

COLLEGE EXPOSURE

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S. P.
Marsh McLennan
SK Group
Zurich Insurance Group

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S. G. R. R., Managing Director

A divergent economic recovery from the crisis created by the pandemic risks deepening global divisions at a time when societies and the international community urgently need to collaborate to check COVID-19, heal its scars and address compounding global risks.

In some societies, rapid progress on vaccination, leaps forward on digitalization and a return to pre-pandemic growth rates herald better prospects for 2022 and beyond. Others could be weighed down for years by struggles to apply even initial vaccine doses, combat digital divides and find new sources of economic growth. Widening disparities within and between countries will not only make it more difficult to control COVID-19 and its variants, but will also risk stalling, if not reversing, joint action against shared threats that the world cannot afford to overlook.

Last year's edition of the *Global Risks Report* warned of potential knock-on economic risks that are now clear and present dangers. Supply chain disruptions, inflation, debt, labour market gaps, protectionism and educational disparities are moving the world economy into choppy waters that both rapidly and slowly recovering countries alike will need to navigate to restore social cohesion, boost employment and thrive. These difficulties are impeding the visibility of emerging challenges, which include climate transition disorder, increased cyber vulnerabilities, greater barriers to international mobility, and crowding and competition in space.

Restoring trust and fostering cooperation within and between countries will be crucial to addressing these challenges and preventing the world from drifting further apart.

The 17th edition of the *Global Risks Report* identifies tensions that will result from diverging trajectories

and approaches within and between countries and then examines the risks that could arise from such tensions. This year's report also highlights the implications of these risks for individuals, governments and businesses.

The Global Risks Perception Survey (GRPS), which has underpinned the report since 2006, was refreshed this year to gather new and broader insights from nearly 1,000 global experts and leaders who responded. The 2021-2022 GRPS includes the following sections:

- **COVID-19 H** invites respondents to opine on the reverberations of the crisis, allowing comparability with the results from the previous year.
- **F O** captures respondent sentiment, informing our analysis of how individual contexts may influence global risk perceptions and affect mitigation.
- **H** captures respondents' perceived trajectory and sense of urgency of global risks, informing our analysis of choices and trade-offs that decision-makers may face.
- **S** ranks potential damage while **E** asks respondents to consider cascading impacts in conjunction with the severity of the risk itself.
- **I a M** asks respondents to assess international efforts in 15 global governance areas to identify achievements and areas of opportunity for global action and cooperation.
- **Q** source expert knowledge.

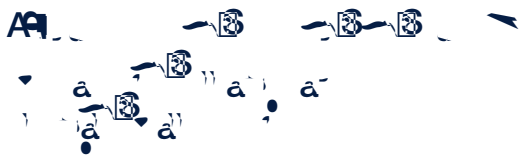
This year the *Global Risks Report* also draws on the views of over 12,000 country-level leaders who identified critical short-term risks to their 124 countries, gathered through the World Economic Forum's Executive Opinion Survey. The areas highlighted in these responses are likely to inform national decision-making and provide a perspective on how short-term risk national priorities may compare with global risks and perspectives.

We are ever grateful to our partners in the report's development: Marsh McLennan, SK Group and Zurich Insurance Group. We also thank our academic partners: the National University of Singapore, the Oxford Martin School at the University of Oxford and the Wharton Risk Management and Decision Processes Center at the University of Pennsylvania.

This report continues to leverage the collective intelligence of an expanding community of the world's foremost risk experts, convened by the World Economic Forum's Global Risks Practice: the Global Risks Report Advisory Board, the Chief Risk Officers Community and the Global Future Council on Frontier Risks, as well as a series of consultations with regional and thematic experts from the public and private sectors.

The report also draws from and supports the World Economic Forum's platforms dedicated to catalysing a new economy and society, accelerating climate action for people and planet, leveraging Fourth Industrial Revolution technologies, stewarding industry transformations and enhancing global and regional cooperation. These platforms and their stakeholders use the insights from this report to shape their agendas for tackling the world's greatest challenges and embedding greater resilience and cooperation.

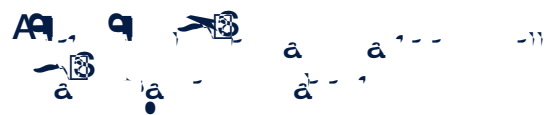
As 2022 begins, COVID-19 and its economic and societal consequences continue to pose a critical threat to the world. Vaccine inequality and a resultant uneven economic recovery risk compounding social fractures and geopolitical tensions. In the poorest 52 countries—home to 20% of the world's people—only 6% of the



Economic challenges flowing from the pandemic persist. The outlook remains weak: at the time of writing, the global economy was expected to be 2.3% smaller by 2024 than it would have been without the pandemic. Rising commodity prices, inflation and debt are emerging risks. Moreover, with another spike in COVID-19 cases towards the end of 2021, the pandemic continues to stifle countries' ability to facilitate a sustained recovery.

The economic fallout from the pandemic is compounding with labour market imbalances, protectionism, and widening digital, education and skills gaps that risk splitting the world into divergent trajectories. In some countries, rapid vaccine rollout, successful digital transformations and new growth opportunities could mean a return to pre-pandemic trends in the short term and the possibility of a more resilient outlook over a longer horizon. Yet many other countries will be held back by low rates of vaccination, continued acute stress on health systems, digital divides and stagnant job markets. These divergences will complicate the international collaboration needed to address the worsening impacts of climate change, manage migration flows and combat dangerous cyber-risks.

Short-term domestic pressures will make it harder for governments to focus on long-term priorities and will limit the political capital allocated to global concerns. "Social cohesion erosion" is a top short-term threat in 31 countries—including Argentina, France, Germany, Mexico and South Africa from the G20. Disparities that were already challenging societies are now expected to widen—51 million more people are projected to live in extreme poverty compared to the pre-pandemic trend—at the risk of increasing polarization and resentment within societies. At the same time, domestic pressures risk stronger national interest postures and worsening fractures in the global economy that will come at the expense of foreign aid and cooperation.



Respondents to the GRPS rank "climate action failure" as the number one long-term threat to the world and the risk with potentially the most severe impacts over the next decade. Climate change is already manifesting rapidly in the form of droughts, fires, floods, resource concerns. dct

commercial satellite market entrants are disrupting incumbents' traditional influence over the global space commons in delivering satellite services, notably internet-related communications. A greater number and range of actors operating in space could generate frictions if space exploration and exploitation are not responsibly managed. With limited and outdated global governance in place to regulate space alongside diverging national-level policies, risks are intensifying.

One consequence of accelerated space activity is a higher risk of collisions that could lead to a proliferation of space debris and impact the orbits that host infrastructure for key systems on Earth, damage valuable space equipment or spark international tensions. Limited governance tools increase the likelihood of space activity escalating geopolitical tensions, and recent weapons tests in space underscore such risks. Increased space activity could also lead to unknown environmental impacts or raise costs for public goods such as weather monitoring or climate change surveillance.



In 2021, countries deployed new mechanisms to respond to a public health crisis with shifting characteristics, leading to both successes and

failures. Two interlinked factors were critical for effective management of the pandemic: first, the readiness of governments to adjust and modify response strategies according to changing circumstances; and second, their ability to maintain societal trust through principled decisions and effective communication.

Reflecting on the distinct resilience goals of governments, businesses and communities will help ensure that agendas are aligned in achieving a whole-of-society approach to tackling critical risks of any nature. For governments, balancing costs, regulating for resilience and adjusting data-sharing arrangements to ensure sharper crisis management are key to galvanizing stronger interaction between public and private sectors. Businesses—recognizing that better national-level preparedness is critical for planning, investing and executing their strategies—can leverage opportunities in areas such as supply chains, codes of conduct within their industry and inclusion of a resilience dimension into workforce benefit offerings. Communities can help local governments to join up with national efforts, improve communication and support grassroots resilience efforts. At an organizational level, strategies such as grounding resilience analyses in key delivery requirements, appreciating systemic vulnerabilities and embracing a diversity of approaches can help leaders build better resilience as well.

G R 2022 W

A

6%

52

97%

-GDP 2020

51 million

197

41.8%

Consistently volatile with multiple surprises

37.4%

Fractured trajectories separating relative winners and losers

10.7%

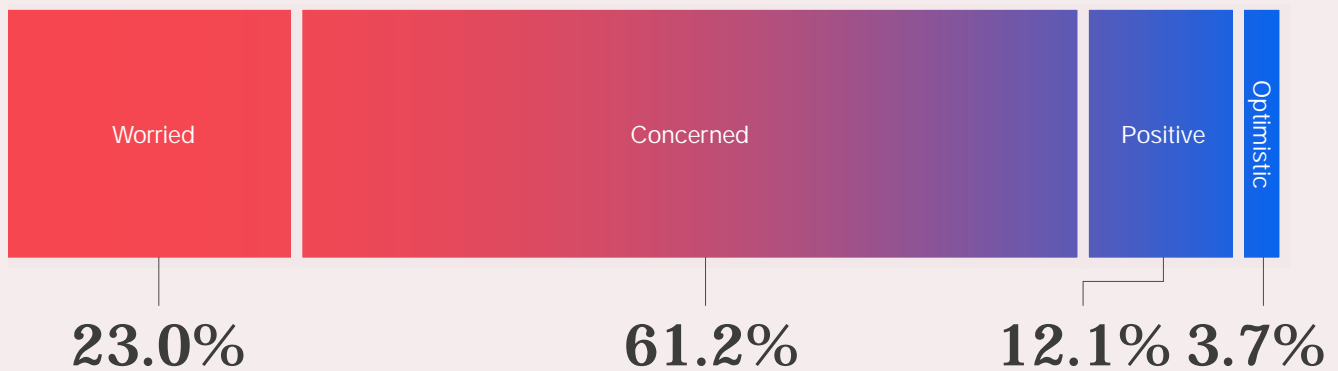
Accelerating global recovery

10.1%

Progressive tipping points with increasing catastrophic outcomes

FIGURE 1.2

“How do you feel about the outlook for the world?”



S : World Economic Forum Global Risks Perception Survey 2021-2022

Effective domestic and international action on these challenges depends on restoring trust within societies, galvanizing national and global leaders and finding new opportunities for collaboration (see Chapter 6). Fully 84%

of GRPS respondents were either concerned or worried about the outlook for the world (see Figure 1.2); lack of optimism could create a vicious cycle of disillusionment and social unrest.



The world continues to grapple with the effects of COVID-19 on public health. At the start of 2022, 5.4 million deaths from COVID-19 had been reported globally, out of 282 million confirmed cases.⁵ Moreover, a significant proportion of those infected by COVID-19 have long-lasting symptoms—some 10% show persistent ill health 12 weeks after having the disease.⁶ COVID-19 vaccination has progressed steadily but unevenly around the world. At the time of writing, 50 countries had vaccinated more than 70% of their population,⁷ with some now starting to receive booster shots, while the vaccination rate in the poorest 52 countries—home to 20% of the world’s population—was still only 6%.⁸ Potentially more infectious variants of the virus—notably the new Omicron variant—along with waning immunity among the vaccinated and a continued high proportion of people who are unvaccinated meant that the number of new cases increased again

towards the end of 2021.⁹ Unsurprisingly, “infectious diseases” are still considered a critical short-term threat to the world in the GRPS.

The COVID-19 crisis has also had extensive collateral health impacts, partly because other diseases were deprioritized. The pandemic led to an additional 53 million cases of major depression globally.¹⁰ “Mental health deterioration” was one of the top five risks that GRPS respondents saw as having deteriorated the most during COVID-19. The incidence of non-communicable diseases—which cause 41 million deaths every year, mostly in low- and middle-income countries—has also worsened worldwide due to treatment delays caused by COVID-19.¹¹ Antimicrobial resistance caused nearly 2 million deaths in 2020 and this number may increase—particularly for malaria and tuberculosis—because of the inappropriate use of antibiotics to treat COVID-19.¹² The pandemic and its collateral health impacts



COVID-19 prompted a global recession, but stark differences in vaccination rates between countries now risk leading to even greater economic divergence than they experienced before the pandemic. A greater prevalence of COVID-19 in low-vaccination countries than in high-vaccination ones will weigh on worker availability and productivity, disrupt supply chains and weaken consumption. Moreover, a lower post-pandemic risk appetite in the vaccinated world—comprised mostly of advanced economies—could weaken their investment in the non-vaccinated world. The economic disruption from the pandemic has also created stronger incentives in the vaccinated world to prioritize resilience over cost minimization. Governments and industries may now drive regional convergence at the expense of global integration as they seek to minimize supply chain disruptions.

Polarized connectivity, education and income trajectories risk further fragmenting the global economy, and divergence is likely to be aggravated by slowing and disparate growth. Advanced economies are

expected to surpass their pre-pandemic growth path by 0.9% by 2024, but developing economies (excluding China) will be 5.5% below it—with Latin America and Sub-Saharan Africa trailing even further behind.²¹ Economic decoupling risks further hindering already-limited means to restore growth in developing economies. Such decoupling will make it harder for emerging economies to leverage young workforces, large consumer markets and competitive costs. They also risk having less access to financing and technology to face global challenges, including climate change.

Although employment is approaching pre-pandemic levels in many advanced economies, globally the jobs recovery from the COVID-19 crisis is lagging the economic recovery—global employment remains lower than it was before the pandemic and the Great Resignation in advanced economies has caused labour market



participation to fall. Youth, women and lower-skilled workers have been especially affected. It will take the global economy at least until 2023 to create the jobs lost to COVID-19, but many of these jobs are expected to be of low productivity and poor quality, according to the International Labour Organization.²² “Livelihood crises” is the second most immediate threat to the world in the GRPS, and the top one at the country level in the Executive Opinion Survey (EOS). It is the most immediate national threat in 97 countries, including 16 of the G20 economies.

A bifurcated economic recovery is likely to prompt an upsurge in economic migration. At the same time, worsening extreme weather and a rise in political instability, state fragility and civil conflict are likely to further swell refugee numbers. GRPS respondents rate “involuntary migration” as a critical threat to the world over the next decade. Yet, it is a top-10 concern in only 10 countries surveyed by the EOS—among them Armenia, El Salvador, Guatemala, Honduras, Nicaragua, Ukraine and Venezuela, which have recently experienced challenges related to migration and refugees. These results suggest that migration is perceived as a short-term challenge localized in certain countries, but a global risk in the longer term. However, the clash between heightened migration pressures in origin countries and increasing barriers to migration in destination countries

risks creating tensions internationally and, in the worst cases, humanitarian crises.

