

Trend
Compendium

2050

Six megatrends
that will shape the world



June 2023

The Roland Berger Trend Compendium 2050 focuses on stable, long-term developments ...

- > The **Roland Berger Trend Compendium 2050** is a global trend study compiled by **Roland Berger Institute (RBI)**, the think tank of Roland Berger. Our Trend Compendium 2050 describes the **most important megatrends** shaping the world between **now and 2050**
- > Our **trend views are based on expert sources and assessments**. Estimates reflect the normal case, i.e. a stable development of the global economy in the long term
- > To incorporate today's uncertainties into strategic planning, we recommend **combining the megatrends of the Roland Berger Trend Compendium 2050** with the **Roland Berger scenario planning approach**



2050

Is it worth dealing with megatrends when globally impactful events such as the COVID-19 pandemic or the war in Ukraine are taking place?

Of course! The coronavirus pandemic and the war in Ukraine have far-reaching consequences and deeply affected people, economies and politics but neither event has derailed the megatrends analyzed herein; such is the inherent nature of megatrends: climate change, societal aging, or technological innovations do not lose their momentum, their direction or their importance. To cope with such challenges and to master resulting opportunities, our awareness and our understanding of megatrends is vital – not least to develop sustainable answers

... and covers six megatrends that shape the future development of our world to 2050

1

People & Society



Population
—
Migration
—
Education & Labor
—
Values

2

Politics & Governance



Global Risks
—
Geopolitics
—
Future of Democracy

3

Environment & Resources



Climate Change & Pollution
—
Biodiversity
—
Resources & Raw Materials

4

Economics & Business



Global Trade & Value Chains
—
Power Shifts
—
Energy Transformation
—
Debt Challenge

5

Technology & Innovation



Value of Technology
—
Frontier Technologies
—
Humans & Machines

6

Health & Care



Global Health Challenges
—
Healthcare of the Future
—
Caregiving

Megatrend 2

Politics & Governance



Global risks center around environmental concerns while geopolitical power shifts are underway – Decline of democratic traits accelerates

Subtrends of megatrend "Politics & Governance"

1



Global Risks

2



Geo-politics

3



Future of Democracy

Anticipating global risks is central to proficient politics and good governance – For the decade ahead, environmental risks weigh in heavily

Top 20 global risks on a ten-year horizon by likely severity of impact

- 1 ■ Failure to mitigate **climate change**
- 2 ■ Failure of **climate-change adaptation**
- 3 ■ **Natural disasters** and **extreme weather** events
- 4 ■ **Biodiversity loss** and **ecosystem collapse**
- 5 ■ Large-scale **involuntary migration**
- 6 ■ **Natural resource crises**
- 7 ■ **Erosion of social cohesion** and **societal polarization**
- 8 ■ Widespread **cybercrime** and **cyber insecurity**
- 9 ■ **Geoeconomic confrontation**
- 10 ■ Large-scale **environmental damage incidents**
- 11 ■ **Misinformation** and **disinformation**
- 12 ■ Ineffectiveness of **multilateral institutions** and **international cooperation**
- 13 ■ **Interstate conflict**
- 14 ■ **Debt crisis**
- 15 ■ **Cost-of-living crisis**
- 16 ■ Breakdown of **critical information infrastructure**
- 17 ■ **Digital power** concentration
- 18 ■ Adverse outcomes of **frontier technologies**
- 19 ■ Failure to stabilize **price trajectories**
- 20 ■ **Chronic diseases** and **health conditions**

■ Economic ■ Environmental ■ Geopolitical ■ Societal ■ Technological

- > The World Economic Forum's Global Risks report is based on its annual **Global Risks Perception Survey**, completed by more than **1,200 members** from the WEF's network of business, government, civil society thought leaders, policy makers and risk experts. Input for the 2023 report was sought in the fall of 2022
- > The WEF defines **global risk** as "the possibility of the occurrence of an event or condition which, if it occurs, would **negatively impact** a significant proportion of global GDP, population or natural resources."
- > Among the WEF Global Risks 2023 assessment with a 10-year view, **environmental (climate- and nature-related) risks clearly dominate** the top 5 as well as the top 10 going forward – a trend evident for more than half a decade
- > **However, a wider variety of global risks is jostling for the attention of decision makers:** Beyond the top 10, the impact of **geopolitical** as well as **technological** risks are both more pronounced in the top 20 long term, while **societal** risks are spread throughout. Most notably among the latter, **challenges brought on by large-scale involuntary migration** takes fifth position

2 Politics & Governance

2.1 Global Risks

2.2 Geo-politics

2.3 Future of Democracy

3 Environment & Resources

4 Economics & Business

5 Technology & Innovation

6 Health & Care

Nearer term and at country level, national economic and geopolitical challenges dominate – National risk perception is uneven

Five most important risks for 2023 and 2024 by selected countries¹⁾

	1	2	3	4	5
US	Debt crisis	Rapid and/or sustained inflation	Geoeconomic confrontation	Cost-of-living crisis	Failure of climate-change adaptation
China	Geoeconomic confrontation	Natural disasters & extreme weather events	Rapid and/or sustained inflation	Infectious diseases	Asset bubble burst, Digital power concentration, Geopolitical contestation of resources
Japan	Geoeconomic confrontation	Natural disasters & extreme weather events	Prolonged economic stagnation	Severe commodity price shocks	Geopolitical contestation of resources
Germany	Rapid and/or sustained inflation	Severe commodity price shocks	Interstate conflict	Severe commodity supply crises	Geopolitical contestation of resources
India	Digital inequality	Geopolitical contestation of resources	Cost-of-living crisis	Debt crisis	Natural disasters and extreme weather events
UK	Cost-of-living crises	Debt crises	Rapid and/or sustained inflation	Failure of climate-change adaptation	Terrestrial biodiversity loss & eco-system collapse, Interstate conflict, Asset bubble burst
France	Debt crisis	Severe commodity price shocks	Rapid and/or sustained inflation	Cost-of-living crisis	Erosion of social cohesion
Canada	Cost-of-living crisis	Debt crisis	Rapid and/or sustained inflation	Failure of climate-change adaptation	Asset bubble burst
Italy	Debt crises	Interstate conflict, Rapid and/or sustained inflation		Failure of climate-change adaptation	Asset bubble burst
Brazil	Rapid and/or sustained inflation	Proliferation of illicit economic activity	Geoeconomic confrontation	Severe economic price shocks, Employment and livelihood crises	
Australia	Cost-of-living crisis	Debt crises	Rapid and/or sustained inflation	Geoeconomic confrontation	Failure of climate-change adaptation
South Korea	Rapid and/or sustained inflation	Proliferation of illicit economic activity	Severe commodity supply crises	Asset bubble burst, Debt crisis	

■ Economic ■ Environmental ■ Geopolitical ■ Societal ■ Technological

1) Top 12 countries by GDP in 2022 included in the study; 2) Survey undertaken April - September 2022, Russia not included

Sources: WEF; IMF; Roland Berger

- > For the World Economic Forum's Executive Opinion Survey over 12,000 respondents from 121 economies were asked to assess the **most pressing issues for the next two years in their country²⁾**
- > Within this shorter time frame, **national perceptions of critical risks vary substantially**, highlighting top local concerns – or their absence when compared to other countries
- > For the next two years, **economic and geopolitical risks weigh heavily** among executives in the largest economies; beyond that, a more **mixed picture** can be observed
- > **Climate- and nature-related risks feature in very different ways:** China and the US, for example, are **the world's largest CO₂ emitters**; however, for 2023 and 2024 China is more concerned with risks stemming from natural disasters and weather events (#2) when compared to the US, where the risk of failure of climate-change adaptation is the #5 concern

Top three risks analysis: Climate action failure would come at a high cost, potentially resulting in double digit economic losses ...

Mid-century GDP changes with different temperature rises and economic impact severity, relative to a no-climate change world¹⁾ [%]

	Well below 2°C increase	2.0°C increase	2.6°C increase	3.2°C increase
	Paris target	The likely range of global temperature gains		Severe case
World	-4.2%	-11.0%	-13.9%	-18.1%
North America	-3.1%	-6.9%	-7.4%	-9.5%
South America	-4.1%	-10.8%	-13.0%	-17.0%
Europe	-2.8%	-7.7%	-8.0%	-10.5%
Middle East & Africa	-4.7%	-14.0%	-21.5%	-27.6%
Asia	-5.5%	-14.9%	-20.4%	-26.5%
Oceania	-4.3%	-11.2%	-12.3%	-16.3%

1) Temperature increases from pre-industrial time to mid-century (2048)
Sources: Swiss Re, Roland Berger



2.1
Global Risks



2.2
Geo-politics



2.3
Future of Democracy

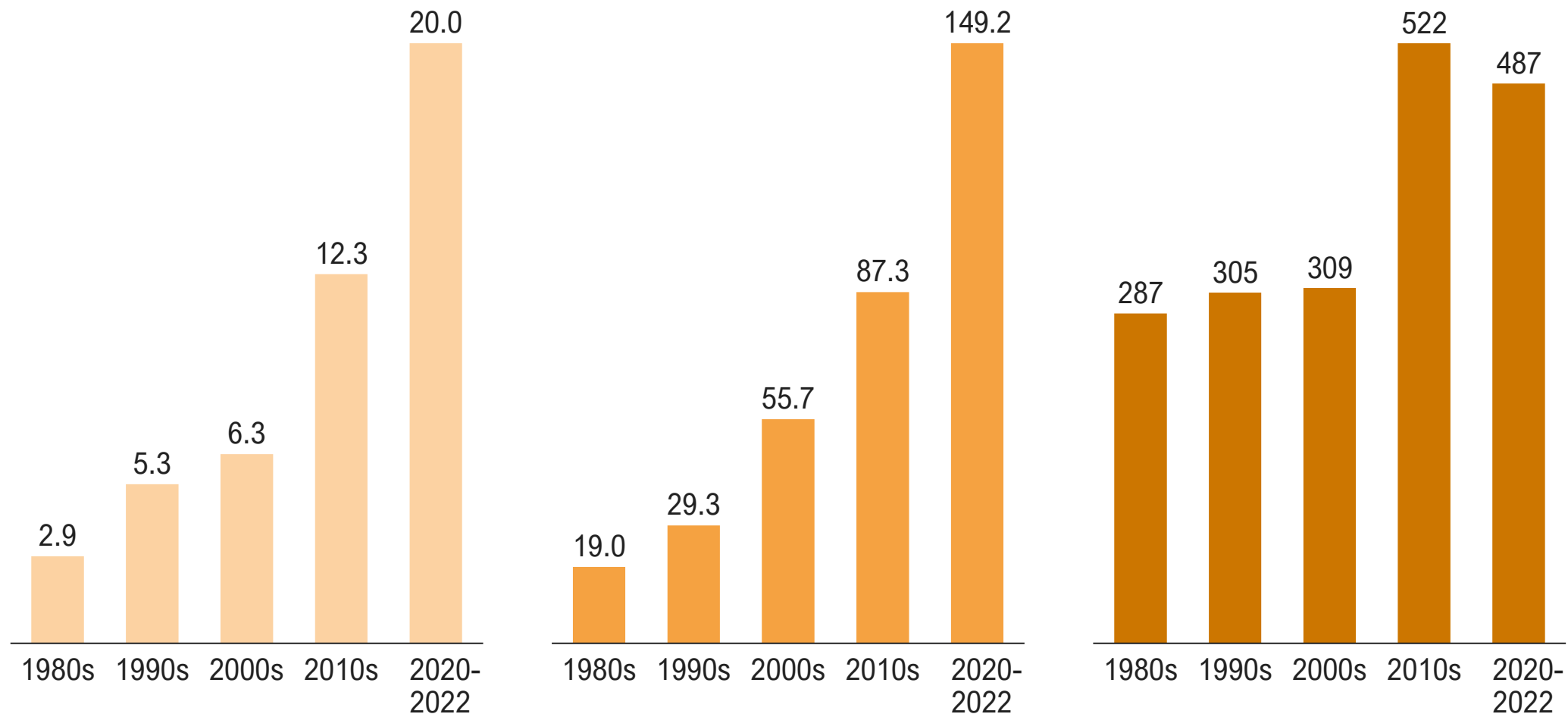
... while the development of extreme weather events – the subsequent top risk and closely related to climate change – shows one very clear direction

Weather and climate disasters in the US where overall damages/costs reached or exceeded USD 1 bn

Average number of events p.a.

Average cost p.a. [USD bn]

Average number of deaths p.a.



