the issue from an Arctic and climate change perspective", he adds.

Høglund hosted the International Conference on the Ecosystem Approach to Management in Arctic Large Marine Ecosystems, held in Tromsø, Norway in April. "A statement and more detailed report from the conference is being developed by the Arctic Council's joint ecosystem approach expert group," he says.

Cop29 plans

Høglund aims to bolster the council's presence at Cop29 in Baku, Azerbaijan this November, having submitted its plan to hold a side event at the climate talks to the UN Framework Convention on Climate Change.

The focus of the planned side event is on the cryosphere – the Earth's ice in all its forms – which Høglund says has "so far been left off the global climate agenda despite its immense impacts".

He adds: "As chair of the Arctic Council, Norway is determined to bring this critical issue to the forefront, convening key actors and driving action."

The session aims to highlight the changes indigenous peoples in the Arctic are "observing and navigating first-hand" and how their knowledge needs to be "equitably and ethically used" in response to these changes.

Also at Cop29, Amap plans to present the results of its upcoming climate report for 2024, giving the updated trends on the warming of the Arctic and its impacts on wildlife and human health.

"The Arctic Council and its working groups have hosted events at Cops since 2004 to bring Arctic issues to the global stage," Høglund stresses.

One notable example is the presentation of the Arctic Climate Impact Assessment report at Cop10 in Rio de Janeiro. Høglund says: "This landmark assessment demonstrated how science and indigenous knowledge can combine to produce a comprehensive and globally influential report."

Looking further ahead, Høglund expects the 1st International Arctic Emergency Management Conference, taking place on March 18-20 in Bodø, Norway – to be an "inclusive" event that takes a "holistic view" of the risks and hazards in the Arctic region.

It is unclear – and Høglund does not say – whether "inclusive" will include Russian representatives in person.■

Wildfires burn in Canada's Northwest Territories last year

The Canadian Press/Alamy Stock Photo

Arctic Council 'virtually meaningless without Russia': LMA's Roberts

The head of marine and aviation at Lloyd's Market Association describes the insurance sector's view of a changing Arctic

Neil Roberts, head of marine and aviation at Lloyd's Market Association, stresses there "isn't just one Arctic but many". Russia's presence in the region is as significant – and in some cases more significant – as the other coastal states of Canada, Denmark, Finland, Iceland, Norway, Sweden and the US.

Amid the conflict in Ukraine, Russia's absence from the Arctic Council since its chairmanship was handed to Norway last year has effectively suspended progress at the "quasi-regulatory but still voluntary" organisation.

"Some say the Arctic Council is virtually meaningless without Russia and it's hard to tell how effective the 'Arctic Seven' can be without Russian data and input," Roberts says in an interview with *Insurance Day*.

It is impossible to ignore the increasing military interest in the Arctic. In 2020, Norway re-opened Olavsvern, its Cold War-era nuclear submarine base, as Russia and the US compete for control of the Arctic Ocean. In July, the Norwegian government decided to block the sale of a chunk of its strategically significant Svalbard archipelago that lies on the edge of the ocean. In addition, Finland and Sweden have joined Nato in reaction to Russia's aggression towards Ukraine.

Roberts notes the "very strong Western interest" in the High North, adding the importance of Canada's "huge Arctic footprint" on the Northwest Passage – the sea lane between the Atlantic and Pacific oceans through the Arctic Ocean.

He explains: "Five years ago, people would generally ignore references to 'military tensions' in the High North, but the pitch and direction of the conversation is changing to reflect recent Russian positioning.

"Whether we're in a time of peace is doubtful. It's not all-out war, but it's not peace as we used to know it as the rules-based order is being threatened. And Russia is one of the agents behind that threat," Roberts says.

Technical advancement in the form of undersea cabling for communications is playing its part in heightening tensions. The locations of these cables are included in navigation maps to avoid accidents, which ironically makes them vulnerable to foul play.

Transiting the Gulf of Finland last October, the Chinese-owned container ship, *Newnew Polar Bear*, and the Russian cargo vessel, *Sevmorput*, are alleged to have been in areas where damage took place to an undersea natural gas pipeline and two telecommunications cables connecting Finland, Sweden and Estonia. "On the positive side and perhaps surprisingly, it's relatively easy to repair a subsea cable as long as access is possible," Roberts says.

The Polar Code

A period of co-operation and joint initiatives helped produce the Polar Code, which came into effect in 2017 for new construction projects and in 2018 for existing ships in service. The Polar Code introduced new standards for vessels using polar waters, setting goal-based standards to enhance safety.

The Polar Operational Limit Assessment Risk Indexing System (Polaris) is an integral part of the Polar Code to which insurers helped to contribute. It is a risk control tool for underwriters but is not perfect, Roberts says, since there is no data to prove how closely it is being adhered to by shipowners.

"There's lots of satellite tracking and monitoring of vessel tracks, but that doesn't tell you anything about adherence to the Polar Code," Roberts says. "One thing you could say though, is there haven't been that many losses." He adds: "Not everyone follows guidance all the time but it's a lot easier to have some rules than none at all. You can play tennis without lines, but it's a lot easier if you have them."

Insurers can only have a patchy view of the impact of Polaris and the Polar Code. "A lot of the trade in the north is Russian and we're not seeing it," Roberts says. "That is an echo of how effective the Arctic Council is without being able to co-operate with the eighth member."

Underwriters normally insist there are at least two navigational systems on a vessel – the prime method and a back-up. "And we do prefer them to still have charts but if there's no reliable map, it's difficult," Roberts says.

Navigational map coverage of the Arctic remains very low, at about 5%. "There are known passages, but it's no use having a known passage if it's got a huge iceberg in the way," Roberts says. "The navigation equipment is improving all the time, but there's a lot of reliance on satellites and satellite data, which can be intercepted. And satellites use undersea cables – because ground stations transmit through them – so there's a vulnerability there."

Arctic drilling on hold

Fossil fuel development in the Arctic region appears to be on hold, not least because of Russia's aggressive foreign policy. "There is already the clear reputational risk for oil companies from having a big spill in the Arctic and we saw Shell pull out of drilling there in 2015," Roberts says. "Members of a market like Lloyd's can support companies that drill there, but it's a moral decision for the individual syndicates involved and nobody at the moment is making a big play for Arctic drilling."

Arctic oil and gas exploration is especially undesirable with the current geopolitics with Russia. Roberts explains: "It means being unsure of the reception you'd get when you're up there."

But traffic volumes reported in 2022 were "surprisingly high", at nearly 3,000 voyages. "Whether they were all across the whole of the Northern Sea Route, I somehow doubt, but 314 vessels is a relatively significant number," he adds.

Roberts notes that the biggest share of the traffic was transporting liquefied natural gas (LNG). "As insurers, we're under some scrutiny as to measuring a client's carbon emissions but that in itself doesn't really move the dial. Some people say you've got to start somewhere, but I'm not sure that starting in the middle is effective, because the root cause is carbon emissions and the best way to reduce those is to cut them."

The benefits of carbon offsetting are open to question, he continues. "The spotlight turns on us in insurance and it turns on shipping, but shipping and aviation combined are responsible for only 5% of global emissions. The fashion industry, for example, is 10% but you don't hear anything about them."

Societal change is needed, he stresses. "It's about behaviours and people understanding they can't do what they did in the past if they want to moderate the climate. It's about a reduction in massively inefficient vehicles for short journeys, changing our diet to reduce beef production, and changing our energy sources. Insurers measuring their clients' carbon footprint is only part of the answer."

New fuels

There has been the "unintended consequence" in efforts to address the carbon emissions of shipping from the change to low-sulphur fuel. "In making the atmosphere clearer, the sun's energy is coming through more strongly because it isn't being deflected by pollution. It's a tragic irony but this is contributing to the rise in sea temperatures," Roberts says.

Another significant concern on the horizon, he continues, is the use of methane-based fuels for shipping. "Experts say that, over the first two decades after its release, methane is more than 80 times more potent than carbon dioxide in terms of warming the climate system, which will be absolutely disastrous if its use is general."

The range of potential new fuels being discussed – methanol, LNG, ammonia and hydrogen – is confusing for shipowners who are already struggling with an ageing world fleet, Roberts says, and do not know what type of engine they should buy.

"You won't be able to turn up at a port looking to refuel with pink hydrogen

"Whether we're in a time of peace is doubtful. It's not all-out war, but it's not peace as we used to know it as the rules-based order is being threatened. And Russia is one of the agents behind that threat"

Neil Roberts
Lloyd's Market Association

when they've only got blue hydrogen or ammonia. Another factor is that 98% of all hydrogen currently being used as fuel is grey – fossil fuel-based."

Melting ice is opening new and potentially shorter shipping routes in the Arctic but cutting time on a route does not necessarily curb the impact of a ship's emissions. "It may make economic sense for the many parties involved in maritime trade, but it doesn't necessarily make environmental sense for the indigenous people who are the ones facing the risks to their natural habitat," Roberts says.

The Arctic Council alone has 130 initiatives running, Roberts notes, and its sub-committee Protection of the Arctic Marine Environment (PAME) is in liaison with an "alphabet soup" of people monitoring ice levels.

"The strange thing for insurers is that, even if vessels are ice class, they're still really struggling with the accuracy of Arctic charts," he says. "It's only 5% charted, even now, and most of those maps are World War Two vintage."

Another "moral question" new shipping routes present is whether Arctic tourism should be an insurable activity. Besides the environmental issues there are the practical difficulties of reaching a vessel in distress up there. Roberts concludes: "It could be a risk too far."■

The facts and myths about Arctic shipping

Former president of The Nautical Institute, Duke Snider, warns that a 'good ice year does not mean ice free'

The idea the Arctic is a hotbed for emerging risks is a "total exaggeration", according to Captain David (Duke) Snider, the chief executive of Martech Polar Consulting.

"The same risks exist today as 10 years ago in many ways, and I do not see geopolitical tensions adding to the mix significantly, regardless of what many pundits and armchair security experts feel," Snider tells *Insurance Day.*

"As climate change advances and ice gradually retreats, the Arctic routes will become more viable for vessels other than icebreakers and high ice-class ships. We are clearly seeing incremental increases in shipping already," he adds.

A former president of The Nautical Institute, Snider says re/insurers must consider that climate change is leading to greater variability in ice conditions and that a "good ice year" does not mean ice free.

"Whereas historically, multi-year pack ice, ice walls or ice bridges typically held the heavier ice back, this is no longer the case. We are seeing more dangerous multi-year ice in waters where typically it was never encountered, such as the southern portions of the Northwest Passage," he explains.

Arctic mariners are also seeing glacial ice – "icebergs, bergy bits and growlers" – in areas that were previously totally free of it. As climate change has reduced the extent of the polar multi-year pack, glaciers are now "calving off bergs", Snider says, and these ice features are now "free to drift" into new areas that were previously ice free.

"In the last several years, we have encountered glacial ice in the Beaufort Sea when we never did in the past," Snider stresses, adding the increased

variability in ice conditions, brought about by climate change, means the start and end of a navigational season are no longer clear cut.

Although the navigational season is thus lengthening, conditions within the season can vary.

"We continue to see ice blockages that only high ice-class vessels can deal with," Snider says. "The major climate models indicate we will first see the trans-Arctic route – across the top – open more regularly. The Northern Sea Route will progressively open next and finally the Northwest Passage will be the last to be regularly open – as long as there is ice, it will be pushed against and into the Canadian archipelago."