Erosion of social cohesion

“Social cohesion erosion” is the risk that has worsened the most globally since the start of the COVID-19 crisis, according to the GRPS. It is perceived as a critical threat to the world across all time spans—short, medium and long term—and is seen as among the most potentially damaging for the next 10 years. In 31 out of the 124 countries surveyed in the EOS—including Argentina, France, Germany, Mexico and South Africa among the G20—“social cohesion erosion” was seen as a top-10 short-term threat to their countries. Inequality—economic, political, technological and intergenerational—was already challenging societies even before the COVID-19 crisis.

expected in the next decade (to countries surveyed by the EOS) among them Armenia, El Salvador, Guatemala, Honduras, Nicaragua, Ukraine and Venezuela, which have recently experienced challenges related to migration and refugees. These results suggest that migration is perceived as a short-term challenge localized in certain countries, but a global risk in the longer term. However, the clash between heightened migration pressures in origin countries and increasing barriers to migration in destination countries



Differing views over vaccinations and COVID-related restrictions are also adding to social pressures, with a number of countries, including in Europe, seeing riots

to the world, and the most potentially severe geopolitical risk for the next decade (see Figure 1.3). Geopolitical and geoeconomic tensions will make it more difficult to tackle common global challenges, notably climate change.

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Crises prompt unexpected paths. Different blind spots, triggers and shocks can have a wide range of outcomes, all with varying likelihoods and impacts. As readers consider the results of the GRPS survey, review the emerging global context and read the deep dives, this report invites them to consider the behaviours and actions of specific stakeholders and to consider the consequences for a range of risk outcomes, from probable to improbable and manageable to severe.

Among the most notable areas of socio-economic concern are the divergent recovery, economic hardship and growing inequality, along with their interaction with ideological polarization and the sense of disenfranchisement of large sections of the global population. Governments' struggles to contain the pandemic

and a lack of global collaboration on COVID-19 offer a sobering view of prospects for managing future global risks such as extreme weather and for pursuing bolder climate action. When it comes to business and industry, even enterprises with the financial room to manoeuvre sometimes struggle to deliver on environmental, social and governance (ESG) commitments while also strengthening the resilience of their supply chains, adapting to social and technological change and remaining vigilant to threats such as cyberattacks.

Two years on from the start of this unprecedented crisis, the actions and behaviours of all stakeholders will determine how quickly the world recovers and embeds the resilience needed to prepare for the next major shock.

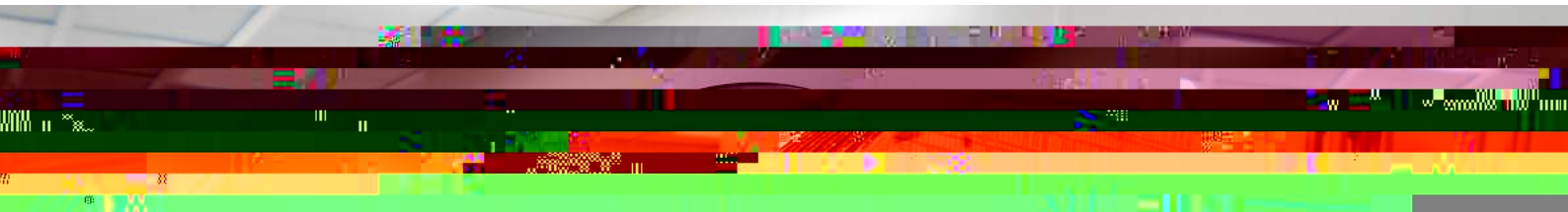


FIGURE 1

COVID-19 Hindsight

Risks that worsened the most since the start of the COVID-19 crisis

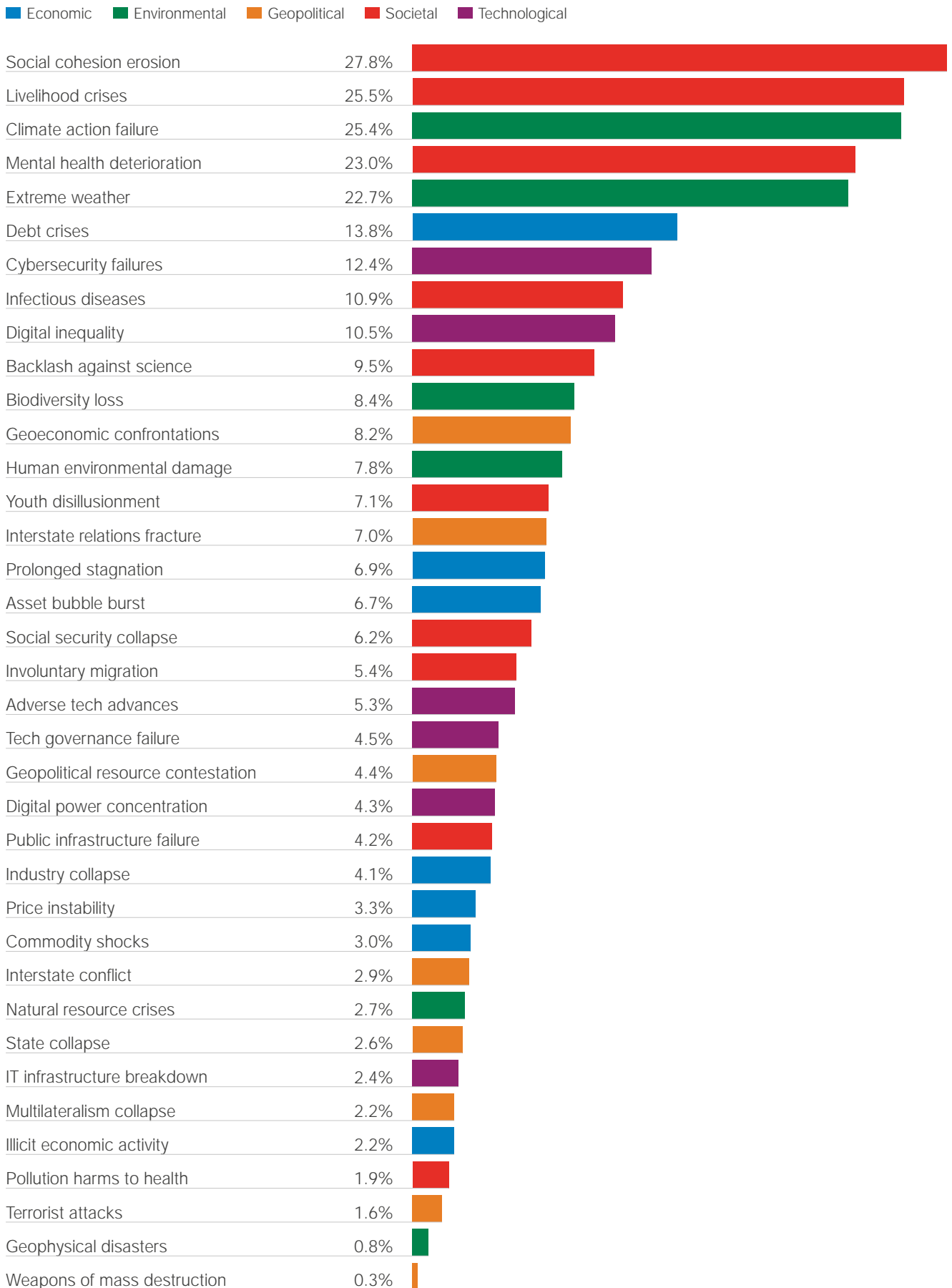
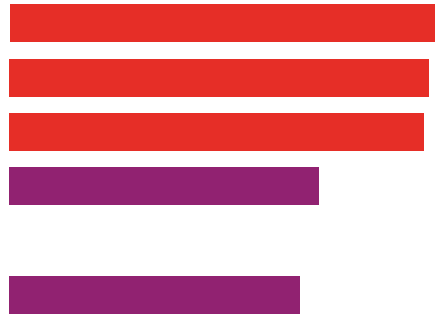


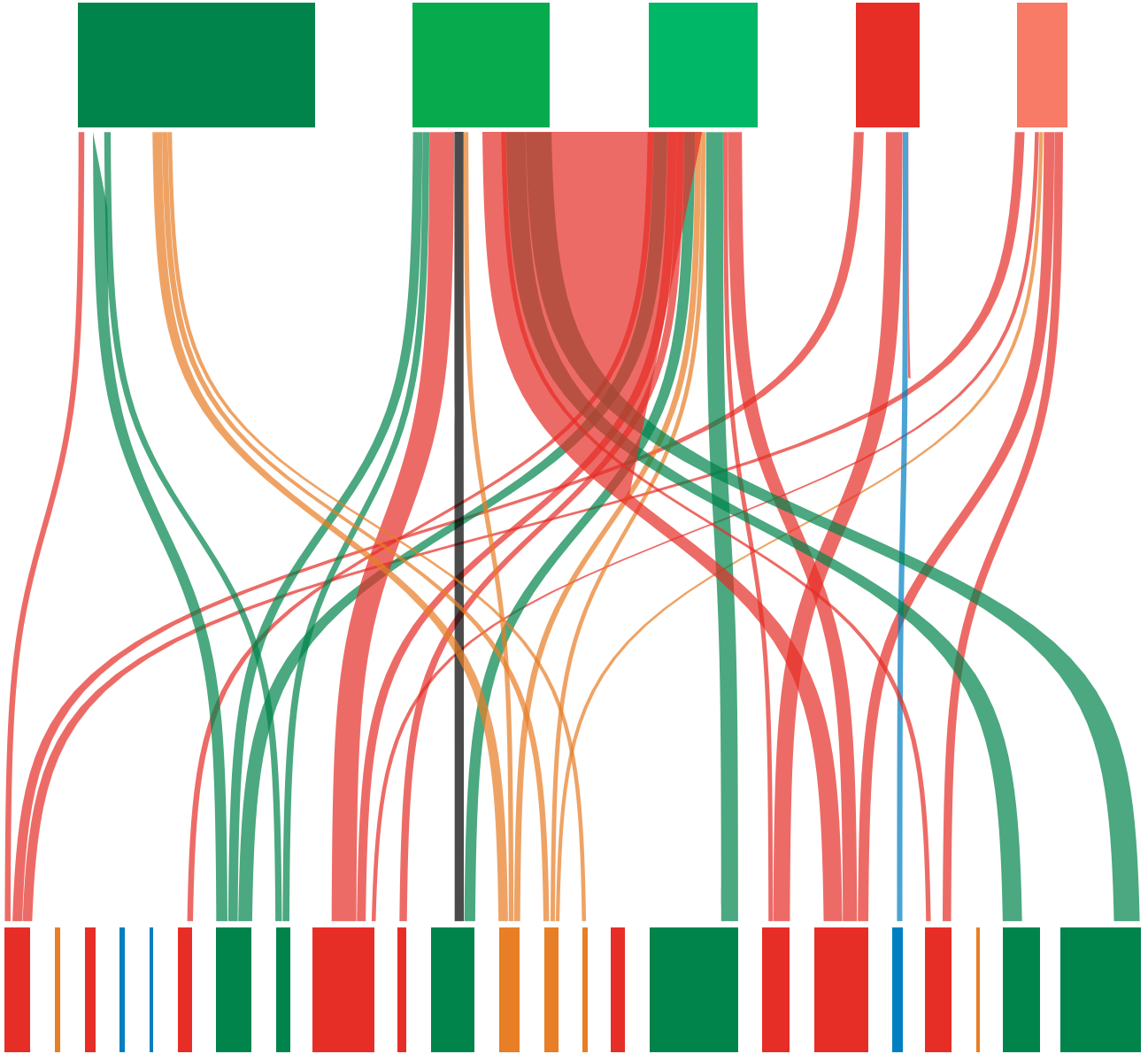
FIGURE II

Global Risks Horizon

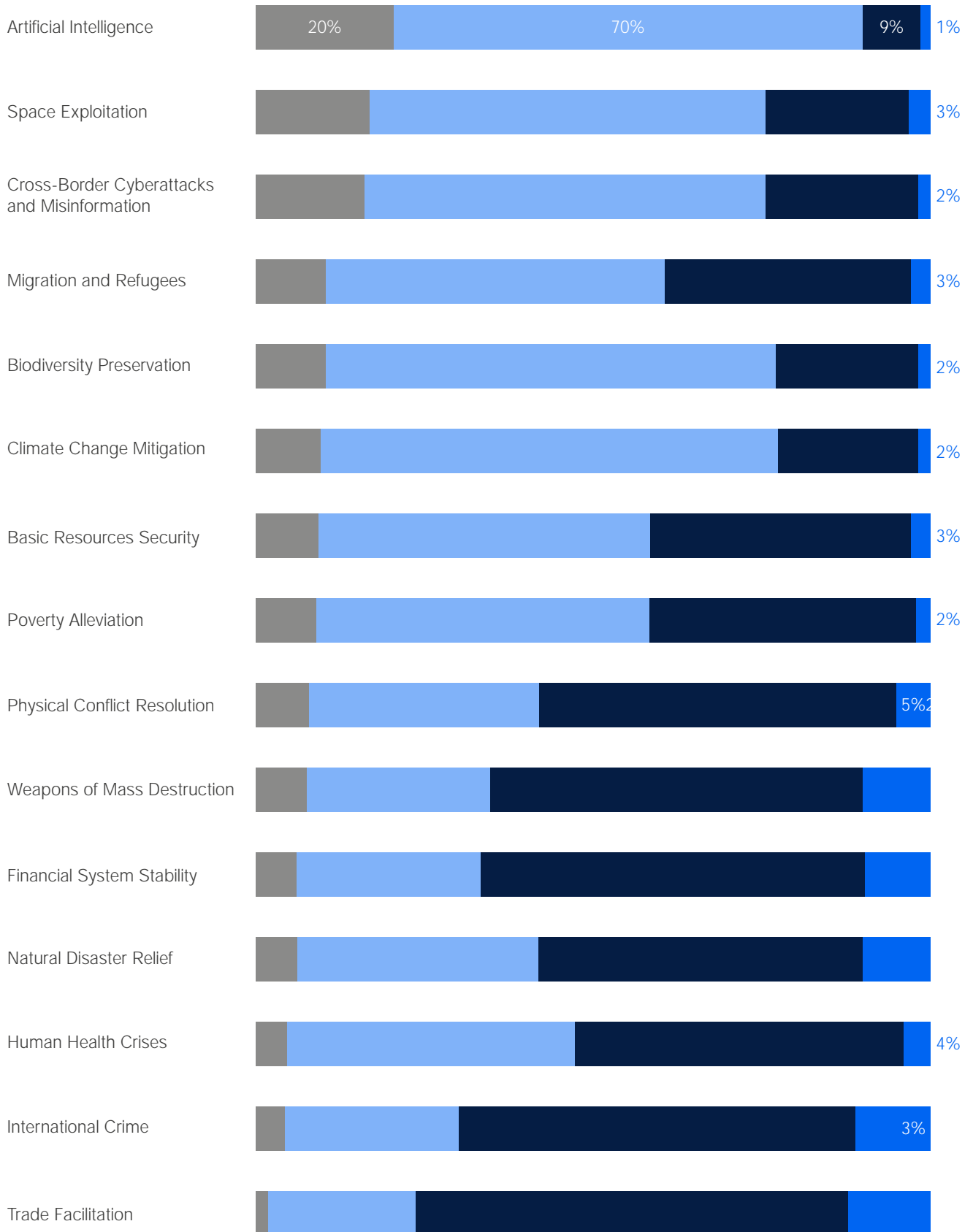
When will risks become a critical threat to the world?