Sources: National Centers for Environmental Information; Roland Berger

Much is at stake if biodiversity continues to diminish – Intact ecosystems deliver values worth billions or trillions of dollars per annum

Monetary values p.a. for biodiversity and ecosystem services, by biome [int. USD/ha, 2007 prices]

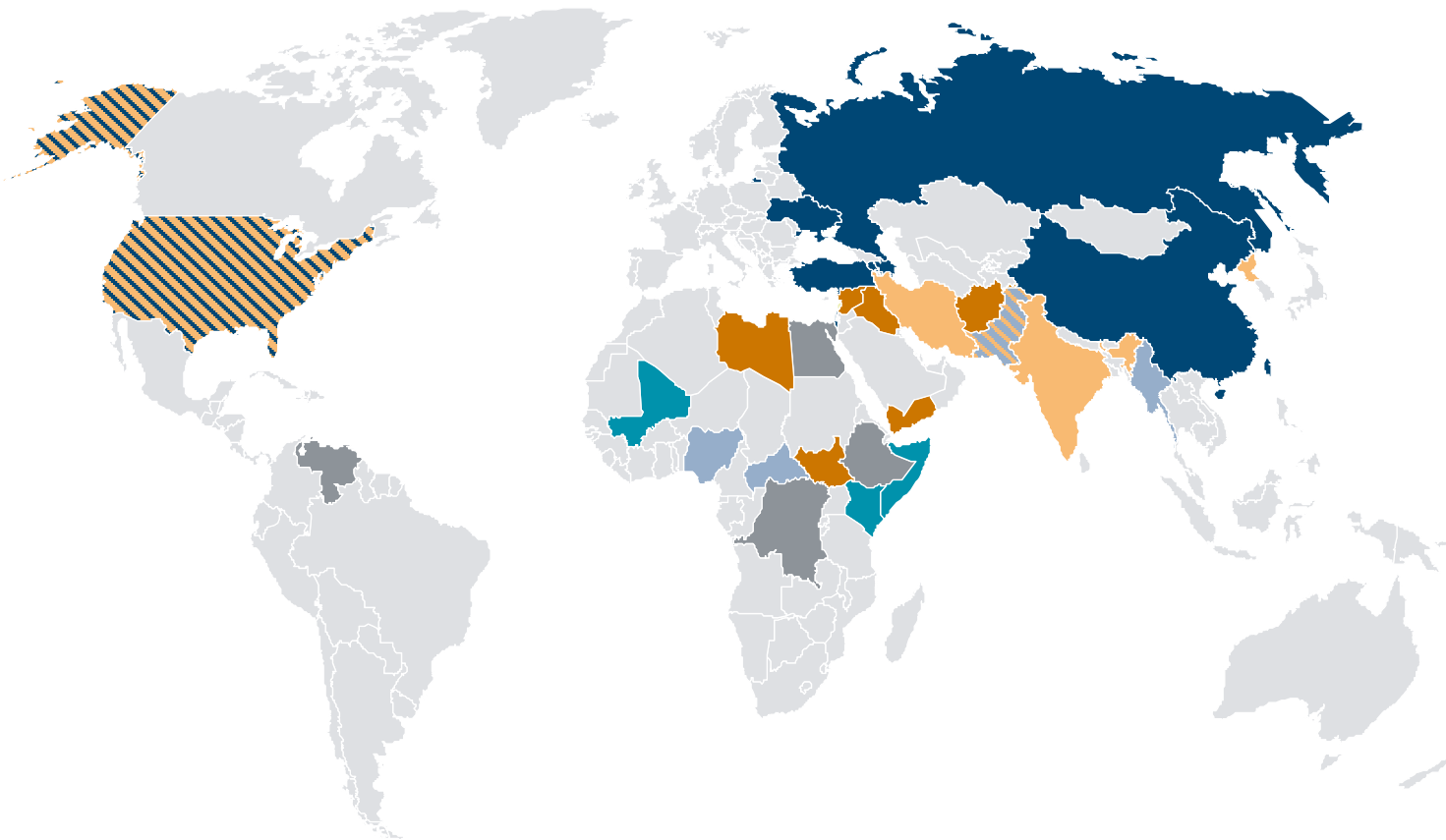
	Provisioning services	Habitat services	Regulating services	Cultural services	Total economic value
Marine	102	5	65	319	491
Coral reefs	55,724	16,210	171,478	108,837	352,249
Coastal systems	2,396	375	25,847	300	28,917
Coastal wetlands	2,998	17,138	171,515	2,193	193,845
Inland wetlands	1,659	2,455	17,364	4,203	25,682
Fresh water	1,914	0	187	2,166	4,267
Tropical forest	1,828	39	2,529	867	5,264
Temperate forest	671	862	491	990	3,013
Woodlands	253	1,277	51	7	1,588
Grasslands	1,305	1,214	159	193	2,871

- > High levels of **biodiversity and intact ecosystems** provide **indispensable beneficial services** at local, regional and global level, thus providing food and habitats, help mitigate climate change and pollution, and provide cultural and recreational services
- > The **global economic value of biodiversity and ecosystem services** is estimated to be more than **1.5 times the global GDP**
- > Such **estimates** are uncertain (as are those for single biomes or services), but they **highlight the sheer scale of the economic value** derived from biodiversity and ecosystem services
- > There are two **main reasons why biodiversity and ecosystem services are undervalued** in political and business decisions, economic accounts and market prices **at present**. First, **decision makers lack knowledge** about the interactions between economies and ecosystems. Second, most of the **ecosystem services** are not priced into the market because they are **public goods**
- > In order to help provide a **full picture of biodiversity's connection to the economy** to better support incoming COP global biodiversity policies and targets currently under debate, a universal, **comprehensive** (and AI-supported) **natural capital accounting framework (UN/SEEA¹)** has been created. By 2020, 90 countries have compiled SEEA accounts with further progress to be reported in spring 2022

1) United Nation/SEEA: System of environmental and economic accounting
Sources: OECD; Markandya; de Groot; Costanza; SEEA; Roland Berger

Geoeconomic confrontation and interstate conflicts are among the top 20 risks – A look at the world map of conflicts makes it clear why this is so

Where are the worlds ongoing conflicts?



Territorial dispute

- > Russo-Ukrainian war
- > Nagorno-Karabakh conflict
- > Kurdish-Turkish conflict
- > Israeli-Palestinian conflict
- > East China Sea disputes
- > South China Sea disputes

Civil war

- > Conflict in Afghanistan
- > Yemeni civil war
- > Syrian civil war
- > Libyan civil war
- > Instability in Iraq
- > South Sudanese civil war

Interstates

- > US-Iran conflict
- > India-Pakistan conflict
- > North-Korea crisis

Political instability

- > Instability in Lebanon, Egypt, DRC and Venezuela
- > Tigray War in Ethiopia

Transnational Terrorism

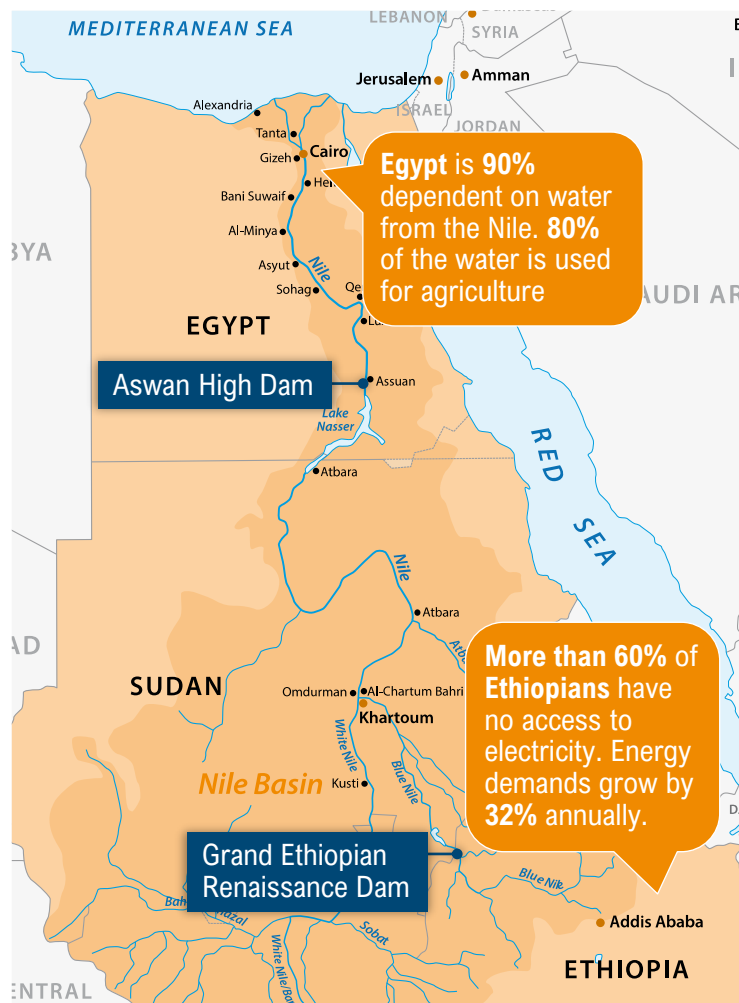
- > Mali war
- > Islamist Militancy in Pakistan
- > Al-Shabaab in Somalia & Kenya

Sectarian

- > Boko Haram Militancy in Nigeria
- > Violence on the Central African Republic
- > Rohingya Crisis

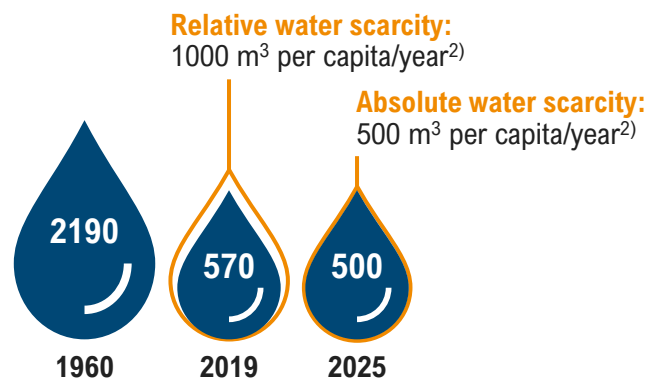
Transboundary resource conflicts create geoeconomic and geopolitical challenges for governments – Confrontations affect many nations

Nile dam conflict: Status of dispute and issues

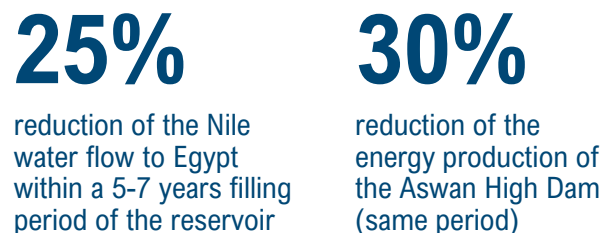


Egypt's water emergency

Available water amount per capita/year



Possible impact of the Grand Ethiopian Renaissance Dam



- > Two closely linked risks for the decade ahead have been identified as **geo-economic confrontation** closely followed by **geo-political resource contestation**
- > With the advent of **global warming**, **water is an increasingly precious far-reaching resource**, for humanity as well as for sectors of the economy including renewable energy generation; it is a contentious governance issue – and it has the potential to be weaponized
- > In the case of **transboundary water disputes**, such as in the example of the long-standing Nile dam conflict, all dimensions are intertwined: Tensions among **Egypt, Sudan, and Ethiopia** over the Grand Ethiopian Renaissance Dam (GERD) on the Blue Nile have escalated; Ethiopia started to fill the GERD's reservoir, ignoring Egypt's mandate that the dam not be filled without a **legally binding agreement over the equitable allocation of the Nile's waters**. Egypt has escalated its call to the **international community** to get involved, and the **US** has threatened to withhold **development aid** to Ethiopia if the conflict is not resolved
- > In total, **11 riparian states¹⁾**, home to **250 million people**, are affected by the dispute and the lack of framework for water allocation – jeopardizing the stability, health and future growth of the region
- > The GERD dispute is a prime example for the **close nexus** of transboundary **conflict management and resource sustainability**

1) Eleven countries are affected by the Nile dispute: The Nile River riparian states are Burundi, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Sudan (Republic of), Tanzania, and Uganda; 2) According to UN