The result is that Arctic voyages will continue to be affected by ice, interfering with passages, either by delaying, diverting or even precluding successful passage for any but ice-class vessels.

Snider explains that liner traffic requires consistent speeds for scheduled port departures and arrivals, and such traffic cannot be operated economically if any ice variability would negatively affect schedules. That traffic must therefore operate expecting delays, diversions or cancellations, he adds.

There will be a continued incremental increase in destinational shipping, he continues, meaning there will be journeys into and out of the Arctic either to resupply communities or export natural resources, but through-traffic will not increase as much because routing and voyage completion "cannot be consistently assured".

"The much-vaunted savings in fuel by taking an Arctic 'short cut' are normally never realised as ships often use more fuel diverting or taking longer than planned," Snider says. Moreover, protection and indemnity and hull and machinery insurance rates increase "dramatically" when operating in the Arctic, he adds, because of the higher costs of building, maintaining, operating and crewing to meet ice conditions.

Although Snider does not expect short-cut shipping and transits to increase as markedly as some might think, he believes that, as traffic does increase, there will be an increase in environmental and cultural impacts, both negative and positive.

"Tourism in particular, with its inherent need to do more than just look from afar, and instead to go ashore into either environmentally or culturally sensitive areas, will potentially give rise to greater negative impact," he says.

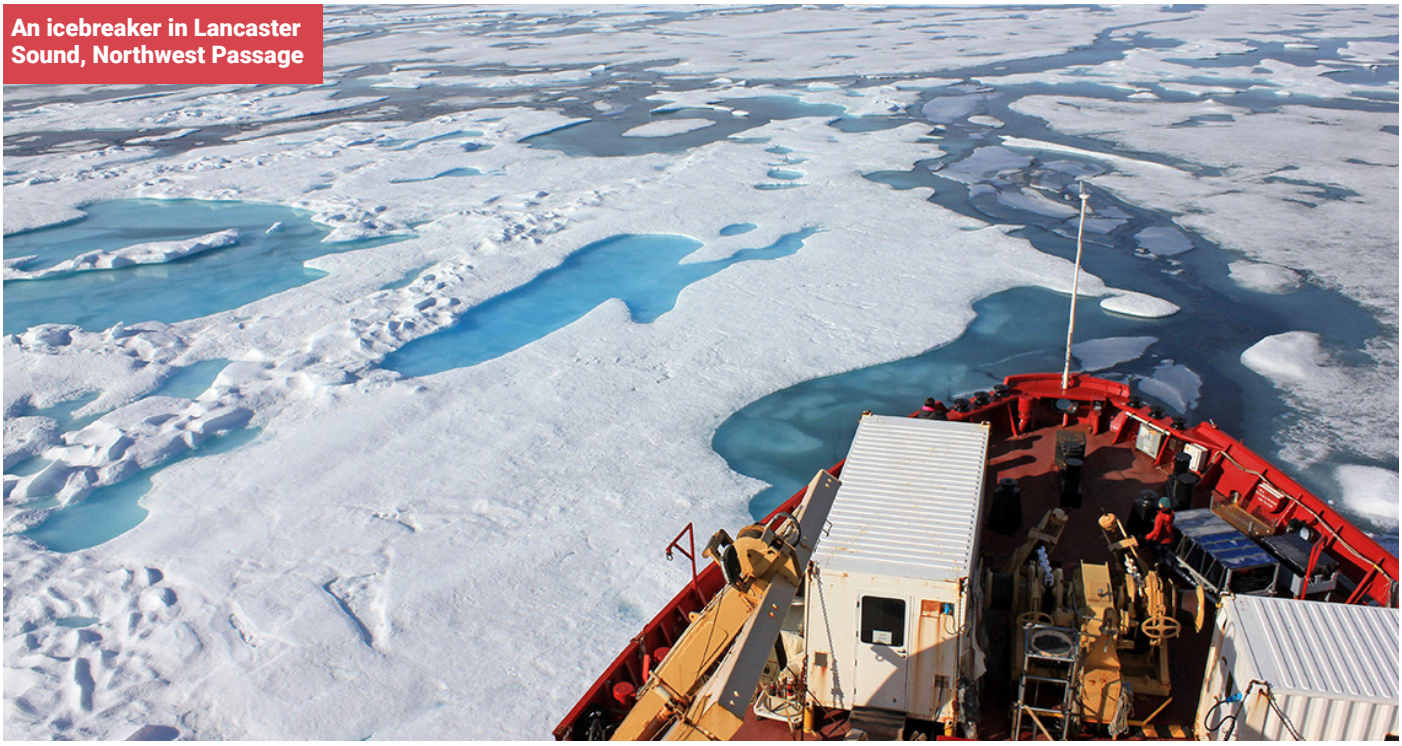
On the economic competitiveness of Arctic routes over traditional shipping routes, Snider says that, apart from specific cargoes not on liner schedules, the so-called short-cut routes are not economically better than sub-arctic routing.

"We will continue to see increased traffic for resupply and resource export," he says, adding running tankers or container ships through the Arctic will not reap the rewards expected.

At present, the route over the North Pole is not "routinely achievable", other than by icebreakers but, as climate change advances, this will likely become the most viable cross-Arctic route, Snider says. However, current ice conditions make estimating the time needed to complete such a voyage "rather disingenuous", he adds.

Seven routes

There are generally seven routes through the Northwest Passage,



An icebreaker in Lancaster Sound, Northwest Passage

Sabena Jane Blackbird/Alamy Stock Photo

the most traditional of which is the southern route – Lancaster Sound, Peel Sound, Victoria Strait, Dolphin and Union, and Coronation Gulf to Amundsen Gulf. Snider says this route is the least ice-impacted but it is draught-limited. Peel Sound, however, can be choked with ice.

The other six are offshoots of the southern route:

- Lancaster Sound, Prince Regent, Bellot Strait, Peel Sound, Victoria Strait and onwards;
- Bellot Strait Peel Sound, James Ross Strait, Simpson Strait, Dolphin and Union then onwards;
- Hudson Bay, Fury and Hecla Strait, Prince Regent Sound, Bellot Straight and then either east or west of King William Island to Dolphin and Union and onwards;
- Lancaster Sound to Viscount Melville Sound and then north of Banks Island;
- Lancaster Sound, Viscount Melville Sound and Prince of Wales Strait to Amundsen; and
- Lancaster Sound, Mclintock Strait, Victoria Strait, Dolphin and Union, and onwards

The Northwest Passage plays host only to the "usual players" or expeditionary mariners because of a lack of local infrastructure in this remote area that has small villages and no real port, fuel, resupply or repair facilities between Nuuk and Dutch Harbor, Snider says.

The Northern Sea Route has a higher population density than the Northwest Passage – of up 10,000 people in some areas – and more developed infrastructure west from Norway to Novaya Zemlya in Russia. There have been extensive oil and gas projects in the western Northern Sea Route, along with a heavy commitment to provide icebreakers. The navigation challenge is around "complex bureaucracy", Snider says.

Although Russia is "aggressively" building search and rescue infrastructure in the Arctic region, no similar effort is being made by other Arctic coastal states, Snider says. Emergency support is limited to the US Coast Guard's Arctic Shield, while Canada "does not preposition air assets", he adds.

Operation Arctic Shield is aimed at projecting US Coast Guard presence into remote areas that remain icebound for around half the year, and are known for their harsh climate and lack of infrastructure.

Training for polar waters

Snider says the Polar Code has provided the first international mandatory set of requirements for ship construction and operation in polar waters but, by necessity, it is a "lowest common denominator".

"Much of Canada's own demonstrative regulatory requirements developed over decades were sadly downgraded to meet the Polar Code instead of maintaining our higher standards," he says.

The Polar Code has been effective, however, in requiring higher standards in many areas of shipboard equipment, for example, but it has "dropped the bar" on experiential requirements for bridge officer training and certification.

Snider stresses that a Certificate of Proficiency for polar waters is not equal to The Nautical Institute's Ice Navigator qualification. If ice is expected, ice experience should be mandatory, he says, and there ought to be an experienced and certified ice navigator onboard. For this, he points to The Swedish Club's advice for trading in the polar regions, that an ice pilot should be onboard assisting the crew.

The Nautical Institute's ice navigator training and certification scheme "fills the gap in competency" left by Polar Code provisions, Snider says. This scheme mirrors the training provided, for example, by STCW (Standards of Training, Certification and Watchkeeping). This includes specific in-ice sea time requirements and some additional ice operations elements.

"Technically, ships operating in polar waters must now hold Polar Ship Certificates that are meant to ensure the vessel meets the Polar Code's requirements, but not all flag states or class societies place the same rigour on inspection and verification of requirements before issuing a certificate," Snider says.

Moreover, to qualify for a Certificate of Proficiency in Basic Training for Ships Operating in Polar Waters, a mariner can gain the required number of sea days in polar waters and "never see ice".

Operators have often been "taking the easy route", Snider says, by expecting their "ice navigators" to have only the basic, regulatory requirements, and their officers to have the mandatory Certificate of Proficiency for ships in polar waters. "Canada must once again require someone on the bridge to have an Ice Navigator Certificate Level 2 issued by The Nautical Institute," he adds.

Quality of charts

Russia operates more than six nuclear-powered and more than six conventionally powered icebreakers. The US has only two operationally capable polar icebreakers, but is building two, possibly three, Polar Security Cutters, Snider says. Canada has committed to build up to six icebreakers, but its order of two polar icebreakers has been "indefinitely delayed", he adds.

On the quality of Arctic Ocean charts, Snider says Russia and Canada have both been gradually increasing their coverage to modern standards. The challenge with charting, he continues, is that adjoining paper charts may have different data, with some survey data used still dating to the 1800s. "There are sporadic soundings in some areas and track-line soundings in many areas," he adds.

"In general, the routes that have

been historically followed and have been required to meet resupply and general transit are up to modern standards in well surveyed corridors. Outside these corridors, surveys may not exist at all," he says. About 10% to 15% of the Canadian Arctic waterways are surveyed to modern standards and, for the most part, that is sufficient, he adds.

"Much of the Canadian archipelago is outside of the waters that shipping wants or needs to go. Only tourist vessels really want to go outside these corridors. If new resource extraction projects require additional areas to be surveyed, they can continue to be met by 'user pays' as we have relied on in the past," Snider explains.

As an example, he points to the intense surveys done on the routes into and out of Milne Inlet to facilitate the safe passage of Baffinland mine resupply and export. There remain a few gaps in up-to-date electronic navigation chart coverage, but the Canadian Hydrographic Service is "rapidly closing those gaps", he adds.

A "zealous" focus on environmental protection gives little leeway to ship operations and "without some latitude and trust", the cost of shipping will increase substantially, which will inevitably be passed on to the consumer, Snider says.

"Far too often, regulations are being very quickly put in place without broad science-based rationale. I have seen regulations based on one-sided environmental 'reports' done by special interest groups that cite dubious input sources. We must get better at doing the science objectively and making balanced decisions," he stresses.

Communication challenges may be overcome by the launch in May of a combined VSAT, LEO and LTE managed connectivity service by British satellite telecommunications company Inmarsat. The Iridium satellite constellation – which provides L-band voice and data information coverage to satellite phones, satellite messenger communication devices and integrated transceivers – is "available but slower" than Inmarsat, Snider says. Global Maritime Distress and Safety System's SAT-C or high-frequency, moreover, are often used as "fall back", he adds, while SpaceX Starlink has the "most promising future capability".

