EMERGENT RISK INTERNATIONAL

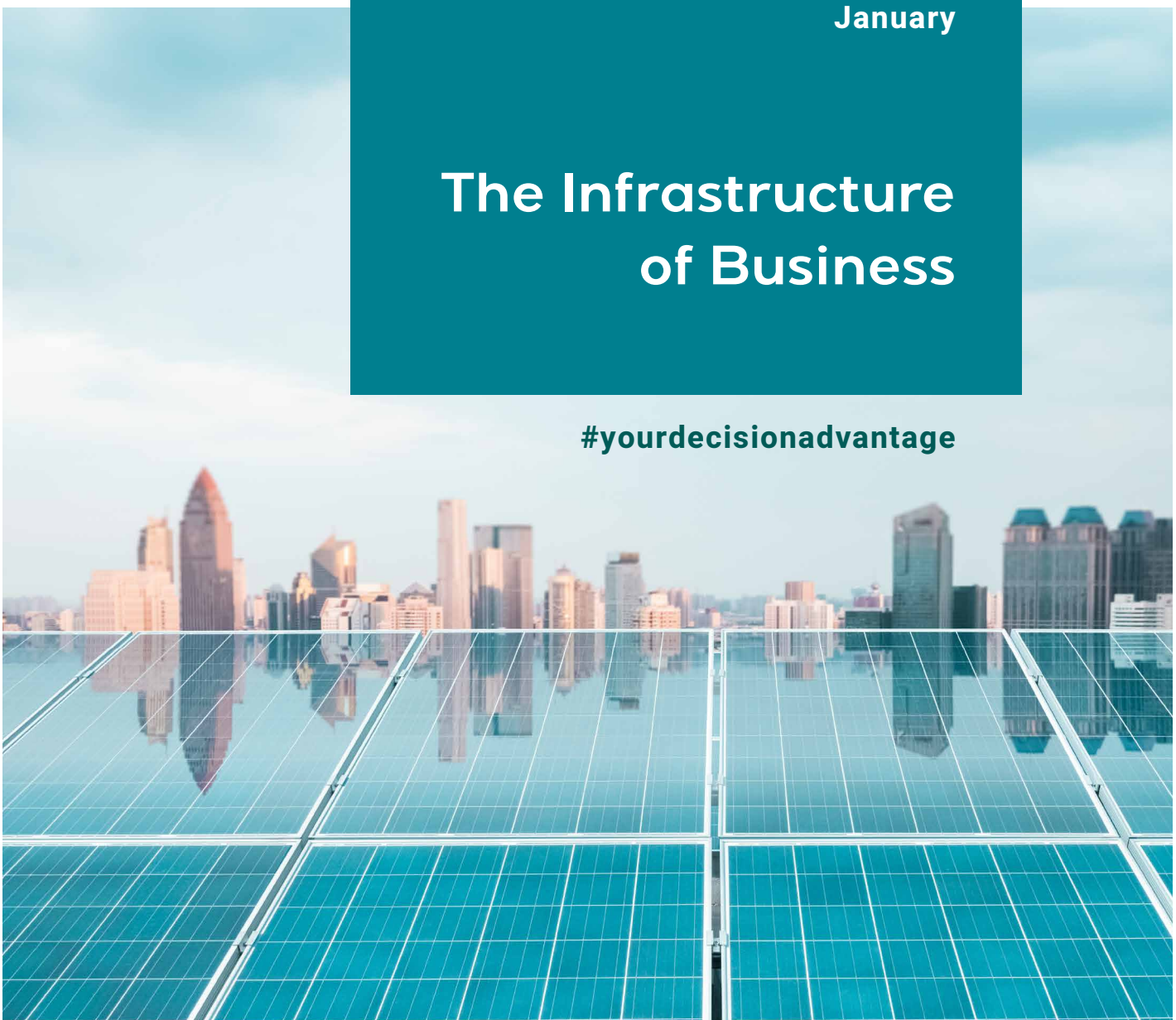
Strategic Intelligence Estimate

2023

January

The Infrastructure of Business

#yourdecisionadvantage



EMERGENT RISK INTERNATIONAL

A NOTE FROM EXECUTIVE LEADERSHIP

The year 2022 was another challenging one. Although many acute pressures springing from COVID-19 in 2021 eased, such as rolling lockdowns, deeper problems emerged, many as a result of political, social and economic atrophy after three years of pandemic-related disruptions. As our team considered these challenges and what affected our clients most in 2022, we decided to focus our Strategic Intelligence Estimate for 2023 on the obstacles and opportunities that will impact Global Business Infrastructure in the coming year.

Global Business Infrastructure has faced a unique, multifaceted set of strains over the last several years, where strategic changes in the global environment, from climate to political upheaval, are forcing dramatic shifts for multinational business. These shifts demand a level of agility rarely practiced by large institutions. With the start of the Russia-Ukraine war in February 2022, global businesses were suddenly faced with Cold War-style choices, as old walls between the West and Russia were re-established and Western business became unpalatable in Russia almost instantaneously. Overnight, overtaxed vital commodity supply lines shifted, impacting everything from food to electricity supply. Meanwhile, climate change, and particularly water scarcity, wreaked havoc on the very same systems. Strains on global economic systems will force changes to business, particularly as accumulated debt from the pandemic, coupled with high commodity prices, force more countries into International Monetary Fund debt restructuring programs. In some of these markets, rolling power outages and food shortages will present challenges as well as opportunities for innovation and the advancement of energy alternatives. But these same markets will continue to be the site of political proxy battles between the West and Russia/China, increasing conflict and political risk for companies with exposure or hopes of building new business in these markets.

These same trends, along with probable recessions in the Western world and continued social patterns of mental health distress and extremism, will deepen political divides and lead to more incidents of physical sabotage on infrastructure in and outside of business. We expect this to impact both the physical and cyber world, with ransomware, destructive cyberattacks and physical attacks on people and infrastructure likely to climb in 2023. As with last year's SIE, where we discussed the role business plays in global events – not just how it is impacted by the world, but how it influences the trajectory of global events – this year's SIE will take us deeper into how this dynamic environment is likely to shift and be shifted by changes in global business infrastructure in the coming year. Some of the topics we touch on include:

Governments
Geopolitical Business Risk

Expansion
Emerging Economies and Growing Debt

Tension
Business in China, Taiwan and the West

Resources
Water Scarcity and Business

Power
Electricity, Energy and Continuity

People
Labor and Workforce Trends

Moving Parts
Logistics and Supply Chain

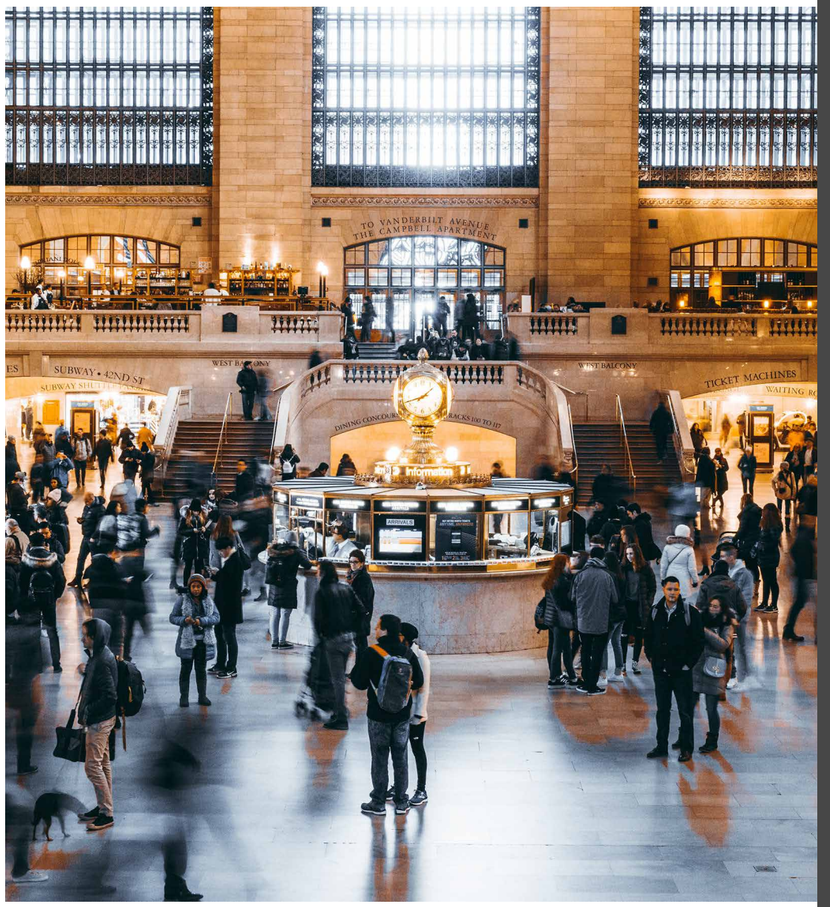
Energy Transitions
Critical Mineral Supply Chains

IT Security
Protecting Digital Infrastructure

Innovation
Developing Technology Trends

Underscoring these topics is their interdependency in building a forward-looking, resilient and risk-aware organization. While it was once a "nice to have," risk intelligence is now a critical component of a resilient organization. And as these topical discussions will demonstrate, broad awareness of factors that impact our organizational resilience goes far beyond traditional security, supply chain and human resources knowledge. Today's risk and resilience experts must understand the deepest layers of our supply chains, a changing labor force, shifting systems of global and local governance, major technology and environmental challenges and regulatory regimes that are often competing with each other and struggling to keep up with evolving risks, technology and human behavior.

Through this volume of work, we hope to offer an at-a-glance view of what we see as some of the most important topics, developments, events and trends we anticipate over the next 12 months. We hope you find it thought-provoking as you consider your own team's goals and priorities for the year. Meanwhile, we wish you a healthy, happy and prosperous 2023.



EXECUTIVE LEADERSHIP TEAM



Meredith Wilson

Chief Executive Officer & Founder

Meredith is the Chief Executive Officer & Founder of ERI. She has spent over two decades working in intelligence, first in government and then building some of the earliest private sector intelligence programs in the private sector. She founded ERI in 2014 to build innovative intelligence programs that help companies leverage the best that intelligence can offer – but within the framework of business. She is based in New England.



Brady Roberts

Chief Operating Officer

Brady is the Chief Operating Officer and is based in Austin, Texas. He joined the company in January 2018, where he oversees ERI's daily operations, trains clients and consults directly with customers, leveraging his over 20 years of experience in the intelligence field.