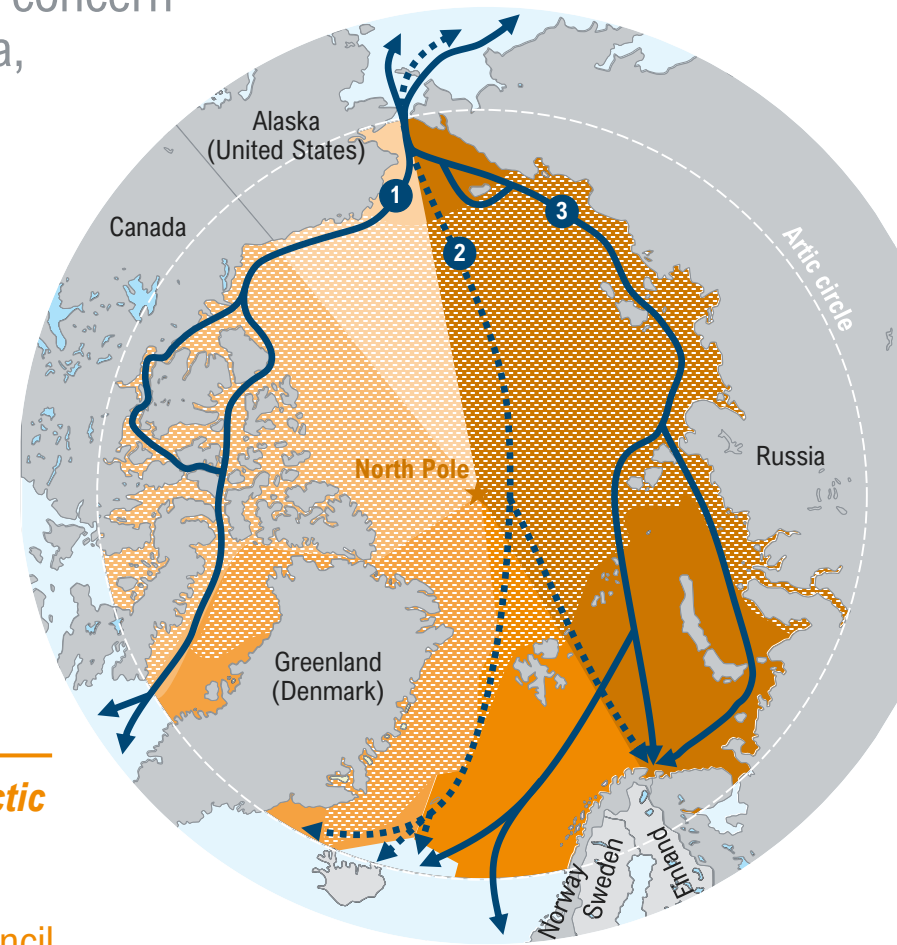
Sources: Security Conference; Brookings; Roland Berger

Due to climate change, governments are facing new territory – Literally: The Arctic is becoming a zone of strategic competition

Arctic territorial claims concern the US, Russia, Canada, Denmark, Norway¹⁾

- 1 North West Passage (NWP)
- 2 Transpolar Route (TSR)
- 3 Northern Sea Route (NSR)
- Sea ice extent (Dec 15, 2020)

- Arctic Ocean territorial claims**
- United States
 - Russia
 - Norway
 - Denmark
 - Canada



“The future of the Arctic is cooperation not confrontation.”

Arctic Council

- > Due to global warming effects, it is expected that most of the Arctic will be accessible year-round to icebreakers by 2050, with existing seasonal passages to vessels accessible without icebreaker support from 2030 onwards
- > New economic, scientific, maritime, and political opportunities in the Arctic will continue to engage competitive dynamics between the United States, Russia, and China – as well as other Arctic Council states
- > With fossil fuels playing a part in the global energy mix well until 2050, the Arctic's oil and gas reserves are a key resource, containing an estimated 13% of the world's undiscovered oil reserves and 30% of its natural gas reserves
- > An increasingly ice-less Arctic also opens new or more permanent shipping routes that can significantly shorten travel times between Europe and Asia, affecting and changing the role of the Middle East in international trade
- > The Arctic's growing geostrategic significance is driving an increase in US and observer countries' attention to the region's security and stability: China's Arctic White Paper (2018) sees its role as a "near-Arctic" state with plans to create a Polar Silk Road by constructing infrastructure throughout the Arctic – potentially gaining access to the Arctic's natural resources, and as a basis for a future military presence

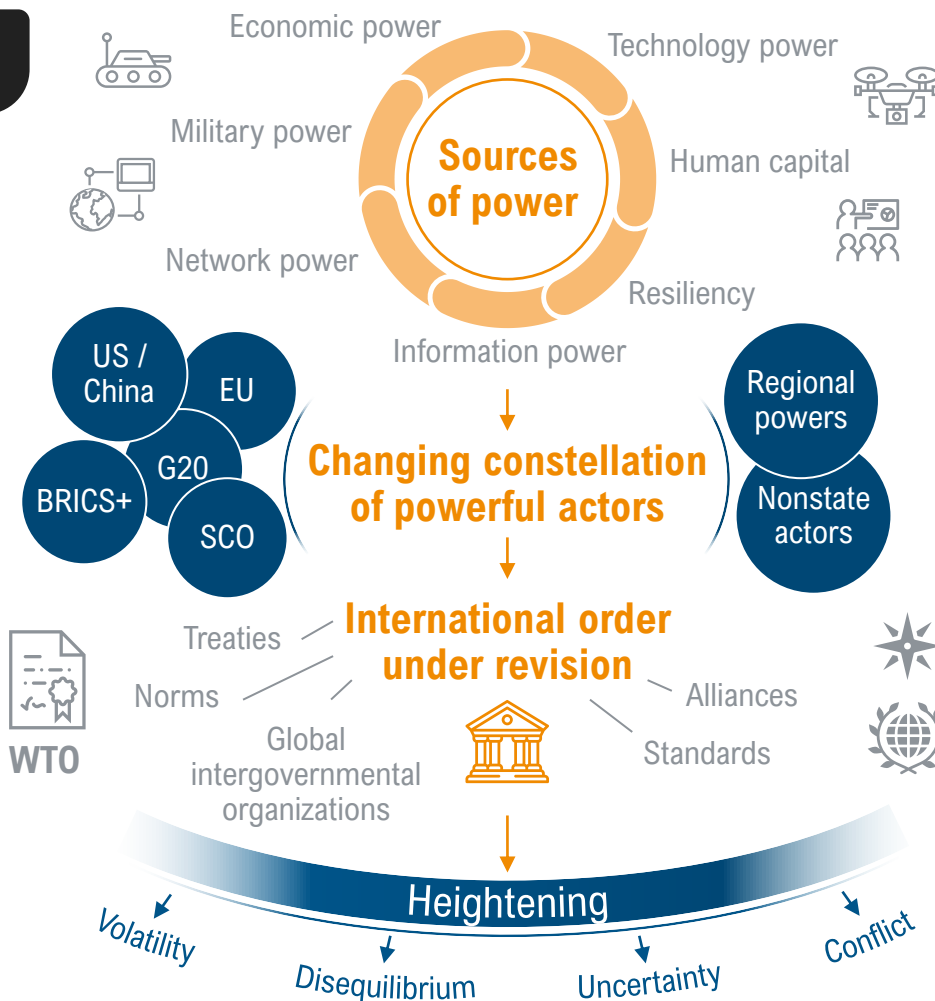
1) 5 countries exert direct Arctic territorial claims: Russia, Canada, Denmark/Greenland, Norway and the US, with a further 3 (Finland, Iceland, Sweden) also being member states of the Arctic Council, the governing body coordinating and implementing policy in the region. A further 38 nations including China (since 2013) hold observer status
 Sources: Marine Policy; CSIS; Brookings; KAS; Roland Berger

Current conflicts take place in an environment of structural changes of geopolitics – And trigger such changes

Factors and challenges influencing the global world order

"Shocks of recent years – most notably, the **war in Ukraine** and **COVID-19 pandemic** – have reflected and accelerated an epochal **change to the global order**. Risks that are more severe in the short term are **embedding structural changes** to the **economic and geopolitical landscape** that will accelerate other global threats faced over the **next 10 years.**"

World Economic Forum



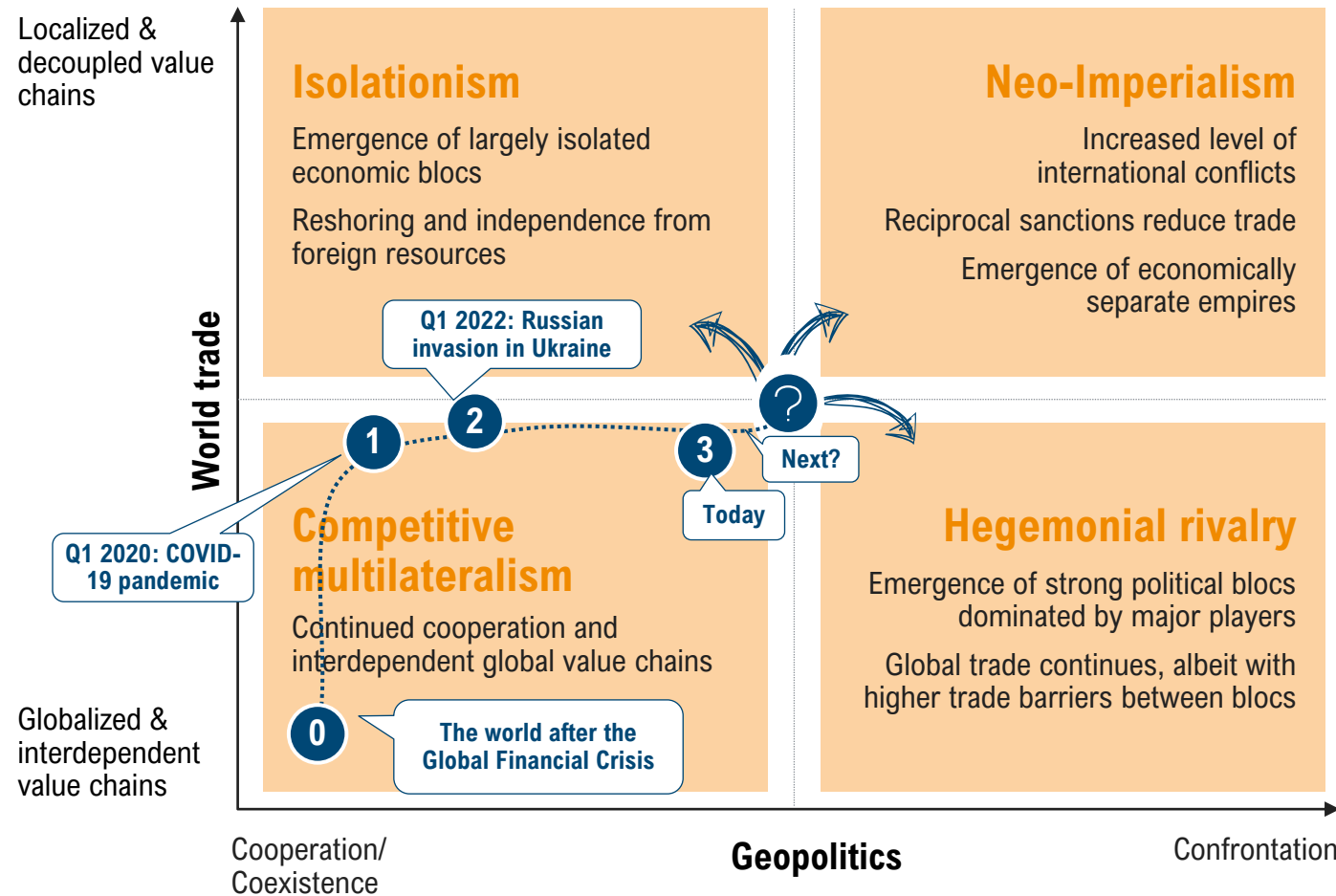
Reshuffling the global order of powerful players, blocs and international alliances

- > Due to Russia's invasion of Ukraine, **NATO's importance is renewed**. At present the alliance has **31 member countries**, including **Finland** which joined NATO in **April 2023**. **Sweden's application** to join has been formally submitted, but ratifications by Hungary and Turkey are **still pending**; three countries (**Ukraine, Bosnia and Herzegovina, Georgia**) show strong aspirations to join

- > New **hybrid unions** are becoming more prominent: in June 2023, India will be hosting the **Shanghai Cooperation Organization (SCO)**, a Eurasian organization for mutual **security, political and economic cooperation** founded in 2001. Full members include China, Russia, India, Iran, Pakistan, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. Iran is set to become a full member, Saudi-Arabia is set to become a dialogue member. Turkey has expressed a wish to join this forum, causing friction with other NATO members

From a world of competitive multilateralism geopolitics is probably evolving to rivalrous multipolarity