It is a myth, Snider says, that the Northwest Passage and Northern Sea Route are becoming Arctic highways. The reality is that transits of either passage are not increasing at a high rate relative to global shipping traffic and many voyages remain expeditionary, he says. Destinational traffic is increasing though, and includes hydrocarbon exploration, development and export. Community resupply maintains steady to low growth in both Russia and Canada, he says.■

Where geography, politics and law meet

Philip Steinberg outlines why a grasp of how a nation extends its continental shelf is important to understanding political conflict in the Arctic Ocean

The idea that geopolitical tensions are swirling around the Arctic Ocean is overblown, according to Professor Philip Steinberg, UArctic chair in political geography at Durham University and director of IBRU: Durham University's Centre for Borders Research.

"I spend an awful lot of my time telling journalists they need to just chill out about what's happening in the Arctic," Steinberg says in an interview with *Insurance Day*. "The Arctic is actually a place where international law

is largely working and not an area to be particularly worried about."

Many misconceptions about political conflict in the Arctic Ocean come from a lack of understanding about how a nation extends its continental shelf.

The UN Convention on the Law of the Sea (Unclos) stipulates a state's sovereignty reaches out 12 nautical miles from its coastline, with the provision ships are allowed innocent passage through its territorial waters. "Innocent passage means you're not engaging in military manoeuvres, you don't call into a port, you don't stop and fish, you just don't stop, basically," Steinberg says.

The area from 12 nautical miles out to 200 nautical miles is the exclusive economic zone (EEZ). Coastal states can claim specific sovereign rights to living and non-living resources in the EEZ, which include exclusive rights to fish and also to drill and mine the seabed. From a navigational perspective, however, the EEZ is classed as high seas, a global commons where the resource of navigation is available to all and where coastal states have no special authority. Beyond the 200 nautical mile limit of the EEZ, the water column is considered high seas for all purposes – fishing as well as navigation.

A final zone, which applies only to the seabed, lies beyond the limits of the EEZ – the extended continental shelf (ECS). Unclos states that, in instances where the continental shelf goes out further than 200 nautical miles from the coast – which is not always the case because, in many places, it stops before 200 nautical miles – then the coastal state can retain exclusive rights to seabed minerals and sedentary living resources.

In addition to setting out a number of legal and geological mechanisms for determining the limit of the continental shelf, Unclos says in converting a continental shelf into an ECS claim a state must abide by one of two limiting factors: the limit of the ECS may be no more than 350 nautical miles from the coastline; or it may not be more than 100 nautical miles beyond the point where the sea is 2,500 metres deep (the 2,500-metre isobath). Coastal states can choose which of those two limiting factors to use when defining their ECS.

Disputed regions

That is where things get interesting in the Arctic context, Steinberg says. The Central Arctic Ocean – the high seas area of the Arctic Ocean – is a relatively deep ocean but it has some areas with very high ridges – and hence shallow waters. A notable example is the area defined by the Lomonosov Ridge, which runs between the continental shelf of Siberia and that of Greenland and Canada.

There has been a lot of media coverage of the three-way geopolitical tug-of-war over which of these countries owns this vast undersea

Disputed regions of Central Arctic Ocean present opportunities and risks

Map: Continental shelf submissions in the Central Arctic Ocean

https://www.durham.ac.uk/research/institutes-and-centres/ibru-borders-research/maps-and-publications/maps/arctic-maps-series/

Source: IBRU, Durham University, UK

mountain range. According to Denmark, the terrestrial ridge is an extension of its autonomous territory of Greenland; to Russia, it is an extension of the Siberian landmass; and, to Canada, it is an extension of Ellesmere Island in the Canadian territory of Nunavut.

Steinberg says: "Canada, Denmark and Russia can all argue the Lomonosov Ridge is an extension of their continent and, because the ridge is fewer than 2,500 meters deep, the three countries can make claims that go all the way to the other side, without applying Unclos's rule that restricts claims to 100 nautical miles from the 2,500-meter isobath." Thus, Steinberg stresses, "what looks like an aggressive, even excessive, claim to distant areas of the ocean is simply a coastal state using established procedures of international law to assert some specifically defined rights to the seabed."

Additionally, he points out: "Nobody has any real interest in mining seabed minerals out there because it's really not a good place to work. Even under the most aggressive models of climate change, nobody's talking about a winter-free, ice-free Central Arctic Ocean. It's still going to be dark and really cold for half the year, no matter what. And of course, it's far from land."

He continues: "There are a lot of more attractive places to extract minerals than the Central Arctic Ocean, not because of any inherent political risk in the Arctic, but simply because of environmental and geological factors." From a political standpoint, it may seem meaningful to lay claim to the North Pole, but in terms of economic value, it is "not worth fighting over", he stresses.

Misunderstood process

Steinberg also highlights much of the drama concerning ECS claims in the Central Arctic Ocean stems from a lack of understanding of the process by which claims are filed and recognised. Making a claim to extend a continental shelf involves extremely expensive and extensive research, including intensive geological and bathymetric mapping. This research is then used to make a filing with the UN's Commission on the Limits of the Continental Shelf (CLCS).

"The CLCS, which is an expert body of geologists who meet several times a year, very slowly goes through these incredibly detailed submissions, which are proprietary data so the submissions themselves are not public," Steinberg says. So slow is the review process that the CLCS has a 20- to 30-year backlog, which is generally accepted because "nobody's been rushing to actually mine there".

However, while in geological terms, a 30-year backlog is insignificant – the underlying data will not change – it does add uncertainty to political calculations of risk and opportunity. In political terms, 30 years is a long time – for instance, it is impossible to know whether in 30 years Russia will still be akin to a dictatorship or, at some point in the future, a true democracy.

"Nobody has any real interest in mining seabed minerals out there because it's really not a good place to work. Even under the most aggressive models of climate change, nobody's talking about a winter-free, ice-free Central Arctic Ocean"

Professor Philip Steinberg
Durham University

Once a review has been completed, the CLCS makes its recommendation on the geological limits of that country's ECS, but the enabling legislation of Unclos recognises in many instances there will be overlaps. The CLCS's role in the process stops at this point, as overlaps are for the opposing or adjacent states to the claimant to solve.

"It's up to those states to negotiate how to either divide the overlapping ECS or maybe have a joint development zone, where they share the proceeds according to some formula," Steinberg says, adding it is these overlaps that make journalists "panic". He points as an example to IBRU's map of maritime jurisdictions in the Arctic, where viewers can see the area around the Lomonosov Ridge claimed by Canada, Denmark and Russia (*see map*).

Reflecting on how this legal situation has an impact on risk and perceptions of risk, Steinberg concludes the Central Arctic Ocean presents political opportunities as well as political risks. "This is all a matter of international law that countries can violate if they want to, but it's in every country's interest to follow the rules," he says.

"The rules are complicated, many people don't understand them and the stakes are quite low, in terms of the actual economic gains or military gains, and so a country can take this opportunity to show it is a member of the international community, in good standing. At some point, a country could pull out and say, 'no, we're just going to start mining', but would they really want to, considering the political risk, economic risk and investment risk?"

New shipping routes

On the prospect of new shipping routes opening up through the Arctic Ocean as a result of receding sea-ice caused by global warming, Steinberg highlights Article 234 of Unclos. Even though Unclos normally does not grant coastal states authority over navigation in their EEZ,

Article 234 grants coastal states the right to implement non-discriminatory environmental protections to protect shipping in ice-covered areas of their EEZ.

That is because ice-covered waters are exceptionally hazardous and also because an accident there, such as an oil spill, could have severe environmental consequences.

Article 234 has allowed Russia to establish extensive – and costly – regulations for shipping across the Northern Sea Route, Steinberg says, requiring, for instance, certified pilots and icebreaker escorts, as well as restricting navigation to certain times and between certain ports.

While the Northern Sea Route across Russia's coast has been opening up, things have been moving much more slowly in the Northwest Passage, through the Canadian Arctic archipelago. There have been many models of shipping economics of the Northwest Passage, enlisting the expertise of climatologists, oceanographic modellers and shipping economists, but it is "nobody's favourite" future route.

Steinberg continues: "It'll be one of the last areas to be ice-free. It's shallow and filled with islands, which means ships would need to reduce their speed. Also, even with projections that describe the Arctic Ocean as 'ice free' in the summer season by 2030 or 2040, this can technically still mean there's a fair amount of ice shifting around, just not in solid, land-fast chunks."

Additionally, drift caused by ocean currents in the region means a lot of this ice will end up stuck between the islands of the Canadian Arctic archipelago. "So, it'll be unpredictable year to year, even day to day, where the ice is going," he adds.

Shippers would want to avoid that unpredictability. Being able to "go over the top" of the Arctic Ocean, which is also a more direct route, is therefore an appealing prospect.

"It's a simpler topographic environment that will presumably become more attractive than the Northwest Passage. There are no legal barriers to this because it would be passage through high seas," Steinberg says.

Also, it is crucial to remember there are indigenous and non-indigenous people who use the Arctic Ocean all year round. Receding ice is not only problematic for them in creating potential shipping routes that could interfere with travel across the ice, but it will also change the region's ecology. And this will have consequences that are unanticipated.

Turning back to EEZs, another issue is how melting Arctic ice affects Article 234. "Will Canada and Russia lose the ability to enact special environmental provisions in their EEZs if the waters are no longer ice-covered for most of the year? Unclos does not precisely define what 'ice-covered' means," Steinberg says.

He continues: "International law is, surprisingly, blind to the fact the physical geography underlying the legal geography is changing. The classic examples of that blindness are outside the Arctic. For instance, do Pacific islands, when they're completely covered by water, still have an EEZ if there's no territory people live on anymore? Or what about coastline changes due to climate change? None of that is clear at all in Unclos. It's debated by lawyers to this day and that all has implications for the Arctic as well."

Summing up, Steinberg sees the Arctic less as a region of threats or opportunities than one of uncertainty. Here, he sees some inspiration in the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, which has been signed by nine deep-water fishing nations and the EU, and which went into force in 2021. "The agreement places a 16-year moratorium on commercial fishing in the region while the ecology of the area is studied, so we can better understand what the impacts of fishing in such a rapidly changing environment might be."

He concludes: "I think we might need something similar with shipping, to work out what legal mechanisms can and should be implemented to achieve a broader understanding of the risks and the opportunities. This should involve the International Maritime Organization and also the indigenous peoples and the Arctic Council, which is already providing a forum for consultation and decision-making in the region. And that's needed before we even start talking about constructing new shipping routes through the Arctic Ocean."■

Westend61 GmbH/Alamy Stock Photo

Cold comfort: treaty envisaged to protect Arctic Ocean biodiversity

Polar explorer and conservationist Pen Hadow explains why marine re/insurers and P&I clubs need to align their advisory services and business strategies, respectively, with the prevention of risks to biodiversity in the Arctic Ocean

Lloyd's has an extraordinary opportunity to build on its heritage and shape its future reputation as the leading maritime intelligence service, according to distinguished polar explorer and conservationist Pen Hadow, *writes Louise Isted.*

It can do this by addressing the vulnerability of the Arctic Ocean's biodiversity to the harmful impacts associated with the new shipping routes being considered, as the region's sea-ice cover recedes because of greenhouse gas emissions.