HERE'S WHAT'S INSIDE

04 **About Us**
The ERI Difference

07 **Governments**
Geopolitical Business Risk

11 **Expansion**
Emerging Economies and Growing Debt

13 **Tension**
Business in China, Taiwan and the West

15 **Resources**
Water Scarcity and Business

17 **Power**
Electricity, Energy and Continuity

19 **People**
Labor and Workforce Trends

21 **Moving Parts**
Logistics and Supply Chain

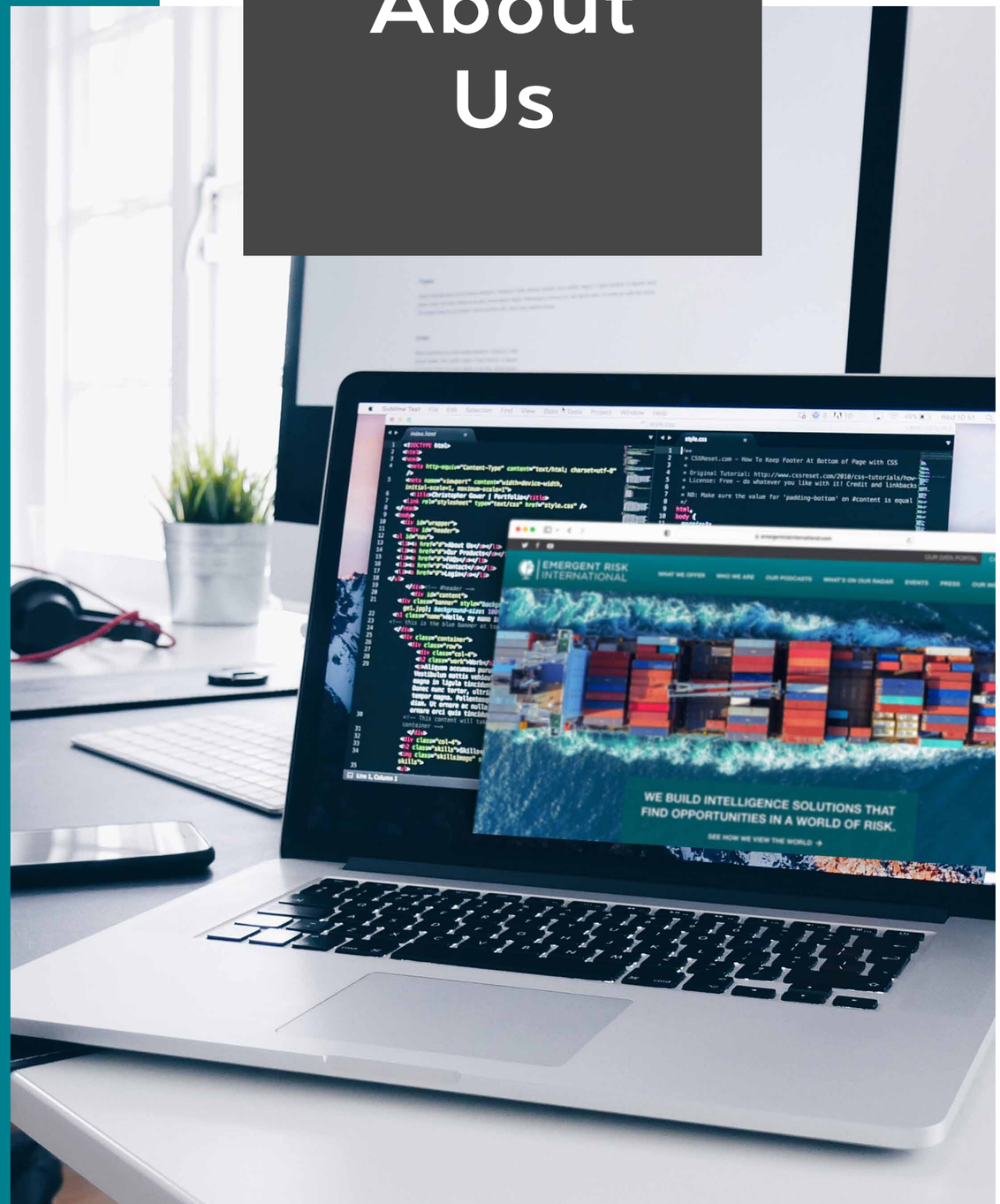
23 **Energy Transitions**
Critical Mineral Supply Chains

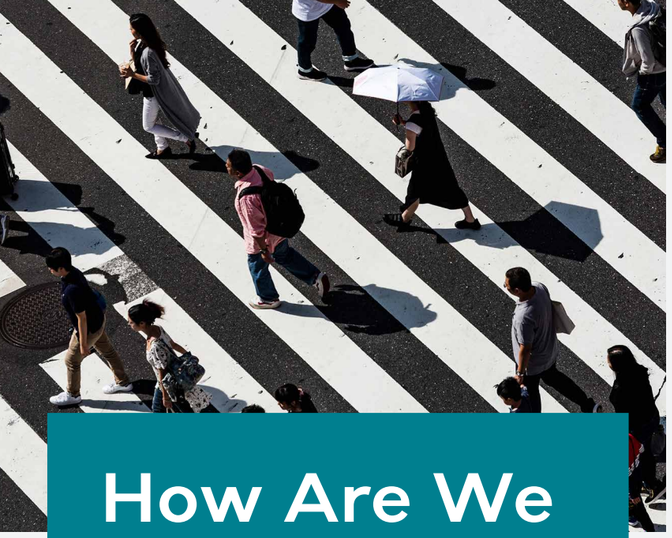
25 **IT Security**
Protecting Digital Infrastructure

27 **Innovation**
Developing Technology Trends

29 **Contributors**
ERI Analytical Team

About Us





How Are We Different?

We understand business. Through our work designing fit-for-purpose intelligence programs or our daily and weekly analysis, we put business and business impacts first.

We rely on data. We are transparent in our sourcing and use data and fact-checked information to ensure a disinformation-free, holistic understanding of the operating environment, grounding our assertions in reality and contextual relevance

We value effective communication. We understand that professionals outside security and intelligence need to receive intelligence in a clear, concise medium that is quick to understand and evaluate. Intelligence must be delivered in a format that works for busy decision-makers.

We build capability. While other companies create dependency on their intelligence products or embedded staff, we help our clients build self-sustaining intelligence functions with strategic aims, inputs from our analysis and trained, supported teams to manage a program. These engagements are overseen by senior professionals with experience building intelligence programs in government and the private sector.

Our Vision

We are a risk insights company. We create and protect value through industry-leading intelligence, technology, training, and talent. We believe that a strategic risk intelligence program supports a whole organization by providing data-driven intelligence that creates a competitive advantage for decision-makers across their entire business. Come work with us, let us show you how we can be **your decision advantage.**

#yourdecisionadvantage

People Solutions

ERI's embedded staffing program was created to provide clients with a one-stop, immediate solution when an in-house team is needed. By bringing our expertise and entire product suite to bear, ERI can set up and run an in-house intelligence program – tailored to your needs – from day one. Our trained business professionals hit the ground running, giving you immediate capability and the ability to respond to short and long-burn crises with foresight and expertise. Your analyst team will set you up for success, creating competitive advantage and preparedness for uncertainty across your enterprise.

"Across the board, insightful on risk topics that truly have a business impact."

-Chief Security Officer, Global Energy Firm



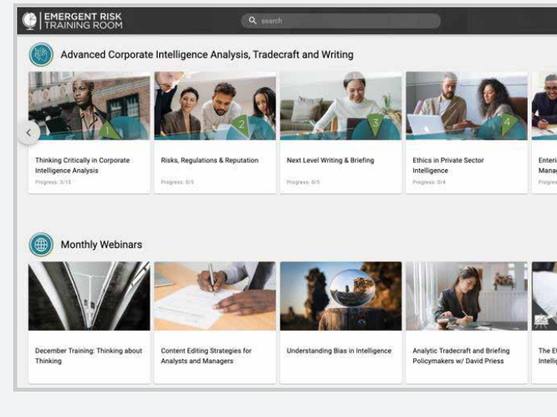
Technology: The Situation Room™

The Situation Room combines ERI's analysis, country reports, daily reviews, live analytics and data feeds. These encourage users to utilize high-quality data-based information and sources to build their analysis and eliminate 'cut and paste reporting' as the primary source of their analysis. Integrations from our partners at Factal and DisasterAware Enterprise give analysts access to real-time security and natural disaster information in one pane – giving them unrivaled access to the ultimate analyst's toolkit.

Training

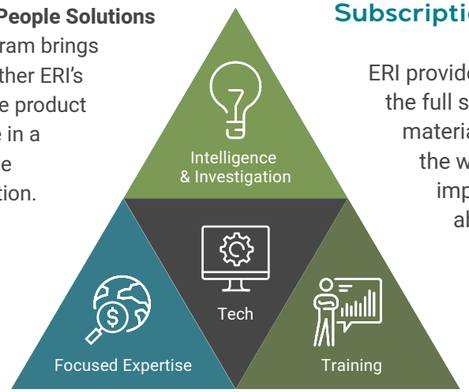
As part of our vision of self-sustaining corporate intelligence programs, our training helps analysts grow in their roles and develop long-term careers.

- **Corporate Intelligence and Analytical Tradecraft and Writing.** Our foundational course, this training, takes analysts through all the elements of an intelligence function.
- **Data Visualization and Analysis.** We bring our understanding of data and infographics in communication to our clients' teams.
- **Advanced Analysis.** For analysts with potential, we train them for senior roles, building their analytical skills and credibility to strengthen their performance within their own teams.



- **Analyst to Manager Transitions Course.** As your team grows, you will need leaders to keep your intelligence program functioning and become truly self-sufficient. This course helps analysts transition to leadership.

Our **People Solutions** program brings together ERI's entire product suite in a single solution.



Subscription and Bespoke Intelligence Products

ERI provides world-class subscription analysis products that consider the full scope of business risk and, importantly, how these risks will materialize across business value chains. We cover every region of the world with analysts that hail from these regions, providing important cultural and social context that can sometimes be absent in products written by non-native analysts.

ERI provides investigative and due diligence reporting. Our global reach allows us to target corporations and businesses globally for verification and clearer understanding of business structures and ownership.

Governments

Geopolitical Business Risk



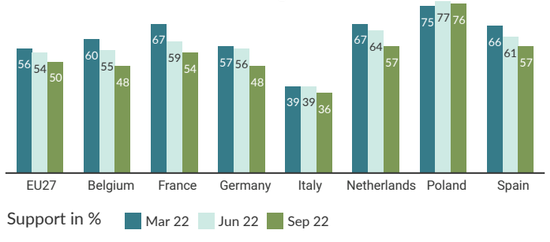
Weariness over Ukraine, deteriorating US relations with key adversaries and increasingly sophisticated dis- and misinformation technologies will heighten political risk in 2023.

Deepening political fissures over Ukraine will drive Western domestic political disputes that distract resources as public weariness and domestic politics deepen divisions.

While Western support for Ukraine remains strong, weariness with the war and its costs to European and American domestic priorities will weaken resolve on both continents, particularly as the US confronts a possible recession and preparations for another bruising Presidential election cycle. Due to the US primaries nearly always tacking to the extreme positions of each party, the US electorate – and global audience – will be subject to intense lobbying against continued funding for the war, weakening overall support. While Europe faces fewer consequential electoral contests this year, economic distress, energy woes and UK and EU political instability will test the continent's willingness to support Ukraine's determination not to compromise territory or resources in a negotiated peace agreement with Russia.

EU27: Should Your Country Support Ukraine by Delivering Weapons

Source: Bertelsmann Stiftung



Meanwhile, Russia will seek to weaponize democratic states through information operations, widening the conflict despite its lack of munitions and willing troops. Russia will fall back on international pariah countries like North Korea and Iran for both formal and informal support, through arms, informal cyber armies and illicit funding, in support of a war of attrition.

While likely to ease in late Q2, China will remain a key bottleneck for businesses as COVID-19 and rifts between China and the West intensify supply chain uncertainty and political risks.

Changes to US export controls and China's restricted access to high-end microchip technology from the US and its partners, coupled with continued US support for Taiwan, will push US-Chinese relations to new levels of tension, despite diplomatic efforts. Companies will find themselves caught in these machinations, either due to their need for these technologies or their role in manufacturing them, or as collateral damage as China seeks to fight export controls with its own advantages – potentially including its overwhelming dominance of rare earth minerals processing. Tension over Taiwan will lead China to continue to militarize and dominate the South China Sea, potentially including attempts to take control of some of Taiwan's farther-flung outer islands, though it will probably avoid full-scale military confrontation with Taiwan this year. China will, however, remain weakened economically and politically as it struggles to overcome the fallout of ending three years of zero-COVID policies and its undervaccinated population. In the first part of 2023, struggles with large numbers of sick workers as these policies are abandoned will slow manufacturing output unpredictably. Weakened overall demand will reduce major sea-freight companies' sailings and concurrently tighten shipping capacity, creating new potential for supply constraints, despite sharply lower demand.

Deteriorating US and EU relations with autocratic regimes, especially in the Middle East, Russia and China, will complicate business relationships and deepen human rights-related concerns.

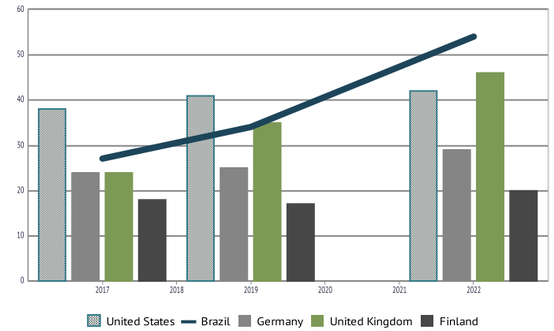
The Biden administration's tenuous relations with Saudi Arabia, Russia and China – while links between the three states are growing – will pose challenges for Western business expansion in these markets. Saudi Arabia is simultaneously wooing and coercing more businesses to expand there through economic incentives and threats to cut off business if companies do not headquarter Middle East operations there. With diminished relations with the US, the rise in investment there will not, however, translate into more respect for human and labor rights, which will increasingly saddle investors with Faustian bargains to maintain their Middle East growth, while companies will face greater competition from Chinese and Russian competitors unpressured to adhere to Western norms. US rifts with Saudi Arabia and Russia will also increase the probability of more energy price hikes, particularly when collusion between Russia and Saudi Arabia mutually benefits their political and economic outcomes.