International order scenario matrix

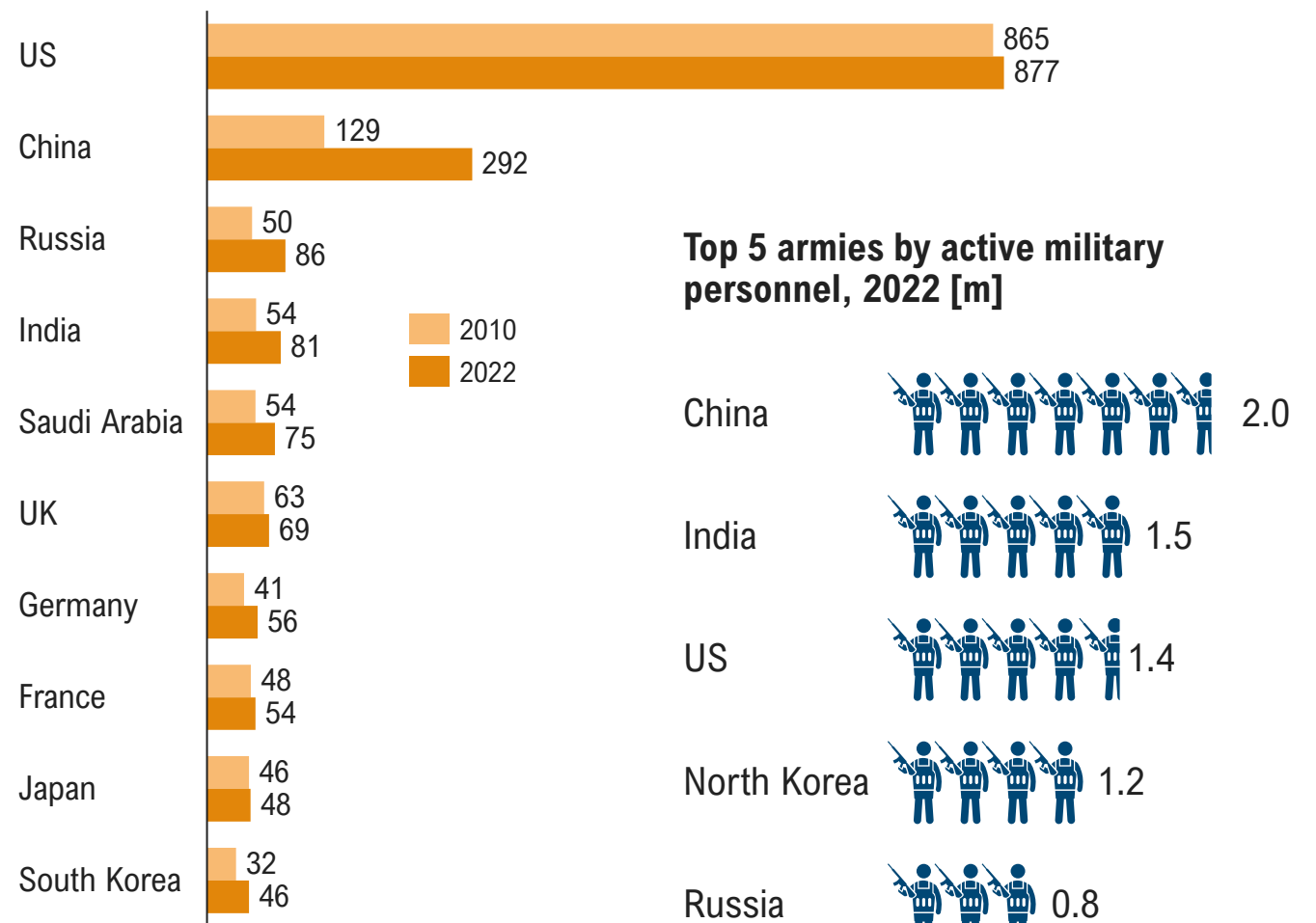


- > For some time, global governance displays a notable tendency toward **rivalrous multipolarity**, where major powers and blocs compete more intensely and less cooperatively on the global stage – leaving the rest of the world to strike a difficult balance
- > While the pace of globalization continues to slow, a **transition to more unilateral action of major powers can be observed**, as is evident in the **rise of trade protectionism** – the latest example being the US IRA¹⁾
- > Established **global value chains** rely on a liberal, cooperative and peaceful world order. The Russian invasion of Ukraine has shown that such a world cannot be taken as a given and subsequent sanctioning of the Russian invasion has further **polarized the international order** while the war exacerbates already existing economic disruptions and challenges such as inflation and shortages stemming from the global pandemic
- > At the same time, this has raised the question of what the **relationship of democratic states with authoritarian/autocratic regimes** may look like in the future

1) Inflation Reduction Act of 2022
Sources: Roland Berger; US Congress

The growing rivalry between countries and blocs is backed by a strong increase of emerging markets' military spendings ...

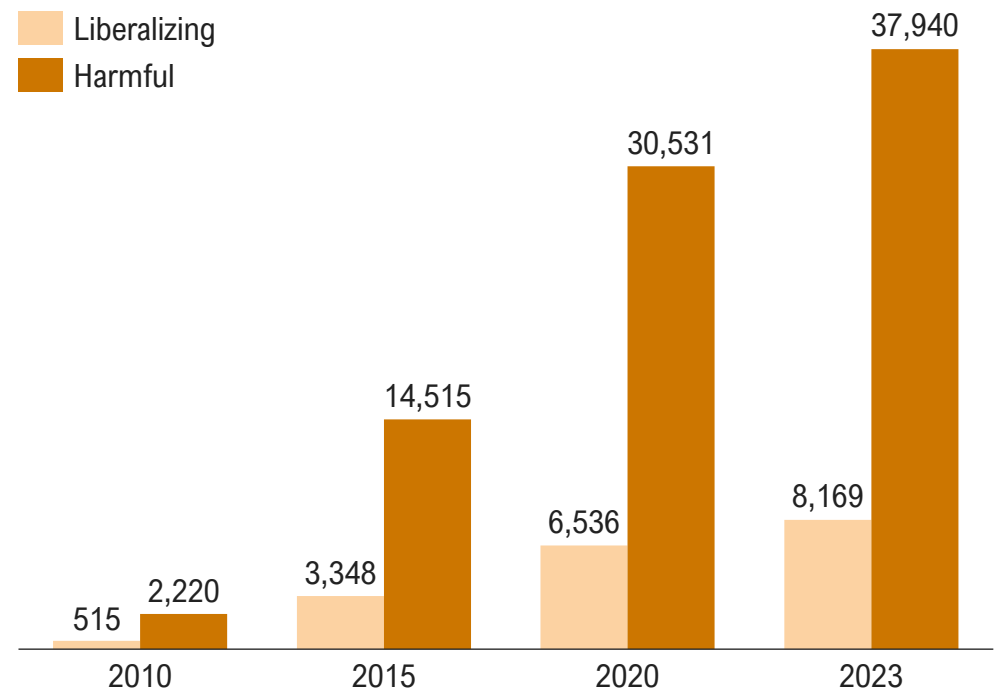
Top 10 countries by military expenditure, 2010 and 2022 [USD bn]



- > The **USA** still has, by far, the highest military expenditure. However, there the trend is downward. **China**, on the other hand, has **significantly increased** its military spending, as have other **Asian countries**, although on a smaller scale
- > **European countries** are **expanding** their military budgets and must continue to do so in the future in order to **comply with NATO agreements**
- > **China and India** have the **largest armies** by military personnel globally
- > There are many, often long-standing, regional, multi- or bilateral military as well as security alliances. Most recently, new groupings are being formed or existing ones being revived, particularly concerning one region: As an example of the former, **AUKUS**, a trilateral security pact between Australia, the UK and the US for the **Indo-Pacific region** was announced in late 2021
- > At the same time, the alliance known as the **Quad** – the Quadrilateral Security Dialogue – involving the US, Australia, India and Japan – was **revived** and is also pledging to work towards peace and prosperity in the **Indo-Pacific region**. Furthermore, in early 2022, Japan and Australia signed a new defense treaty, the Reciprocal Access Agreement. Their joint statement explicitly mentioned the **growing collaboration among the Quad nations** to "drive forward coordinated responses to the most pressing challenges" in this region. Efforts are also underway for **Quad Plus** or **Quad 2.0**, involving – but by no means limited to – South Korea, Vietnam, New Zealand, Brazil and Israel for future strategic alignment

... as well as growing protectionism – Global trade is increasingly burdened by harmful trade interventions and policies

Cumulative number of harmful and liberalizing trade interventions, globally 2010-2023



Selected policies and interventions placing a burden on free global trade

Strategic sovereignty policies

- > **China's Dual Circulation Strategy:** putting a stronger focus on domestic consumption. Strategy "Made in China 2025" aims to increase the share of domestically produced key materials, thus reducing dependence on foreign suppliers
- > **US Chips & Science Act:** aimed at keeping manufacturing and research of semiconductors in the domestic market, lowering strategic dependence
- > **EU Chips Act:** directed at strengthening domestic EU semiconductor market by reducing the strategic vulnerability from third country imports

Race for green subsidies

- > **EU carbon levy:** promoting greener industry by levying a carbon price tariff on polluting imports, disincentivizing imports from less developed countries
- > **US Inflation Reduction Act:** promoting a greener economy by falling back on protectionist levers to boost domestic industry and energy transition

Geopolitical tensions

- > **Trade wars and sanction policies:** causing fragmentation and bloc formation, disrupting global trade, harming producers and consumers

Potential to foster trade

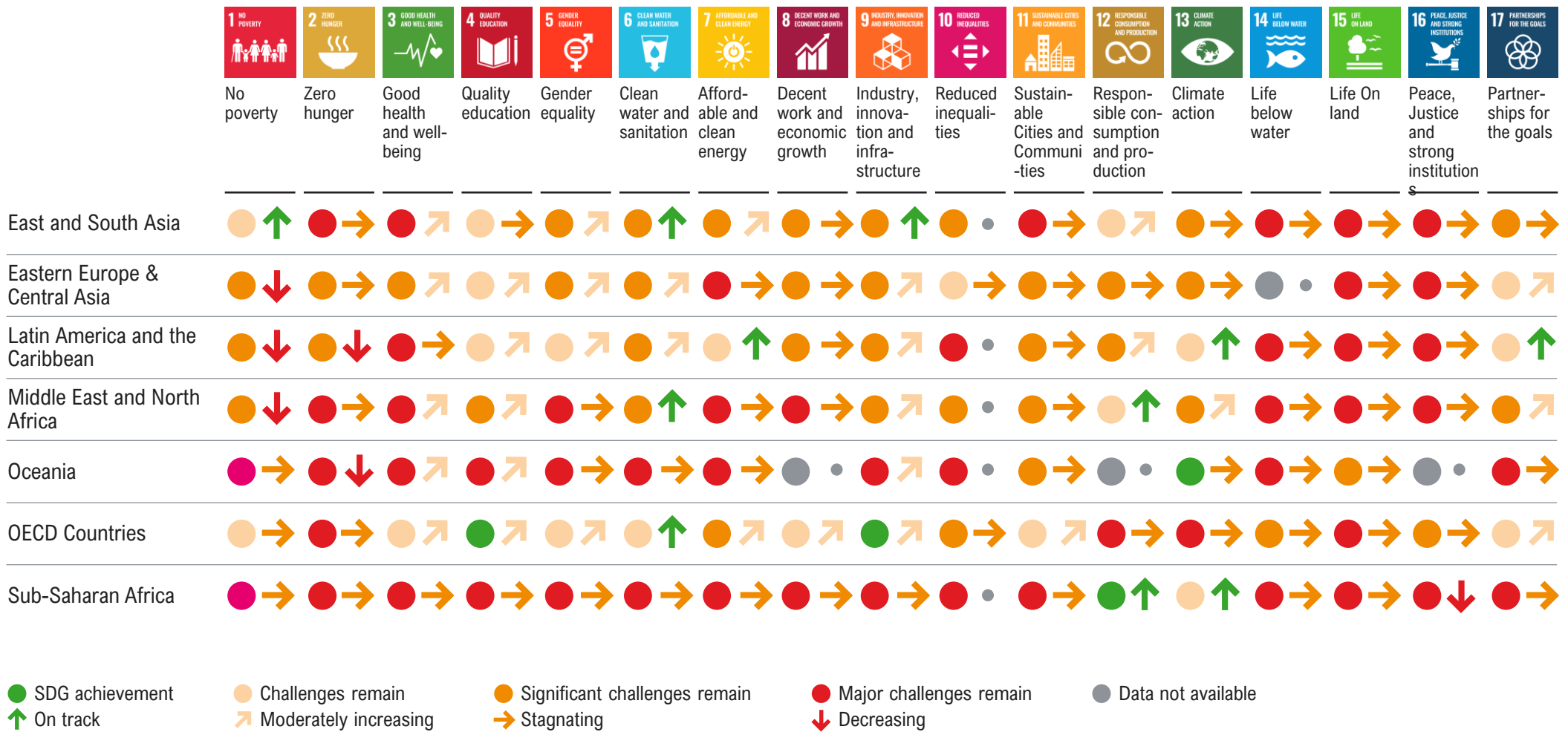
On a **regional level** there are **strong existing institutions and agreements** lowering trade barriers (e.g. EU, USMCA¹), CETA²), RCEP³), AfCFTA⁴), Mercosur⁵), CPTPP⁶) as well as **ongoing efforts to establish new agreements** (e.g. EU-Mercosur, EU enlargement)

1) USMCA = United States-Mexico-Canada-Agreement; 2) CETA = Comprehensive Economic and Trade Agreement (EU and Canada); 3) RCEP = Regional Comprehensive Economic Partnership (Asia-Pacific countries, incl. China, Japan, Australia); 4) AfCFTA = African Continental Free Trade Agreement; 5) Mercosur = South American trade bloc, full members are Argentina, Brazil, Paraguay and Uruguay; 6) CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership

Sources: Global Trade Alert; Roland Berger

Instead of confrontation, the world needs cooperation to achieve the United Nations' Sustainable Development Goals 2030

SDG dashboard, levels and trends by region, 2023¹⁾



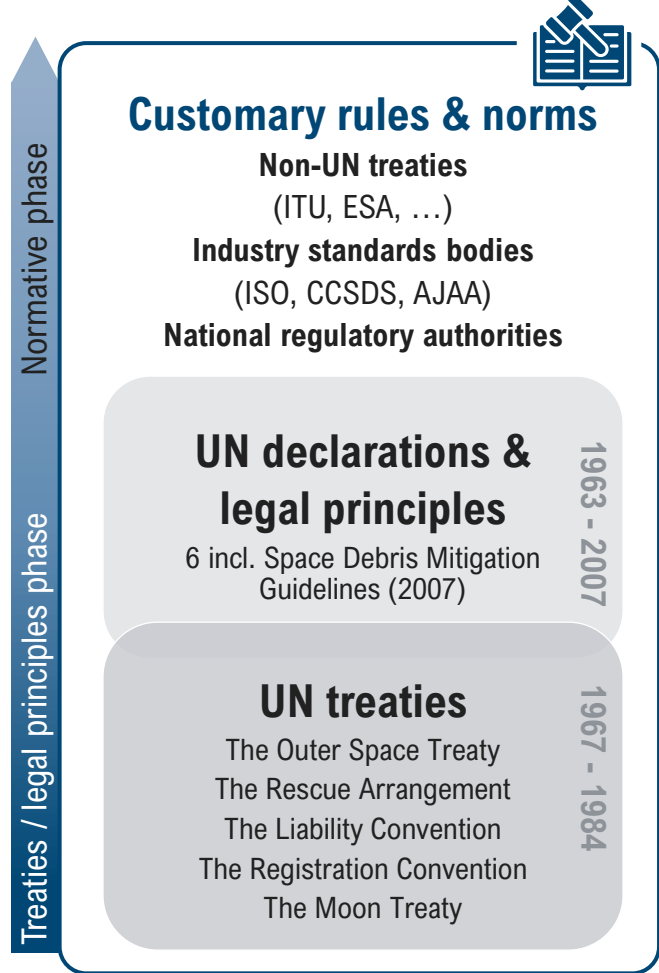
1) Data availability for 156 countries, population-weighted averages
Sources: Sachs et al.; Roland Berger

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International cooperation is needed on numerous fields like space operations ...