Hadow made history in 2003 as the first person to trek solo from Canada to the North Pole – a feat that can be compared with making the first solo ascent of Everest by the hardest route without oxygen.

The 770-km journey over 75 days, in temperatures as low as -45°C, required 30 to 40 hours of swimming between the ice floes, revealing to Hadow the scale and speed of the region's loss of sea-ice habitat.

After a total of 10,000 hours over 15 years on the Arctic's sea-ice, Hadow had an epiphany that led to the creation of 90 North Foundation, which aims to establish a North Pole Marine Reserve in the form of an international treaty.

Voicing his concern shipowners are looking to exploit this newly accessible ocean, Hadow is gaining supporters from the environmental and commercial spheres. His efforts have included reaching out to delegates at last year's Marine Insur-

ance Norway and Cargo Insurance London conferences, and the global gathering of the International Union of Marine Insurance.

"One of the UK's commercial assets that's still a global centre of excellence and expertise is the specialty insurance market that is Lloyd's. Its roots are in intelligence for shipping routes and, guess what, as the Arctic's sea-ice cover recedes, the last shipping routes are finally being revealed," Hadow says in an interview with *Insurance Day*.

"Insurers should be proactively supporting the gathering of intelligence through research programmes like those of 90 North Foundation, so they can communicate effectively the negative impacts to the shipping community of vessel activity on both the region's vulnerable biodiversity and their own licence to operate if they're thinking of going into the high seas of the Central Arctic Ocean," he adds.

"The reputations of marine re/insurers, along with P&I [protection and indemnity] clubs, shipowners, ship operators and shippers, will take a severe reputational beating if they wantonly ignore the warning signs," he continues, "because there are some very substantial organisations and international processes that are well advanced in developing an international treaty to underpin the North Pole Marine Reserve concept, and transboundary shipping, along with vessels associated with commercial fishing and deep-sea mining, are a big 'no-no'."

Fewer than 10 research vessels in history have ever been into the Central Arctic Ocean's high seas "at the top" of the planet. In 2017, Hadow led the only non-icebreaking vessels ever to have sailed unobstructed by ice into the region. In two 50 ft sailboats his team penetrated nearly 300 nautical miles into the area, via the Bering Strait, while undertaking oceanographic research. This part of the world is, to date, "exceptionally undisturbed" by human activity, he says. "It's our intention to keep it that way," he stresses, "and it's much simpler to keep commercial activities out by international agreement than to winkle them out once entrenched."

Pen Hadow on his solo trek from Canada to the North Pole in 2003

Martin Hartley

Sea-ice shrinkage

The fundament to the emerging risks in the Central Arctic Ocean and wider Arctic Ocean is the receding of the sea-ice cover.

Hadow mentions a phrase he has heard used by marine insurers, "never north of 68", which refers to a circle of latitude 68 degrees north of the Earth's equatorial plane. According to the Lloyd's Market Association's joint hull committee, this concerns the limits to normal navigation – beyond which the insured needs to seek quotes for cover – although the actual degree of latitude varies around the Arctic to reflect historic winter sea-ice cover. The point of this, Hadow says, is the insurance industry gets "understandably twitchy" if its clients plan to enter areas with sea-ice cover.

The International Maritime Organization's (IMO) definition of the Arctic Ocean reflects the 15 million square kilometre sea area historically covered by winter sea-ice, its approximate average thickness being just two to three metres. In contrast, Antarctica's 15 million square kilometre ice sheet has an average thickness of almost 2,000 m. The decreasing area of the Arctic Ocean's residual summer sea-ice cover is currently around 3.5 million square kilometres. Its continued seasonal shrinkage creates two substantial risks.

Hadow says: "The first is the sea-ice is not simply a geophysical surface phenomenon giving our planet's northernmost region its characteristic white capping. It also provides a critically important reflective heat shield, which effectively keeps the northern hemisphere – and indeed the rest of the globe – a great deal cooler than it would otherwise be. But, as we continue to peel back the sea-ice cover, ever more solar energy is absorbed as heat, which then works its way through

the global ocean and atmospheric circulatory systems and so the disappearance of Arctic sea-ice accelerates global warming and the associated climate changes."

The second risk relates to the fact the sea-ice provides a physical habitat for one of Earth's major marine ecosystems – a floating ice-reef ecosystem. And with the sea-ice cover reducing dramatically – the US National Oceanic and Atmospheric Administration estimate is 12.2% a decade over the past 40 years – it inevitably means the wildlife dependent on its existence will "already be stressed and therefore vulnerable to additional vessel-related impacts", Hadow says.

Despite this vulnerability, the sectors known to be looking to exploit these newly accessible waters – and seabed – are commercial fishing, international shipping, hydrocarbon and mineral mining and cruise tourism.

"We first need to ensure risk managers and insurers understand the movement of vessels in marine waters absolutely is not a benign activity, but it invariably and demonstrably introduces acoustic, chemical, physical and biological impacts that result in stressors and thus potential risks to the survival and health of the indigenous biodiversity. In short, vessel activity leads to the dispersion, disruption, damage and/or destruction of marine wildlife," Hadow adds.

Responding to the forecasted increase in vessel activity and the special operational risks posed, the IMO introduced the International Code for Ships Operating in Polar Waters (Polar Code) in 2017, which is mandatory under both the International Convention for the Safety of Life at Sea and the International Convention for the Prevention of Pollution from Ships.

The Polar Code covers the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the Arctic and Southern Oceans. However, in environmental terms, the Polar Code is primarily focused on the risk posed by an oil spill, which is only one of the risks vessels present to biodiversity and with a very low frequency of occurrence.

In July this year, the IMO supplemented the Polar Code by introducing its ban on the use and carriage of heavy fuel oil in the Arctic Ocean. Hadow expects this will have little immediate impact because it will allow most ships to use and carry such fuel until 2029 as there is a waiver for vessels flagged by Arctic coastal states.

Arctic Amplification effect

90 North Foundation focuses on the interface between the Arctic Ocean's unique and vulnerable biodiversity, and the impacts that surface vessels introduce to what is the world's fastest-changing marine environment.

Hadow says: "The Arctic Ocean has already warmed four times more than any other ocean environment, and some of its marginal sea areas,

North Pole Marine Reserve will act as a 'biological refugium'

Source: 90 North Foundation

like the northern Barents Sea, in Russian and Norwegian waters, have warmed seven times faster.

"It's not just that the ice is melting, but there are all sorts of other chemical and physical changes occurring, driven by the warming of its water column, that are affecting the habitat and therefore the indigenous species."

A multiplicity of interconnecting feedbacks activated by the warming is known collectively as the Arctic Amplification effect.

For example, organic debris previously locked within the permafrost of the surrounding tundra is now being washed out and carried by the rivers of northern Russia into the Arctic Ocean. This relatively dark-coloured debris, held in suspension in the sea water, creates what is referred to as Arctic tea, which further increases the absorption of heat energy from the sun, thereby delaying the autumn freezing process and accelerating the spring melting processes of the sea-ice.

90 North Foundation wants to minimise the indirect human impacts within the Central Arctic Ocean – the area 200 nautical miles north of the surrounding lands with an area of 2.8 million square kilometres – and optimise the resilience of the wildlife by preventing the additional direct risks presented by vessel activity.

"This region is a global commons, a shared inheritance, to be conserved for the benefit of the global community," Hadow stresses. "It's the world's most iconic marine environment featuring the animal used to symbolise climate change, the polar bear, and its disappearing sea-ice provides the biggest visible manifestation of climate change."

There are species now being observed within the Arctic Ocean for the first time. Mackerel, for example, have been observed in the Fram Strait – the passage between Greenland and Svalbard. Another example is narwhal, normally seen around the islands of Svalbard, which have been observed about 110 km from the North Pole. Hadow contrasts these natural migrations into the waters of indigenous species – likely activated by habitat change – with the invasive biota that find themselves routinely dumped from within ship ballast waters.

"The North Pole Marine Reserve is, in effect, designed to be an Arctic Ark that will optimise the resilience of any species that finds itself there, for as long as possible, until humankind gets its act together and can manage the process of reversing global warming," Hadow says, "which for oceans is centuries away, if not millennia, given the physics of energy and water."

With starlight-only for up to 11 weeks straight each year, the Arctic Ocean will always have the coolest and darkest waters on the planet, which means some of the species forced to migrate there will not survive in the long term. For those that manage to, however, Hadow says the Arctic Ark will create a "last bastion of hope as a biological refugium", with no commercial fishing, no international shipping, no mining and minimal cruise tourism.

"The North Pole Marine Reserve is, in effect, designed to be an Arctic Ark that will optimise the resilience of any species that finds itself there, for as long as possible, until humankind gets its act together and can manage the process of reversing global warming"

Pen Hadow
90 North Foundation

International treaty

The envisaged North Pole Marine Reserve would be established through a treaty that combines existing international agreements, such as the Central Arctic Ocean Fisheries Agreement (CAOFA), which is a voluntary commitment against commercial fishing in the Central Arctic Ocean until 2037, along with potential IMO conservation measures for shipping, and the circumpolar nations' historic commitment to co-operation and peaceful co-existence.

That date is etched into 90 North Foundation's mission as the absolute deadline for a North Pole treaty. Hadow explains: "The Central Arctic Ocean is an exceptional region that we know almost nothing about in biological and ecosystem terms. Let us not, just because we can, extract the living marine resources and then accidentally find ourselves, for example, having destroyed what may prove to have been the nursery grounds for the huge north Atlantic and north Pacific fishing industry."

The CAOFA illustrates the rare application of the precautionary principle in the face of commercial forces and at considerable geographic scale, which Hadow is urging the global commercial and diplomatic communities to expand to include transboundary shipping, deep-sea mining and cruise tourism.

Major players understand the significance of this ecosystem and the risks it faces. The UN Convention on Biological Diversity has assessed the Central Arctic Ocean to be an "ecologically or biologically significant marine area". The UN Sustainable Goal 14 – life below water – identifies the special value of the

Central Arctic Ocean. The International Union for the Conservation of Nature, a UN advisory body, is actively promoting the protection of the entire Arctic Ocean. And the Arctic Council is keeping a watching brief on how best to contribute to the custodianship of this vulnerable marine environment.

Of the 25 categories of vessel-related impacts on biodiversity, one major but under-reported impact from shipping on biodiversity is underwater radiated noise, notably from propeller cavitation. And Arctic waters, being cold, transmit sound over far greater distances than temperate or tropical waters – more than 150 km in some cases.

"If you've got this relentless noise emanating from a shipping route being introduced into the Arctic Ocean for the first time in human history, mammals, for example, tend to be dispersed to less favourable habitats because they can't think straight to hunt, navigate and communicate and so it can cause a deleterious effect on the health of a population," Hadow says.

In addition to the acoustic category, which also includes active sonar and seismic surveying, vessels can have serious chemical, biological and physical impacts. Examples of the latter include mammal strikes, when vessels accidentally ram – and thus kill or seriously injure – a whale asleep at the surface; and seabed trawling can destroy polar corals, which likely take significantly longer to recover than those of temperate waters.

"The marine industry generally has a very poor grasp, frankly, of the dispersive, damaging or downright destructive nature of international shipping, which likes to think of itself as benign," Hadow stresses.