■ Economic ■ Environmental ■ Geopolitical



■ Not started ■ Early development ■ Established ■ Effective



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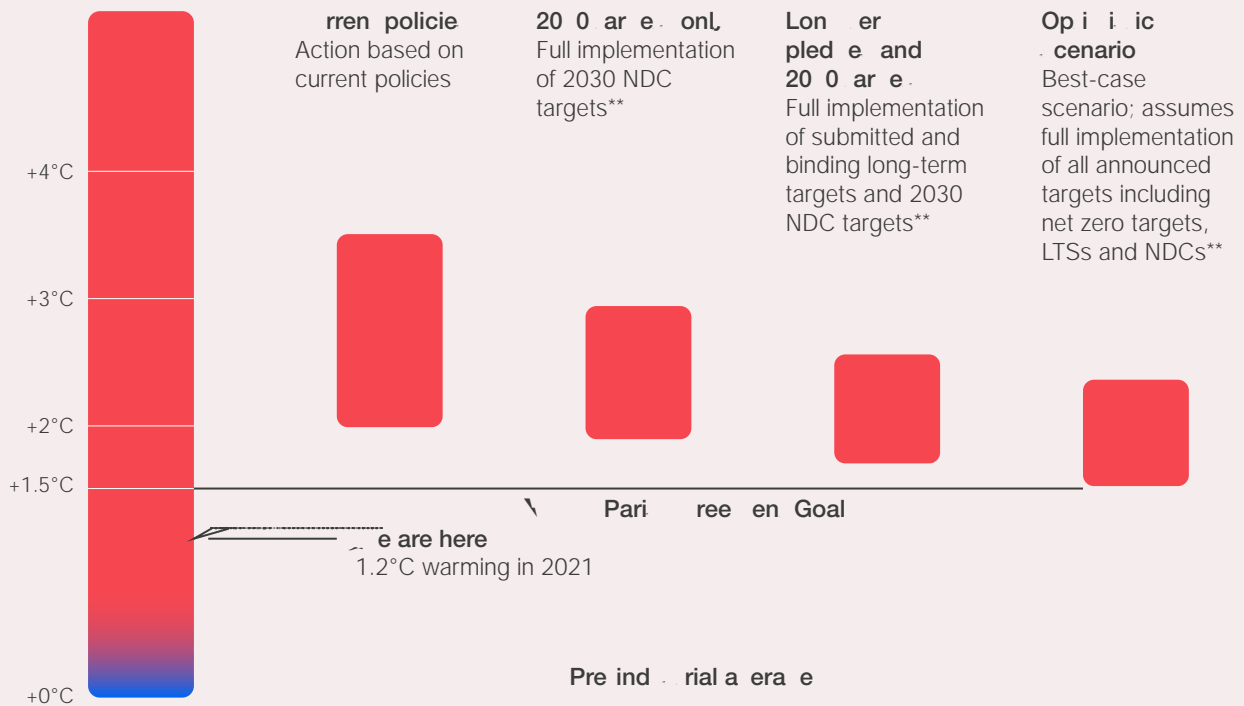
Climate Change

Accelerating and widespread climate change manifests itself in irreversible consequences.¹ The overwhelming weight of scientific analysis points to environmental adjustments and cataclysmic feedback loops that will push ecosystems beyond tipping points.² At that moment, decarbonization efforts would be rendered mute.

The latest nationally determined contributions (NDCs) to decarbonization made at the 2021 United Nations Climate Change Conference of the Parties (COP26) still fall short of the 1.5°C goal set out in the Paris Climate Agreement (for an extensive summary of COP26 outcomes, see Chapter 1, Box 1.1).³ The current trajectory is expected to steer the world towards a 2.4°C warming,⁴ with only the most optimistic of scenarios holding it to 1.8°C (see Figure 2.1).

Without stronger action, global capacity to mitigate and adapt will be diminished, eventually leading to a “too little, too late” situation and ultimately a “hot house world scenario” with runaway climate change that makes the world all but uninhabitable.⁵ The world will face high costs if we collectively fail to achieve the net zero goal by 2050.⁶ Complete climate inaction will lead to losses projected to be between 4% and 18% of global GDP⁷ with different impacts across regions.⁸

The transition to net zero—the state in which greenhouse gases (GHG) emitted into the atmosphere are balanced by their removal from the atmosphere*—could be as transformative for economies and societies as past industrial revolutions. However, the complexities of the technological, economic and societal



** Nationally determined contributions (NDCs) are non-binding national plans for climate action, including targets for GHG emissions reductions. Long-term strategies (LTSs) are national mid-century development plans for confronting climate change. If 2030 NDC targets are weaker than projected emissions levels under current policies, then current policies are used here.

changes needed for decarbonization, coupled with the slow and insufficient nature of current commitments, will inevitably lead to varying degrees of disorderliness.

As climate change intensifies and some economies recover more quickly than others from COVID-19, a disorderly transition could bifurcate societies and drive countries further apart, and a too-slow transition will only beget damage and disruption across multiple dimensions over the longer term (see Box 2.1). Within countries, the disruptive potential of the transition could be amplified by disconnects between governments, businesses and households with respect to policy commitments, financial incentives, regulations and immediate needs. A sustained lack of coordination between countries would likely have profound geopolitical implications, with rising friction between strong decarbonization advocates and those who oppose quick strong action by using tactics such as stalling climate action or greenwashing—the practice of making people believe that a company or authority is more environmentally friendly than it actually is.

systems,¹⁰ are intensifying momentum for the transition. And while COVID-19 lockdowns saw a global dip in GHG emissions, upward trajectories soon resumed:¹¹ GHG emissions rates rose faster in 2020 than their average over the last decade,¹² illustrating how the global economy is still heavily dependent on fossil fuels.

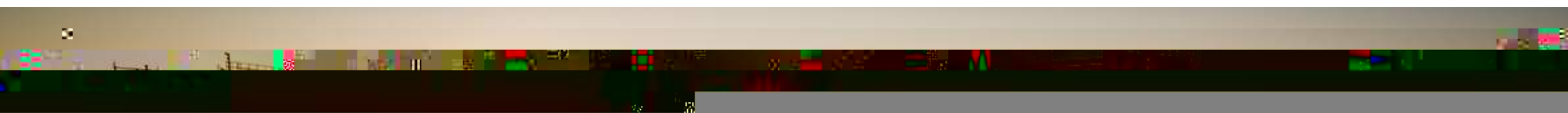
Governments, businesses, investors and communities are increasingly converging on the need for a quicker transition—each group setting higher expectations of the other. Green parties and green policies—such as a carbon border adjustment tax¹³—have gained traction in many countries, regions and industries, as have multilateral ideas like climate clubs.¹⁴ A plethora of climate risk disclosure frameworks and measurement standards are now being

comparing (ISSB)



Clear evidence of rising physical risks, such as melting land ice, rising sea levels and prolonged periods of extreme heat and cold,⁹ as well as their associated consequences for human and economic

social and governance (ESG) targets and metrics,¹⁵ coupled with ESG-based investments, is re-shaping the financial and economic landscape,¹⁶ and an increasing number of organizations are committing to decarbonize their operations. As banks, insurers and institutional investors are steering capital towards net zero, financial systems are rapidly emerging as critical enablers of the transition. A growing share of the US\$100 trillion bond market is mobilized for climate change solutions, and it is expected to reach the milestone of US\$1 trillion in annual issuances by 2022.¹⁷ Moreover, during COP26, the Glasgow Financial Alliance for Net Zero (GFANZ) announced that over US\$130 trillion in private capital has been committed to carbon neutrality—enough to achieve net zero by 2050.¹⁸ Similarly, parties at COP26 agreed on the framework



Some economic incentives also complicate attempts to coordinate measures that could internalize costs in high-emission industries and countries, minimize market disruptions and more fairly redistribute burdens and rewards. Instead of fostering decarbonization, the lack of global emission prices and reporting requirements continues to shield consumers and producers from the cost of inaction.³⁸ This incentivizes countries and businesses not to curb emissions, but instead to game the system and avoid liability by offshoring carbon-intense activities or trading their emissions to countries with less stringent regulations.³⁹ Developing countries attracted to emissions in-shoring schemes by short-term financial gain

squander the opportunity to use carbon allowances for their own development and risk undermining their future access to trade flows and the finance needed for mitigation and adaptation.⁴⁰

Businesses may be unprepared for transition risks such as rapid shifts in policies and regulations, the need to develop low-carbon technologies and changes in consumer behaviour and investor preferences.⁴¹ These risks have the potential to destabilize the financial system,⁴² as in aggregate they can increase default rates and asset volatility. They are further amplified in economies with low investment capability, high reliance on fossil fuels and less-inclusive political systems.⁴³

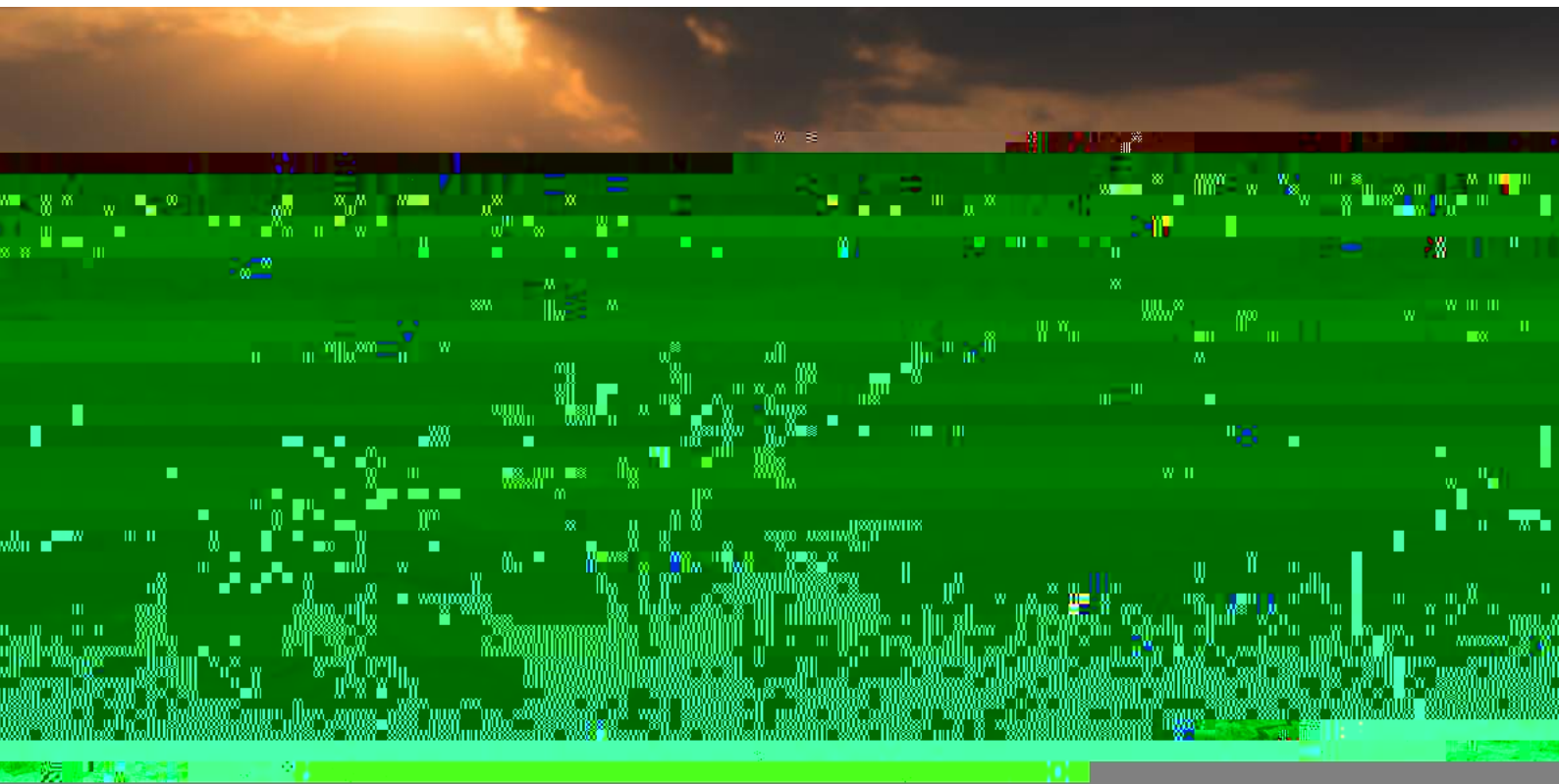
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The consequences and repercussions of the transition will necessarily reflect the speed at which it takes place; the efforts that go into it; and whether it is slow or aggressive, concerted or entrenched, and focused more on mitigation or adaptation. The goal of 1.5°C is so fundamental that societies need to be prepared to assume negative consequences of policies taken by governments today to avoid the worst consequences tomorrow. This includes job losses, increased costs and geopolitical insecurity associated with a disorderly transition. Only a socially just transition will make the consequences bearable for large parts of societies with governments needing to create policies and social-protection systems that help reduce the impacts for those affected. A rapid decarbonization would increase economic and societal disruption in the short term, while a slower pace with fewer short-term impacts would entail much larger costs and greater disorderliness in the long-term.

GRPS respondents drew attention to the societal consequences of environmental degradation at a global scale. They identify “climate action failure” and “extreme weather” as strong aggravators of

from the atmosphere need to be scaled up to come close to keeping the 1.5°C scenario within reach under all IPCC scenarios.⁶¹ The robustness of any net zero strategy that relies on CDR depends both on the effectiveness of the underlying projects that drive the CO₂ removal and, especially, on the permanence of the stored carbon.⁶² Other solutions, such as carbon capture, utilization and storage (CCUS), are already heavily subsidized,⁶³ but they risk being used for greenwashing as carbon-heavy industries eventually fail to structural change their value chains to reduce their emissions.⁶⁴ Similarly, Bio-energy Carbon Capture and Storage (BECCS) solutions could create unintended geopolitical consequences or prove to be counterproductive.⁶⁵

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food, securing water and collecting bioenergy sources such as firewood and crop waste. Together, these consequences could trigger disillusionment with climate action and lead to the radicalization of marginalized socio-economic groups across the political spectrum.