Evolution of past and present space governance framework



Future challenges

- 5 new government-developed space stations by 2030
- 28 nations with domestic space policies
- 50+ countries operate spacecraft in orbit
- 75+ government space agencies – 16 with launch capability
- 20+ new space agencies proposed by countries or blocs
- 1,500+ mostly for-profit space actors
- 30,000+ pieces of space debris regularly being tracked

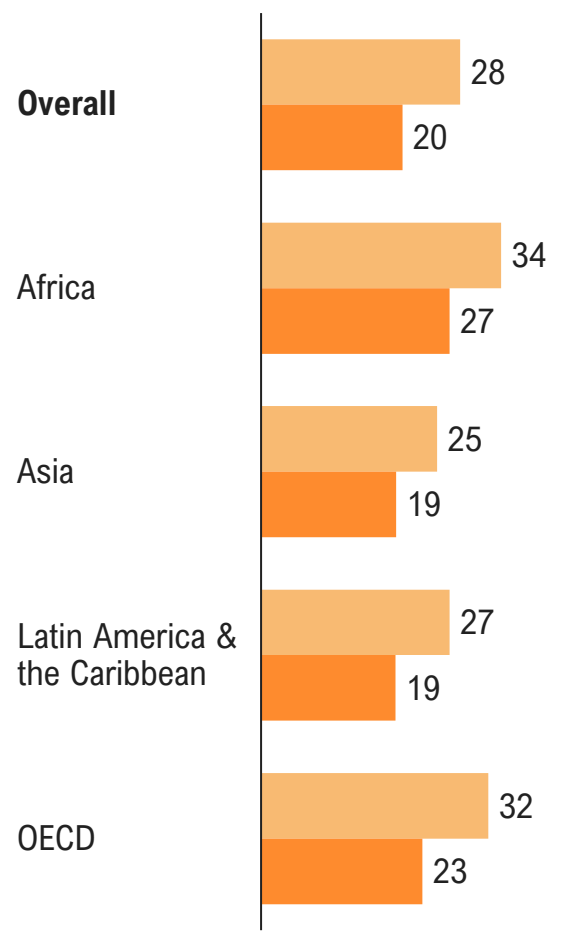
- > Space is a much evolving area of governance: Cornerstone **UN treaties** date back to the cold war period and were followed by **norms and principles**, mainly through **voluntary, non-legal measures** with the goal of achieving mutual understanding and reducing suspicion and rivalry between states. Today, COPUOS and UNOOSA¹⁾ act as two of the organizations managing **peaceful space operations** within the existing framework – amongst a much wider number of institutions
- > **The US, Russia, China, Europe, India, Japan, and Israel** represent the **most established space powers**, each with indigenous orbital launch capability and a long track record of operating satellites. Today, a rising number of entities – **nations, blocs and non-state/for profit actors** such as SpaceX, Blue Origin and Virgin Galactic – elsewhere are planning or undertaking space initiatives, shaping the **space industry's increasingly global value chain**
- > Although the **privatization of space** has so far proven to be primarily a Western phenomenon, nations around the world are adopting observed **public-private partnership models** – **competition is rising**, changing the utilization of space
- > **Current international space governance was not built for this changing nature of space development**, often termed NewSpace. In the long-run, bilateral agreements, national policies, and passive support of non-binding agreements will not be sufficient – **new governance is needed**
- > Of the **many challenges** arising – overpopulated orbits, growing space debris, radio frequency interferences, issues of spectrum allocation, and the development of counter-space capabilities – none can be addressed without reinstating intergovernmental bodies and **new binding rules of engagement** to develop an **effective space regime**

1) COPUS: Committee on the Peaceful Uses of Outer Space; UNOOSA: United Nations Office for Outer Space Affairs
Sources: Wilson Center; UN; ESA; Ghent Institute; Roland Berger

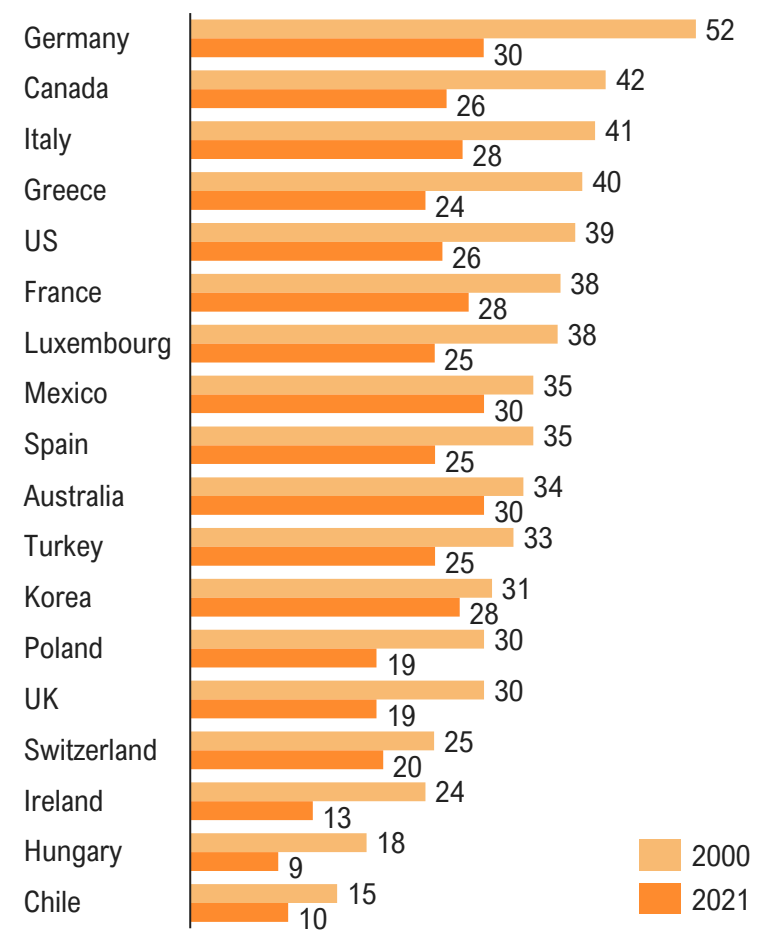
... tax governance for multinationals ...

Statutory corporate income tax rates, 2000 and 2021¹⁾ [%]

Selected regions²⁾



Selected OECD countries



- > In late 2021, G20 leaders endorsed the implementation of a **15% global minimum tax for multinational enterprises (MNEs)**, coming into law in 2023
- > To be implemented by **141 countries and jurisdictions**, the aim is to reign in the long observed global "race to the bottom" in terms of **corporate income tax rates**, where mismatches between countries' tax systems are instrumentalized for the purpose of aggressive tax planning
- > In terms of global tax governance, this agreement equips governments with **domestic and international instruments** needed to tackle **tax avoidance**, which is **costing governments an estimated USD 100-240 billion in lost corporate income tax revenues per year**
- > The new minimum corporate tax rate is part of a wider, two pillar **BEPS framework³⁾** tackling **international taxation issues**. Its mandate also addresses emergent taxation challenges – scale without mass, reliance on intangible assets, centrality of data – arising from digitalization, globalization and new business models

1) Combined tax rate of state and sub-central tax rates 2) Unweighted country average 3) BEPS: Base Erosion and Profit Shifting
 Sources: OECD; ITR; Roland Berger

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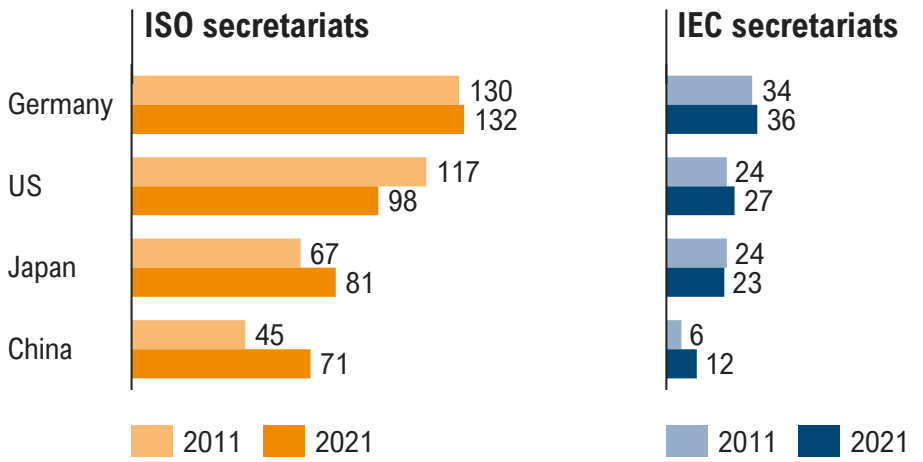
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... AI regulation ...

Areas concerning AI governance¹⁾



Number of secretariat positions by country, 2011 and 2021

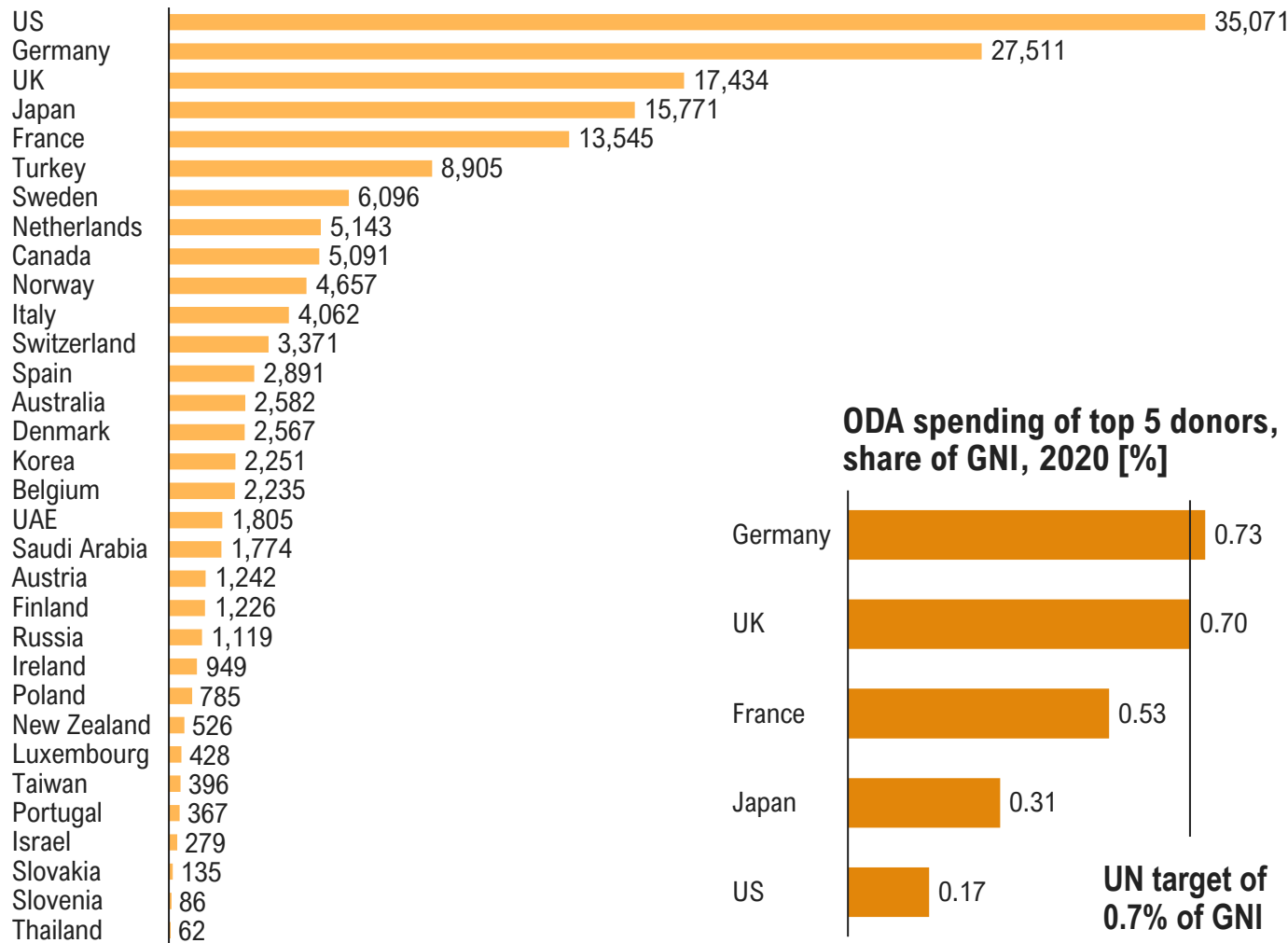


1) Standards organizations involved in AI include ISO/IEC JTC, ITU, IEEE, CEN-CENELEC, ETSI, IETF
Sources: OECD; OxCAIGG; EU; Nikkei Asia; Carnegie Endowment; China Briefing; HBR; Roland Berger