The Arctic Council brokered the CAOFA, an achievement Hadow and possibly others felt worthy of a nomination for a Nobel Peace Prize, such was its success in evoking the diplomatic concept of Arctic exceptionalism and the precautionary principle with respect to sustainability. Conceivably it could build on this achievement, Hadow says, and bring about an all-encompassing treaty for the Central Arctic Ocean, if not the wider Arctic Ocean.

"The well-established but still growing phenomenon of ecological diplomacy across international boundaries has played its part in enabling agreements for the Arctic Ocean, notably through the Arctic Council, each adding a layer that is building awareness of the political case for Arctic exceptionalism," Hadow says.

Existing agreements and emerging initiatives could be strategically "aligned and conflated" and captured in a single treaty for the Central Arctic Ocean. Also delivered in challenging times, the Antarctic Treaty System, signed in 1959 during the Cold War, offers an "encouraging parallel", Hadow says, where the international community found a way to come together to protect a global commons.

"If the treaty ends up not using the words North Pole Marine Reserve, then so be it. The name isn't important, but it helps us all focus on a destination," he says. "It would be an iconic global achievement that

Trawling for plankton in the Arctic Ocean

Conor McDonnell

would give the global community hope that the decision-makers responsible for managing our planet's life-supporting ecosystems and resources understand that sustainability for humankind is not a given and they're prepared to do the hard miles to secure it."

Economic pressures

Hadow's message to marine re/insurers and risk managers is there are going to be growing economic pressures to put a new shipping route "slap through" the North Pole's high seas region. That shipping route, running from the Atlantic Ocean to the Pacific Ocean via the Central Arctic Ocean, already has a name – the Transpolar Sea Route. China has referred to this route in its state programmes as the Polar Silk Road, as part of its global Belt and Road Initiative.

Hadow highlights the geopolitical tensions that have turned the Suez Canal into a high-risk and costly bottleneck for shipping, and the possibility of climate change continuing to create a bottleneck owing to water shortages for the Panama Canal.

He says: "If these situations continue and the sea-ice opens up, then ships will look to start migrating northwards, in preference to heading via the southern Capes. There will be irrefutable financial pressures to make a 6,000-kilometre saving between Shanghai and Rotterdam, by bisecting the high seas at the top of the planet via the Fram and Bering Straits. It is the direct impacts from the vessels that threaten to turn the region's marine biodiversity, already stressed by habitat loss, into a super-stressed state, due to the unrelenting operations of bulk, tanker and container vessels."

Hadow is optimistic, however, that in the final analysis, flag states and shipping-related companies will support the treaty's "overwhelming rationale" to declare the Central Arctic Ocean a marine sanctuary for wildlife in perpetuity. "Three of the world's five largest container ship companies have already pledged never to use the Arctic Ocean, and several of the largest consumer brands have pledged similarly," he adds.

With respect to Russia's widely reported plans to build up transboundary shipping on the Northern Sea Route, through the waters of its exclusive economic zone to the south of the Central Arctic Ocean, Hadow believes these may be curtailed by the headwinds created by the wider international movement to avoid and protect the wider Arctic Ocean's biodiversity. "The build-up will likely be restricted to 'destinational movements' with Russian vessels working Russia's northern coast, moving raw materials and supplying coastal settlements," he says.

The Northwest Passage, through the geographically extensive archipelago north of the Canadian mainland, is unlikely to become a major sea route because, Hadow continues, it will always be a slow and challenging route owing to its narrow and bottlenecked seaways, the possibility of sea-ice and a shallow bathymetry.

He adds: "However, in the medium term, before the Central Arctic Ocean becomes routinely ice-free for a viable seasonal duration, I'm particularly concerned about the increased number of transboundary transits from China in the past two years because this coastal marine environment is the preferred habitat for many of the Arctic's charismatic megafauna, bowhead whale, beluga, narwhal, Atlantic walrus, polar bear and several seal species."

Three workstreams

90 North Foundation has three workstreams. One is scientific research, for which it has a partnership with the UK's University of Exeter – the Arctic Ocean Research Unit – and is focused on delivering evidence and insight on the interaction between biodiversity and vessels. The foundation is also commissioning UN reports through the IMO-led World Maritime University.

Its second workstream focuses on raising public awareness, understanding and engagement on the biodiversity issues posed by the Arctic's receding sea-ice. In effect, its objective is to make the Arctic Ocean more relatable and relevant to everyone south of the circumpolar north. Projects include international research-led expeditions on the Arctic Ocean, multimedia immersive experiences in capital cities, funding a free-to-use globally accessible Arctic marine film bank, and co-producing national curriculum-related teacher resources.

Its third workstream is about providing the international leadership that will accelerate the evidence-supported conservation measures that will protect the region's biodiversity.

Hadow says his address at IMO's plenary session in the autumn of 2017 resulted in its secretary-general "rising to lead an ovation – a rare event".

Despite his evident world view, Hadow's affinity with the Arctic stems from one country in particular – Scotland. Raised on a hill farm in Perthshire, Hadow's nanny had been under instruction to encourage him to play outside in the cold for ever-longer periods with ever-less clothing, to build his mental and physiological resilience. Enid Wigley was already familiar with polar explorers, having previously cared for – and been asked to toughen up – the only son of British Royal Navy officer and explorer, Captain Robert Falcon Scott, better known as Scott of the Antarctic, who led two famous expeditions to Antarctica. That son was Peter, who became Sir Peter Scott, founder of the World Wide Fund for Nature and the world's first global environmental figure.

The irony of Hadow's solo trek from Canada to the North Pole 21 years ago is the warming climate and loss of sea-ice cover means he himself will probably go down in history – not only as the first to succeed in this endeavour, but also as the last to have had the opportunity.■

Deep thoughts: why deep-sea mining poses more questions than it answers

Romie Goedicke, co-lead for nature at the UNEP FI, outlines the concerns surrounding deep-sea mining and the potential risks for re/insurers

The UN Environment Programme (UNEP) is mandated to keep the environment under review and has been monitoring proposals for deep seabed mining, both within and beyond national jurisdictions, *writes Louise Isted.*

While no commercial activities exist at present, several countries have signalled their intention to assess the environmental impact of the activity in their national waters or apply to the International Seabed Authority (ISA) for approval to extract minerals and metals from the deep seabed. These include cobalt, copper, gold, lead, manganese, nickel, silver, zinc and other rare metals.

In an interview with *Insurance Day*, Romie Goedicke, co-lead for nature at the UNEP Finance Initiative (UNEP FI), outlines the concerns.

What is the purpose of deep-sea mining?
Deep-sea mining refers to the extraction of mineral deposits and metals from the deep seabed, which is the area of the ocean below 200 metres.

This activity has been gaining attention due to the anticipated rising demand for minerals and metals found there, but significant concerns have been raised by many stakeholders. To date, 27 countries have asked for a moratorium on deep-sea mining activities, along with more than 45 companies and financial institutions and other key players such as the International Union for Conservation of Nature.

A key concern of this activity is about three-quarters of the deep seabed is still unexplored and, since the ecosystems found there are unique and fragile, there could be many environmental impacts derived from this activity if it is conducted commercially.

No commercial-scale deep-sea mining has taken place yet, so how would you describe the state of play with its evolution?
The deep seabed is located in zones where states have national jurisdiction or in international waters.

For the former, some nations, such as Norway, are considering allowing deep-sea mining in their exclusive economic zones (where they have rights over natural resources). As for the latter, the ISA – mandated both to regulate exploration for and exploitation of deep seabed minerals found in the seabed and subsoil beyond the limits of national jurisdiction and to ensure the effective protection of the marine environment – has been co-ordinating the process of developing regulations on the exploitation of the deep seabed since 2014 but has yet to determine whether it can be conducted commercially.

In either case, adhering to the precautionary principle as recognised in international law, such as the UN Convention on the Law of the Sea, it would be essential to have science-based knowledge about the environmental, social and economic impacts of deep-sea mining before deciding if and how it can take place.

"About three-quarters of the deep seabed is still unexplored and, since the ecosystems found there are unique and fragile, there could be many environmental impacts derived from this activity if [deep seabed mining] is conducted commercially"

Romie Goedicke
UNEP Finance Initiative

What is your response to the claim deep-sea mining is an environmentally friendly alternative to terrestrial mining that is essential for the transition to renewable energy?

There is no scientific evidence available that confirms the assertions suggesting one (between land or deep-sea mining) is more environmentally friendly than the other. Echoing what UNEP has stated in its issue brief on deep-sea mining from May this year, the environmental impacts of exploiting the deep seabed are currently uncertain and potentially grave, which entails these should be studied further before making any such claims.

What are the potential reputational, financial, operational and regulatory risks for re/insurers and investors from deep-sea mining?

Potential investors or re/insurers in deep-sea mining would face numerous risks, as described in UNEP FI's briefing paper titled Harmful Marine Extractives: Deep-Sea Mining.

To list some of these, there is a notable reputational risk for companies engaging in or supporting deep-sea mining, especially considering the increase in global calls for a moratorium on deep-sea mining, or even just expressions of concern on its potential impact.

Since these calls come from many actors, including companies, those actively supporting deep-sea mining might be excluded from the supply chains of companies with a stance on the matter, such as Microsoft or Ford.

From an operational standpoint, consideration must be given to how the mining companies' operations could bring discontent with communities or with civil society, the latter of which has already been voicing its capacity and willingness to protest against marine extractive industries.

Another risk is the current lack of a regulatory framework. The ISA is still working on developing one for maritime zones beyond national jurisdiction and UNEP, through its issues brief on deep-sea mining, has suggested creating a common reporting framework for the valuation of ecosystems across exclusive economic zones and international waters.

Neither is yet in place and it is likely if any future deep-sea mining activity were to cause significant environmental damage, legal action could be taken for damages and regulatory changes may follow as well.

UNEP FI has concluded that the extraction of seabed deposits cannot be considered sustainable and urges financial institutions not to support the sector. Why have you reached this conclusion?

A key challenge to the viability of deep-sea mining is the lack of certainty of environmental impacts for marine ecosystems, as well as social ones.

Until the need for and the consequences of deep-sea mining commercially are better understood, it is difficult to state deep-sea mining could align with the definition of a sustainable blue economy and whether it could be part of a net-zero and nature-positive future.

Taking into account the goals of the Paris Agreement and the Kunming-Montreal Global Biodiversity Framework, UNEP FI advises financial institutions against supporting the sector until and if there is clear evidence the social and environmental impacts can align with a sustainable pathway.■

Ocean Rebellion protesters demonstrate near the Hidden Gem sea mining vessel

SOPA Images Limited.Alamy Stock Photo

The next Gold Rush? Why deep-sea mining sparks controversy

Technology and regulation race against – not with – each other, as companies and nations seek to harvest the world's abyssal plains

To say deep-sea mining is controversial understates the fact this nascent industry has already attracted both citizen protests and scientific rebuttals, *writes Queenie Shaikh.*

The argument against deep-sea mining operations states the obvious: it is one of the very last places on Earth to be untouched. So far, only Norway has voted to allow companies to begin deep-sea mining efforts and its decision, taken at the start of this year, is tendentious.

It is a remarkable choice, since it sees Norway diverge from mounting international consensus. The UK, Canada and New Zealand have each called for a moratorium on the practice and, in July, 32 countries at the general assembly of the International Seabed Authority (ISA) united against the imminent start of deep-sea mining.

As an intergovernmental body comprising 167 member states, what happens at the ISA matters. Its role is to authorise and control the development of "mineral-related operations" on the seabed, which is considered part of the so-called common heritage of all mankind.