Lessons for Climate Action

Governments will face backlash whether climate action is slow or aggressive. Steeper transition costs such as high and quick increase in the price of carbon and fossil fuels could weaken public support for fast action; conversely, slow action could trigger further radicalization from those who feel authorities at all levels do not act fast enough, with a potential increase in inter-generational friction and more fiscal drain due to increased recovery funding. Investing in a net zero economy could create unsustainable levels of debt for economies lacking the means of such large-scale investment, or the loss of rent/tax revenue for economies heavily dependent on carbon intensive resource production, which would cripple public finances already vulnerable from the economic impacts of COVID-19 fallouts (see Chapter 1). Especially at risk are more climate-vulnerable countries; such green investment could be seen as a diversion from pandemic-related recovery programmes and the enhancement of core public infrastructure and services. Unequal access to low- or zero-carbon innovations could undermine support for governments in some countries.⁶⁸

A socially unjust transition would exacerbate geopolitical and economic friction and inequalities between countries and regions. Laggard economies—especially those reliant on carbon-intensive sectors and that fail to keep up with technological innovation—risk losing competitive advantage and leverage in trade agreements, civil unrest, regime change and massive economic and societal disruption. Unequal access to materials and funding to enable the transition could increase tensions, as could unintended consequences—such as the destruction of ecosystems in developing countries to extract resources for next-level electrification of mobility in developed economies.⁶⁹

Failed or delayed financial promises by advanced economies—such as a decline in promised foreign direct investment (FDI),⁷⁰ or shortcomings to the globally agreed annual \$100 billion for emerging and developing countries to finance their transition to lower emissions and adaptation measures to the physical consequences of climate change⁷¹—could leave developing countries stranded with costly, aggressive



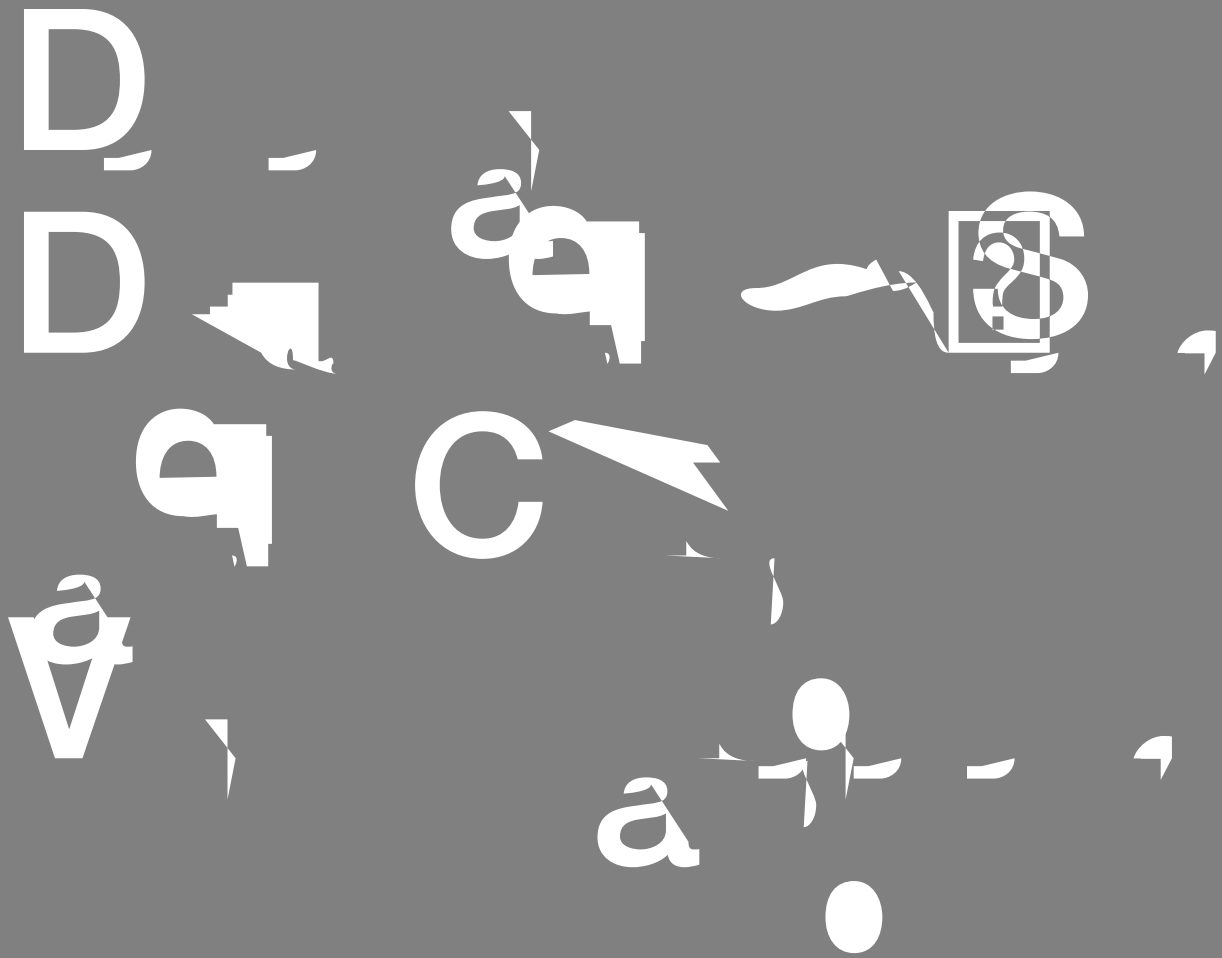
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Digital

Governments, societies and companies increasingly rely on technology to manage everything from public services to business processes, even routine grocery shopping.¹ Converging technological platforms, tools and interfaces connected via an internet that is rapidly shifting to a more decentralized version 3.0 are at once creating a more complex cyberthreat landscape and a growing number of critical failure points. As society continues to migrate into the digital world, the threat of cybercrime looms large, routinely costing organizations tens—even hundreds—of millions of dollars. The costs are not just financial: critical infrastructure, societal cohesion and mental well-being are also in jeopardy.

Digital

Growing dependency on digital systems over the last 20 years has drastically shifted how many societies function.² The COVID-19-induced shift to remote work has accelerated the adoption of platforms and devices that allow sensitive data to be shared with third parties—cloud service providers, data aggregators, application programming interfaces (APIs) and other technology-related intermediaries.³ These systems, while powerful tools for data and processing, attach an additional layer of dependency on service providers. Remote work has also moved digital exchanges from

office networks to residential ones, which have a greater variety of connected devices with less protection against cyber intrusion. In parallel, the appetite for capabilities predicated upon using multiple technologies working in concert—including artificial intelligence (AI), Internet of Things (IoT)/Internet of Robotic Things-enabled devices, edge computing, blockchain and 5G—is only growing.⁴ While these capabilities afford tremendous opportunities for businesses and societies to use technology in ways that can dramatically improve efficiency, quality and productivity, these same capabilities also expose users to elevated and more pernicious forms of digital and cyber risk.

In the future, the interconnectedness and convergence of these digital tools will continue to increase as society embraces the next version of the internet built upon blockchain technology. One manifestation of this migration will be the metaverse: a network of 3D virtual spaces, enabled by cryptocurrencies and non-fungible tokens (NFTs) among other technologies, with unprecedented socio-economic interoperability and immersive virtual reality experiences.⁵ Users will be required to navigate security vulnerabilities inherent in both increased dependency on and growing fragmentation in these types of complex technologies often characterized by decentralization and lack of structured guardrails or sophisticated onboarding infrastructure.



In the context of widespread dependency on increasingly complex digital systems, growing cyberthreats are outpacing societies' ability to effectively prevent and manage them. For example, the digitalization of physical supply chains creates new vulnerabilities

cyber professionals—a gap of more than 3 million worldwide²²—who can provide cyber leadership, test and secure systems, and train people in digital hygiene.²³ As with other key commodities, a continued lack of cybersecurity professionals could ultimately hamper economic growth,²⁴ although new initiatives to “democratize” cybersecurity, for example, by providing free cybersecurity risk management tools, could help fill some of the gaps for small businesses or other institutions.²⁵

There are concerns that quantum computing could be powerful enough to break encryption keys—which poses a significant security risk because of the sensitivity and criticality of the financial, personal and other data protected by these keys. The emergence of the metaverse could also expand the attack surface for malicious actors by creating more entry points for malware and data breaches.²⁶ As the value of digital commerce in the metaverse grows in scope and scale—by some estimates projected to be over US\$800 billion by 2024—these types of attacks will grow in frequency and aggression.²⁷ The myriad forms of digital property such as NFT art collections and

digital real estate could further entice criminal activity.

For governments attempting to prevent cybersecurity failures, patchwork enforcement mechanisms across jurisdictions continue to hamper efforts to control cybercrime.²⁸ Geopolitical rifts hinder potential cross-border collaboration, with some governments unwilling or unable to regulate cyber intrusions that originate inside and impact outside their borders. Unsurprisingly, given the geopolitical tensions around digital sovereignty, according to GRPS respondents, “cross-border cyberattacks and misinformation” and “artificial intelligence” were among the areas with the least “established” or “effective” international risk mitigation efforts.

Companies must also act ahead of new regulatory shifts, as the political undercurrents/geopolitical tensions between various countries might impact cross-border data flows. This might mean moving data processing to jurisdictions that might allow for better customer protection around data privacy issues.²⁹

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Often-repeated examples of past cyber intrusions are worth re-examination, as these cases demonstrate how damaging attacks on large and strategically significant systems—such as banking, hospital, Global

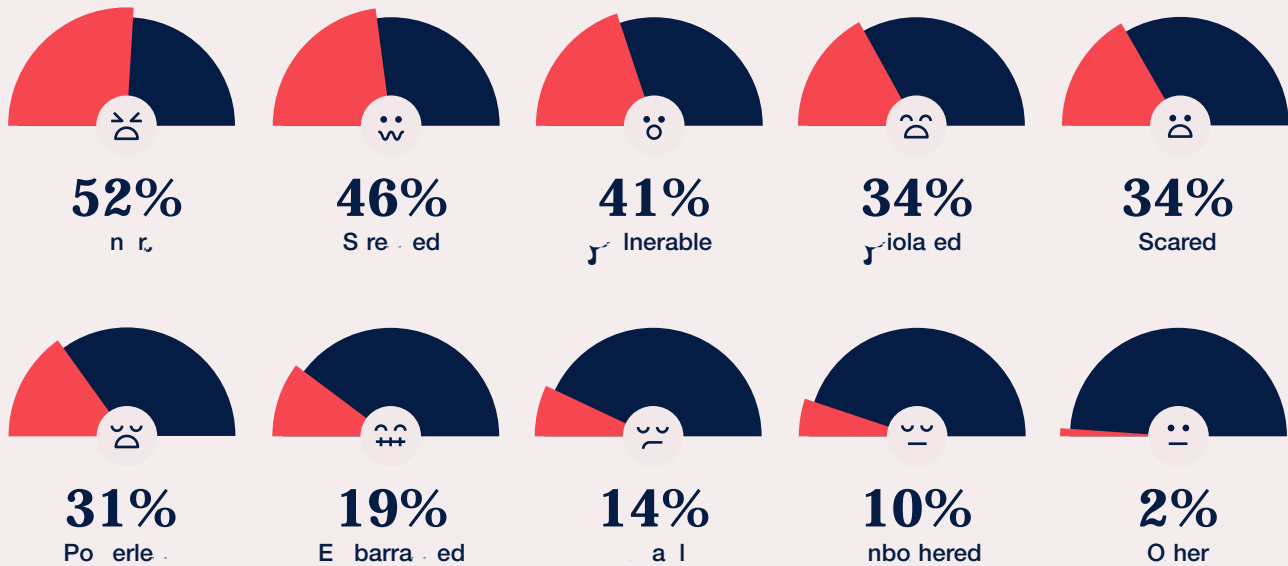
In 2021, UK internet banking fraud rose by 117% in volume and 43% in value compared with 2020 levels, as people spent more time shopping online.³⁶ Digital safety overall—from health misinformation and extremism to child exploitation—faces new challenges with unexperienced and more vulnerable populations coming online.³⁷

Even in the best-case scenario of aggressive digital threat defences, there will be significant increases in the cost of operations for all stakeholders. This could be particularly challenging for small- or medium-sized businesses that might spend 4% or more of their operational budget on security, compared to larger organizations that might spend closer to 1–2%.³⁸ Indeed, amid the rising frequency and severity of ransomware claims, cyber insurance pricing in the United States rose by 96% in the third quarter of 2021, marking the most significant

FIGURE 3.2

Emotions Experienced after Detecting Unauthorized Access

Global total of those who detected unauthorized access in past 12 months



Source: NortonLifeLock Inc. 2021. "2021 Norton Cyber Safety Insights Report: Global Results". Norton and The Harris Poll. May 2021. https://now.symassets.com/content/dam/norton/campaign/NortonReport/2021/2021_NortonLifeLock_Cyber_Safety_Insights_Report_Global_Results.pdf

the cultural heart of Silicon Valley—are more likely than wealthier residents to be cybercrime victims.⁴⁴ In other situations, obligatory digital identity markers could introduce new risks for citizens, particularly evident in the growing risk that deepfakes could compromise biometric authentication.⁴⁵

Individuals will increasingly experience anxiety as control over their data becomes more precarious and they are subjected to personal attacks, fraud, cyberbullying and stalking (see Figure 3.2).⁴⁶ A perceived lack of agency could also lead to apathy in taking responsibility for securing one’s own digital footprint, as evinced by the continued market dominance of instant messenger applications plagued by privacy controversies.⁴⁷ Even with more widespread “reject all” options on websites intended to simplify personal data privacy, there are drawbacks and caveats—such as limiting functionality and other options. Importantly, these features are just a tiny part of the larger privacy

equation. Websites are still littered with tracking pixels and third-party scripts that remain powerful ways to fingerprint online behaviours.⁴⁸

Government at all levels faces mounting responsibilities and many are struggling to uphold their end of the digital social contract: securing critical infrastructure; addressing threats to “epistemic security” from disinformation; protecting the integrity of civic processes and public services; legislating against cybercrime; training and educating populaces around cyber literacy; regulating digital service providers; and ensuring the availability of resources, such as rare-earth minerals, for the digital economy. The necessary oversight could lead to overreach as governments move to shut down systems, erect higher digital barriers or embark on digital colonization (by monopolizing digital systems) for geopolitical ends.⁴⁹ While such actions might carry the ostensible goal of reducing

NotPetya 2.0

What if an attack that is even more wide-ranging and costly than NotPetya—with the ability to self-propagate and even mutate to avoid preventative controls—created cascading lockups of systemically important businesses, bankrupting organizations, disrupting services and unwinding the digital transformation efforts made over the past years?

Supply Chain

What if the shifts towards privately held IT infrastructure as well as cryptocurrency and decentralized finance undermine governments' control over data, processes and financial systems?