Rapid advancement of AI-related technology will make disinformation harder to detect and will result in new methods of manipulating political outcomes.

After several years of slow progress, artificial intelligence made a major leap forward in 2022, especially with language processing that is sometimes indistinguishable from, and in many cases better than, human capabilities, with the public release of Chat-GPT. The tool, along with the technologies that spawn from it, will enable production of disinformation at scale and will likely be deployed by threat and political actors alike to influence electoral outcomes globally. Upcoming elections, especially local elections in countries like Russia, Turkey and parts of Africa, will be early tests of what is possible with this technology and how political and international actors are likely to deploy it. Fact-checking and deriving the original source of news, journal articles and other information that the public relies on may become more fraught. Microtargeting of the US and EU electorate will increase through this technology, allowing political actors to fine-tune dis- and misinformation to appeal to niche groups, potentially altering election outcomes in close races with a flood of last-minute disinformation.

News Avoidance in Selected Countries Worldwide 2017-2022

Percentage of people who say they are actively avoiding reading the news

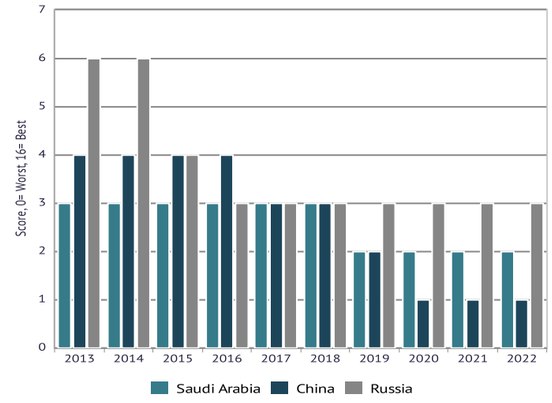


Source: YouGov Last updated: 23 December 2022

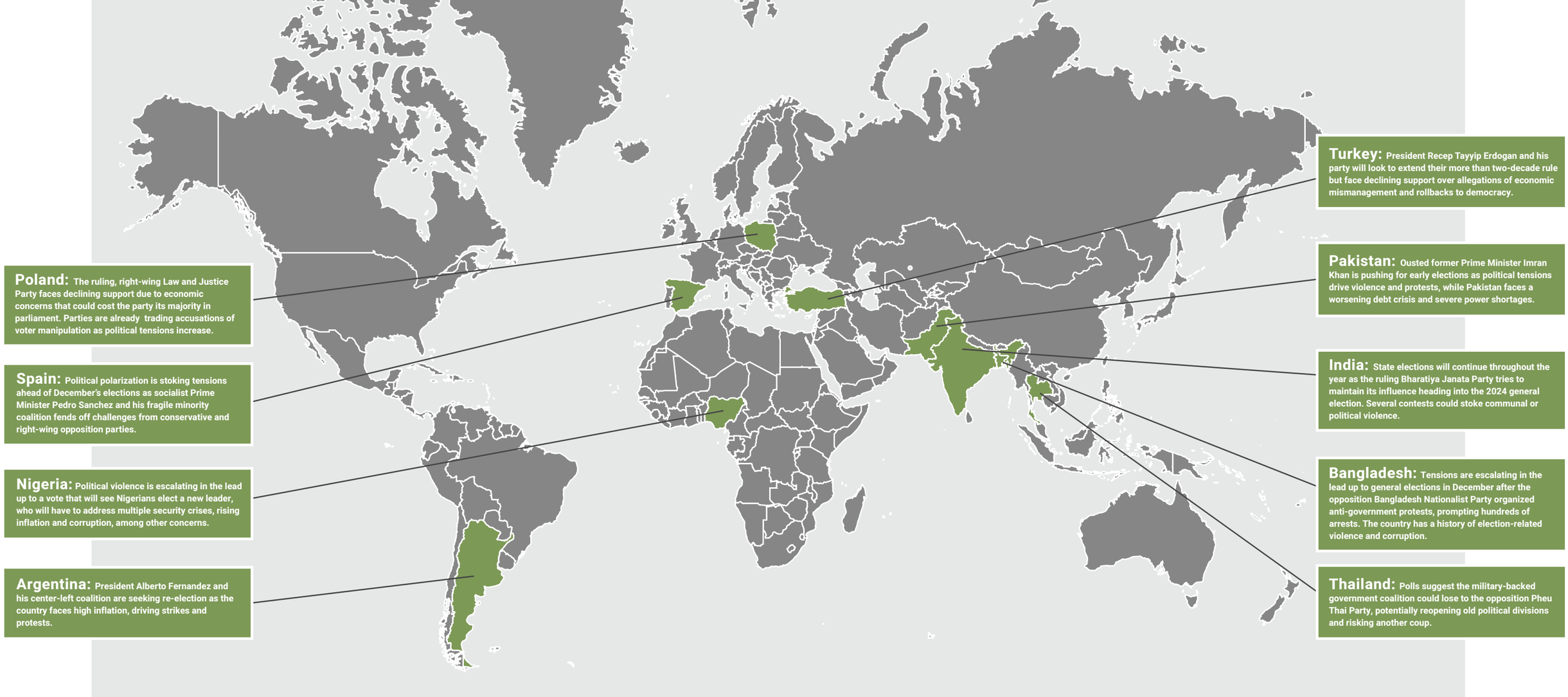


Freedom of Expression & Belief

(Score, 0= Worst, 16= Best)



Source: Freedom in The World-Comparative Historical Statistics



Poland: The ruling, right-wing Law and Justice Party faces declining support due to economic concerns that could cost the party its majority in parliament. Parties are already trading accusations of voter manipulation as political tensions increase.

Spain: Political polarization is stoking tensions ahead of December's elections as socialist Prime Minister Pedro Sanchez and his fragile minority coalition fends off challenges from conservative and right-wing opposition parties.

Nigeria: Political violence is escalating in the lead up to a vote that will see Nigerians elect a new leader, who will have to address multiple security crises, rising inflation and corruption, among other concerns.

Argentina: President Alberto Fernandez and his center-left coalition are seeking re-election as the country faces high inflation, driving strikes and protests.

Turkey: President Recep Tayyip Erdogan and his party will look to extend their more than two-decade rule but face declining support over allegations of economic mismanagement and rollbacks to democracy.

Pakistan: Ousted former Prime Minister Imran Khan is pushing for early elections as political tensions drive violence and protests, while Pakistan faces a worsening debt crisis and severe power shortages.

India: State elections will continue throughout the year as the ruling Bharatiya Janata Party tries to maintain its influence heading into the 2024 general election. Several contests could stoke communal or political violence.

Bangladesh: Tensions are escalating in the lead up to general elections in December after the opposition Bangladesh Nationalist Party organized anti-government protests, prompting hundreds of arrests. The country has a history of election-related violence and corruption.

Thailand: Polls suggest the military-backed government coalition could lose to the opposition Pheu Thai Party, potentially reopening old political divisions and risking another coup.

JAN
- JAN 08 — Benin — Parliamentary
- JAN 13 — Czech Republic — Presidential
- JAN 14 — Kazakhstan — Parliamentary

FEB
- FEB 25 — Nigeria — General
- FEB 28 — Djibouti — Parliamentary
- FEB — India — State

MAR
- MAR 05 — Estonia — Parliamentary
- MAR 23 — Jamaica — Local
- MAR — Cuba — Parliamentary

APR
- APR 02 — Finland — Parliamentary
- APR — Montenegro — Presidential
- APR — Paraguay — General

MAY
- MAY 07 — Thailand — General
- MAY 14 — Germany — Bremen State
- MAY 28 — Spain — Regional
- MAY — India — State

JUN
- JUN 04 — Guinea-Bissau — Parliamentary
- JUN 18 — Turkey — General
- JUN 24 — Sierra Leone — General
- JUN 25 — Guatemala — General

JUL
- JUL 23 — Cambodia — General
- JUL — Sudan — General
- JUL — Greece — General
- JUL AUG — Zimbabwe — General

SEP
- SEP 05 — Russia — Regional

OCT
- OCT 29 — Argentina — General
- OCT — Pakistan — General
- OCT — Luxembourg — General
- OCT — Germany — Bavarian & Hessian State
- OCT — Switzerland — Parliamentary
- OCT — Ukraine — Parliamentary
- OCT — Liberia — Presidential

NOV
- NOV — Belarus — Parliamentary
- NOV — Poland — Parliamentary
- NOV — India — State

DEC
- DEC 10 — Spain — General
- DEC — Bangladesh — General
- DEC — Democratic Republic of Congo — General

TBD
- TBD — Slovakia — General
- TBD — India — Jammu & Kashmir State
- TBD — Turkmenistan — Parliamentary
- TBD — Myanmar — General
- TBD — Bhutan — Regional
- TBD — Madagascar — General

2023 ELECTIONS CALENDAR

Source: Emergent Risk International, International Foundation for Electoral Systems

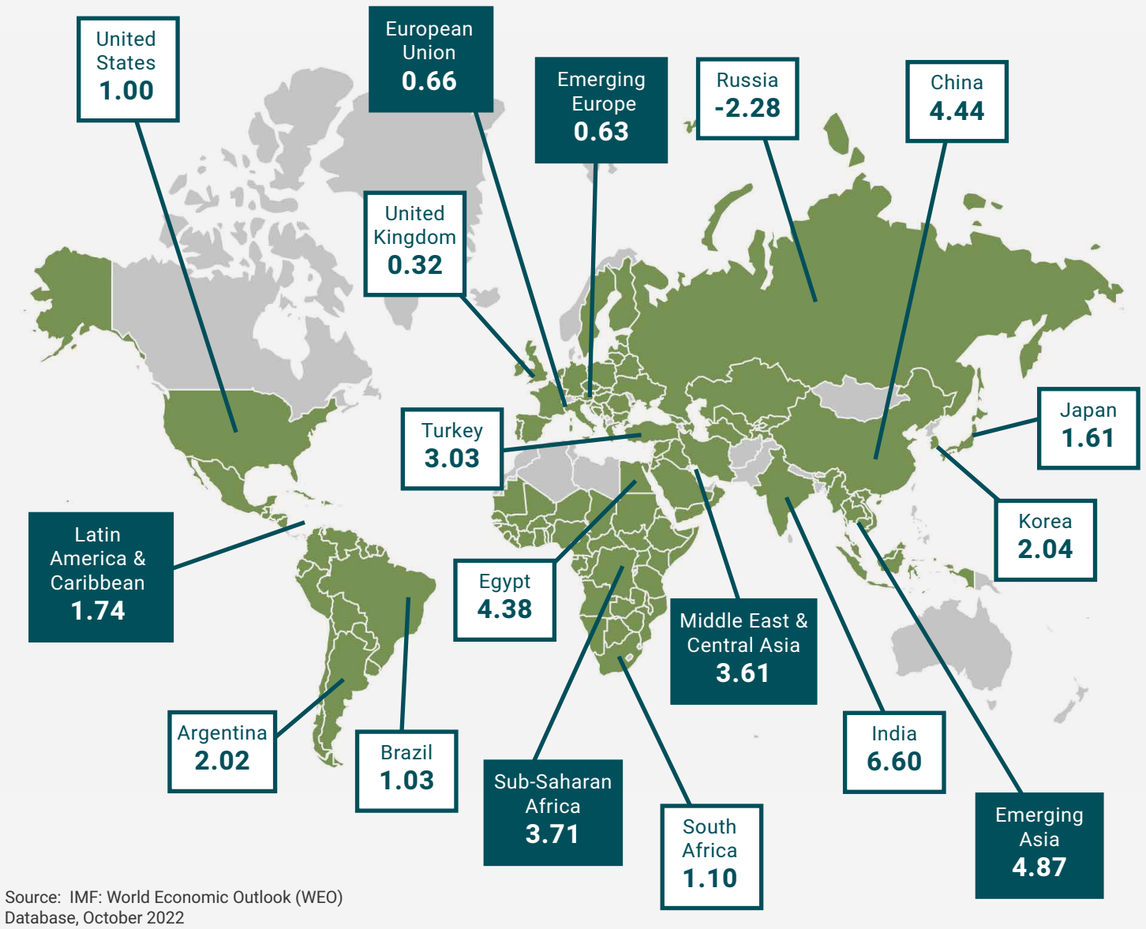
Expansion

Emerging Economies and Growing Debt

Slow economic growth in developed nations will strain emerging markets in 2023 until global inflation eases in the second half of the year.