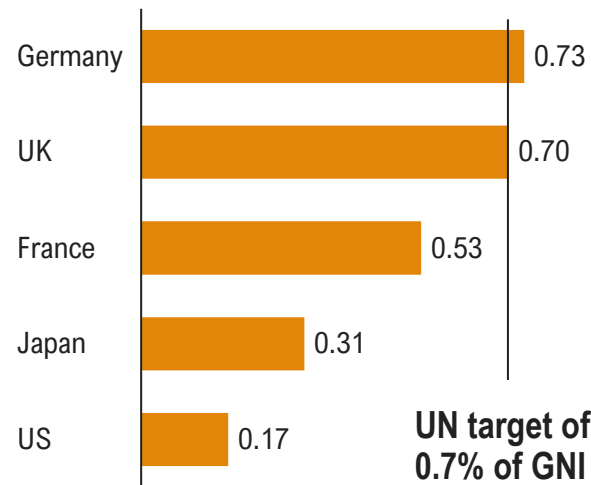
- > For best possible future development, the **emerging field of AI** needs to be supported by **an agreed supranational policy framework** in areas of security, privacy, engineering, big data, accountability, quality and ethics. The nature of AI calls for international efforts at a political level, to **mitigate risks to multilateralism** and global trade, including through the **EU-US Trade and Technology Council**, and through **cooperation** with the **"standardization superpower China"**
- > The **world's first concrete proposal** for regulating artificial intelligence, the **draft EU AI Act** (April 2021) is a landmark attempt to provide a regulatory foundation for the **safe, fair, and innovative development of AI in the EU**, and is of consequence **across the globe**. EU regulation will employ a **tiered risk-based approach** concerning the controls it will place on the use of AI systems including the **use of algorithms** and depending on the intended **purpose** of the AI system; companies that violate regulations could **face fines** of up to 6% of their worldwide annual turnover. If finalized in 2022, a subsequent two year "grace period" appears likely
- > In the **US** by contrast, regulatory guidelines have been proposed on an **agency-by-agency basis**; there is currently **no federal regulation** of AI in the US – but it is on the horizon. Meanwhile, much of the governing legal framework is through the **cross-application of a mix of rules and regulations governing traditional disciplines**, such as product liability, intellectual property, discrimination and workplace rights, and data privacy
- > Strikingly different, China's **Standards Strategy 2025**, published in October 2021, strives to play an **increasing role in the formulation of international standards – including AI – to shape the future direction of tech development overall**. **Specifications affect** products, services and processes of **all producers** and consumers/users around the world and are usually **formed based on the best technical solutions** – indicating the advanced development of a country, also in terms of innovation. Taking the **lead in the formulation of industry standards**, **allows for stronger control over system design and rulemaking**, leading to a dominating position in the global market. Not limited to **AI and data**, China's strategy affects other areas of innovative technologies yet to be standardized (drones, lithium batteries, etc.)

... official development assistance ...

Net official development assistance grant equivalent, 2020 [USD m]



ODA spending of top 5 donors, share of GNI, 2020 [%]

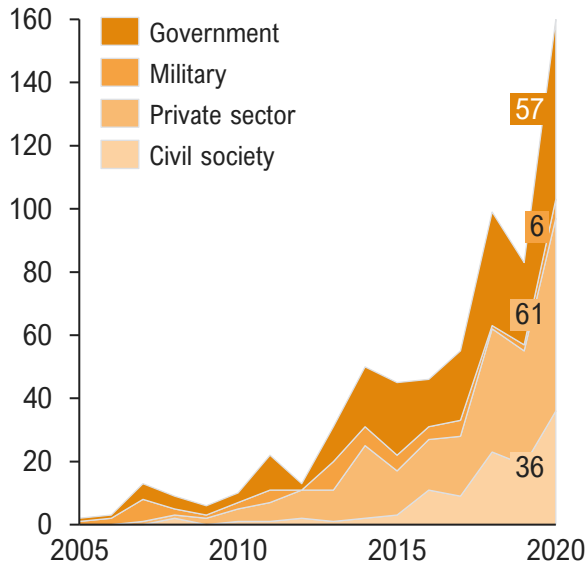


UN target of 0.7% of GNI

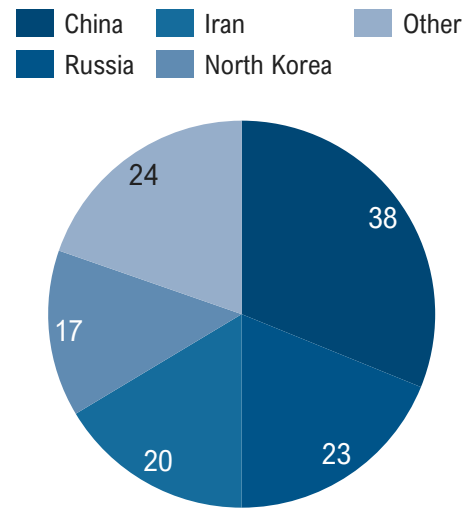
- > Official development assistance (ODA) has been increasing for decades. ODA is defined by the OECD Development Assistance Committee (DAC) as **government aid** that **promotes** and specifically targets the **economic development and welfare of developing countries**; it remains the **main source of financing for development aid**
- > The **top five donor nations** account for around **64%** of total government aid
- > However, some of the top donor countries spend relatively little on ODA as a percentage of GNI – indeed, the **number one ODA donor, the United States**, spent **less than 0.5%** on ODA in 2020
- > The **UN target of 0.7% ODA of donors' national income** is reached by less than half a dozen of donor countries – these include Sweden, Norway, Luxembourg, Germany and Denmark
- > **Wider concepts of foreign aid**, other than ODA, can take on very different forms: **China** – not being part of the OECD DAC – is estimated to spend USD 5 billion on foreign aid, however this is considered mostly **transactional** in nature
- > **Total ODA** (USD 161 billion) is **dwarfed by the total amount of remittances** (USD 540 billion to low- and middle-income countries in 2020), thus supporting home nations **through transfers of private funds** from abroad

... cybersecurity and many other fields!

Cyberattacks by target, 2005-2020¹⁾



Number of state cyberattacks by sponsor, 2020



“Particularly in an era of rising tensions between superpowers, cyberattacks are another battlefield in which escalation is a key risk. If cyberthreats continue, governments will continue to retaliate against perpetrators, leading to open cyberwarfare, further disruption for societies and loss of trust in governments’ ability to act as digital stewards.”

World Economic Forum

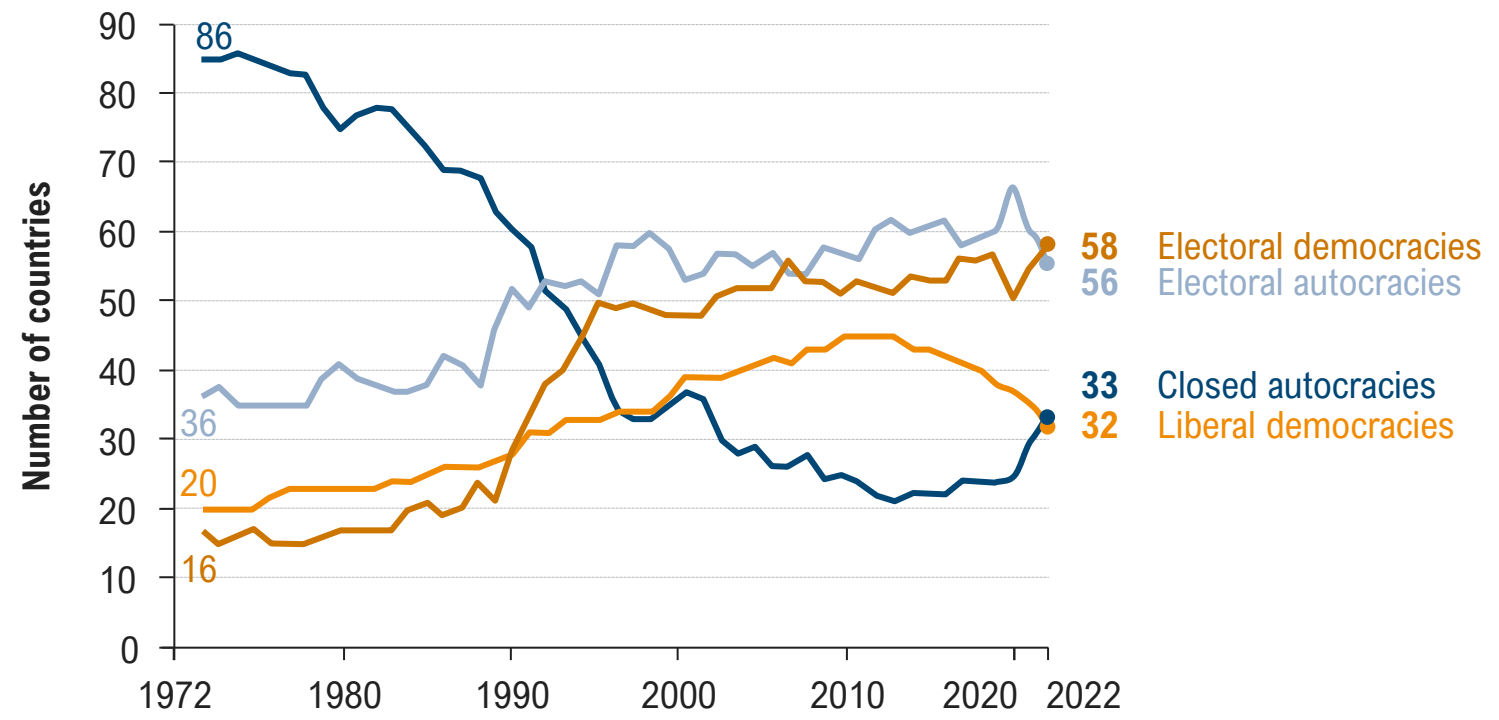
1) CFR's Digital and Cyberspace Policy program's cyber operations tracker is a database of publicly known state-sponsored incidents that have occurred since 2005

Sources: CFR; WEF; CSIS; Roland Berger

- > **Cyberwarfare** utilizes techniques of defending and attacking information and computer networks that inhabit cyberspace. It denies an opponent's ability to do the same, while employing technological instruments of war
- > Since 2005, **34 countries are suspected of sponsoring cyber operations**. China, Russia, Iran, and North Korea sponsored 3/4 of all suspected operations, mostly related to espionage
- > The CFR's cyber operations tracker focuses on instances of **publicly known state-sponsored cyber activity**, therefore only containing **data** involving suspected **perpetrators (threat actors)** affiliated with a **nation-state**. The purpose is to accurately and comprehensively identify when states and their proxies conduct cyberoperations in pursuit of their **foreign policy interests**. Reporting on nonstate actors, such as hacktivist groups, tends to be opaquer, giving less reliable data
- > **Cyberterrorism**, on the other hand, is the use of computer network tools to **shut down critical national infrastructures** (such as energy, transportation, government operations) or to coerce or intimidate a government or civilian population

From geo- to national politics: Autocratization trends are intensifying – The future of liberal democracy is under threat