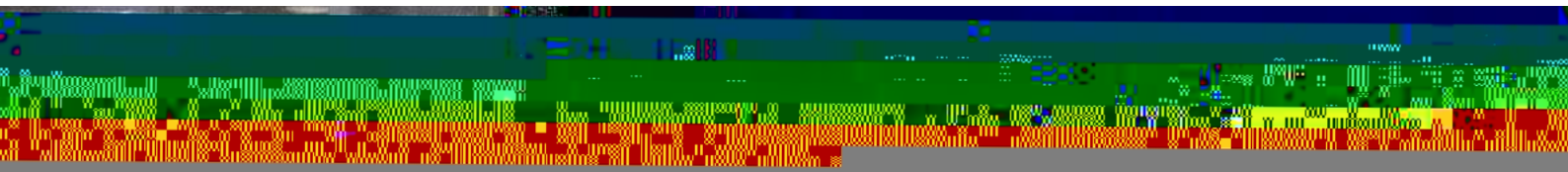
Unintended Consequences

What if subtle changes in health, banking or other data go undetected for years, but carry significant consequences for premature death, loss of funds or other significant consequences over time? How can cyber espionage compromise return on R&D investment and competitiveness in the future?

T a a a a

As our reliance on digital technologies grows and Internet 3.0 becomes reality, efforts aimed at building norms and defining rules of behaviour for all stakeholders in cyberspace are intensifying. While multistakeholder international dialogues can help strengthen links between actors operating in the digital security realm, cooperation between organizations could unlock best practices that can be replicated across industries and economies. Initiatives should focus on emerging technologies, such as blockchain, quantum and artificial intelligence, as well as the modes of digital exchange they facilitate, like the metaverse. Leaders must remain attentive to perennial concerns like cybercrime and ransomware

attacks as well. At the organizational level, upskilling leaders on cybersecurity issues and elevating emerging cyber risks to board-level conversations will strengthen cyber-resilience. In a deeply connected society, digital trust is the currency that facilitates future innovation and prosperity. Trustworthy technologies, in turn, represent the foundation on which the scaffolding of a fair and cohesive society is built. Unless we act to improve digital trust with intentional and persistent trust-building initiatives, the digital world will continue to drift towards fragmentation and the promise of one of the most dynamic eras of human progress may be lost.



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Large parts of the global population face an increasingly insecure outlook (see Chapter 1). Global Risks Perception Survey (GRPS) respondents perceive “livelihood crises” as one of the most potentially severe risks over the next decade. Millions of people are already seeking to cross borders in search of better economic opportunities.

Over the last decade, the number of international migrants has grown consistently, from 221 million people in 2010 to 281 million in 2020.¹ Economic hardship, climate change, conflict and political instability are forcing millions more people to leave their homes. These trends are reflected in the GRPS, where “involuntary migration” is ranked as a top long-term concern.

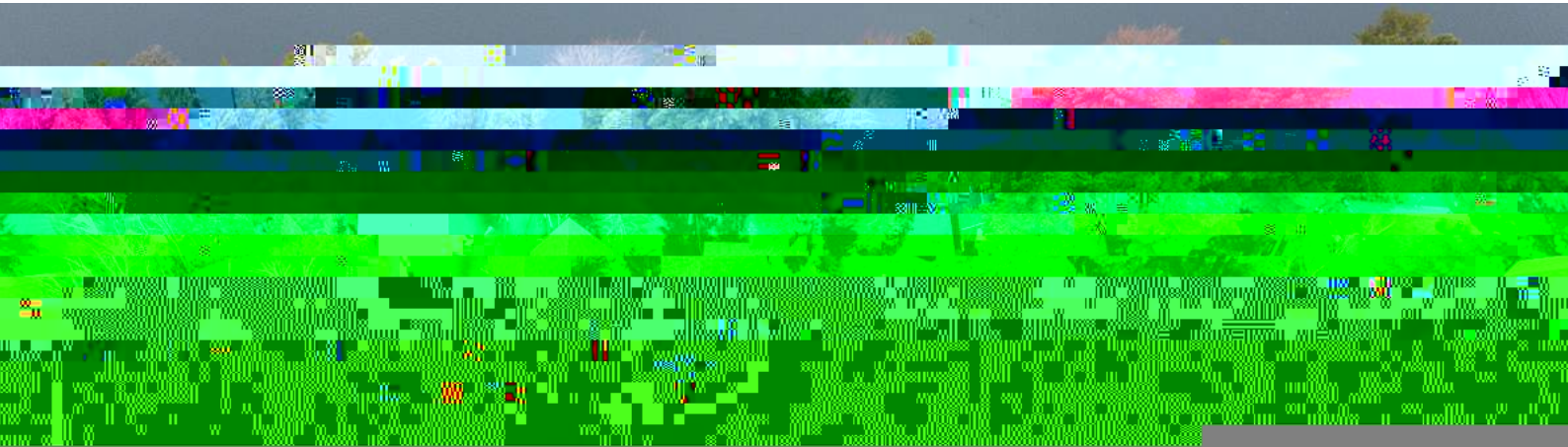
Better international collaboration is required to manage these flows to ensure that economic migrants are not exposed to exploitation and that involuntary migrants—refugees—crossing into other countries receive the assistance and shelter that they need. The scale of the challenge has put significant pressure on existing frameworks for migration and refugee protection, such as the 1951 Refugee Convention and 1967

Protocol;² this pressure is compounded by fractures within the international community and national interest postures that risk limiting global capacity to address this challenge. Some 60% of GRPS respondents believe “migration and refugees” is an area where international mitigation efforts are falling short (that is, they have either “not started” or are in “early development”).

Economic migration often has considerable benefits for both origin and destination countries. It is “the most effective way to reduce poverty and share prosperity”, according to a World Bank report,³ and can support economic growth by helping address labour shortages in destination countries. While most cross-border migration takes place between low- and middle-income countries, 83% of non-migrant residents in the 22 richest Organisation for Economic Co-operation and Development (OECD) countries have experienced net economic gains from the influx of migrants.⁴ On the other hand, some project-based migration undertakings to enhance cross-border infrastructure have had negative impacts in destination countries, where the

ones (see Chapter 1)—face highly insecure economic outlooks as growth stagnates, public finances continue to be stretched and pandemic-related stimuli—on which vulnerable groups have depended—are scaled back. Employment in both these countries may also decline if the pandemic persists, exacerbated by a worldwide trend for workplace automation, re-shoring business operations and shortening supply chains that may affect foreign direct investment (FDI) inflows, exports and growth stagnation.

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because of the economic disruption it created and because of the accelerating automation and digitalization of tasks and services. The World Economic Forum's *Future of Jobs Report* found that 50% of employers globally planned to automate tasks in response to COVID-19, often in sectors that have relied on migrant workers.²³ The report also estimates that 85 million jobs will be destroyed by automation by 2025, and although 97 million new jobs will emerge, these jobs may not necessarily match the skillsets of many migrants.²⁴ The short-term economic rebound from the pandemic has resulted in a surge in hiring in some key sectors for migrants such as hospitality and healthcare, but in the long-term, new consumption patterns in destination countries—such as more e-commerce and less business travel—are expected to shrink demand for jobs in migrant-

intensive industries such as agriculture, food services and warehousing.²⁵

National interest postures have also become more entrenched across both developing and advanced economies. For example, Chile and Peru have reframed their migration governance mechanisms, which complicates access for migrant and refugee populations to essential financial and healthcare services.²⁶ Meanwhile, restrictive policies originally grounded in public health concerns have not been rolled back, as indicated by sustained declines in issued visas for the United Kingdom and the perpetuation of Title 42 expulsions at the US border.²⁷ Other destination countries have sought to harden borders to prevent the arrival of involuntary migrants, as evidenced in fresh ambitions to build walls in Europe and Turkey.²⁸

C

Barriers to orderly migration could have negative global consequences, such as widening labour gaps and income disparity, triggering or worsening humanitarian crises and increasing societal polarization.

The economic rebound from COVID-19 has created labour shortages in specific industries—albeit some may be temporary—by disrupting market dynamics and supply chains and prompting workers to re-evaluate their personal and career choices. At the time of writing, the United States faced over 11 million unfilled jobs in general and the European Union had a deficit of 400,000 drivers just in the trucking industry.

Humanitarian Crises

Humanitarian crises could worsen where barriers to exit prevent vulnerable groups from escaping persecution or violence. In some fragile states, governments could block their citizens' departure to halt depopulation as well as capital flight. In Afghanistan and Myanmar, governments have reportedly impeded citizens from leaving the country.³⁶ Blocking emigration prevents people from seeking more secure livelihoods and diasporas from reuniting with families. It can exacerbate societal fractures by closing a mechanism to reduce poverty and narrow inequality, fuelling citizens' animosity towards government and potentially empowering criminal or even terrorist groups that offer hope to disaffected individuals.

More limited international mobility opportunities will push migrants to embark

to take increasingly drastic measures to circumvent migration restrictions and flee to neighbouring countries⁴⁴—including Iran, which has enlarged its military presence along the border to deter a potential Taliban incursion.⁴⁵ Management of migration flows has become a tense issue between Turkey, which hosts some 3.6 million Syrian refugees,⁴⁶ and the European Union.

Geopolitical rifts could also worsen—and new ones emerge—if origin country migration is increasingly used as a geopolitical instrument. The crossing of migrants from Morocco into the Spanish enclave of Ceuta aggravated tensions that originated in the European Union's lack of support for Morocco's claims over the Western Sahara.⁴⁷ Political tensions between Belarus and the European Union escalated considerably as Belarus encouraged travel from the Middle East, moved migrants to camps along its border with Poland and pushed them to cross over, prompting Poland to deploy troops



Labour: Constraints

Businesses in destination countries are at risk from a global worker deficit and demand-side shocks that could result from constrained migration. Migrant workers comprise an attractive consumer group that can contribute to developing domestic markets and support international expansion by boosting brand awareness

in their home countries. But businesses perceived to favour stricter foreign labour requirements, or that are seen as not making enough effort to support their migrant staff, could face a public backlash from migrant communities and their supporters. On the other hand, businesses that welcome migrant workers with a view to low-cost labour may expose themselves to union pushback.

Talent - Attraction

At a time of global divergence, migration could foster economic integration. International mobility could narrow inequality within and between countries by matching job seekers in origin countries with unfulfilled vacancies abroad in growth industries—such as healthcare, renewable energy and transportation.⁵²

prompt closer political ties between countries and encourage collaboration on issues of mutual concern such as shared infrastructure for cross-border financial flows. The global community could also build goodwill across geopolitical divisions by strengthening collaboration mechanisms for refugee intake.

More efficient and orderly channels for migration—including coherent legal and policy frameworks, cross-border cooperation and alignment and better enforcement against smuggling operations—could

Migration offers opportunities but also entails challenges for origin, corridor and destination countries. Leaders have the chance to jointly identify where new bridges can be built for mutual benefit.

1 United Nations Population Division, "International Migrant Stock".

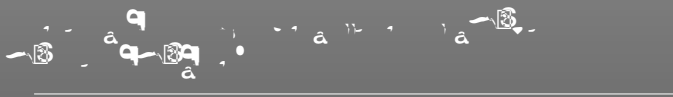
- 26 Freier, L.F. and Vera Espinoza, M., 2021. "COVID-19 and immigrants' increased exclusion: The politics of immigrant integration in Chile and Peru". *Frontiers in Human Dynamics* 3: 6. <https://www.frontiersin.org/articles/10.3389/fhumd.2021.606871/full>
- 27 Constantino, A. K. 2021. "U.S. defends expulsion of undocumented migrants under health policy, even as it eases border restrictions for travelers with visas". CNBC. 13 October 2021. <https://www.cnbc.com/2021/10/13/us-defends-expelling-migrants-as-canada-mexico-border-restrictions-ease.html>; GOV.UK. "Summary of latest statistics. Immigration statistics, year ending June 2021". Cabinet Office Government Digital Service. <https://www.gov.uk/government/statistics/immigration-statistics-year-ending-june-2021/summary-of-latest-statistics>, accessed 21 December 2021; Somerville, W. and Walsh, P.W. 2021. "United Kingdom's decades-long immigration shift



5



70,000



28



1 million





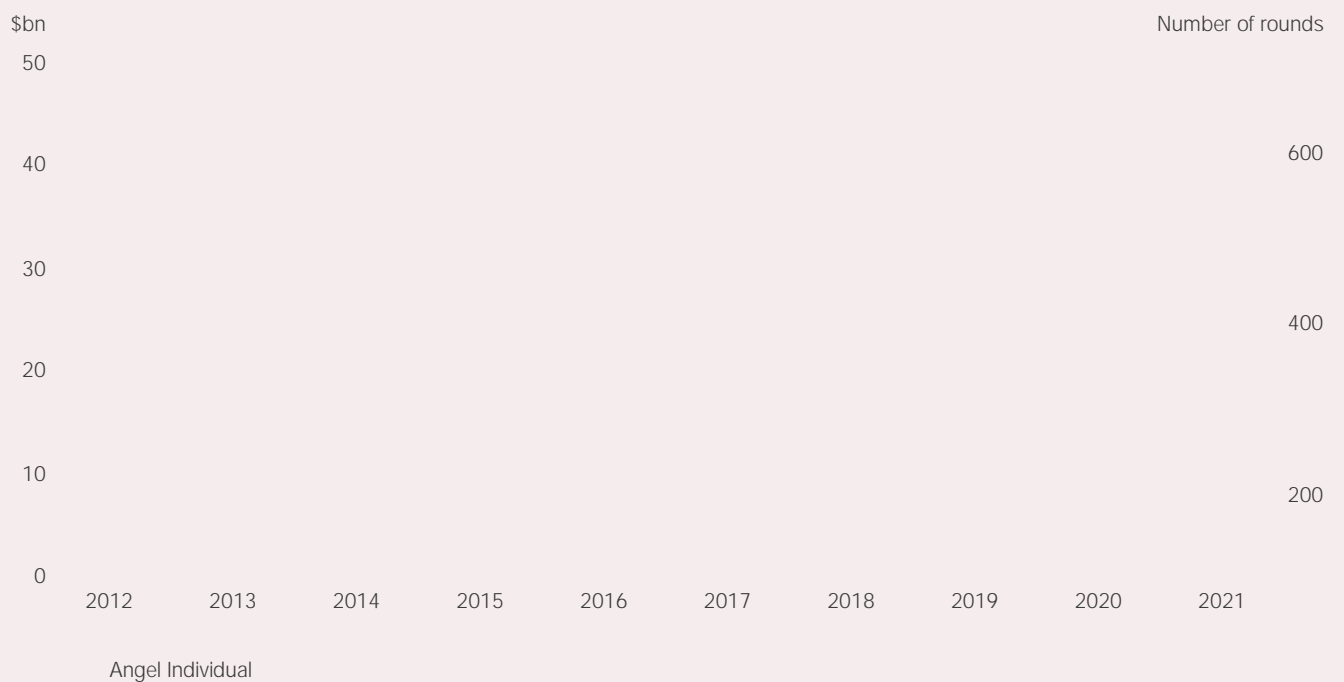
Humans have been inspired by space exploration for decades but growing commercial and geopolitical interests are increasingly influencing this frontier. While early space activity was conducted or funded by the public sector, the last decade has seen growing private investment. New commercial entrants are disrupting traditional incumbents' control in delivering satellite services, especially in internet-related communications or launch services. Some governments are encouraging private space activity to further national "territorial" claims or to foster the development of high-value jobs, especially in the zone of Low Earth Orbit (LEO) or Medium Earth Orbit (MEO), as well as enhancing their military or defence-oriented presence.* Increased exploitation of these orbits carries the risk of congestion, an increase in debris and the possibility of collisions in a realm with few governance structures to mitigate new threats.