Forecast GDP Growth 2023: Major Economies, Regions and Groupings

Gross domestic product, constant prices - % Change



Source: IMF: World Economic Outlook (WEO) Database, October 2022

Emerging markets will face export losses, reduced remittances and declining foreign investment in 2023 due to slow developed nation economic growth.

While most emerging economies in Asia and Latin America will continue to grow through 2023, export-oriented countries such as Bangladesh, Cambodia, Vietnam and Mexico will see export revenue decline due to reduced consumption in developing countries. Slow industrial activity will reduce global labor demand, including demand for migrant workers, constraining remittance flows to developing economies. Global investors will become more risk-averse in 2023 as international capital flows constrict, limiting investment in less politically and economically stable emerging markets until the global economy improves.

Lower and middle-income countries' rising public debt, coupled with constrained international credit resources, will increase demands on global lenders like the World Bank and International Monetary Fund (IMF).

US measures to control domestic inflation in 2023 will keep the US dollar strong against other currencies, pushing low- and middle-income nations toward debt default as their currencies weaken. Global debt reached $300 trillion in 2021 – the biggest one-year debt surge since WWII – after COVID-19 forced governments to increase public expenditure to support healthcare infrastructure and livelihoods, with expenses disproportionately impacting low- and middle-income nations more than advanced economies. The IMF, whose primary role is to help countries in debt distress, maintains a lending capacity of $1 trillion, with the US, Germany, Japan and France among its major creditors. However, tightened fiscal policy in creditor countries risks restricting the IMF's lending capacity and constraining its ability to rescue low-income countries from debt default. The IMF and World Bank warned that nearly 60% of low-income countries were in debt distress in 2022.

Businesses will confront recession risks in 2023 by reducing manufacturing and shipping constraints, cutting labor costs and investing in technological innovation.

As credit markets become limited this year, many companies will seek to constrain operational costs by reducing labor, instead scaling down production or investing in automation. However, efforts to trim workforce sizes will likely meet with labor movement, regulatory and even legal opposition in some countries, increasing tensions between governments and businesses. Major manufacturing industries will work to ease shipping bottlenecks and geopolitics-driven impediments to commodity flows and inflationary pressure on materials, particularly semiconductor chips, key metals, rare earth minerals, timber and cotton. This business focus on supply-side constraints will contribute to global inflation easing by mid-2023, eventually allowing many central banks to lower interest rates toward the end of 2023.



Economic growth in developed nations will almost certainly stay low in 2023, though the prospects of a global financial crisis remain muted.

Government attempts to tackle rising inflation by increasing central banks' interest rates will reduce the flow of capital within markets, restricting business investments and slowing global growth rates through most of 2023. A potential recession will likely be "long and shallow" rather than sudden and steep, slowly cutting into business profits and state coffers through most of this year. However, the IMF expects global inflation to drop to 4.7% by the end of 2023, allowing governments to start easing cash flows into the economy. GDP growth rates may rebound toward the start of 2024 as supply-side constraints ease, including food and energy supply uncertainty stemming from the Russia-Ukraine war – a major contributor to inflation in 2022. Economic growth will stay slow in most developed countries, including the EU, the UK, US and Japan, with the hospitality, tourism, real estate and travel sectors suffering from shrinking consumer spending and diminished industrial activity. Unlike the 2008 financial crisis, however, most central banks, federal governments and global lenders are anticipating these growth constraints and are well placed to enact remedial measures to prevent a deep recession.

Tension

Business in China, Taiwan and the West

A full-blown China-Taiwan conflict this year is unlikely, but China will be more disruptive and the Taiwan Strait remains a flashpoint.

For the next five years, China under Xi Jinping will be increasingly assertive internationally, while developing its domestic economy and self-reliance in key strategic industries.

In securing his third five year term as China's leader, Xi has centralized power around himself and China's policies to 2027 will largely follow the trajectory Xi has set for the past decade. Domestically, Xi will continue his "common prosperity" drive, weakening the power of China's rising oligarchs and conglomerates, while attempting to forestall public discontent at slowing economic growth and the social and health effects of COVID-19. In parallel, Xi's "dual circulation" economic policy will work to establish a domestic consumption-based economy, as a hedge against China's over-reliance on exports and to create jobs for China's rising middle class. Recognizing China's vulnerability to US coercion, Xi will also prioritize increased Chinese self-reliance in key industries, notably semiconductor chips, but also energy, food security, artificial intelligence among other fields. China's uncompromising foreign policy under Xi will continue. With tensions with the US and the West unlikely to ease and neither side willing to compromise, there is little prospect of substantial progress in US-China trade negotiations, while more US and EU export restrictions are more likely, as is continued Chinese attempts at economic coercion in international disputes. China will continue repression and human rights abuses in Xinjiang and Tibet, while the next five years will see Hong Kong increasingly resemble a mainland Chinese city, rather than an autonomous territory.

China will almost certainly not invade Taiwan in 2023 and the prospect of an invasion rises only incrementally by 2027.

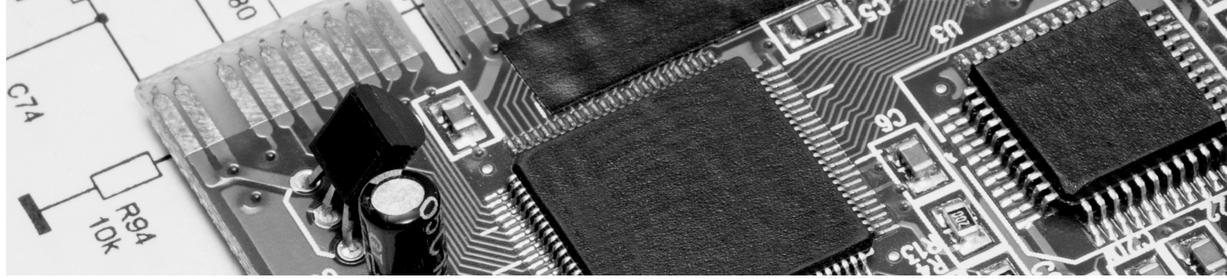
China's rhetoric towards Taiwan has hardened substantially over the 10 years of Xi's leadership, in parallel with a growing Taiwanese identity on the island. Although the People's Liberation Army is extremely focused on Taiwan, a full invasion of the island is probably beyond the PLA for now, given its inexperience with real-world amphibious operations and Xi's directive to develop such a capability by 2027.

Taiwan Outlying Islands and Territorial Waters

Source: Taiwan Ministry of Defense, Xinhua News Agency, Google Earth

- Chinese military's live-fire exercise areas in 1996
- Chinese military's live-fire exercise areas in after Speaker Pelosi's August visit in 2022
- Air Defense Identification Zone
- Taiwan Strait median line
- Territorial waters
- Internal waters

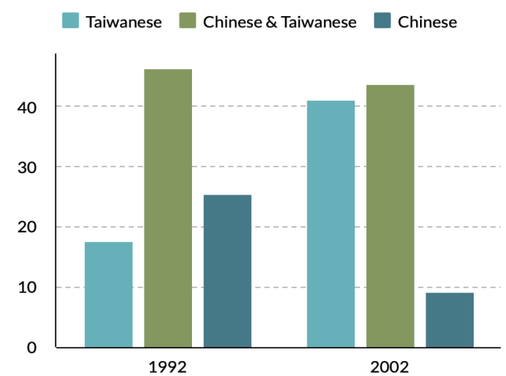
Instead, heightened Chinese military harassment of Taiwan is certain over the next five years, which will at times spur international concerns over an invasion or US-China conflict. Air and naval penetrations of Taiwanese-controlled territory will continue at sharply elevated levels and Chinese military exercises on Taiwan's maritime margins will be far more frequent. During Taiwan's 2024 elections, provocative international visits and other moments of tension, Chinese military activity will probably effectively blockade Taiwan's ports and airports, while in extremis China could decide to capture one or more of Taiwan's outer islands close to the mainland.



China will increase coercion and gray zone tactics against Taiwan in 2023, seeking to influence Taiwan's 2024 elections.

While Beijing may not yet be ready or willing to launch n invasion of Taiwan, it will continue to intensify a range of coercive actions other than military force – known as "gray zone" activities. Taiwan's next presidential election must be held before April 2024, and China will employ a near full range of national capabilities to try to influence its outcome, including overt and convert information and disinformation campaigns, cyber-espionage and cyberattacks, economic coercion, as well as military pressure. While much of this coercion will be aimed at the Taiwanese people, Taiwanese government and Taiwanese companies, China will also likely seek to divide Taiwan from the US and other international partners, including by pressuring western multinational companies to either choose between China and Taiwan, or to lobby on Beijing's behalf. China's gray zone coercion of Taiwan will not end after the election, but will intensify toward2027, particularly if President Tsai-Ing Wen is succeeded by another similarly anti-Beijing candidate.

Taiwanese/Chinese Identity



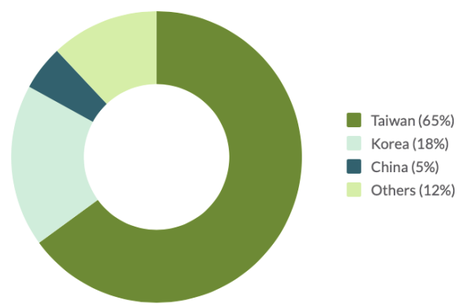
Source: Election Study Center, NCCU (1992~2022.06)

Taiwan will remain dominant in the world's semiconductor chip industry in 2023 and beyond, with moves to diversify supply chains slow to take effect.

Taiwan's two-thirds share of the semiconductor chip market will remain basically unchanged in 2023 and will only slowly decrease over the next five years as alternative foundries in the US, Japan, South Korea and elsewhere come online. Moreover, the world's dependence on Taiwan for over 90% of all advanced chips will probably be even slower to change, with South Korean and US plans to developed advanced manufacturing capabilities constrained by their lack of skilled engineers, among other challenges. However, with the US severely restricting China's access to its semiconductor chip technology and tools, and Beijing seeking to develop its own self-reliant chip industry, China will have little or no reliance on Taiwanese chips, limiting the industry's potential to mitigate a Taiwan Strait crisis.

Semiconductor Chip Market Share 2021

Total Foundry Revenue $94.587M



Source: TrendForce's Department of Semiconductor Research

Resources

Water Scarcity and Business

Drought and water shortages will require business to adapt to changing water availability, disrupted transport and energy, and potential water conflicts.



Intense droughts are likely in 2023, increasing competition for water and disrupting river transport and power generation.

Intense droughts, which were prevalent throughout 2022, will continue into the New Year as the La Nina climate cycle enters its third year. Low water levels in major rivers like the Mississippi, the Rhine and the Yangtze will likely be problematic again in 2023, disrupting logistics and transportation and shrinking domestic power generation in the US, EU and China. Low water levels will also directly disrupt production in water-intensive sectors like the semiconductor or agriculture industries, increasing competition between economically important sectors for water access and increasing the likelihood that regulators will step in to manage intra- and inter-industry water competition. Public tolerance for water waste or pollution will fall, particularly where drought has led to public restrictions on water use or power cuts to households, and firms caught breaking regulations are likely to face steep reputation costs in 2023 and beyond.

Continued climate change extremes will intensify water scarcity, risking conflicts over water and reputation harm to water-use intensive companies.

Global emissions are still growing and climate change targets to keep average global temperatures from rising 1.5C (2.7F) over pre-industrial levels within the next five years will almost certainly be missed, particularly as geopolitical tensions delay coordinated action on climate change in 2023. With global water scarcity likely to increase over the next five years due to rising temperatures, physical security risks for companies operating in unstable countries in badly affected regions like the Middle East, sub-Saharan Africa, or the western US will increase driven by potential conflicts over water resources. Meanwhile multinational companies that source raw materials or goods from water-scarce developing nations should expect greater reputation, operational and regulatory risk from their extended supply chains. Social conflict over water will be worst in countries with large wealth gaps and worsening infrastructure, like South Africa. It could also aggravate cross-border disputes over water rights between countries such as Egypt and Ethiopia, India and Pakistan and the US and Mexico.