Dissenting voices

Dissenting voices against interference with that heritage are echoing across society and the scientific community. At the end of last year, research vessel *MV Coco* was disrupted by Greenpeace activists who wanted to block The Metals Company's collection of data to support its application for a mining permit across a section of seabed between Mexico and Hawaii.

Car manufacturer BMW has already pledged not to use materials gathered from deep-sea mining – a bold move, given these activities promise the supply of elements needed for the batteries that will power the electric vehicle revolution.

A spanner in the works of such courage is the ISA's recent election of a new secretary-general. Leticia Carvalho, a Brazilian oceanographer

A Greenpeace protest against deep-sea mining in November 2023

Imago/Alamy Stock Photo

who inherited the top job from the incumbent, UK barrister Michael Lodge, has said "rebuilding trust" is fundamental. Interviews she gave before her selection suggest the ISA may adopt a softer view of deep-sea mining in the near future.

Companies in the private sector who want to press ahead with this activity reason that recent estimates suggest there could be as much as $16trn-worth of minerals waiting to be exploited on the seabed.

To be clear: commercial deep-sea mining has not yet started anywhere in the world and the ISA does not expect to complete its set of regulations for this until 2025 at the earliest.

Enthusiastic early movers

However, this has not curbed the enthusiasm of organisations such as The Metals Company, which wants to apply for an exploitation licence later this year. If granted, it might begin mining operations before the ISA's mining code is ready. Advocates of early permits argue seabed minerals are necessary for metal-dependent technologies and industries, and that environmental harm can be mitigated.

Cullen Hendrix, senior fellow at the Peterson Institute for International Economics in Washington DC, describes deep-sea mining as a "frontier technology". The drive to move mining from land to the seabed may have an element of "out of sight, out of mind", Hendrix tells *Insurance Day*.

Little is known about deep-sea mining's potential impacts. Research published in July by the Massachusetts Institute of Technology suggests if ocean currents are disrupted, the ocean may be able to absorb less carbon from the atmosphere – with dramatic climatic effects.

Hendrix argues the "significant groundswell" of concern about deep-sea mining should not be mischaracterised as coming solely from engaged activists and scientists. The ultimate barrier might come from the "investor class", who are unsure about the environmental impacts of deep-sea mining – and the impact that would have on their reputations.

"If you have environmental groups demonstrating against a company about what they're doing, it can have a huge impact on their brand. Who wants to be associated with that?"

Hélène Galy
WTW Research Network

The rewards are tantalisingly obvious. If some of the supposed $16trn economic potential of deep-sea mining can be unlocked, it could be transformative for small and medium-sized national economies. Hendrix likens this to how the offshore oil and gas boom transformed Norway into one of the world's happiest and wealthiest countries, with the safety net of its sovereign wealth fund to boot. Hendrix believes more countries may try to jump on this Gold Rush bandwagon.

Hélène Galy, managing director of the WTW Research Network, says in an interview with *Insurance Day* that about 30 nations are interested in deep-sea mining at present. The fact most of the economic potential is believed to lie outside 300-mile exclusive economic zones and in international waters only complicates matters, Galy adds.

Hendrix and Galy paint a picture of technology and regulation racing against – not with – each other, as companies and nations seek to harvest the world's abyssal plains.

Insurers' concerns

Where do insurers fit into this race? Galy expects three key concerns for them: technological uncertainty, environmental impact and reputational risk. "If you have environmental groups demonstrating against a company about what they're doing, it can have a huge impact on their brand. Who wants to be associated with that?"

Stressing there is "no such thing as a free lunch when it comes to risk", Hendrix says prospective insurers of this new market will have to balance the "devil they know" in terms of terrestrial mining – and its associated impacts – with the unknown risks of deep-sea mining before they can offer insurance products.

The sheer physical depth of deep-sea mining makes the challenge for insurers even harder, Hendrix says. "It's going to be very difficult for global civil society to monitor deep-sea mining activities. Most organisations – even well-meaning organisations – are probably more likely to cut corners if they don't think anyone is looking over their shoulder," he adds.

Deep-sea mining thus contrasts with terrestrial mining, where local communities can observe landslides and demand to know what is happening. The world's mines are some of the fiercest flashpoints of union-corporate dissent and, even in less regulated markets, a stripmined stretch of land acts as all the evidence lawyers need to prove malpractice.

Hendrix's simile of a "Gold Rush dynamic" is appropriate. The rush to California in the mid-1800s led of course to the abuse of Native Americans. The neighbours to deep-sea mining operations will be fish, sea mammals, coral and vegetation. Just because Mother Earth cannot take companies to court for abuse of the environment, it does not mean deep-sea mining should proceed.■

Unintended consequences: could solar radiation management create new climate risks?

Hugo Martin/Alamy Stock Photo

Solar radiation management has the potential to create unexpected losses

On January 1, 2020 the International Maritime Organization's (IMO) much-vaunted Global Sulphur Cap regulation came into force, *writes Queenie Shaikh.*

After years in the debating chamber and months of fervent preparation, the global shipping industry had agreed it would cap sulphur content in marine fuel at 0.5%, down from 3.5%. The aim was to cut particulate emissions and help prevent the thousands of premature deaths from pollution globally each year.

No one could know then this cap would turn out to be arguably the largest accidental experiment in geoengineering in human history.

Earlier this year, US scientists researching the sudden increase in global temperatures in 2022 and 2023, made a startling discovery: the 80% drop in sulphur dioxide from ships had created a so-called geoengineering "termination shock".

Dimmer clouds over the ocean – caused by fewer sulphur aerosols in the atmosphere – meant less sunlight was reflected into space, they said. Overall, the IMO's efforts to tackle global warming may have caused an additional rise of about 0.16°C in global average temperatures.

This research is still being corroborated by the global scientific community but, if proven, shows the tangible risks of tampering with Earth's atmosphere. It also lays bare the unintended consequences of rushing to find solutions to climate change.

Solar radiation management

Solar radiation management (SRM) has long been mooted as a potential way to limit the impacts of climate change. Its proponents argue, if conducted on a temporary basis, SRM could buy us more time to cut greenhouse gas (GHG) emissions and reduce carbon dioxide in the atmosphere.

SRM encompasses a range of approaches that aim to limit global warming by increasing the amount of sunlight the atmosphere reflects back into space or by reducing how much outgoing thermal radiation is trapped by clouds.

Potential methods include injecting reflective aerosols into the stratosphere and brightening clouds over the ocean by spraying mist created from sea water from unmanned rotor ships.

No matter how it may be performed, SRM is a solution that is slowly garnering interest from governments and scientists alike. The UK and German governments already have an explicit position of support for SRM research and countries including

the US, China, Finland, Norway and Japan have funded exploratory projects into SRM techniques.

However, Robert Muir-Wood, chief research officer at Moody's RMS, argues SRM remains "extremely controversial, with a lot of opposition to even performing experiments".

He says while the "theory of geoengineering is quite well developed, the practice of geoengineering has got absolutely nowhere".

This is what makes experiments like the shipping industry's action on sulphur dioxide so interesting, he adds.

"If anyone had suggested an experiment to see if the sulphur cap for ships' fuel influenced the climate, it would never have been allowed. But because it wasn't considered an experiment around geoengineering it happened and we can see the results," Muir-Wood says.

Emerging understanding

This sentiment is shared by Sarah Kapnick, chief scientist at the US National Oceanic and Atmospheric Administration (NOAA), and her special adviser, Greg Frost. Between them they have more than 50 years of experience in climate science but acknowledge SRM is a politically sensitive and emerging field where practicalities are concerned.

"It's right to say this is emerging. We've passed through theoretical and early research and it's starting to be more applied, but we must create a model of the Earth's atmospheric system to get there," Kapnick says.

The US Congress has injected $41m over five years into what Frost and Kapnick both call a "comprehensive research programme" for the NOAA.

"The NOAA is the only federal agency across the US that has funding from Congress to study SRM," Kapnick says, adding a huge focus of this research will be aimed at understanding the scientific foundation of SRM approaches and their impacts.

It is these impacts that give Muir-Wood the most pause for thought.

"The insurance sector might not know it, but we've seen how inadvertent SRM can cause claims," he says. He cites the eruption of Mount Pinatubo in the Philippines in 1991, which was the second-largest volcanic eruption of the 20th century.

Scientists believe the volcano dumped more than 17 million tonnes of sulphur dioxide into the atmosphere, causing a global volcanic winter and an average decrease in global temperatures by 0.4°C.

This had several knock-on effects, with stratospheric temperature increases purported to have contributed to the 1993 Storm of the Century in the US. The storm – also known as 93 Superstorm - caused $5.5bn of damage in 1993 ($12bn in today's money).

"Mount Pinatubo proves the climate is very sensitive to injecting aerosols in the upper atmosphere. Between this and the Global Sulphur Cap, we have two pretty good inadvertent experiments," Muir-Wood says.

Causal link challenge

But the 1991 example also shows the problem for insurers and policymakers alike when it comes to SRM – the still relatively limited understanding of interconnected atmospheric systems makes proving causal links extremely challenging.

Muir-Wood points to the example of the Braer storm of January 1993, which remains the most intense extratropical cyclone ever recorded over the northern Atlantic. The "explosively deepening" storm took its name from *MV Braer* – the stranded oil tanker the cyclone hammered near the Shetland Islands.

MV Braer was a landmark case in marine environmental protection and Muir-Wood says there is a possible link to the Pinatubo eruption two years earlier.

"One theory is the exceptional low pressures [associated with the Braer storm] were a function of the cooling caused by Mount Pinatubo. Here we potentially have a cooling event that was linked to some other things that might not have happened otherwise... and SRM tries to imitate those cooling events."

He is quick to add the standard of proof for these causal links would be very different. "To prove that link to

"At present, everyone knows acts of God, hurricanes and droughts happen. But as soon as blame can be assigned, liability insurance comes into play. The question becomes, who might need to pay up because they can't prove they weren't responsible in some way?"

Robert Muir-Wood
Moody's RMS

the point you could actually use it to justify insurance payouts would be quite challenging," he says.

This speaks to a wider point about why SRM should be on the radar for insurers. Muir-Wood says in court it would be very hard to prove claims-generating events were caused by SRM modifications.

"At present, everyone knows acts of God, hurricanes and droughts happen. But as soon as blame can be assigned, liability insurance comes into play. The question becomes, who might need to pay up because they can't prove they weren't responsible in some way?" he asks.

Muir-Wood argues even if international co-operation on SRM could be agreed and a global body was created to manage the world's geoengineering projects, it would be "incredibly burdensome" for an insurer to sit at the end of the process and underwrite based on potential liability.

He says even when running a hypothetical court case (a decade ago) on the attribution of climate change-related claims, it was not possible to get the "nature of proof" that would be used in an actual court of law.

The fundamental challenge, he says, is all atmospheric models have assumptions. "We can say that climate change might have increased the probability of a heatwave by a factor of 10, but to establish liability requires a level of proof beyond any scientist right now."

For an SRM project, the challenge would be to prove the geoengineers were not in some way responsible for the occurrence of the latest climate extreme.

This is a sentiment the team at the NOAA shares. Much of their $41m in Congressional funding is being directed towards the challenge of atmospheric modelling, as a pre-requisite to any SRM project.