A LEO/MEO.

The traditional Geostationary Orbit (GEO) commercial satellite market, which has dominated the communications sector for decades, is now losing commercial value because of competition from new players seeking to provide services from LEO or MEO. More recently, in the last decade, the financing of new applications for space-based initiatives has grown fast: businesses, start-ups and research entities are proliferating, raising money in the billions, and thereby driving down the cost of launch systems, particularly in LEO (see Figure 5.1).¹ Lower costs bring more opportunity for a greater diversity of actors to launch constellations of smaller satellites. With this more cost-effective access to space, attention is increasingly shifting to new opportunities in areas such as hyperspectral remote sensing, energy

FIGURE 5.1

Direct and Indirect Investment in Space



Source: Space Capital. Q3 2021. <https://app.powerbi.com/view?r=eyJrjoiNGY4MWI4OWEiMjNmZS00OTM3LWE5M2Q1YTgxZTdjODk3YTllliwidCI6JjYzMDZkMTJjLTcwODMwODcwMmIzMiIsImMiOjN9>

generation, manufacturing, mining and tourism.² However, the largest growth is still expected to come from industries that are already expanding digital connectivity on Earth, such as direct-to-consumer broadband access.³

N a a a a

Space programmes are still widely seen as a sign of national prestige, as they project geopolitical and military power as well as have scientific and commercial significance. Powers such as China, Europe (EU and ESA), France, Germany, India, Japan, NATO, Russia, the United Kingdom and the United States have publicly announced space forces and continue to build space infrastructure, with plans for at least five new space stations by 2030 in the works.⁴ The first commercial space station is also slated for completion in the next decade.⁵ Next-step deep space exploration projects are under development, such as the United States-led Artemis programme—which aims to reopen exploration of the Moon and eventually develop outposts on Mars and

asteroids.⁶ In addition, new space-faring powers will emerge as more economies begin to see opportunities to expand both geopolitical and commercial influence in this arena. Among countries that have



C , — B ,

A greater number and diversity of actors operating in space could generate new or exacerbate old frictions if not responsibly managed. The trend in commercial, civil and military sectors is to replace traditionally large and expensive single geostationary satellite systems with a more distributed system of multiple smaller satellites in LEO. Approximately 11,000 satellites have been launched since Sputnik 1 in 1957, but 70,000 more could enter orbit in the coming decades if proposed plans play out.¹² The vast majority of these new planned and approved satellites will be launched by a handful of operators that will have increasing influence over the regulatory landscape.

Once in orbit, and unless actively decommissioned, many of these satellites could remain in space for hundreds of

Evolution of the Number of Objects in All Orbits, 1960–2020

0

Space Command were both created in the last two years. Other leading armed forces also now typically include a space component—for instance, in 2021, the French Air Force became the Air and Space Force (Armée de l’Air & de l’Espace). In November of 2021, an anti-satellite weapons test conducted by Russia created significant debris and threatened astronauts on the ISS.²⁸ Other countries have conducted similar testing, raising the spectre of repeat occurrences from other nations, which would add considerably to the problem of space debris (see Figure 5.2).²⁹ A hypersonic weapons arms race also risks contributing to the militarization of space—China, Russia and the United States are all developing such weapons and each tested them in the second half of 2021.³⁰ And with expanding geospatial

intelligence, all of Earth is observable by satellites, which could spur some nations to blind, jam or otherwise interfere with satellite Earth observation.³¹ As technology advances, space mineral exploitation—already heralded as part of some deep-space exploration programmes—could also be viewed as another competitive wedge over a more distant horizon.³²

Gaps in space governance render arms races even more likely. For example, the Outer Space Treaty prohibits nuclear weapons in space but does not address conventional weapons, which is particularly worrisome in today’s context of conventional weapons development and testing in space. New rules are unlikely in the near future, as there is little agreement over key issues such as

boundaries, control over space objects, or dual-use systems.³³ Any further decline in cooperation on space governance will only exacerbate risks.³⁴

Societies are dependent on space infrastructure in myriad everyday ways.

GPS satellites not only allow for safe navigation in the air, land and sea, but they also underpin financial transactions, data transmissions and energy control systems. Threats—such as a massive solar storm or jamming or spoofing of GPS satellites—could cause the internet to slow, navigation systems to fail, and controls for energy grids, water or transportation to crash. Ripple effects across societies could be extensive, even for a few seconds of disruption.³⁵

There are also significant unknowns about the impacts of rapid space development on Earth's environment—including damage to the ozone layer, butterfly effects from black carbon (soot) emissions, and possible alterations of the polar jet stream.³⁶ Of course, technological advances, such as developments in space-based solar power, could offset many of the potential negative environmental impacts of growing space exploration and exploitation.³⁷

Notwithstanding high levels of private sector investment, increased commercialization and growing geopolitical competition will demand higher government spending on space programmes and defence at a time when public finances are under greater pressure due to the economic overhang of COVID-19 (see Chapter 1). For example, governments will increasingly need to compete for talent, with private sector entities offering more lucrative employment packages. Defence agencies will need to continue to expend resources to defend against more-sophisticated space-based weaponry and increasingly effective space-based tools of statecraft, such as enhanced surveillance or espionage.

Yet, for a large majority of governments, space technology and access will remain out of reach altogether at a time when reliance on space technologies is growing for all. Forty-one nations have registered space agencies with UNOOSA,³⁸ yet the many governments not represented will continue to struggle to develop their capacities or earn a seat at the table in key decision-making processes. Without concerted effort to facilitate inclusive growth in the space realm, inequalities in the commercial and geopolitical benefits accruing from space development will only grow.

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What if a cascading chain of collisions between near-Earth objects and space debris result in a saturated Low Earth Orbit that renders space practically unusable for further commercial development?

Key Question

What if a cascading chain of collisions between near-Earth objects and space debris result in a saturated Low Earth Orbit that renders space practically unusable for further commercial development?

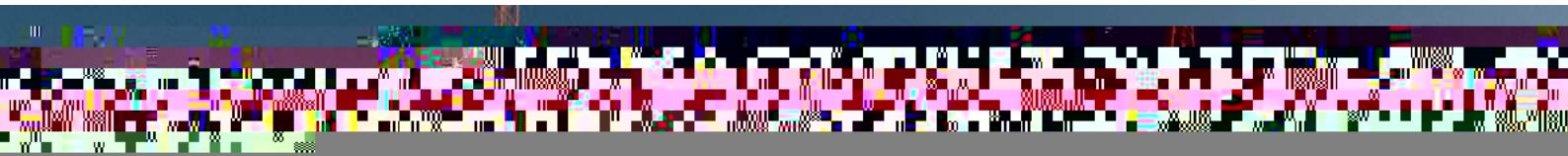


Venture financing flooded into the space industry following the successful launches of commercial space flights. As commercial activity in space grows, more companies could crop up seeking entry while investor interest is high. However, if manufacturing,

tourism or other space ventures fail to take flight, speculators and space industry companies could see their bubble burst. Similarly, grassroots campaigns to ban space pollution and prevent privatization of important science data could give investors pause, stifling the unmitigated venture financing in the field.⁴⁰



Although space represents yet another realm in which geopolitical and commercial tensions will play out, important traditions of cooperation in this arena should not be forgotten. Norms of behaviour established through voluntary measures that are not legally binding with the goal of building trust and establishing mutual understanding have helped mitigate escalating tensions in the past. While this trend could continue, more robust formal governance will be required in a more crowded and competitive space. Specific and functional bilateral or



- 1 Fildes, N. 2021. "Satellite groups face race to scale up or become space junk: Billionaire enthusiasts and new technology have brought valuations down to earth in a fragmented market". Financial Times. 14 November 2021. <https://www.ft.com/content/138b3f58-cdad-484f-b180-ce0b96bb7028>
- 2 Morgan Stanley. 2020 "Space: Investing in the Final Frontier". 24 July 2020. <https://www.morganstanley.com/ideas/investing-in-space>; Stutt, A. 2020. "The global race to mine outer space". Mining.com. 22 May 2020. <https://www.mining.com/the-global-race-to-mine-outer-space/>; Woo, E. 2021. "Start-ups aim beyond Earth". The New York Times. 7 July 2021. <https://www.nytimes.com/2021/07/07/technology/space-start-ups.html>
- 3 Morgan Stanley. 2020. Op. cit.
- 4 Gabba, A. 2021. "US accuses Russia of 'dangerous' behavior after anti-satellite weapons test". The Guardian. 15 November 2020. <https://www.theguardian.com/science/2021/nov/15/us-investigating-debris-event-space-reports-russia-anti->

ignores a tradition of cooperation". The Conversation. 10 January 2019. <https://theconversation.com/renewed-space-rivalry-between-nations-ignores-a-tradition-of-cooperation-108810>

25 Goguichvili, S., Linenbergyu.8ne0

R R

COVID-19 L
W - - S R a

67.2%

COVID-19

20-40

COVID-19

2.1 million

2021



FIGURE 6.1

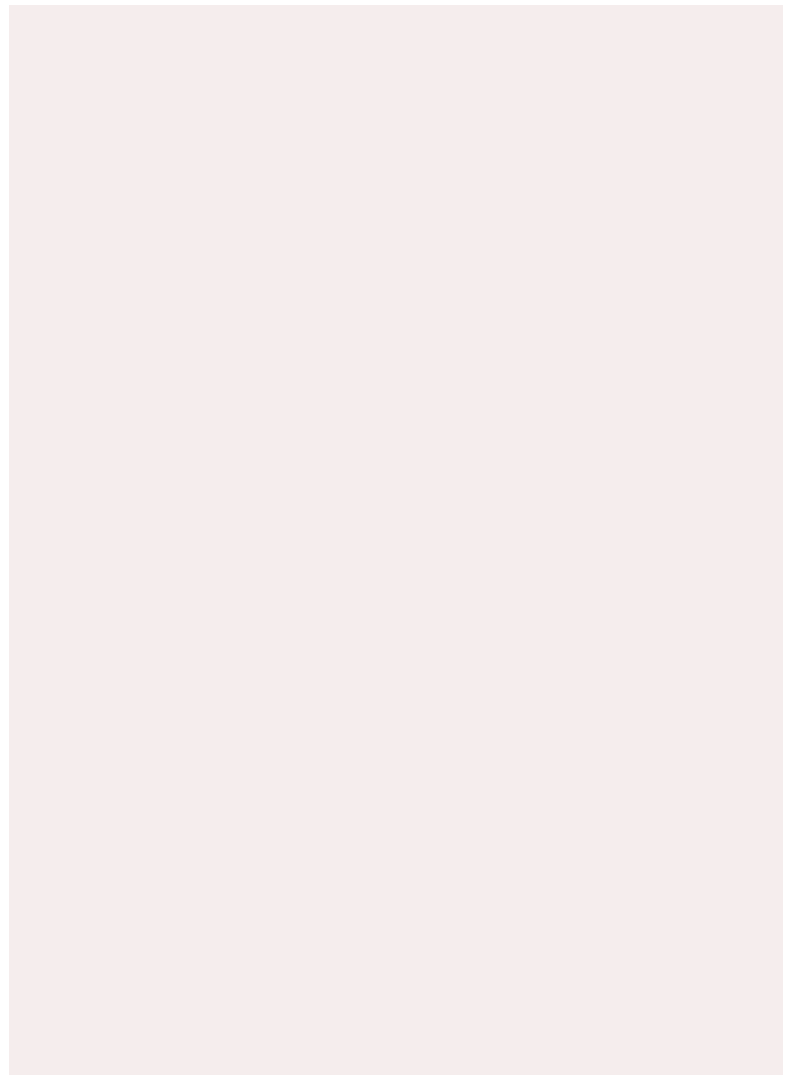
Factors for success

In general, effective national responses were characterized by a holistic view of societal well-being, multi-pronged approaches to transmission control and health system protection, robust coordination of policy and process, reliable logistics and the deployment of new interventions and increasingly granular and real-time data where available. Countries such as Chile and Finland were better able to manage peak periods than those with less well-rounded approaches.¹ They achieved this via cross-departmental policy agendas; expanded networks of community health workers; key health worker protections; a range of individually imperfect but collectively effective transmission control measures such as testing, tracing, and isolating; digital healthcare technologies; and early investment in anticipation of future needs.

Critical for many countries was the establishment of well-judged policy transitions between enabling social interaction and economic activity when possible and returning, when needed, to the kind of mobility constraints that were default strategies in the early stages of the crisis. Rapid and wholesale easing of constraints on social and economic activity often resulted in a steep rise in case numbers, although the impact on health systems and mortality was often mitigated by high vaccination rates. Some countries that had prided themselves on very low case numbers for a long time found it hard to acknowledge or pivot when that was no longer the best indicator to measure the state of the pandemic.² The Omicron variant, with its higher infectiousness, will moreover force governments to revisit the balance between sustaining economic activity and limiting spread. Some are choosing to minimize disruptions in light of the virus' evidently milder threat, although they must be prepared to reinstate restrictions as necessary given that healthcare systems remain at risk of collapse.³

The arrival of effective vaccines and antiviral treatments changed the game in terms of managing the impact of the virus

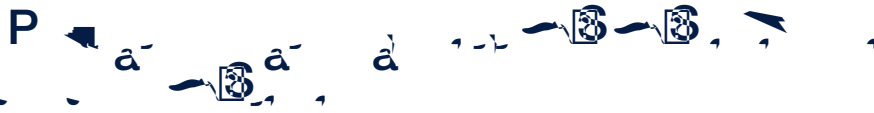
on citizens' health and national health systems, enabling greater latitude in other policies.⁴ Mass deployment of affordable rapid tests also helped people move and mingle again while mitigating transmission risk. However, although a range of vaccines was technically available from early in the year, differing negotiating powers, contracting approaches and approval regimes.^{866 r4e}



The lowest vaccination rates were mostly found in low-income countries (see Figure 6.2), especially in Africa, that had to rely on “vaccine diplomacy” initiatives from individual countries and multilateral agreements such as the Covid-19 Vaccines Global Access (COVAX) programme. The latter suffered from low contributions from high-income countries, high levels of bureaucracy, unpredictable supplies, and storage and distribution challenges.⁸ Relatively younger populations and “a favorable climate may have blunted the mortality of the virus in these countries, though excess deaths were estimated at between 0–2.1 million in Africa by May 2021,⁹ and long Covid may emerge as a longer-term challenge given the large number of non-fatal cases.