Yangtze River Shrinks 2020-22

Source: European Space Agency

Note: Water flow in the main trunk of the Yangtze River fell over 50% below the previous five-year average in August 2022.

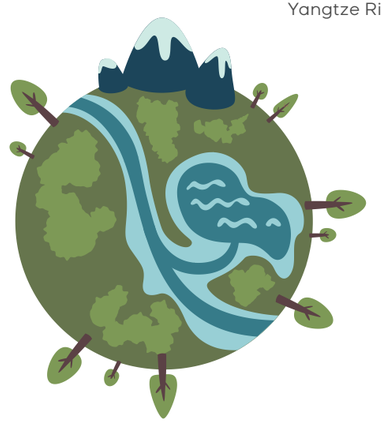


Long-term changes in water availability will demand strategic changes in multinational companies' business models.

A world where water use is increasingly regulated and access to it is more often disputed or even fought over will see business evolving to adopt best water-use practices. With major manufacturing economies, such as China, Vietnam and India, already facing substantial water strain, their low labor costs in manufacturing economies will become less of a competitive advantage for companies in future years. Just as firms consider labor availability, energy supplies and regulatory environments when assessing new projects, long-term water availability projections will increasingly shape where companies establish supply chains. Growing water consciousness will be reinforced in 2023 by the use of big data to allow firms' and consumers' water use to be tracked in real time to conserve supplies and ensure the concerns of regulators and local communities over pollution and waste are met.

Global Rivers

Support Huge Amounts of Economic Activity



Yangtze River Economic Belt:
$5.3 trn

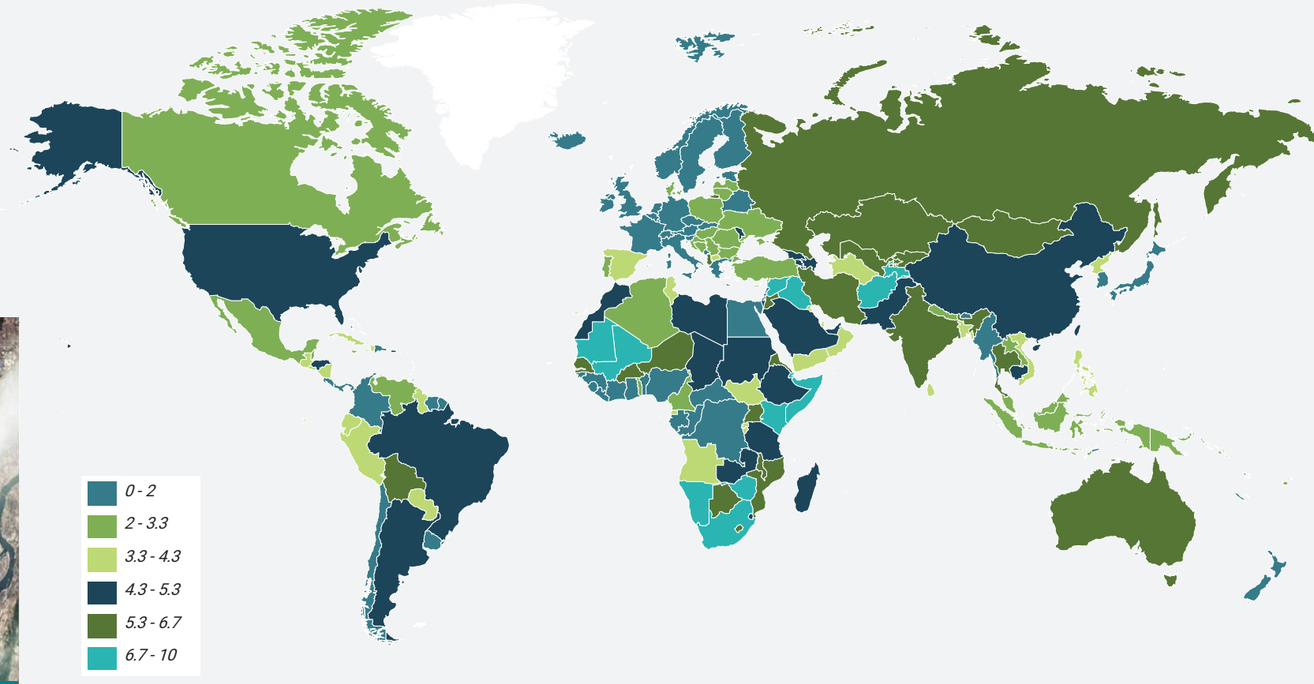
Colorado River:
$1.4 trn

Rhine River:
$800 bn

Indus River:
$380 bn

Source: Chinawaterrisk.org

Global Drought Risks 2023

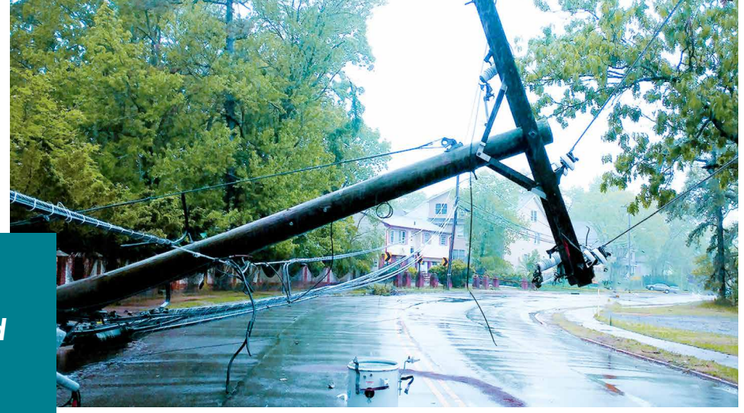


Source: European Commission

Power

Electricity, Energy and Continuity

Electricity shortages and outages will affect developed and developing countries alike in 2023, driven by energy market problems, aging infrastructure, natural disasters and attacks on infrastructure.



Global electricity demand is growing faster than production, with the Russia-Ukraine conflict causing market imbalances that will strain many countries' ability to provide continuous and reliable power in 2023.

While the world still produces enough electricity to meet total global demand, the margin is narrowing as developing nations increase consumption faster than their generation capacity, a trend that if not reversed could see global demand exceed supply within the next decade. However, electricity generation is not distributed evenly around the world, and the world's low-income countries will continue to suffer a substantial electricity generation deficit, leading to regular power outages affecting both residential customers and businesses. The Russia-Ukraine conflict has disrupted world energy markets, raising global LNG prices as Europe seeks alternative suppliers. Energy strains will ease somewhat as the northern hemisphere winter ends, although diesel shortages will affect the transport industry in 2023, especially in Europe. However, countries that rely heavily on gas or coal for power generation, such as Bangladesh and Pakistan, will continue to struggle to purchase sufficient supplies for normal power generation in 2023, leading to regular and prolonged electricity outages. In response to power generation shortages, some countries – such as China and the UK – have restarted or delayed the closure of coal-fired power stations, slowing their transition to renewable energy with potential reputational consequences for business customers.

Climate change and severe weather will cause more power disruptions in 2023 and beyond due to infrastructure damage, demand stress and production problems.

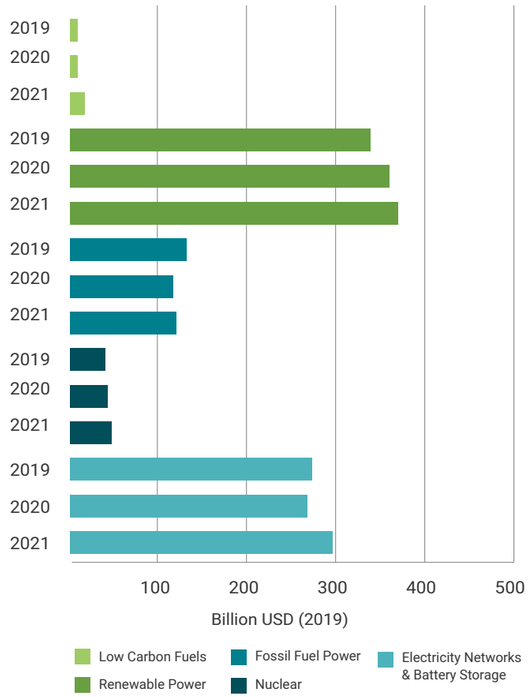
Outside of Ukraine, most of the severe electricity outages in 2023 will be due to severe weather events and the effects of climate change. Hurricanes, typhoons, cyclones, wildfires and winter storms will cause the most acute outages, particularly where they strike aging, poorly maintained infrastructure or infrastructure poorly adapted to changing climatic conditions. However, more major and sustained outages will be driven by longer lasting climate events, with hotter and longer heat waves creating unusually high demand for electricity for cooling – such as occurred in India in May 2022, driving record energy demand and power outages for two-thirds of Indians. Changing rainfall patterns and extended droughts will increasingly disrupt hydro-electric generation, as occurred in China last summer, and could occur in the US Colorado River basin within years, while rising water temperatures in French rivers and lakes made them too hot to use for cooling nuclear plants.

Aging power infrastructure and spiraling maintenance costs in many nations will lead to an uptick in planned and unplanned power outages in 2023.

Globally, countries will continue to prioritize investment in renewable and low-emission power generation over new fossil fuel power stations. With major international investors and lenders reluctant to invest in new coal-fired power stations, some countries will be forced to extend their reliance on aging power stations, while the global economic downturn and debt challenges in many developing nations prevents needed maintenance of their power grids. The US has quadrupled its annual investment in its power grid in the past 20 years to renew aging infrastructure – now spending upwards of $40 billion per year. South Africa, however, suffered continual outages in 2022 due to failing generation and transmission infrastructure, with the government unlikely to be able to fix infrastructure and restore normal service in the foreseeable future. In France, routine maintenance of the country's 40-year-old nuclear power stations found corrosion problems, leading to 25 of 56 reactors being taken offline simultaneously last summer. France, previously Europe's largest electricity exporter, became an importer.

Global Energy Supply Investment

Electricity



Source: International Energy Agency

Physical and cyberattacks on electricity and energy infrastructure will rise in 2023 as state and nonstate actors recognize their disruptive effect.

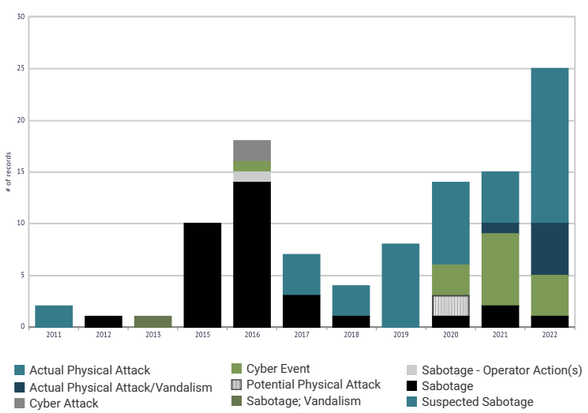
The widespread and distributed nature of power grids makes them particularly vulnerable to both physical and cyberattacks. Russia will continue to target Ukraine's electricity infrastructure as an act of war – as it has done since it occupied a nuclear power plant in the early days of the invasion – and if tensions rise with the US and NATO will likely also target their power grids with cyberattacks and possible physical sabotage. The US has also seen an unusual rise in physical attacks on power infrastructure, including a shooting at a power substation in North Carolina, which took out power for 40,000 residents. Incidents in South Carolina and Washington have been classed as vandalism, but at least one attack on Oregon infrastructure required planning and equipment.

Russian and Chinese attacks on US power grids will remain commonplace, but sound security will defeat most intrusions. However, attacks on other competitor nations with weaker cybersecurity – such as a recent attack on an Indian nuclear plant – could be far more consequential.



Reported Sabotage of Electric Grid in the United States

Source: Department of Energy



People

Labor and Workforce Trends

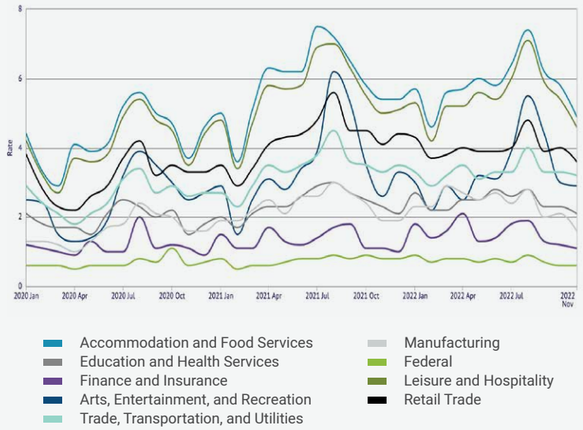
The global labor market remains unbalanced by the effects of the pandemic, while competition for quality applicants is increasingly complicated by economic, political and social factors.