Number of countries classified by regime type, 1972-2022¹⁾



- > **Electoral democracies** are the **most common regime type**; electoral democracies as well as electoral autocracies have increased in numbers over the past five decades – the latter, for example, includes Serbia, Hungary, and India
- > The most recent years' **increase** in the number of **electoral democracies** may appear to be a positive but is largely a **consequence of liberal democracies undergoing** (gradual) **autocratization**
- > For the first time since 1995, there are **fewer liberal democracies than closed autocracies**; the former decline from a **peak of 44 in 2009 to 32 in 2022**
- > The number of **closed autocracies** has gone up from a low of 22 in 2012 to 33 in 2022, highlighting the other momentum of the current wave of autocratization. In recent years, countries such as **Afghanistan, Chad, Guinea, Haiti, Iran, Mali, Myanmar, Turkmenistan, and Uzbekistan** have fallen under this regime type

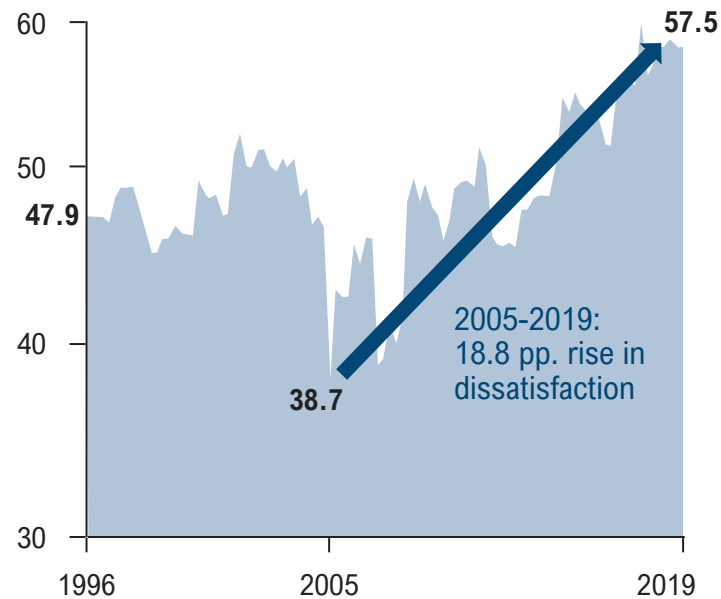
The University of Gothenburg varieties of democracies (V-DEM) dataset covers 470+ indicators for 200+ countries. According to V-DEM, **electoral democracies** are systems where a number of institutional features guarantee free and fair elections such as freedom of association and freedom of expression; **liberal democracies** in addition include protection of individual liberties, and the checks and balances between institutions; **autocracies (electoral or closed)** display a sliding lack of such features

1) Uncertainty remains about regimes that exhibit similar degrees of authoritarian and democratic traits and thus are close to the threshold between democracy and autocracy. In 2022, such uncertainty applied to 16 countries. Thus, the **number of autocracies** in the world might range from 84 to 100 countries, with **89 being the best estimate**
 Sources: University of Gothenburg/V-Dem Institute; Roland Berger

Within democracies, public dissatisfaction with democracy is on the rise since 2005 – However, amongst advanced economies views vary widely

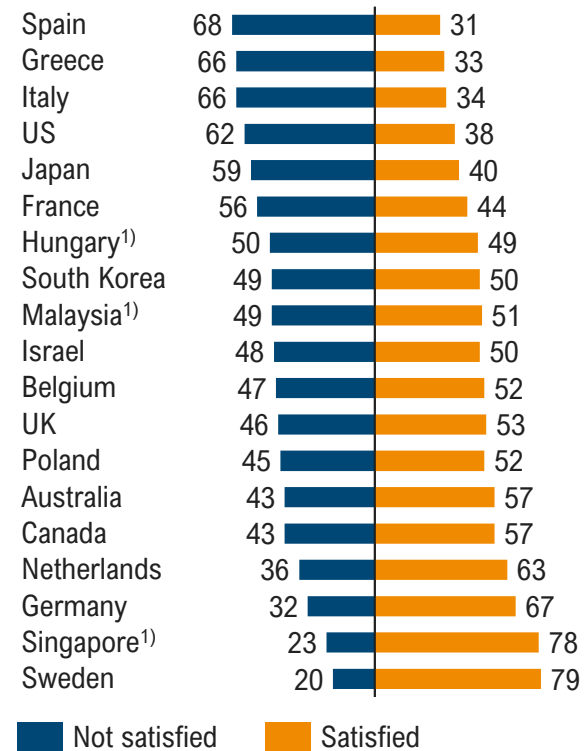
Global dissatisfaction with democracy, 1996-2020 and spring 2022 [%]

Share of population in 77 democracies being dissatisfied with democracy, 1996-2020 [%]



The University of Cambridge's Centre for the Future of Democracy tracks the 'mood' in **77 democracies**; observations are based on a constant-country, population-weighted sample of these democracies for which data exists from the mid-1990s to 2019. This represents 2.4 billion individuals across all continents

Share of population in selected democracies being not satisfied/satisfied with democracy, spring 2022 [%]



Pew Research surveyed public attitudes in 19 advanced economies from March to May 2022

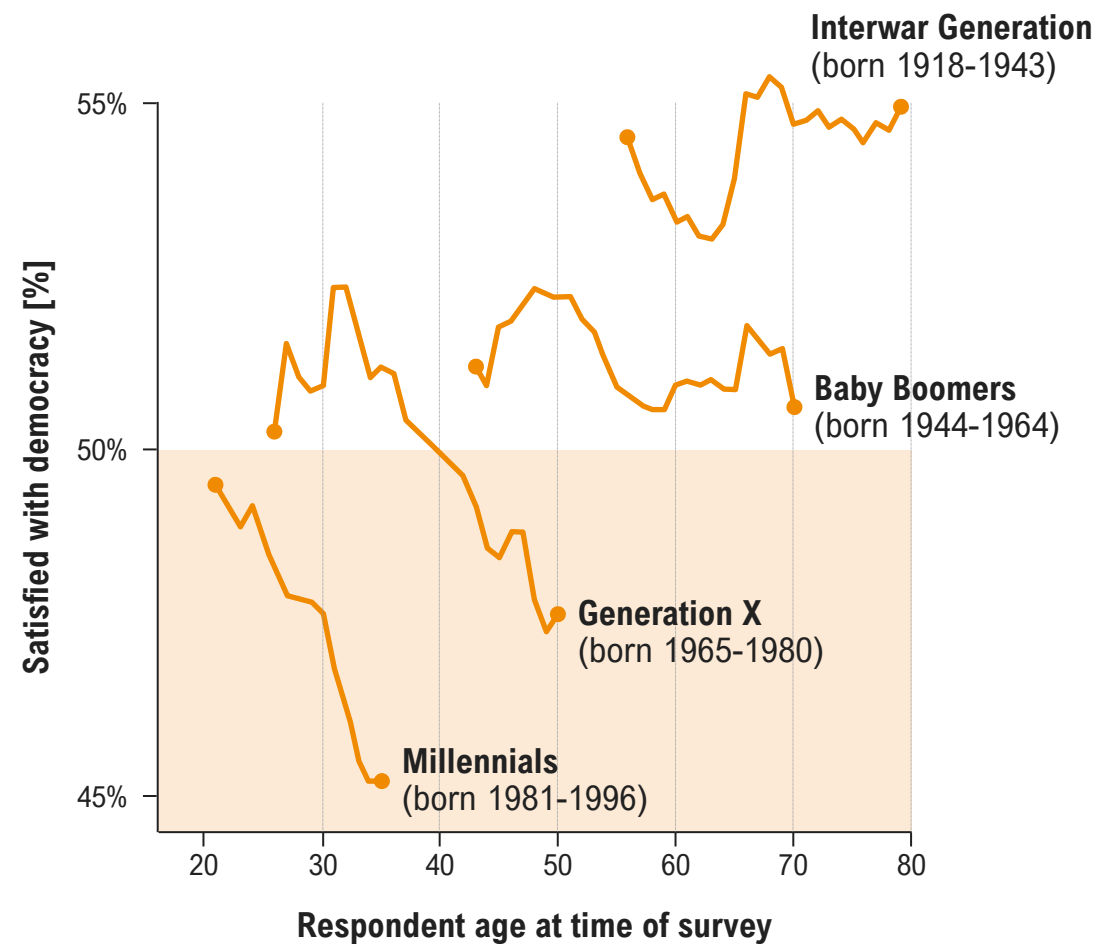
- > Across the globe, democracy appears to be in a **state of discontent**: **dissatisfaction with democracy has risen over time**
- > 2019 represents the **highest level of democratic discontent** on record: nearly 58% are unhappy with democracy
- > The **rise in democratic dissatisfaction** has been especially sharp **since 2005**, with just 38.7% of citizens dissatisfied in that year. Since then, the proportion of dissatisfied citizens in the 77 observed democracies has risen by almost one-fifth of the population
- > But **views can vary widely at the national level**: according to a Pew Research survey undertaken across **19 advanced economies** in spring 2022 **levels of dissatisfaction** with democracy are notable in southern European nations (Spain, Italy, Greece) but also the US, while northern European countries (Sweden, Germany, Netherlands, Poland, UK) appear more satisfied with the way democracy is working in their country

1) Hungary, Malaysia and Singapore are electoral autocracies according to the V-DEM University of Gothenburg classification

Sources: University of Cambridge Bennett Institute; Pew Research Center; Roland Berger

What is particularly alarming: Younger generations are less satisfied with democracy than older ones and their satisfaction declines further with age

Global satisfaction with democracy by generational cohort and age¹⁾ [%]



- > Around the world, **young adults living in democracies today are less satisfied** with the performance of democracy than **older generations** – each generational cohort is less satisfied with democracy than the preceding cohort at comparable ages
- > For example, while a **majority of Millennials** – having come of age in the 21st century – **express dissatisfaction with democracy** in their countries, a generation ago the majority of those at a comparable age (people from **Generation X in their twenties and thirties**) **have been satisfied** with democratic performance
- > As the **population share of Millennials and Generation X will increase** compared to the shares of the older generations, the **overall satisfaction can be expected to decline in the future**
- > In addition to the differences between the generations, the development over time within the two younger generations – Millennials and Generation X – raises **further concerns as younger cohorts have become more dissatisfied as they have aged**. If this development continues, the overall satisfaction with democracy will decline further
- > The **good news** is that, although differences between these generations are significant, with a range of 45%-55%, they are not insurmountable – a **chance to mitigate remains**
- > In addition, there is also **room for improvement in terms of the older generations**. If the satisfaction of the baby boomers were to increase, the overall satisfaction would strongly increase, as they account for a large share of the total population

1) Global aggregate of 75 countries in all regions of the world, weighted by country-population
Sources: University of Cambridge Bennett Institute; Roland Berger

The future of autocratization is democratic erosion – How to spot future would-be autocrats: Checklist of early-warning signs

Early warning signs of autocratic tendencies in (would-be) leaders/parties include:



Low commitment to the democratic process:

Unwillingness to publicly commit to legal means for gaining power

- Expresses willingness/need to violate the constitution
- Expresses sympathy for non-constitutional means of accessing power
- Attempts to undermine the legitimacy of elections



Demonization of political opponents:

Denial of the legitimacy of democratic political parties to participate in political process

- Describes rivals as subversive/criminal or foreign agents
- Claims that rivals constitute an existential threat



Encouragement of political violence:

No rejection of the use of force and willingness to ask for armed forces

- Encourages or sponsors mob attacks on opponents
- Endorses or praises political violence
- Has ties to militia or armed gangs



Disrespect for fundamental minority rights:

Curtailment of the civil liberties of democratic parties' leaders and supporters

- Support laws or policies restricting civil liberties
- Threatens to take legal action against critics
- Praises repression