In general, successful vaccine rollout programmes struck a balance between speed and robustness, recognizing that perfect was sometimes the enemy of good. Vaccine effectiveness was found to improve following a second dose but waned over





The COVID-19 crisis repeatedly surprised those charged with anticipating its trajectory and will likely leave further complex problems in its wake. Nor is the pandemic and its response the only challenge that governments, societies and businesses are facing. As the *Global Risks Report* sets out, new crises may lie just over the horizon.

Many critical risks demand a whole-of-society response. This involves not only the engagement of different sectors leading to multiple individual actions, but also more effective interaction between different sectors in ways that are accretive to well-being and prosperity.¹⁸

Countries must distinguish between different resilience goals to harness their collective capabilities more effectively and navigate the many inevitable trade-offs, as failure to appreciate where agendas are misaligned will limit the traction any solutions can gain. One such goal might be community resilience to potential disasters; another might be reliable critical economic and societal infrastructure; a third might be long-term strategic imperatives such as industrial transformation.¹⁹ Each of these goals requires different strategies, providing a frame for different cross-sectoral interactions.

Government

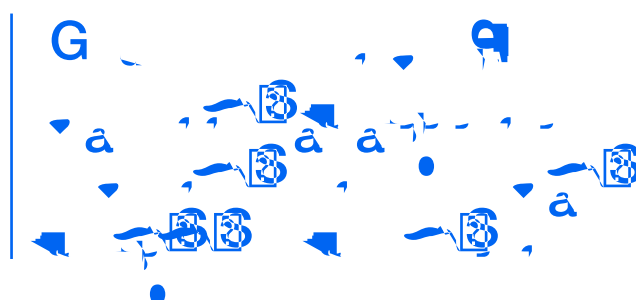
National risk assessments and resilience strategy reviews should be used to reveal where momentum is insufficient and greater government intervention is needed. It is not desirable or feasible for governments to seek to fill all gaps themselves; instead, they should look to harness the capabilities and energies of other sectors to complement enhanced competencies that ought to lie in the public realm.²⁰ Strategies should set out what is needed and examine all available levers with fresh eyes. They should identify where governments may need to compel action by others, and where they can exercise power as a

client, stimulate new initiatives, facilitate collaboration or simply act as cheerleader for good practices.

In their interactions with the private sector, governments that are more dirigiste might want to adjust their approaches to models for stockpiling critical goods, requisitioning and procurement in a crisis.²¹ All might also seek tougher cybersecurity mandates and set out stronger expectations of stress testing for critical infrastructure.²² They might seek to bring about a research and development ecosystem for resilience, coordinate crisis management exercises involving public and private sectors and provide a level of backstop for pooled insurance schemes targeted at catastrophic risks.²³

On three issues, finding a balanced path is critical. First, it is essential to allocate risk in a way that means the taxpayer does not ultimately pay up in every crisis nor do governments sweep risks off the public balance sheet onto the private sector. More transparent, analysis-led discussions about risks and tolerances should spur more equitable, creative solutions about the cost and pricing of risk as well as fiscal and market buffers that might mitigate fallout in the event of crisis.

Second, regulating for resilience must factor in rapid changes in assets, industries and systems; conflicting priorities in regulatory mandates; and enforcement challenges. Arguably, systemically important assets, firms and sub-sectors ought to experience greater oversight to prevent “hidden” assets in digital ecosystems, dominant firms in niche but critical industries and growing segments of certain sectors



where the plausible near-simultaneous failure of several providers could have negative far-reaching consequences.²⁴ For regulatory regimes that primarily look out for present-day consumers, long-term resilience should be a central tenet and capability underpinning the development and implementation of major critical infrastructure capital investment plans.²⁵ Stronger cross-sector regulatory hubs could sharpen debate and help reconcile differing agendas of bodies with separate statutory powers.²⁶

Third, data-sharing arrangements must be adjusted in a way that enables both pre-emptive resilience building and sharper crisis management. There are good reasons for constraining some flows of data and intelligence, including national security, commercial confidentiality, antitrust constraints and personal privacy. Acknowledging this, governments may seek to identify crisis circumstances—such as a cybersecurity lapse—in which they should compel critical infrastructure operators to provide data to government bodies. In other situations, such as an earthquake, they might permit, or even encourage, competing firms to share data with each other to ensure strategic supplies for the nation. Prior to crises, governments should consider how to develop more collaborative approaches to scenario and impact analyses, build semi-accessible and proprietary data into resilience analytics and crisis decision-making, and better facilitate

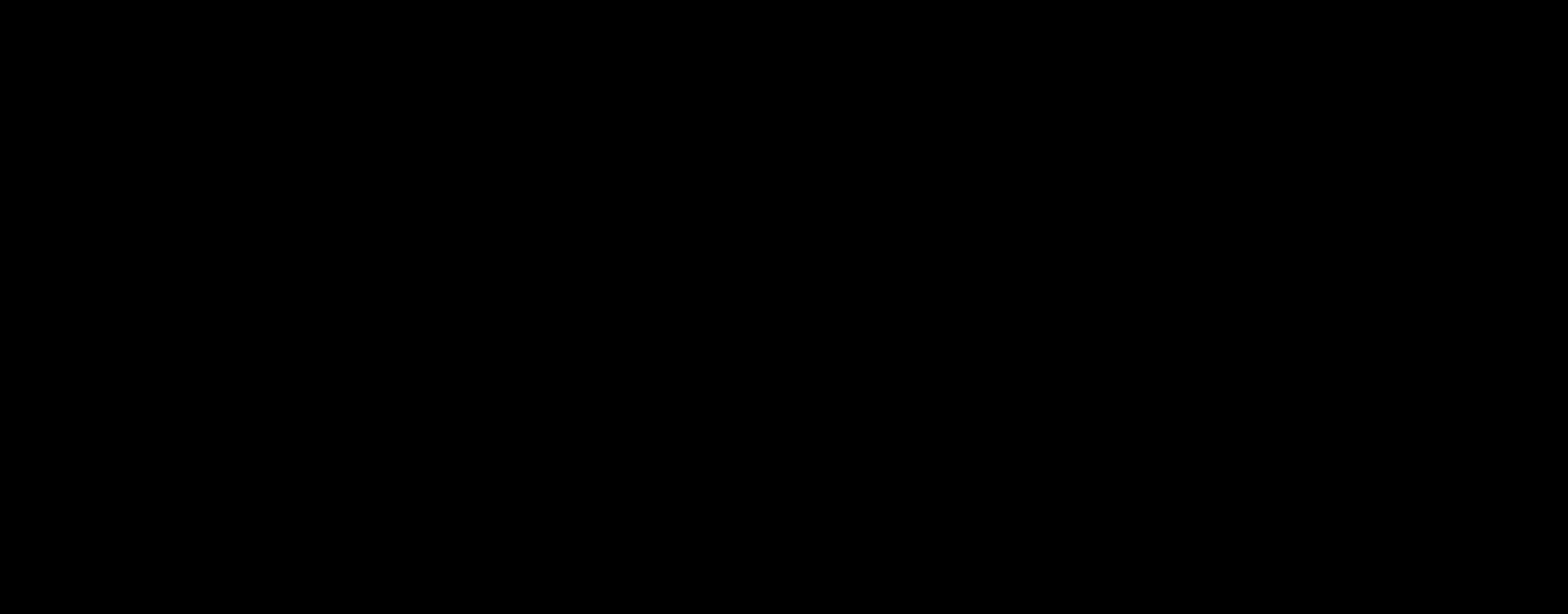
pre-competitive data sharing by companies for innovations that will benefit both participants and the national good.²⁷

BUILDING RESILIENCE

Many companies have sought to understand how they can contribute to the resilience of the countries in which they operate. They recognize that better national-level preparedness leads to shock events having smaller impacts on the economy and stability of government policy, creating a better environment in which to plan, invest and execute.

Opportunities fall into four groups. First, large firms already look intensively at business interruption risks across supply chains, managed service providers, utilities and customers with a view to softening the impact of bottlenecks and outages; smaller firms could do the same with a lighter touch.²⁸ Second, nationally important companies worked with each other where permitted during the pandemic; more broadly scoped codes of conduct could set out best-practice behaviours per industry for future crises.²⁹ Third, the pandemic spurred companies to look harder at the resilience of their workforces and the communities in which they are located; large employers could build a resilience dimension into health and benefits offerings.³⁰ Fourth, some firms have been seeking to take a more

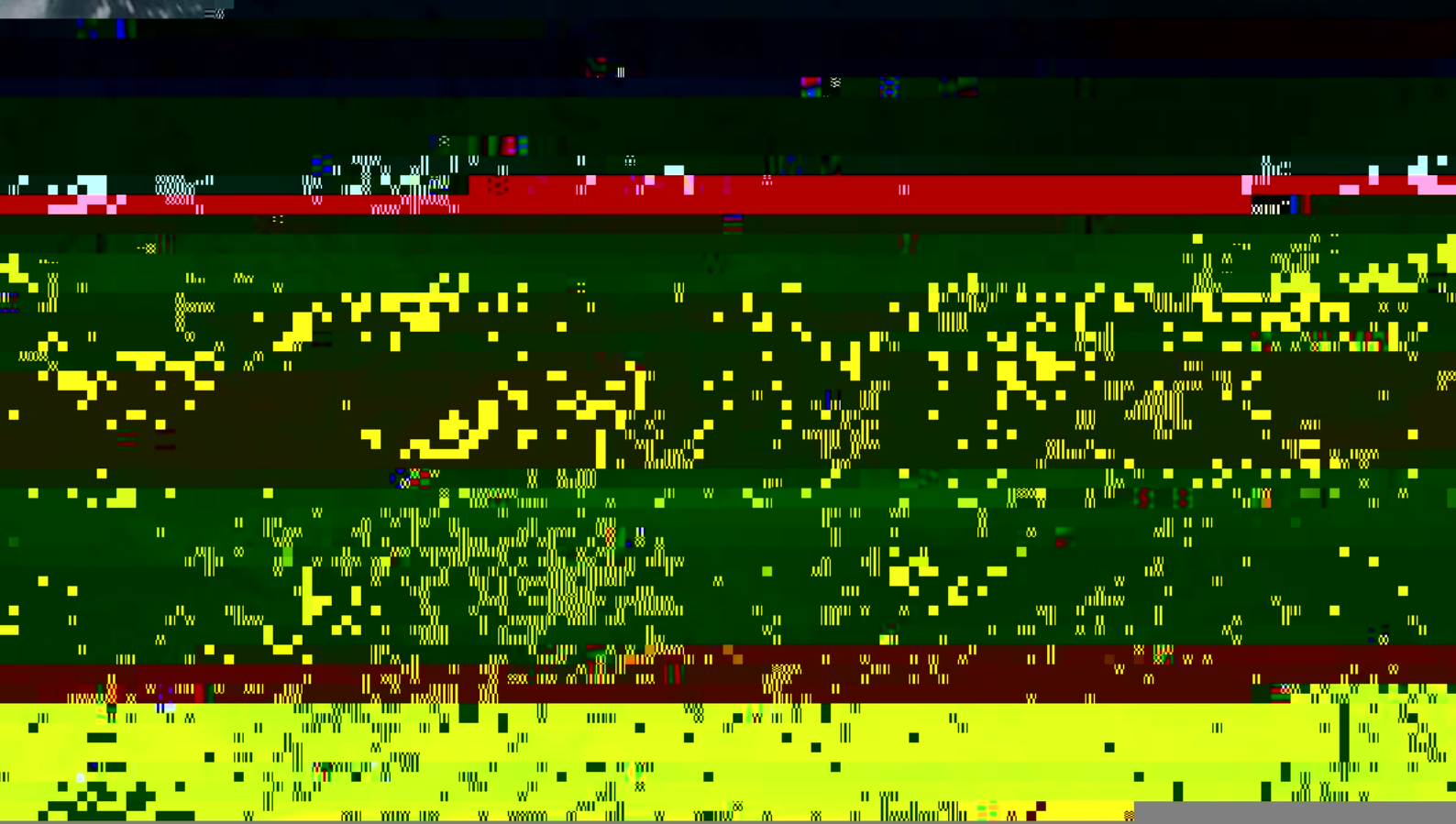




BOX 6.1

From Insights to Practice

- 24 Smith-Bingham, R. 2021. Op. Cit
- 25 OECD. 2021. Building Resilience: New Strategies for Strengthening Infrastructure Resilience and Maintenance. <https://www.oecd.org/g20/topics/infrastructure/Building-Infrastructure-Resilience-OECD-Report.pdf>
- 26 Financial Services Regulatory Initiatives Forum. 2021. Regulatory Initiatives Grid. November 2021. <https://www.fca.org.uk/publication/>



ALLIANZ ARENA

APPENDIX A

Global Risks, 2022

Global Risks

A “global risk” is the possibility of the occurrence of an event or condition that, if it occurs, could cause significant negative impact for several countries or industries. For the purposes of this report, the scope is over the next 10 years.

To ensure legibility, the names of the global risks have been abbreviated in the figures. The portion of the full name used in the abbreviation is in bold.

Global Risk	Description
A sset price disconnect in large economies	Prices for housing, investment funds, shares and other assets in a large economy increasingly disconnect from the real economy
C ollapse of a systemically important firm	Collapse of a systemically important global industry or firm with an impact on the global economy, financial markets and/or society
D ebt crises in large economies	Corporate and/or public finances overwhelmed by debt accumulation and/or debt servicing in large economies, resulting in mass bankruptcies, defaults, insolvency, liquidity crises or sovereign debt crises
Failure to control price trajectories	Inability to control an unmanageable increase (inflation) or decrease (deflation) in the general price level of goods and services
Proliferation of illicit activities	Global proliferation of informal and/or illegal activities that undermine economic advancement and growth: counterfeiting, illicit financial flows, illicit trade, tax evasion, human trafficking, organized crime etc.
P rolonged near-zero or slow economic growth	Near-zero or slow global growth lasting for many years
Severe supply and demand shocks	Abrupt shocks to the supply and demand of systemically important commodities at a global scale that strain corporate, public and/or household budgets: chemicals, emissions, energy, foods, metals, minerals etc.
B iodiversity loss and ecosystem collapse	Irreversible consequences for the environment, humankind, and economic activity, and a permanent destruction of natural capital, as a result of species extinction and/or reduction
E xtreme weather events	



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A . . . outcomes of
- technological

Intended or unintended negative consequences of technological advances on individuals, businesses, ecosystems and/or economies: AI, brain-computer interfaces, biotechnology, geo-engineering, quantum computing etc.