Even as the global economic slowdown reduces staffing pressures in some industries, the structural changes wrought by the pandemic and persistent inflation will continue to drive labor challenges.

The lingering effects of COVID-19 on the global workforce – including worker fatalities, early retirement, low immigration and heightened absenteeism – will drive persistent worker shortages in 2023, despite a global economic downturn easing labor demand pressures. Technology companies will likely face the softest labor market in 2023, following recent layoffs driven by a pandemic hiring surge that proved unsustainable. However, the pandemic removed several million workers from the US economy – a situation replicated in many other countries – leading to labor force shifts as workers moved to better paying jobs, leaving low-paying, difficult or undesirable industries struggling to find sufficient workers. Although the US and other advanced economies continue to create new jobs and their workforces are recovering their lost size, industries like agriculture, retail, manufacturing and hospitality will continue to face either labor shortages or substantial wage growth. An average of 4 million US workers quit their jobs each month in 2021, which accelerated in early 2022 before peaking in March at 4.5 million resignations. The so-called "Great Resignation" is likely to continue in 2023, with health care climbing the ranks of the industries most impacted, as the fallout from the pandemic has led to burnout in addition to the stress of rising public mistrust of the health care system and wage grievances. Lower-wage earners in the retail and food service industries, particularly, will continue to leave their positions in search of better conditions.

Employment and Labor Market Statistics of U.S. Rate of Quits

Source: Federal Reserve Bank of St Louis



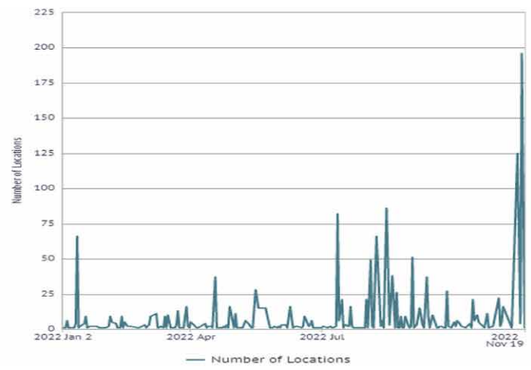
Note: The food service, hospitality, retail, entertainment, and transportation industries saw the highest rates of employee resignations this year, while the federal and state governments, finance and insurance, education, and manufacturing industries had higher retention levels.

The failure of employers, employees and job seekers to align expectations will cause both hiring and retention challenges for firms, as well as increasing union membership and industrial action in key sectors.

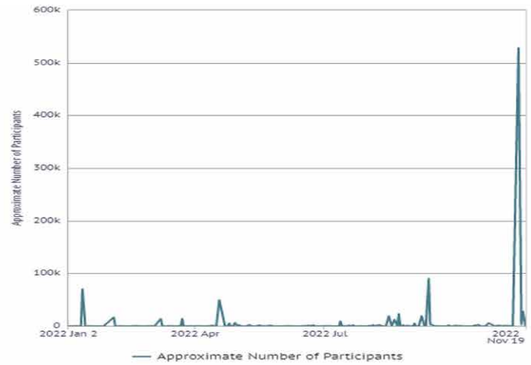
As many employers insist workers return to the office, they will face increased pushback from workers who prefer remote positions, adding to staffing challenges, and even raising insider threat risk as employees begrudgingly resume the daily commute. Across 14 developed economies, job postings for remote work declined 5% year over year during the third quarter of 2022 despite unchanged worker demand for remote positions, further highlighting the labor imbalance. Similarly, the mismatch of worker expectations of substantial wage rises in a high inflation environment with the reality of a weakening global economy and declining revenues in many industries will create friction, at times driving strikes and labor action, but also increasing employee demand for other compensation and conditions – such as remote or hybrid work – to make jobs more attractive. Transportation strikes, which dominated the latter months of 2022 worldwide, will likely continue into 2023, both fueling and reflecting workers' mounting frustrations over below-inflation wage increases. As these strikes continue into 2023, copycat protests are likely to increase, with worker and driver shortages exacerbating existing supply chain problems, increasing transport costs due to limited availability, and driving greater reputation risk for targeted companies.

United States Strike Action 2022

Number of Locations



Approximate Number of Participants



Source: Cornell University ILR Labor Action Tracker

Diversity, equity and inclusion (DEI); environmental, social and governance (ESG); and human rights considerations and regulations will likely shift the way companies engage with their direct employees and supply chain workforce.

DEI and ESG concerns will intensify in 2023, with companies increasingly held to account not only for their relationship with their own staff but also the rights and conditions of workers within their entire supply chain. In some cases, governments will drive this dynamic, placing sanctions or restrictions on entire countries, regions or companies – as the US has done with China's Xinjiang region, as well as several Malaysian palm oil plantations, both over forced labor concerns. In other situations, however, public pressure will mount on multinational companies to take responsibility for improving worker conditions far into their supply chains, particularly in the mining, extractives and renewable energies industries, where growing demand for key minerals such as copper and cobalt will lead consumers, the media and activists to hold multinational companies to account for labor abuses in producing countries. As "Generation Z" continues to enter a complex labor market, some evidence suggests they are more selective than their predecessor generations about the organizations they work for, often placing high value on demonstrated company culture, sustainability and ethics, directly linking company DEI and ESG performance to their labor market competitiveness.



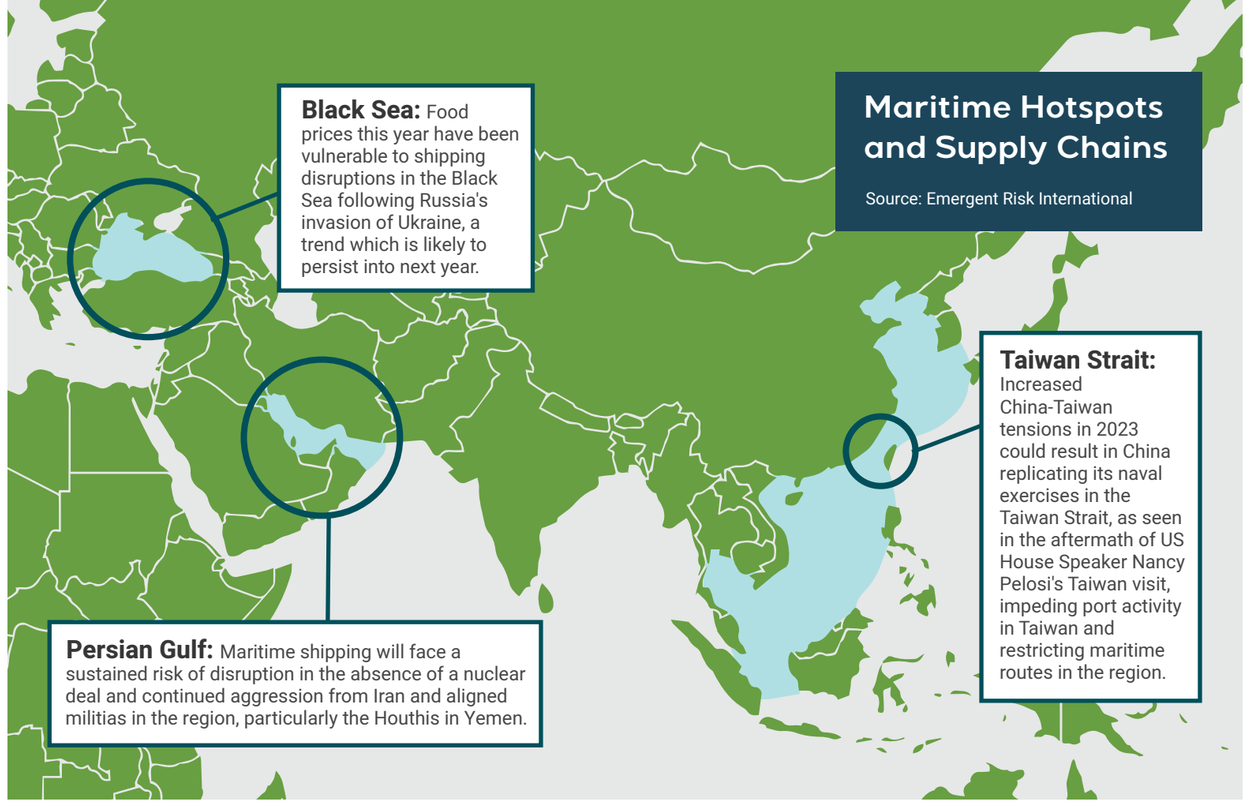
Moving Parts

Logistics and Supply Chain

Global supply chains will be more resilient in 2023, but geopolitical and economic pressures will continue to drive reorganization and relocation of business operations.

Geopolitical tensions will accelerate companies' relocation of supply chains.

Supply chain reshoring, friend-shoring and near-shoring efforts will accelerate in 2023 as companies seek to increase supply chain resiliency in anticipation of extended regional and global geopolitical tensions. Few companies will abandon production in China entirely, given the country's outsized role in global manufacturing and the lack of sufficiently ready alternatives. However, for critical products and components – such as semiconductor chips or active pharmaceutic ingredients – companies and governments will make major steps toward supporting new supply chain options this year, increasingly outside Asia. Supply chain reorganization this year will extend beyond manufactured products to raw commodities, particularly energy and key minerals and metals, as the US and other Western governments seek to reduce reliance on Russian energy and Chinese mineral processing, including supporting development of their own alternatives. With US-China geopolitical competition increasing political uncertainty for manufacturers, the expanding US sanctions regime and rising shipping costs will also drive supply chain relocation, particularly for semiconductor chips, but also for clothing and lower-valued manufactured goods as the US continues to seek ways to pressure Beijing.



Supply chain disruptions from climate change and extreme weather events will intensify this year.

Climate-related disruptions will likely continue to increase in severity and frequency in 2023, hampering multinational supply chains reliant on imported agricultural goods and the movement of manufactured goods through river freight as well as increasing corporate reliance on rail and truck transport. With fertilizer shortages due to the Russia-Ukraine war limiting global agricultural production, food supply chains will remain vulnerable to extreme weather events this year causing sudden shortages and price volatility. Agricultural losses due to natural disasters could create significant acute food security challenges and restrict raw material supplies for the textile industry. Low river levels due to drought will likely continue into 2023 with severe impacts on the Rhine, Mississippi, Yangtze and Loire rivers likely constraining Chinese, European and US supply chains, as limited road and rail alternatives increase overall transport costs. Climate-change related natural disasters will also affect the global energy industry, damaging unprotected infrastructure and reducing long-term generation capacity through water shortages.

Consumers, investors and some governments will demand "greener" and more ethical supply chains.

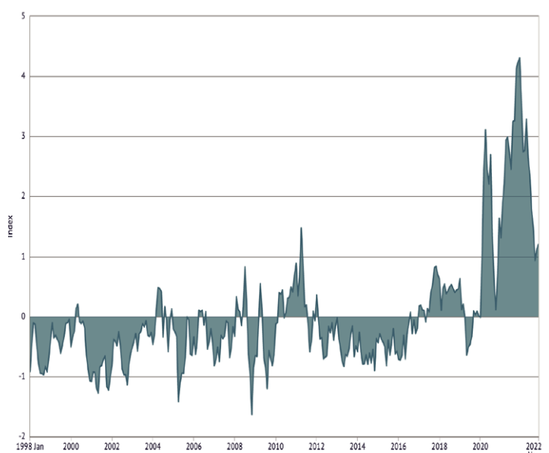
Growing consumer and investor demands, coupled with increasing environmental, social and governance (ESG) regulations will drive manufacturers to adopt more climate-friendly practices this year and beyond. This pressure will be particularly acute in the European market, where taxes and other financial penalties will affect carbon-intensive industries. Pressure to minimize carbon dioxide emissions will increase the steady adoption of "circular" supply chains, where manufacturers repurpose and reuse waste from customer returns, converting those into refurbished or new products. New ESG reporting frameworks – such as the US Securities and Exchange Commission's (SEC) Sustainability Accounting Standards Board and Task Force on Climate-related Financial Disclosures – will lead investors and activists to demand companies extend environmental commitments throughout their supply chains. On the flipside, divisive political opinions in the US on ESG could lead to more splintered ESG initiatives within supply chains as more states move to make their own rules about ESG and its role in business.