2 Politics & Governance

2.1 Global Risks

2.2 Geo-politics

2.3 Future of Democracy

3 Environment & Resources

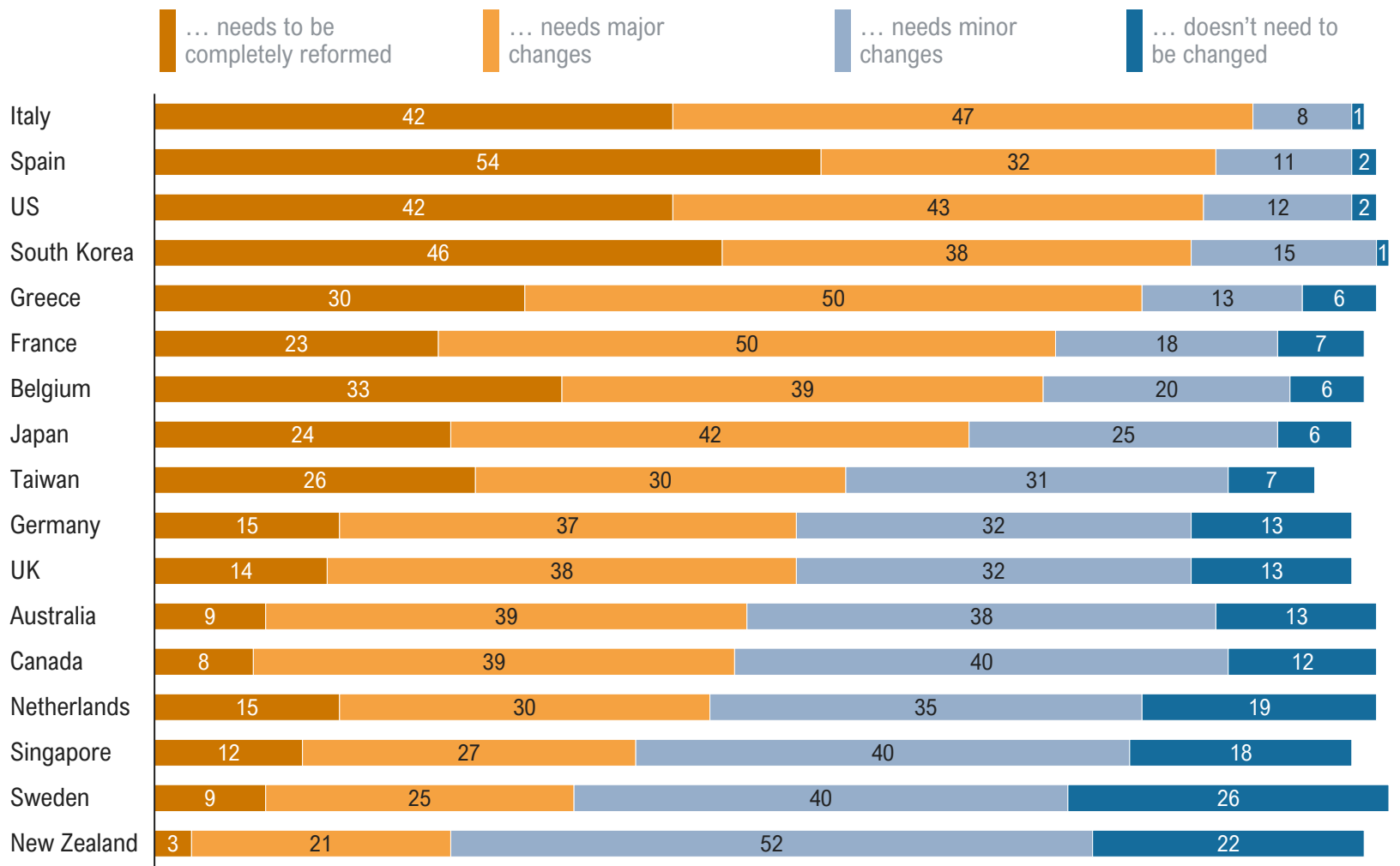
4 Economics & Business

5 Technology & Innovation

6 Health & Care

Good governance factors in the public mood: In advanced economies, post-pandemic expectations signal the need for major political reforms

Share of respondents saying the political system¹⁾... [%]



> A median of **56% across 17 advanced economies** surveyed in spring 2021, shown left, say their political system needs **major changes** or needs to be **completely reformed**

> Roughly **two-thirds or more** express this opinion in **Italy, Spain, USA, South Korea, Greece, France, Belgium and Japan**

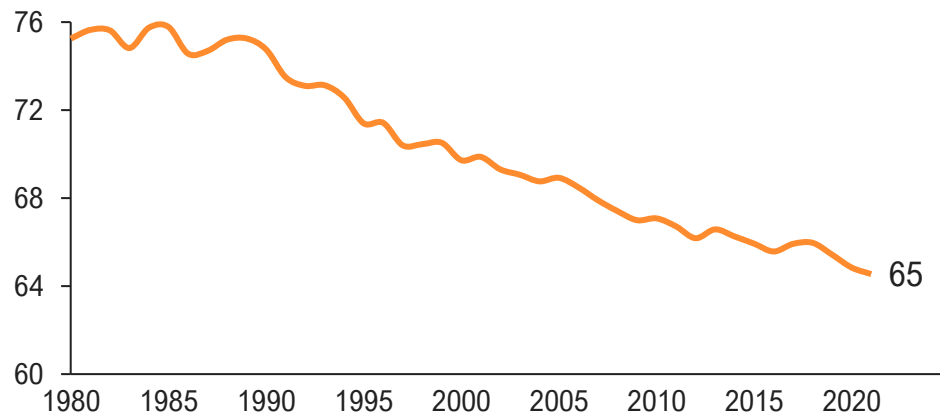
> Political reform does **not appear to be so pressing** or radical in other countries, particularly in **Sweden, Canada and New Zealand**

> **Reasons** for wanting change are varied but attitudes are shaped in part by views about the national **economy**, the impact of **COVID-19**, and **social and political divides**

1) Spring 2021 global attitudes survey; those who did not answer not shown
Sources: Pew Research Center; Roland Berger

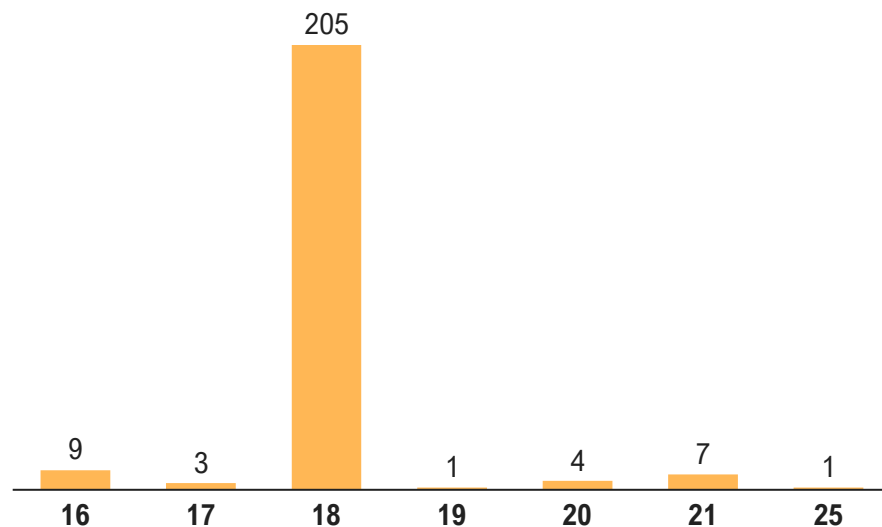
Different aspects of electoral developments can be observed: Voter turnout is declining globally. Lowering the voting age is not widespread – yet

Voter turnout trends at parliamentary elections, 1980-2020¹⁾ [%]



Number of countries and territories where the minimum voting age is ... years old, 2020²⁾

National minimum voting age of 16 in: Argentina, Austria, Brazil, Cuba, Ecuador, Germany (only in some local elections), Malta, Nicaragua, Scotland

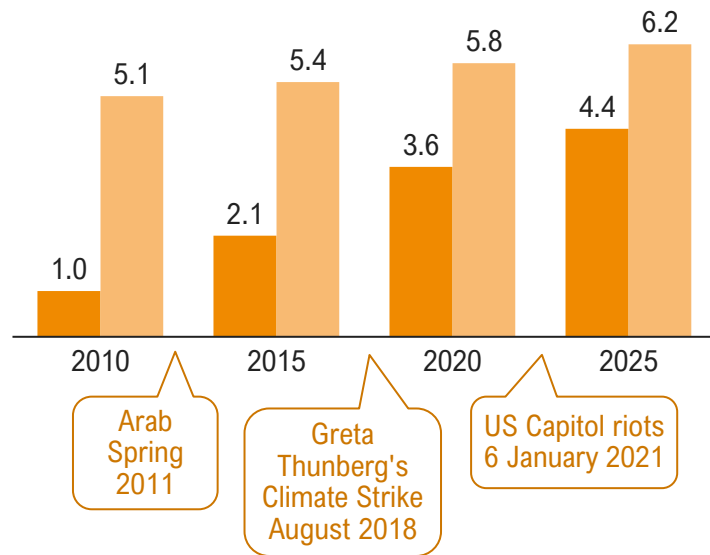


- > **Voter turnout** at national elections has been **declining globally** for several decades – but nationally this may vary greatly
- > A **core tenet of democracy is the right to vote in (free and fair) elections**: Populations aged 18 and over usually have a right to vote in almost all forms of political systems where elections are held
- > The **vast majority of countries and territories** have a **minimum voting age of 18** for national elections – bar a small number of countries with an **age threshold** of 20+ (some Middle Eastern countries, Taiwan, Singapore)
- > However, several countries, particularly in **South America**, have **lowered their voting age** for some decades in national elections, while in Europe, **Austria** and **Malta** are more recent innovators
- > Some countries **have introduced lower age thresholds for regional or local elections**, such as Estonia, in some German states and in parts of the UK – the **debate continues in many countries**
- > Lowering the voting age is often driven by the ambition **to give younger populations equity in how their countries are governed**

1) All countries excl. countries with compulsory voting law, 10-year average 2) Data available for 237 countries and territories
Sources: International IDEA; ACE Electoral Knowledge Network; Roland Berger

The voice of the people is making itself heard increasingly through the medium of technology, on social media and online platforms

Social media users and global population aged 15+, 2010-2025¹⁾ [bn]

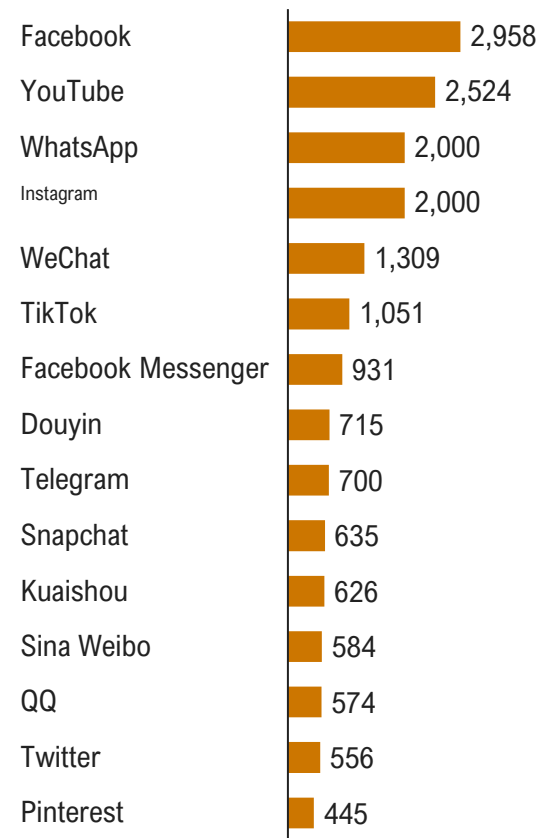


“ *Technology has already revolutionized our notion of what democracy means. It used to mean one person, one vote. Now it means, one device, one voice.* **”**

Barry Chudakov, founder, Sertain Research

■ Social media users ■ Total global population aged 15+ years

Global social platforms ranked by number of active users, January 2023²⁾ [m]



> Globally, and compared to other generations, the use of **social media as a means of freedom of expression and interaction** is unlikely to diminish in future years: **over 70%** of the global population aged 15 and older are expected to **use social media by 2025 – up from 62% today**

> The **mass adoption of social media** tools for the **purpose of pro-democracy citizen protests** – first seen during the Arab Spring a decade ago – has also given rise to **abuse** (e.g. dissemination of **fake news** or **conspiracy theories**) by national and foreign anti-democratic forces; further threats to democracies lie in the **danger of confirmation bias**, the **shaping of opinions based on misinform-ation** and, more generally, the **absence of regulation and oversight** in the social media sphere – a current and future hot topic

> Equally and going forward, the rising use of social media as a global platform for **younger activists** – as in the exemplary case of the global **Fridays for Future** campaign started by the then under-age Greta Thunberg – illustrates that the **global agenda is not limited to being shaped by voting adults** in any one country alone

1) Approximation, legal use age 13 (on average across most major social media sites), 2025 forecast 2) Not necessarily unique individuals Sources: Statista; UN; DataReportal; Roland Berger

A positive note at the end: Democratic leaders stand united combatting autocratic trends – Russian invasion of Ukraine adds significance

Latest US and EU democratic efforts and themes and the standpoint of Ukraine

USA: International Democracy Summit



Held in 2021 & 2023

Three key themes:

- Defending against authoritarianism
- Addressing and fighting corruption
- Advancing respect for human rights

“*Democracy doesn't happen by accident. We have to defend it, fight for it, strengthen it, renew it.*”

Joe Biden
President of the US

EU: European Democracy Action Plan



Launched December 2020

Includes measure on:

- Electoral integrity
- Tackling disinformation
- Media freedom
- Media pluralism

“*Democracy is Europe's most powerful diplomatic tool. Our work to uphold democracy globally has never been so important.*”

Ursula von der Leyen
President, EU Commission



“*Together we need to save Ukraine. Together we need to save the world of democracy.*”

Volodymyr Zelensky, President of Ukraine

- > The **future of democracy** requires **concerted efforts** – not just in times of war
- > A notable, **renewed level of recognition** of the importance and value of democracy has reached political leaders in democracies
- > Standing united can contribute to their **strength, but only if citizens are equally committed** to democratic principles
- > This **succeeds only if institutions and processes are truly democratic** (fairness, no corruption, checks and balances) and if they are efficient and contribute to prosperity – and if democratically elected leaders abide by this mandate

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