B . . . of
critical information

Deterioration, saturation or shutdown of critical physical and digital infrastructure or services as a result of a systemic dependency on cyber networks and/or technology: AI-intensive systems, internet, hand-held devices, I2ra9 0 00g elal I2raratellals 95 Frae or

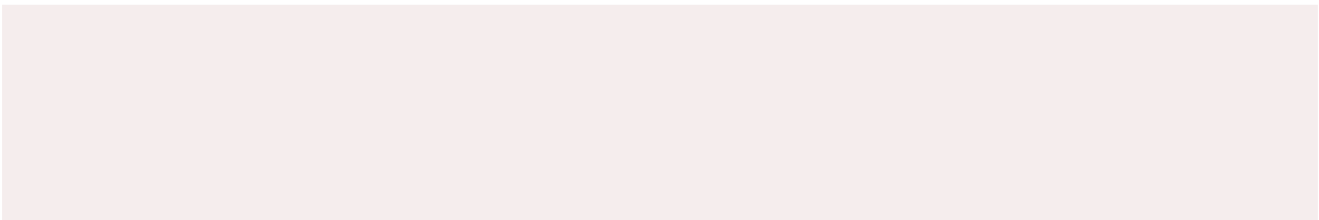




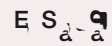



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	R. 1	R. 2	R. 3	R. 4	R. 5
	Collapse or lack of social security systems	Prolonged economic stagnation	Employment and livelihood crises	Proliferation of illicit economic activity	Digital inequality
	Natural resource crises	Infectious diseases	Debt crises in large economies	Failure to stabilize price trajectories	Employment and livelihood crises
	Prolonged economic stagnation	State collapse	Extreme weather events	Employment and livelihood crises	Collapse or lack of social security systems Digital inequality
	Interstate conflict	Debt crises in large economies	Asset bubble bursts in large economies Fracture of interstate relations	...	Human-made environmental damage
	Prolonged economic stagnation	Debt crises in large economies	Climate action failure	Asset bubble bursts in large economies	Infectious diseases
	Erosion of social				



	R. 1	R. 2	R. 3	R. 4	R. 5
L. 1	State collapse	Human-made environmental damage	Collapse or lack of social security systems	Debt crises in large economies Prolonged economic stagnation	...
L. 2	Digital inequality	Infectious diseases	Climate action failure	Extreme weather events	Debt crises in large economies
L. 3	Interstate conflict	Severe commodity shocks	Asset bubble bursts in large economies Failure of cybersecurity measures	...	Human-made environmental damage
		Climate action			
		Debt crises in			
				events	

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	R. 1	R. 2	R. 3	R. 4	R. 5
P _{aaa}	Collapse or lack of social security systems	Prolonged economic stagnation	Employment and livelihood crises	Digital inequality	Human-made environmental damage
P _{aaa}	Proliferation of illicit economic activity	Collapse or lack of social security systems	Digital inequality	Human-made environmental damage	Employment and livelihood crises State collapse
P	State collapse	Prolonged economic stagnation	Employment and livelihood crises	Digital inequality	Human-made environmental damage Proliferation of illicit economic activity
P _{aaa}	Prolonged economic stagnation	Digital inequality	Extreme weather events	Employment and livelihood crises	Failure of public infrastructure
P _{aaa}	Human-made environmental damage	Infectious diseases	Interstate conflict	Fracture of interstate relations Prolonged economic stagnation	...
P _{aaa}	Prolonged economic stagnation	Debt crises in large economies	Employment and livelihood crises	Digital inequality	Collapse or lack of social security systems
Q _{aaa}	Climate action failure	Digital inequality	Collapse of a systemically important industry Fracture of interstate relations Infectious diseases Natural resource crises
R _{aaa}	Human-made environmental damage	Employment and livelihood crises	Debt crises in large economies Geopolitization of strategic resources	...	Large-scale involuntary migration
R _{aaa}	Interstate conflict	Failure to stabilize price trajectories	Infectious diseases	Employment and livelihood crises	Severe commodity shocks

	R. 1	R. 2	R. 3	R. 4	R. 5
R _{aa}	Employment and livelihood crises	Prolonged economic stagnation	Extreme weather events	Digital inequality	Failure of cybersecurity measures
S _{aa} A _{aa}	Failure to stabilize price trajectories	Human-made environmental damage Infectious diseases	...	Interstate conflict	Fracture of interstate relations Prolonged economic stagnation
S _a	Employment and livelihood crises	Debt crises in large economies	Terrorist attacks	Human-made environmental damage	Digital inequality Natural resource crises
S _{aa}	Human-made environmental damage	Debt crises in large economies	Employment and livelihood crises	Digital inequality	Geopolitization of strategic resources
S _{aL}	Employment and livelihood crises	Human-made environmental damage	Prolonged economic stagnation	Failure to stabilize price trajectories	Widespread youth disillusionment

	R. 1	R. 2	R. 3	R. 4	R. 5
S. L _a a	Human-made environmental damage	Debt crises in			

	R. 1	R. 2	R. 3	R. 4	R. 5
U _a	Prolonged economic stagnation	State collapse	Climate action failure Failure to stabilize price trajectories Interstate conflict

APPENDIX C

T. G. R. R. : G. R. R. 2021 2022
P. S. 2021 2022

uses ranking rather than a 1–5 rating scale to allow respondents to answer the question with more confidence.

4. **Global Risks, Embedded (GR-EB)**: recognizing that risks are not isolated but affect and amplify each other through negative feedback loops, this section incentivizes a holistic view of global risks by asking respondents to consider cascading impacts in conjunction with the severity of the risk itself.

5. **Global Risks, Embedded, Interconnected (GR-EB-IR)**: recognizing that risk

mitigation needs to be a part of the global agenda, this section asks respondents to assess the current state of international mitigation efforts in 15 global governance areas. It identifies achievements and areas of opportunity for global action and cooperation and informs an analysis of how the various stages of effectiveness may influence future preparedness.

6. **Quality Questions (QQ)**: complements risk identification with a series of questions to detect blind spots, trends and shocks. This section ensures that the GRPS is a flexible and engaging mechanism to source expert knowledge.

Methodology

COVID-19 Hazards & Outlook

COVID-19 Hazards:

For each of the 37 global risks listed in Appendix A, respondents were asked to identify three global risks that they believe had worsened since the start of the COVID-19 crisis. A simple tally for each of the 37 global risks was calculated on this basis. The results are illustrated in Figure I.

Outlook:

Respondents were asked to express their feeling about the outlook for the world in four sentiments: worried, concerned, positive, optimistic. A simple tally for each of the four sentiments was calculated on this basis. The results are illustrated in Figure 1.2.

Respondents were then asked to characterize their outlook for the world over the next 3 years with the following four answer options: accelerating global recovery; fractured trajectories, separating winners and losers; consistently volatile with multiple surprises; progressive tipping points with increasing catastrophic outcomes. A simple tally for each of the four sentiments was calculated on this basis. The results are illustrated in Figure 1.1.

Global Risks, Horizon

For each of the 37 global risks listed in Appendix A, respondents were asked to identify when they believe a risk will become a critical threat to the world, within the following timeframes:

- Short-term threats: 0–2 years

- Medium-term threats: 2–5 years

- Long-term threats: 5–10 years

A simple tally for each of the 37 global risks was calculated on this basis. The results are illustrated in Figure II.

Global Risks, Severity

For each of the 37 global risks listed in Appendix A, respondents were asked to choose nine risks and rank order them from 1 to 9 according to their perceived severity of impact—“most severe” was defined as having the potential to yield the most damage on a global scale within the next 10 years. Respondents were asked to value the impact of risks considering multiple criteria, including human suffering, societal disruption, economic shock, environmental degradation and political instability.

The results were aggregated according to the following scoring schedule:

- 9 points each time a risk was selected as the most severe risk
- 8 points each time a risk was selected as the second-most severe risk

- 5 points each time a risk was selected as the fifth-most severe risk
- 4 points each time a risk was selected as the sixth-most severe risk
- 3 points each time a risk was selected as seventh-most severe risk
- 2 points each time a risk was selected as the eighth-most severe risk
- 1 point each time a risk was selected as the ninth-most severe risk

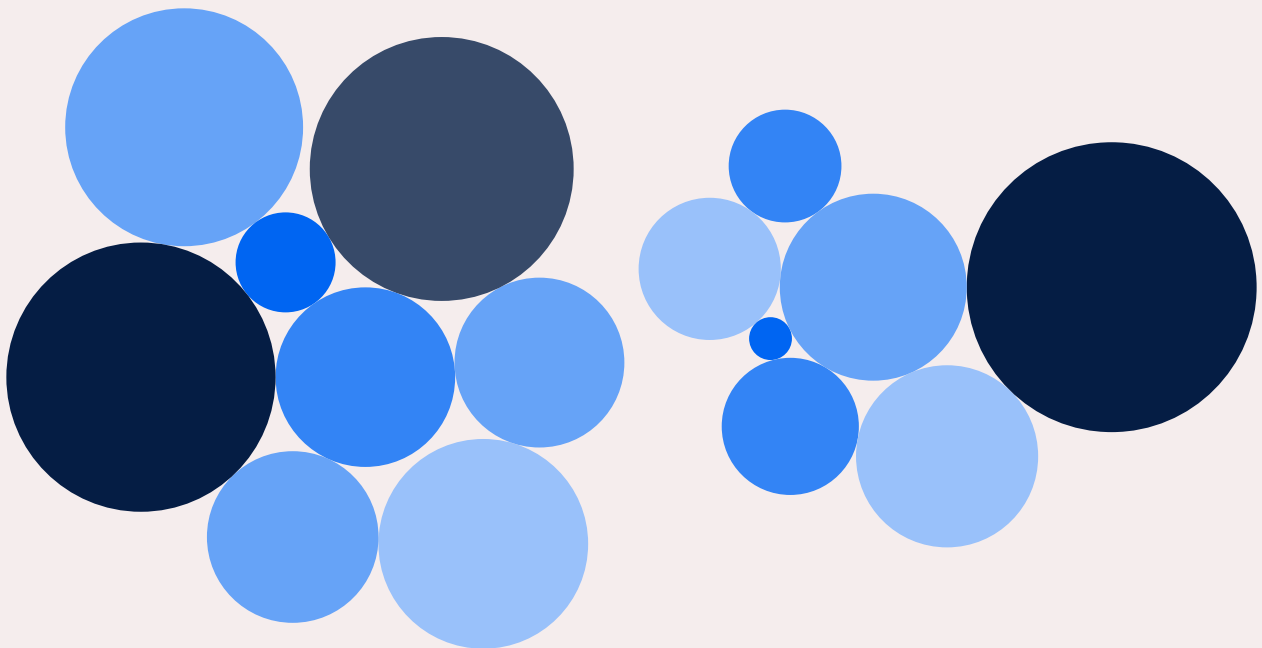
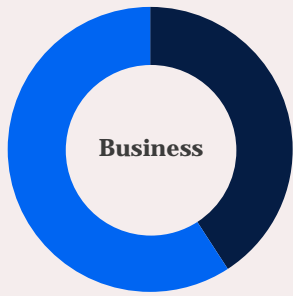
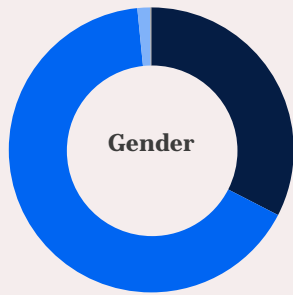
A simple sum of the scores for each of the risks according to the above scoring schedule was calculated on this basis. The results are illustrated in Figure 1.3.

Global Risks Effects

In the Global Risks Severity component, for each of the risks ranked most severe, second-most severe and third-most severe, respondents were then asked

TABLE C.1

Survey Sample Composition





E. G. F.

Head of Global Risks and Geopolitical Agenda

M. K.

Lead, Global Risks and Geopolitical Agenda

R. L.

Guy Miller, Eugenie Molyneux, Darren Nulty, Pavel Osipyants, Timothy Powell and Alessio Vinci.

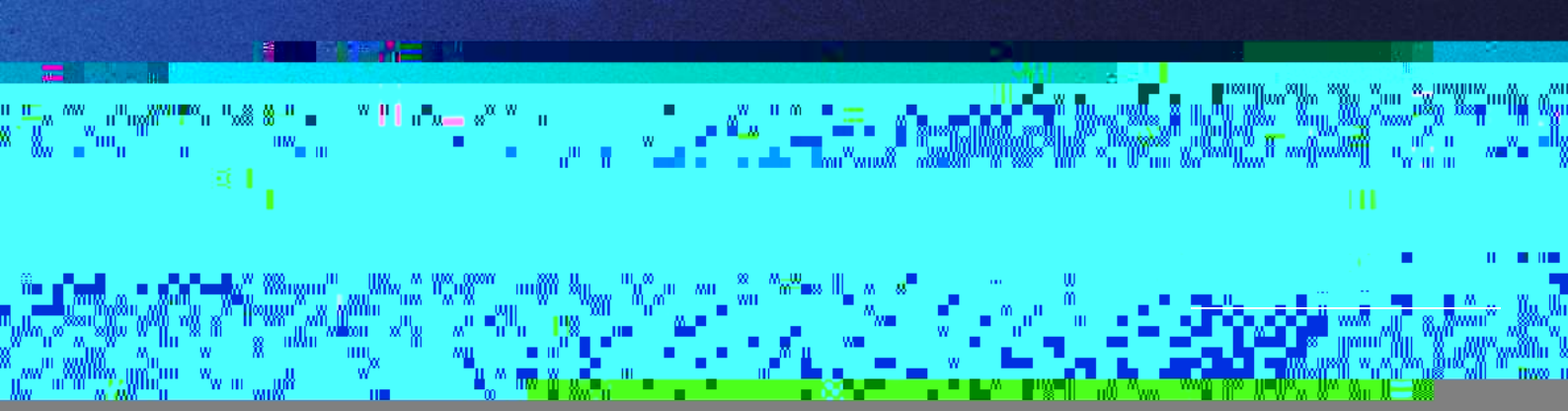
SK Group : Ilbum Kim.

Nanyang Technological University Singapore : Tan Eng Chye and Ho Teck Hua.

Oxford Management Services : Julian Laird.

Wolters Kluwer : Howard Kunreuther.

Global Forum on Resilient and Sustainable Development : Eric Parrado (Inter-American Development Bank, Council Co-Chair), Ngaire Woods (University of Oxford, Council Co-Chair), Clarissa Rios Rojas (University of Cambridge, Council Fellow), Deborah Ashby (Imperial College London), Elhadj As Sy (Kofi Annan Foundation), Nayef Al-Rodhan (University of Oxford), Guillaume Barthe-Dejean (SK Group), Nita A. Farahany (Duke University), Pascale Fung (Hong Kong University of Science and Technology), Alexander Gabuev (Carnegie Moscow Center), Florence Gaub (EU Institute for Security Studies), Sergei Guriev (Sciences Po), Orit Halpern (Concordia University), Maha Hosain Aziz (New York University), Meng Ke (Tsinghua University), Patricia Lerner (Greenpeace International), Liu Meng (UN Global Compact), Amrita Narlikar (German Institute for Global and Area Studies), Maria Soledad Nuñez Mendez (UCOM University), Jake Okechukwu Effoduh (Global Shaper), Peter Piot (London School of Hygiene and Tropical Medicine), John Scott (Zurich Insurance)



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World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org