Labor shortages and industrial disputes will strain supply chains and cause sudden disruptions.

Labor disruptions and labor shortages will continue to challenge multinational supply chains in 2023, particularly through a global shortage of skilled workers, strikes in industrial manufacturing and the transportation sector, as well as global demands for wage increases. Strikes will cause abrupt disruptions to organizations' supply chains, most frequently in countries with acute inflation and with disproportionately low wages. South Africa's Transnet port strike, the UK's Felixstowe Port strike and France's nuclear reactor worker strikes in late 2022 all highlighted the cross-sector consequences on corporate supply chains of simultaneous strikes in different countries. As inflation eases and wage pressures normalize, more likely in the second half of 2023, labor markets in many countries will begin to rebalance and worker shortages in lower-wage industries will probably improve. However, in countries like the US, UK and parts of Europe, the pandemic removed millions of workers from the labor force, a factor that will not be resolved this year, keeping upward pressure on wages throughout multiple sectors. China's major COVID-19 outbreak at the start of the year risks driving a similar dynamic there as workers leave cities to return to rural areas or older workers die or retire early, potentially easing some of China's unemployment challenges but exacerbating labor problems in skilled manufacturing industries, such as semiconductor chips.

Supply Chain Pressure Index

Source: New York Federal Reserve



Energy Transitions

Critical Mineral Supply Chains



Multinational companies will incur serious supply, reputation and political risks as the global renewable energy transition demands more critical minerals.

Global demand for critical minerals will be manageable in 2023 but will soon exceed supply, limiting production and increasing costs for companies.

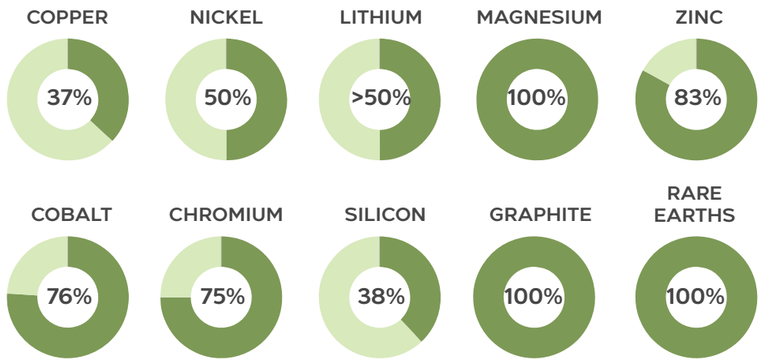
Aluminum, lithium, copper, nickel, cobalt and graphite, among others, will likely be the most in-demand in the coming years, with lithium and copper forecast to hit major supply deficits during the 2025-2030 period. Production of renewable energy equipment, as well as computers, electric vehicles, cell phones and other commercial and consumer electronics will all face serious limitations from these deficits. While the US, Canada and EU will continue to explore and develop domestic mining and refining, they will not likely hit key production milestones for at least several years, as mineral mining typically takes more than 10 years to reach production. While several North American projects are planned, US and allied mining will likely require a period to catch up with the well-established players in China and Latin America.

Political competition between nations and regional blocs will constrain mineral supply, as governments aim to control limited mineral resources with trade agreements and restrictive legislation.

The US Inflation Reduction Act requires that starting in 2023, and increasing through 2027, a greater percentage of critical minerals and other electric vehicle battery aspects must be derived from US or partner country supply lines. While the law sets out a five-year timetable, more legislation is possible in the interim, given the bipartisan US political focus on challenging China economically. The net result of this and similar foreign laws will be higher prices, as governments' strategic nationalistic aims are asserted over the commercial needs of companies. Some countries are likely to organize themselves along a similar trajectory of oil cartel countries, such as Latin America mineral exporters creating OPEC-like structures. Nationalization efforts to control critical minerals, as seen in 2022 with lithium in Mexico, Chile and Argentina, will also play a greater role. Companies will need to anticipate and manage relations with aggressive state-centric polities or regional arrangements whose electoral, sometimes ideological, priorities will subsume pressure from industry.

U.S. Reliance on Imports for Critical Minerals Used in "GREEN" Energy

Source: Senate RPC, USGS



Global climate activism will dent mineral supply, adding layers of reputation and regulation risk, given the locations of critical minerals and their environmental impacts.

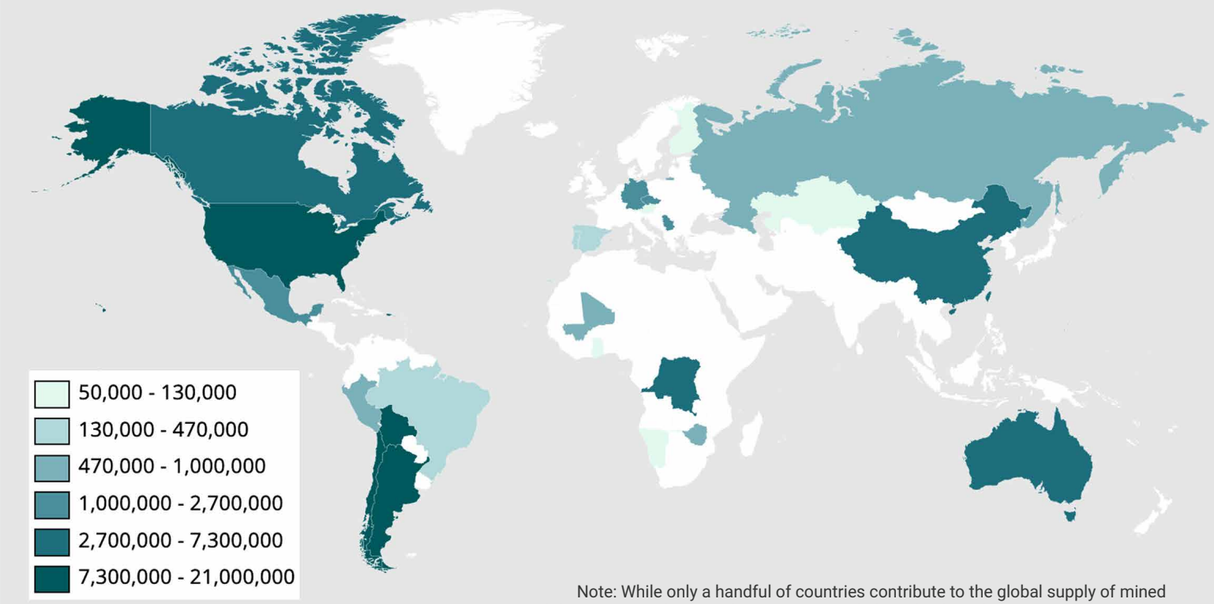
The scale of mining required to meet 2020-2050 demand will raise global emissions; cause deforestation; increase water use; and lead to mining waste. While environmentalists will continue to focus on fossil fuel-related entities for the coming decades, they will increasingly divert attention to mining, which will facilitate the move toward electric vehicles and renewable energy but have its own environmental consequences. Activists will remain vocal critics of the industry's environmental, human rights and resource costs, particularly heavy water usage involved in mining at the expense of local communities when global water supplies are dwindling, as well as labor abuses against miners in developing countries. The greatest impact from activists on critical mineral supply will be the inability of Western governments and some developing countries to overcome local environmental and community pushback against certain mining project plans. As mineral mining increases across a variety of large projects around the world – including in developed countries with more active environmentalist groups – their highly visible construction operations will create urgency for the wider public and activists. This will likely become more noticeable in the US and Canada in the next few years, with signs of local resistance to mining projects already emerging, while several mining initiatives in the EU have failed due to protests.

Future technological advancements will change which minerals are in demand, adding uncertainty for companies' strategic investment planning.

While the technology that drove the use of fossil fuels and resources like iron and steel remained mostly static for centuries, the same is probably not true for new renewable energy technologies and the minerals they need, whose value may be torpedoed by future changes in battery and renewable technologies. Uncertainty over the long-term demand for some minerals will necessitate companies develop built-in supply chain flexibility that can shift toward the newest mineral needs as technology develops.

Identified Global Lithium Reserves

Source: US Geological Survey, Mineral Commodity Summaries, January 2022



Note: While only a handful of countries contribute to the global supply of mined lithium, many others, such as Mexico, are believed to have large untapped reserves.

IT Security

Protecting Digital Infrastructure

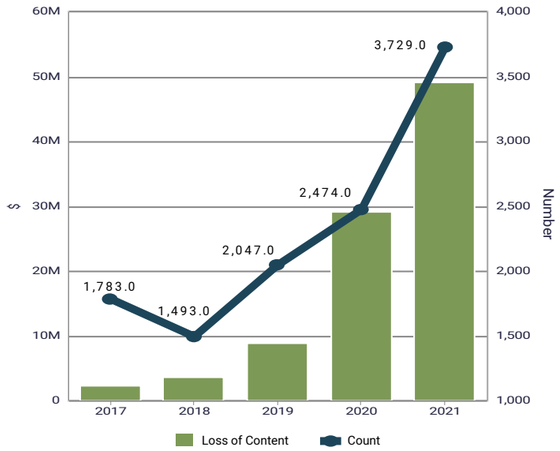
Cybercrime and disruption will grow further in 2023, with black market cybercrime industries growing in size and sophistication, targeting businesses and governments most likely to pay ransom.

Transnational cyber actors are increasing the number, scale and sophistication of attacks, threatening greater business disruptions worldwide in 2023.

All companies will face pressure to protect their operations from cyberattacks from a diverse set of threats, including nation-state actors, with varied motivations. Protecting operations will require deeper knowledge of business partners' cybersecurity practices as industry data underscores the risk of so-called "supply chain attacks" – data compromises originating from partners. Attackers are innovating their targeting strategies to focus on victims whose business operations lack resilience or whose consumer base cannot sustain service disruptions, which will likely drive ransomware payouts up in 2023. These criminals are driven by the promise of large profits and operate in reliable safe havens with decreasing technical barriers to entry for new actors, according to the US Office of the Director of National Intelligence. Although metrics vary, ransomware attacks grew faster than ever in 2021 – the last year for which there are full statistics. Ransomware attacks totaled 25% of recorded breaches and increased by almost 13% – an increase as large as the last five years combined, according to Verizon's 2022 Data Breach Investigations Report.

World - Ransomware Attacks and Losses

Source: U.S. Federal Bureau of Investigation



The maturing cybercrime-as-a-service (CaaS) economy will increase threats for companies in 2023, with commercialization and convenience for would-be attackers.

Major transnational cybercrime groups have expanded their CaaS operations across all threat vectors, especially ransomware, enabling entry-level cybercriminals to stretch their targeting strategies or augment their skills to attack more sophisticated business and government networks to maximize their goals. Nearly every aspect of the cybercrime toolkit – from initial infection to detection avoidance – is available for purchase. Expertise that existed solely in the hands of sophisticated attackers continues to be commodified for criminals with more rudimentary skill sets. CaaS groups are professionalizing, with glossy advertisements for service as well as detailed job recruitment posts. Ransomware gangs have launched "customer care centers" to field victims' inquiries, including instructions on procuring bitcoins in exchange for decryption keys. Savvier ransomware operators are searching for cyber insurance documents within a network to gain a window into the victim's cost-benefit analysis framework and maximize their ransom demands. For most victims, ransomware payments are currently covered by cybersecurity insurance, with companies reporting a 98% payout rate, according to UK-based cybersecurity firm Sophos. However, cyber insurance is becoming difficult to obtain and insurance companies are increasingly wary of insuring cyber issues due to their rising cost and ubiquity among businesses.

Evolving geopolitical rivalries, wider adoption of advanced technology, major elections and a possible global recession in 2023 will probably create additional opportunities for cybercriminals and test the agility of security teams.