"How does one begin to even think about how to create the framework for creating this in the models?" Frost asks. "I think there won't be a point where we just know everything we need to know. The idea, hopefully, is eventually we narrow uncertainties... at first, the more we learn, the more uncertainties we might create."

In other words, SRM may create more Global Sulphur Cap-style risks and unintended consequences. "There are uncertain but very real potential impacts of SRM on regional weather and extreme weather events. That uncertainty could lead to risk and that risk could lead to conflict," Frost adds.

Winners and losers

They say SRM might be a game of winners and losers if it is deployed on a global scale. But the NOAA still believes it is worth pursuing because SRM can enable reduced heat stress, mitigated sea level rises, reduced impacts to agriculture and ecosystems and even diminished coral bleaching.

"SRM is one way to cool the planet down very quickly and cut some of the known risks of climate change that are already being felt"

Sarah Kapnick
National Oceanic and Atmospheric Administration

It is a textbook example of not letting perfect be the enemy of good and both Kapnick and Frost admit SRM is far from perfect.

"Let's be clear: SRM does not deal with the underlying drivers of climate change. At best, it's a band aid for its impacts. The best case of SRM is we treat it as a stop-gap to enable us to reduce emissions in real terms across the global economy," Frost says.

Muir-Wood points out even projects that are created with the best of intentions may not make it out of the research lab.

"When it comes to SRM, we already see a lot of societal pressure. It's like a 'chemtrails conspiracy' for the climate," he says.

Resistance from citizens even to small-scale SRM projects in countries such as Sweden have served as the harbinger of the challenges to come. But Muir-Wood stresses the climate change science and policy community are also resistant to SRM projects because they distract from the real drivers of climate change – and potentially give bad actors a pass to continue their polluting ways.

Kapnick and Frost are sympathetic to that perspective, but still support SRM.

"Clearly the only long-term solution to anthropogenic climate change is to reduce the amount of GHGs in the atmosphere. But that's taking longer than we hoped... SRM is one way to cool the planet down very quickly and cut some of the known risks of climate change that are already being felt," Kapnick adds.

SRM, then, fits squarely on the Rumsfeld Matrix. Scientists argue the "known unknown" impacts of SRM are better than the "known known" impacts of climate change. Caught in the middle are citizens and, yes, insurers, who will have to watch from the sidelines as these projects are developed and debated in the coming decades.■

Defining 'unprecedented' in the world of political violence

Political violence insurers are facing arguably the greatest level of volatility for decades with an escalation in the number of unexpected events

Unprecedented is a word that seems to be used more and more when it comes to describing political unrest, *writes Francis Churchill.*

This year was meant to be unprecedented because of the number of elections scheduled to happen – including in the UK, France, India and the US among other countries – threatening to create a unique environment for the political violence (PV) landscape.

Between the escalation of violence in the Middle East, an assassination attempt on a former US president-cum-presidential candidate and the worst race riots seen in the UK for more than 10 years, this year does feel unprecedented. The US election in November threatens more violence.

This is not a new problem for the PV market. Over the last 20 years, there have been far too many black swan events – low probability but high impact events – for insurers to be able to explain away the next significant event they are not prepared for, says Mark Costin, commercial director at Insurwave, an insurtech.

"Insurance generally exists to provide indemnity for unforeseen circumstances, and I think where it's come to grief is where it's been caught in a situation where the circumstances are less unforeseen than they could have been, but the market has not been paying attention," says Costin. "If Vladimir Putin confiscates all of the western-built aircraft in Russia and they don't see it coming, it's a big problem."

There is more volatility now than in the last 30 years, Costin says. "If you're a PV underwriter, you are being exposed to market conditions that you very probably have not been exposed to throughout your career."

Andy Barton/Alamy Live News

Does this mean the PV market has entered a new phase of emerging risks, or is it just business as usual, albeit at a much faster pace of change?

Markets previously seen as benign – particularly North America and Europe – are becoming new flashpoints. Costin says he recently spoke to a US insurer who admitted they were exiting the PV space entirely ahead of the US presidential elections in November. Similarly, the UK has just seen a wave of anti-immigration riots on a scale not witnessed since the London riots in 2011.

Technology, in particular social media, has had a massive impact on how unrest spreads, says Dan Callow, lead underwriter for political violence, terrorism and war at IQUW.

The UK riots were sparked by online misinformation wrongly attributing the murder of three young girls at a dance class in Southport to an illegal immigrant. While initial estimates suggest insured losses from the damage to property and looting by the rioters will be manageable, they were a stark reminder that western democracies are not immune to PV losses.

But, says Callow, in many ways the UK was already primed for the unrest. "For a lot of those rioters, it doesn't really matter what the reason is. They just want to riot regardless of what the cause is."

Geopolitical instability

There is an underlying malaise, not just in the UK but elsewhere, that underwriters now need to consider. There are also factors that are not novel. General instability across the geopolitical landscape – particularly noticeable over the last three years – is contributing to an uptick in civil unrest. A hot summer in the

UK likely contributed, too. "When it's cold and wet, you have less issues," says Callow.

Despite the additional unrest, Callow argues the market is still well-placed to write business. The drivers of losses for rioting events have stayed constant – retail damage and looting – meaning it is still possible for insurers to manage their exposure adequately. Insurers need to be more aware of their exposure but, Callow says, business can still be written.

"A lot of stuff was lumped together for a lot of years and now people are actually analysing their portfolios better and realising they've got too much or haven't priced enough," he says.

Callow has a similar view on the international front. The October 7, 2023 attack on Israeli civilians by Hamas changed the dynamic and, since then, there has been less limit available for the Middle East region, but the PV market still has a huge amount of capacity. Pricing is also still reasonable, especially when compared to, for example, natural catastrophe perils, such as hurricanes in the Gulf of Mexico.

Callow is not convinced, however, that the market as a whole has a clear view of its aggregate limit in the Middle East region. "I think [the market] would be surprised how big those numbers are," he says. While country-by-country markets manage their exposures, the risk landscape has changed and there is a real possibility of a regional conflict that could trigger policies in multiple geographies.

It also depends on which countries are in the mix. Saudi Arabia and the UAE, for example, carry a lot of limit. While they are not imminently at risk of being drawn into conflict, Callow says, "at some point, if something escalated, they're going to have to make a call on where their alliances are, and that could change things". If a regional war breaks out involving multiple countries: "that's a potential huge event".

"If you're a PV underwriter, you are being exposed to market conditions that you very probably have not been exposed to throughout your career"

Mark Costin
Insurwave

There has also been a change in the nature of some conflicts, with PV, war and terror cover starting to overlap. Harry Simpson, head of PV and terrorism at broker BMS, says he is increasingly seeing clients in conflict or high-risk zones looking for abandonment cover – protection for property or assets that are left abandoned because of political violence but are undamaged. Abandonment cover is widely available in the political risk market, but not necessarily in PV.

This issue came to the fore most recently when the Taliban regained control of Afghanistan and a number of security guards with insurance cover abandoned assets.

"You had insureds sitting there who potentially purchased an encompassing political violence, including war, policy for a number of years, but they didn't actually have a loss that could be indemnified," Simpson says.

Over recent months, insureds in Yemen and Lebanon, for example, have been looking for such cover. "I think we will see clients very much in the emerging world and territories of known war or potential war wanting that coverage," says Simpson.

Lack of flexibility

PV policies also tend to lack the flexibility that the war market has. War policies usually have 48 hours to review and then seven days to withdraw cover or ask for additional premiums if a threat escalates. This means PV underwriters have to be "much more aware" of the projected longer-term risk they are taking on, Costin says, and how to access the information they need. "If you're in a world where events are moving very quickly," he adds, "you need to issue contracts that have the ability to change in relatively short order."

That does not mean pulling out of markets, but about having conversations with insureds about where exposures might be changing or increasing, and how this might change pricing or wordings. Costin explains: "That's not an unreasonable position for them to take, otherwise customers would not be seeking to insure themselves against those events."

The PV market also needs to be more proactive, much like the cyber market has been towards risk mitigation. When an insurer becomes aware of a threat to global intelligence, they ought to share the implications of this with the insured so they can act on the risk. Costin notes there has been an influx of managing general agents into the PV market, bringing a more tech-forward approach. They are more likely to take a transactional view, which will likely feed into the wider market dynamic, he adds.

"Insurance is about relationships, banking is about doing deals and is a much colder environment," he says. "The insurance market needs to take a slice of the banking cake."

Callow is more confident the market can handle the changing threat landscape. "It's a marketplace so people have different views on risk," he says. "It comes down to a company's appetite. Some people like the volatility and, if they don't, they'll write a different attachment point."

There is nothing unprecedented about that.■

The aftermath of Hurricane Debby in Florida last month

Pat Bonish/Alamy Stock Photo

Gearing up for the Atlantic hurricane debate at RVS Monte Carlo

It is generally accepted in hurricane science there will be no increase in the number of tropical cyclones as a result of sea water warming, but they will be stronger and more destructive, says Ariel Re's Elizabeth Harris

Weather forecasters are predicting above-normal hurricane activity in the Atlantic basin this season caused by a number of factors that were discussed at a symposium on hurricane risk in a changing climate earlier this year.

Following the symposium, I co-wrote a chapter in a new book, *Advances in Hurricane Risk in a Changing Climate*. I co-wrote the chapter with Robert Marsh, professor of oceanography and climate at the University of Southampton, Jeremy Grist, senior research fellow at the UK National Oceanography Centre, and Dipanjan Dey, assistant professor in the School of Earth, Ocean and Climate Sciences at the Indian Institute of Technology. The book's foreword is by world-leading climate scientist Kerry Emanuel, professor of atmospheric science at the Massachusetts Institute of Technology.

My co-authors and I conclude changes in the speed of ocean circulation will be the main cause increasing warm water volume available in the north Atlantic for hurricane development.

Our conclusions were reached using a high-resolution climate model run from 1950 to 2050 with high human-caused greenhouse gas emissions.

Contributing factors

This year, higher-than-average sea temperatures, combined with cooler temperatures developing in the Pacific as La Niña sets in, are contributing to reduced Atlantic trade winds and less vertical wind shear – therefore favouring tropical storm formation.

National Oceanic and Atmosphere Administration (NOAA) National Weather Service forecasters are predicting above-normal hurricane activity for the 2024 Atlantic hurricane season, which takes place between June 1 and November 30.

The NOAA is forecasting a range of 17 to 25 total named storms with winds of 39 mph or higher. Of those, eight to 13 are forecast to become hurricanes with winds of 74 mph or higher, including four to seven major hurricanes of category 3 or higher, with winds of 111 mph or higher.

There is much we cannot predict about the climate as we do not know exactly how this increase in warm water for hurricane development will interact with changes in atmospheric stability. It is generally accepted in hurricane science there will be no increase in the number of tropical cyclones as a result of this sea water warming, but they will be stronger and more destructive.

Despite a potential drop in the frequency of all tropical cyclones, we could potentially see more of the major hurricanes that cause the worst damage and loss of life and have the biggest societal impact – an area of concern for reinsurers at Monte Carlo as they discuss risks likely to occur over the next 12 months.

Worrying pattern

While there has not been a detectable trend of increasing major US hurricane landfalls, reinsurers should be aware of a pattern of fewer but more severe events in the Atlantic basin. However, it is impossible to accurately predict the future impact of these severe storms on the re/insurance industry as the amount of damage they inflict depends on where the track is.