Geopolitics and cyber threats will remain interconnected this year, leaving companies vulnerable to evolving global power politics. In November 2022, The European Union Agency for Cybersecurity (ENISA) noted that the cyber landscape deteriorated in Europe during February and March, coinciding with Russia's invasion of Ukraine. In 2023, approximately 65 countries are due to hold elections – events that will attract cyberattacks from hostile foreign interests, especially on critical infrastructure, and disinformation campaigns on social media. Destabilizing cyber events will likely emerge from actors aligned with China and Russia, which have leveraged their cyber espionage capabilities and telecommunications infrastructure to aid their allies and have allowed firms to sell equipment and know-how on the open market to be used against public and private entities in other countries, according to the US National Intelligence Council. IBM Security X-Force noted a 3,000% increase in internet of things (IoT) malware activity from mid-2019 to the end of 2020, as the COVID-19 pandemic unfolded. Vulnerabilities related to IoT and industrial control systems (ICS) increased at an even faster rate than overall vulnerabilities, experiencing a 16% and 50% year-over-year increase, respectively, compared to a 0.4% growth in the number of vulnerabilities overall. As such, the transportation, energy, manufacturing and telecommunications sectors – which have widely deployed IoT devices and sensors – will probably remain at elevated risk.

Governments will likely step up cybercrime regulations, especially ransomware, which may elevate compliance overhead and reputation risk for businesses.

In 2023, more government initiatives will shape business security around connected devices, as well as cloud systems and networks that link them together, including in the US. Governments also are introducing more ransomware legislation, such as the US Strengthening American Cybersecurity Act of 2022, which mandates certain requirements for critical industries, including reporting ransomware payments.

In 2023, businesses will navigate an increasing patchwork of state-level regulations in the US as well as burgeoning regional data protection regulatory



frameworks. Some governments are even considering banning ransomware payments to break the criminal industry's business model, although in Italy – where such payments are illegal under existing law – many companies still pay ransoms.

Comprehensive, consistent global data on cybercrimes and their cumulative effect on businesses and economies are often unavailable. Some have called for the establishment of an equivalent of Interpol for cybersecurity to help centralize reporting, tracking and information sharing. By most metrics, cybercrimes have become more prevalent and costly, and 2023 will likely continue this trend.

A Data Breach in the US Costs Over Twice the Global Average

$9.44M
Average cost of a data breach in the **UNITED STATES**

$4.35M
GLOBAL
average total cost of a data breach

$10.10M
Average total cost of a breach in the global **HEALTHCARE INDUSTRY**

For the 12th consecutive year, the United States tops the world in the highest cost of a data breach, 5.09 million US dollars more than the global average. Globally, healthcare had the highest average data breach cost of any industry. The cost of a breach in the healthcare industry jumped 42% since 2020. Source: IBM Security X-Force Report, 2022

Innovation

Developing Technology Trends

Progress in quantum computing and artificial intelligence promises breakthrough commercial applications for companies in 2023, while new technologies will emerge from the unfolding space race.



Commercial quantum computing will play a cornerstone role in Fifth Industrial Revolution technology, driving major competition between China and the West.

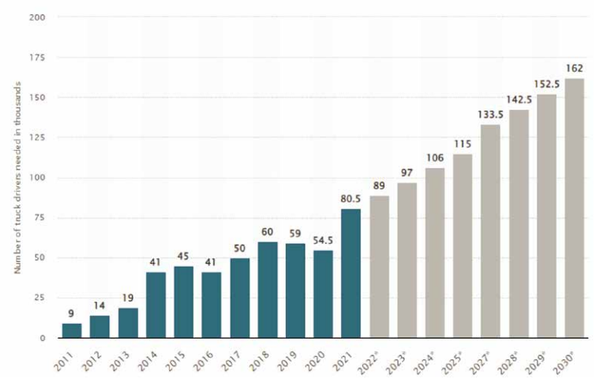
Quantum computing advancements in 2023 will allow companies access to unprecedented computational power to solve complex problems and handle unprecedented amounts of data. With such potential in mind, new startup firms in the quantum sector are likely to emerge over the coming years, with large multinationals already investing to roll out quantum computing to optimize operations in the hopes the technology will drive automation and artificial intelligence forward. As automakers focus on electric vehicles, commercial quantum computing – delivered as a service – will be used to run simulations of chemical reactions in a bid to optimize battery life and reduce testing costs. Likewise, pharmaceutical companies will apply chemical modeling to research new drugs and vaccines to cure diseases, empowering researchers to simulate large molecules and interactions with proteins. In time, commercial quantum computing could unlock developments of new artificial materials with industrial applications such as superconductivity and efficient heat isolation.

Autonomous vehicles will become more mainstream in 2023, disrupting the transportation labor market and challenging businesses to integrate fleets of AI-driven and traditional vehicles.

Truck driver shortages in the US and Europe in 2023 will contribute to greater industry interest in driverless trucks. Despite technological challenges and safety concerns, self-driving vehicles could help mitigate supply chain constraints at times of crisis or industrial action. Large companies will seek to reduce their dependence on human workforces by investing in automated vehicles to be used both for permanent day-to-day operations and contingencies. Keen to mitigate financial risk, large logistics and ride-sharing companies will advance trials of self-driven vehicle fleets in 2023, providing feedback for artificial intelligence (AI) research, with new startups competing to improve and develop vehicles' problem-solving skills. As with all automation, autonomous vehicles will face labor pushback; however, with the trucking industry facing driver shortages due to difficult and tiring conditions, new generations of truckers may welcome driving assistance technology and automated functions for night travel or bad weather.

Truck Driver Shortage in the United States from 2011-2030

The US trucking industry must recruit about 1.2 million drivers over the next decade to sustain supply and avoid forecast shortages of 160,000 drivers by 2030. Automation will likely fill the void.



Source: Statista

With drones already playing an increasing role in surveillance and law enforcement, 2023 will see greater focus on the ethics, legislation and politics of their use.

The sale of surveillance drones for government and industrial security purposes will continue to soar this year, with the global market expected to hit $5.2 billion in 2023 and $21.1 billion in a decade. With critical infrastructure worldwide under increased threat, commercial operators will increasingly rely on them for autonomous protection. Other businesses, meanwhile, will use drones to identify and possibly dissuade, deter or interdict criminals, using audio, light or even nonlethal weapons on intruders while recording incidents live. The oil and gas industry is likely to use drones with more frequency to monitor pipelines and rigs in conflict areas in Latin American and African countries, warding off attacks and crude theft at less physical risk to company personnel and contractors. However, drone usage will attract controversy and regulatory scrutiny in almost all countries this year. The US and partner governments are concerned about espionage capabilities in Chinese-built devices, which will probably lead to legislation restricting the use of Chinese-made technology. Similarly, given concerns over privacy and malicious criminal use, beginning in September 2023, drone pilots in the US will be required to register with the Federal Aviation Administration (FAA) and ensure their equipment actively broadcasts a location ping, measures that are likely to be adopted in more Western countries, but potentially create additional cybersecurity vulnerabilities.

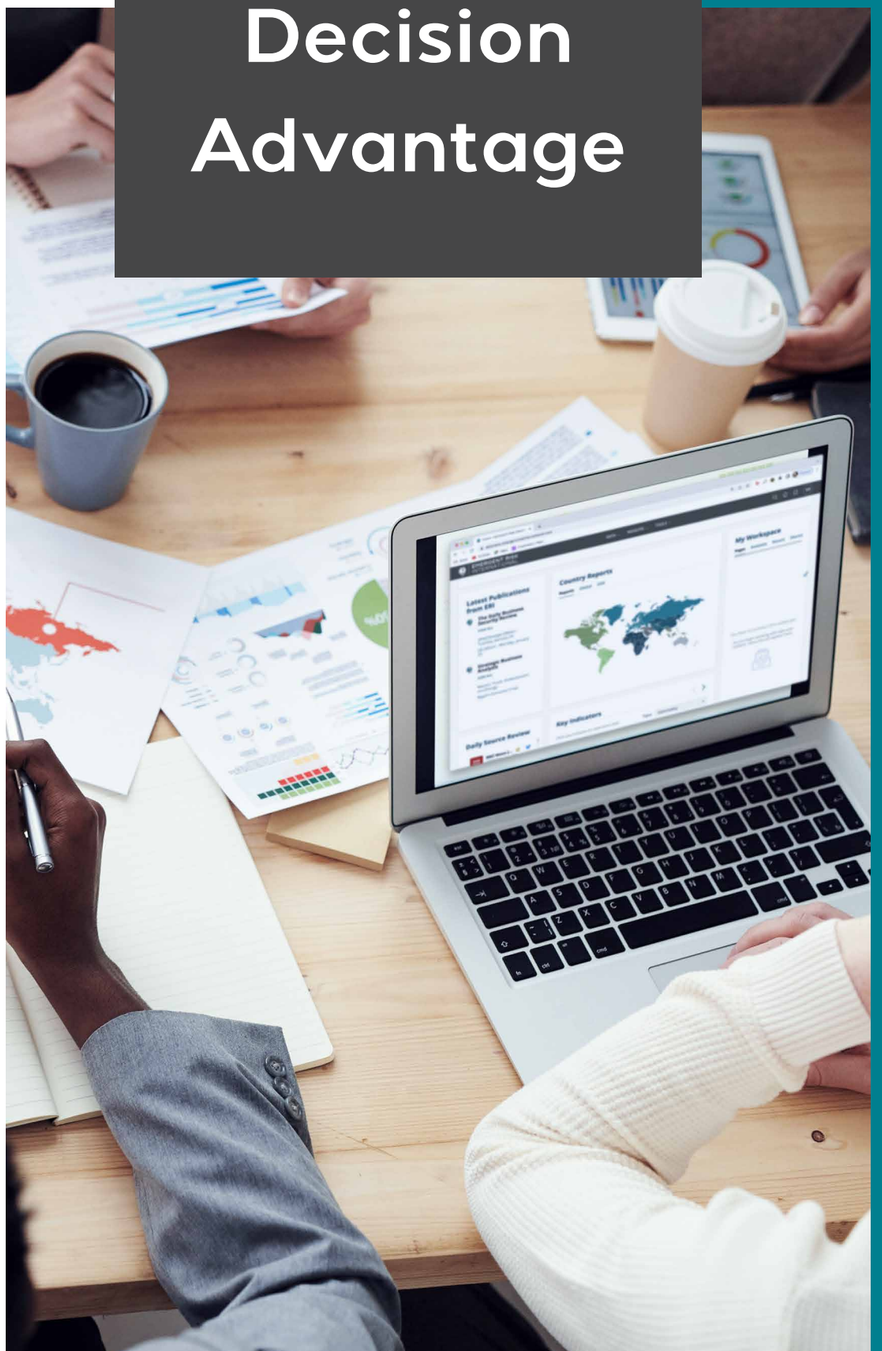




The emerging space economy driven by US and Chinese competition for critical resources will drive development of novel technologies in 2023 and beyond.

As global demand for critical minerals soars, governments and private enterprises will look to develop technology to turn space settlement and mining into feasible economic activities. The Artemis Accords to return humans to the moon by 2025 underscore increasing cooperation across Western space agencies and private spaceflight companies. Developing 3D printing technology could play a large role in the coming space age. Industrial businesses are investing in printing to reduce costs and optimize large-scale operations, with contractors interested in printing rockets and portable infrastructure to deploy on the moon. As NASA seeks to build a lunar base by 2030, the development of deployable 3D printers for lunar use will likely lead to novel, cheaper terrestrial construction methods. The new cultured meat sector reveals that 3D printing of animal protein could help address challenges surrounding nutrition in space but will have important uses on Earth as well, including potentially reducing the amount of foodstuffs delivered and transported by ships, allowing users to print edible products when required or controlling greenhouse gas emissions.

Your Decision Advantage



CONTRIBUTORS

ERI Analytical Team



Kieran O'Leary

Director of Analysis



Thea Gioe

Director of Training



Jaquelyn Gonzalez Boachie

Deputy Director of Analysis



Iman Elbanna

Senior Manager Client Relations



Misty Lynch

Editor



Pearl De Souza

Senior Analyst: South Asia and Europe



Federico Gaon

Senior Analyst: Americas, Middle East and North Africa



Cameron Evers

Senior Analyst: Americas and Sub-Saharan Africa



Klaudio Llusku

Analyst: South Asia and Europe



Neil Thompson

Analyst: East and Southeast Asia, Africa



Hayden Trout

Analyst: Supply Chains



Jessica Pickering

Analyst: East and Southeast Asia, and Africa

#yourdecisionadvantage

EMERGENT RISK INTERNATIONAL

#yourdecisionadvantage

CONTACT US

eriteam@emergentriskinternational.com
emergentriskinternational.com

©2023 Emergent Risk International. All Rights Reserved.