If it is over the ocean or a sparsely inhabited area there will be limited damage, whereas if it strikes a major city such as Houston, New Orleans, Tampa or Miami, there could be huge destruction and loss of life, as well as major losses for the reinsurance industry.

We were lucky in 2023 with only one major hurricane landfall – Hurricane Idalia, a category 3 storm, whose track avoided causing significant damage across parts of the south-eastern US. On the other hand, you can have a year like 1992 when Hurricane Andrew was the only hurricane of the season, but it caused enormous damage because it made landfall in Miami and subsequently shaped the property catastrophe sector.

While reinsurers should be aware of these changes to future Atlantic hurricane seasons, it is not the frequency and severity of tropical cyclones that have driven changes in untrended losses, but population movements towards the coast as well as an increase in wealth and inflation. Building codes and claims litigation also materially affect storm losses.

It was a great honour to contribute to this book, which will appeal not only to academics but policymakers and the insurance industry, who all have an interest in the way hurricane risk is evolving as a result of climate change and climate variability.■

Elizabeth Harris is vice-president of modelling and research at Ariel Re

NOAA continues to predict above-average north Atlantic hurricane season

Graph: North Atlantic hurricane season forecast

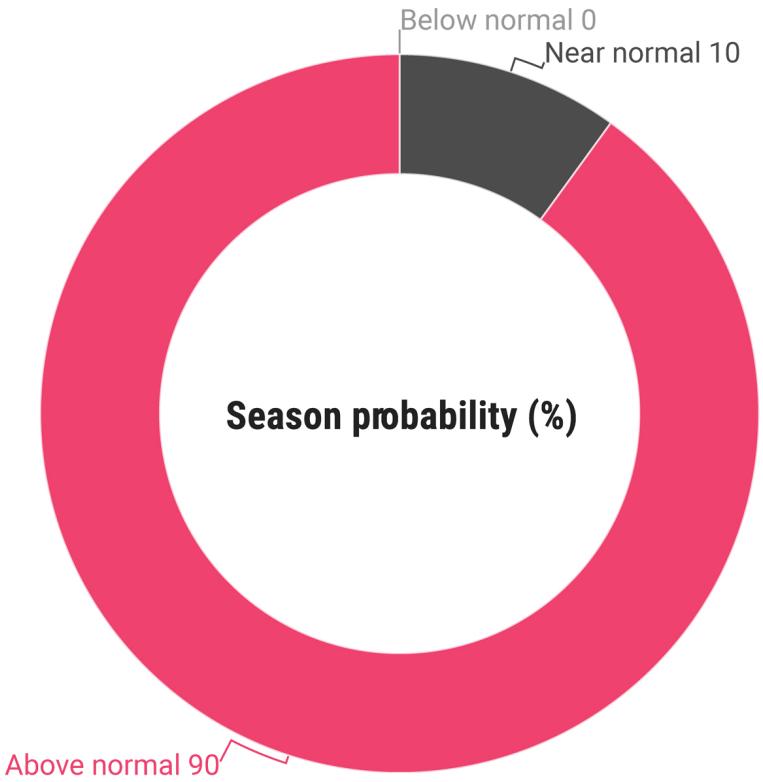


Table: Number of named storms and hurricanes

Type	Number
Named storms	17 to 24
Hurricanes	8 to 13
Major hurricanes	4 to 7

Source: National Oceanic and Atmospheric Administration

How to lose the debate on climate change

Global warming is not a belief nor a point of view, but a threat. However, climate activists who endorse criminal activity are on a hiding to nothing

Any belief sits across a cline, from the evangelist to the sceptic. This is true for the "belief" that climate change is real and it is why we are decades late in taking action, *writes Louise Isted.*

Global warming sceptics pop up in the most unlikely of places. A smart and funny chemistry teacher on YouTube seemed to be a useful resource for my son's exam revision until, that is, he went off the National Curriculum script.

"CO_2 levels have increased since the Industrial Revolution, which some think is responsible for the increase in global temperatures. As 95% of the greenhouse effect is caused by water vapour, I'm not so sure, personally."

No doubt enjoying the anonymous freedom afforded by the internet that would be unavailable to him in a classroom, he went on: "Every Intergovernmental Panel on Climate Change [IPCC] model over the last 20 years has been wildly incorrect, and any warming has been far lower than predicted."

That is the science the United Nations relies on. No harm done though because I know that at least one teenager didn't then rush out to stop IPCC climatologists from getting to their place of work.

On the other hand, five climate activists have just been jailed for conspiracy to cause a public nuisance be-

Traffic is held on the M25 motorway during the Just Stop Oil protest in 2022

Mark Kerrison/Alamy Stock Photo

cause they held a Zoom call to recruit volunteers to block the M25. Their call to action succeeded, with 45 Just Stop Oil protesters creating chaos on London's orbital motorway over four successive days in November 2022.

Hardly a peaceful protest but then, you could argue, neither was the suffragette movement of the early 1900s. The Women's Social and Political Union, whose motto was "deeds not words", sometimes resorted to violence because they felt the impact of peaceful tactics had been exhausted.

Back to November 2022, and countless members of the public – whose opinions about climate change were unknown – missed meetings, flights and medical appointments, two lorries collided and a police motorcyclist came off his bike. Prosecutors at the trial alleged the protests had cost the economy at least £765,000 ($989,059) and the Metropolitan Police more than £1.1m.

The judge at their trial at Southwark Crown Court told Just Stop Oil's Roger Hallam, Daniel Shaw, Louise Lancaster, Lucia Whittaker De Abreu and Cressida Gethin: "You have taken it upon yourselves to decide that your fellow citizens must suffer disruption and harm, and how much disruption and harm they must suffer, simply so that you may parade your views."

In my long career covering climate change, I've written about the good, the bad and the pathetic, but the re/insurance sector stands out as mostly good. More and more climate scientists and engineers are joining the ranks of underwriters to find, not excuses, but solutions

Parading their views outside Lloyd's in February, activists from Extinction Rebellion formed a 300m-long human chain around the iconic building in the City of London. Their spokesperson, Marijn van de Geer, said: "We are all standing here today risking our freedom because the climate and ecological crisis is getting so bad, so quickly, that we can't see any other way to get our voices heard."

The protesters allowed staff to leave One Lime Street but refused to permit anyone to enter or re-enter. I was one of those who left the building and then, um, re-entered. Over the noise of the XR Rhythms UK percussion band, I shouted to the person politely blocking my way that I had been writing about climate change for nearly 25 years.

As my underwriter host and I peered at the protesters through the glass of a lift at Lloyd's, we saw their placards that suggested we ought to feel ashamed of the link between insurance and fossil fuels. My host told me: "The world would come to a halt without oil and gas and so there has to be a transition." Tell that to the people of Pakistan who found themselves chest-deep in floodwater, I thought, but didn't say.

In my long career covering climate change, I've written about the good, the bad and the pathetic, but the re/insurance sector stands out as mostly good. More and more climate scientists and engineers are joining the ranks of underwriters to find, not excuses, but solutions.

Climate change is not a belief nor a point of view, but a threat. Enabling tribalism – and thus the existence of a cline – is a waste of everyone's time and activists who endorse criminal activity are on a hiding to nothing.

Michel Forst, the UN special rapporteur for environmental defenders, is correct in saying the multi-year sentences handed to the Just Stop Oil activists were "punitive and repressive". Nevertheless, rather than inspire the masses, they undermined the cause they seem to think they understand better than most.

Re/insurers are uniquely placed to influence corporates and incentivise society to tackle global warming. Collective effort by the sector as a whole would be direct action worth having.■

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Extinction Rebellion protest at Lloyd's in Feburary

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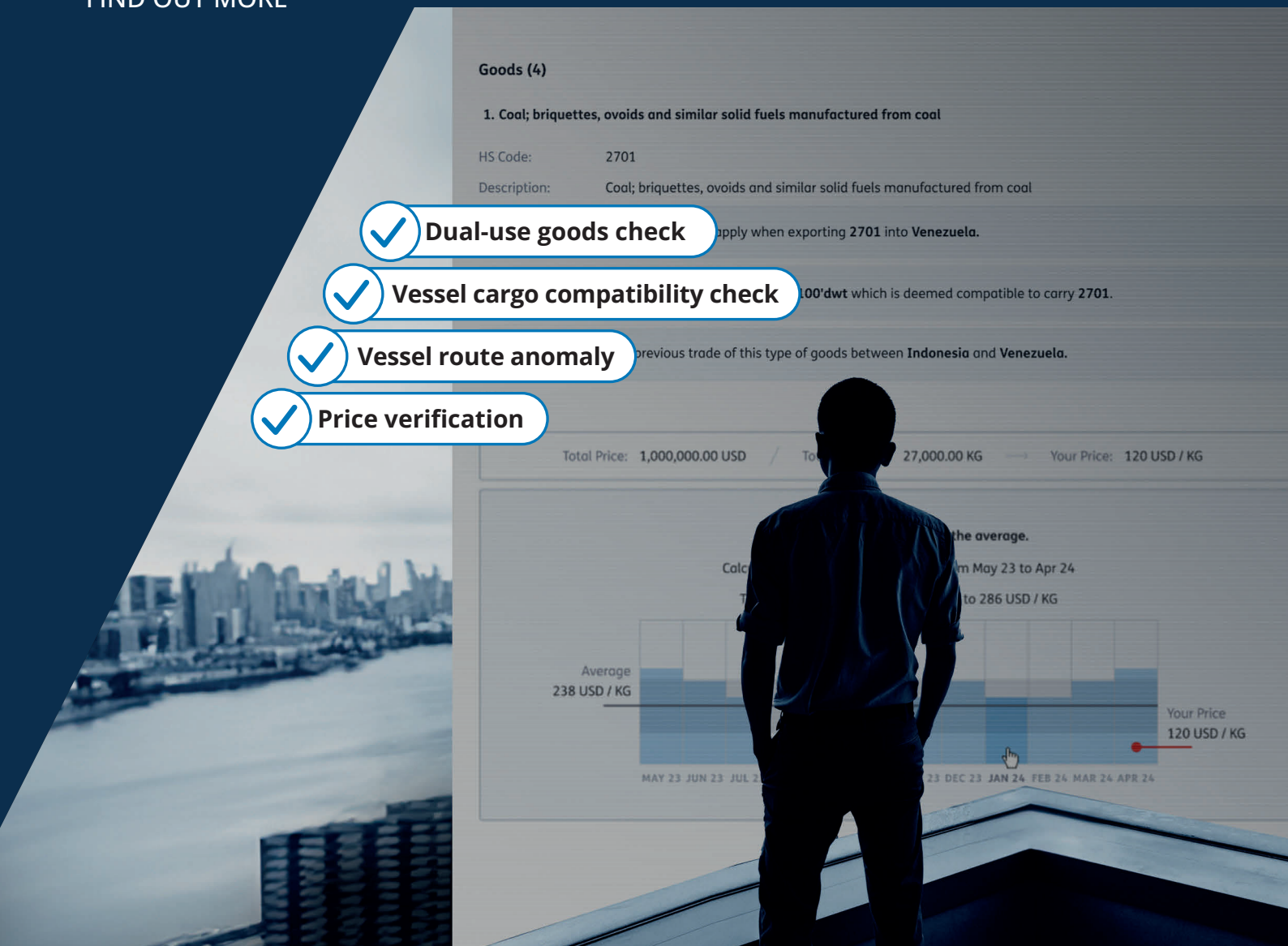

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