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Executive summary



Explore the interactive version

Board Sustainability, ESG & Climate Governance by Digoshen and Boards Impact Forum Teams

The key issues shaping and influencing Board Sustainability, ESG & Climate Governance are as follows:

Cyber Risk Governance

The number of corporate boards with a dedicated cybersecurity committee is expected to increase sharply by 2025

Generative AI*

Generative AI is a type of artificial intelligence that creates new content based on patterns and data it has learned from

Technology and Inequality

The world is divided between technology haves and have nots, and innovative tools can often compound social injustice

Adaptation for Health

Adapting societies to the warming climate should be transformational, but often remains incremental

Health Benefits of the Energy Transition

Slashing emissions can yield benefits not just for the environment, but also for public health

Cooperating on Climate and Health

Effectively addressing climate-related health issues will not be possible without broad, comprehensive collaboration

Driving Climate Benefits

According to the IPCC, large-scale carbon dioxide capture and removal is necessary to achieve our climate goals

ESG Reporting, Comparability and Assurance

Environmental, Social and Governance reporting occurs too infrequently to keep up with evolving expectations

SMEs and Value Chains

Plugging more small firms into global value chains can help accelerate the global net-zero transition

Values, Ethics, and Integrity

Good faith efforts to do no harm and reduce negative externalities are necessary

Leading on Inclusion, Sustainability and Trust

Companies have a responsibility to deploy technology in a way that benefits everyone

ESG Skills and Capabilities

The employees required to assess new layers of corporate performance need a blend of competencies and skills

ESG Shareholder Engagement

Environmental, Social and Governance-based engagement can help drive climate action and address public health issues

Building Climate Coalitions

Effective action requires engagement with many different stakeholders

Legal and Regulatory Evolution

Proactive engagement with global legal and regulatory developments can foster preparedness

ESG Ratings and Rankings

Useful Environmental, Social and Governance performance measurement relies on a shared definition of ESG

Diversity, Equity and Inclusion

Whether based on race, caste, religion, or gender, discrimination is rampant

Investing in Climate Action

Strategic investments can stimulate economies and build climate resilience

The Paris Agreement

It provides a framework for climate action, though COP26 demonstrated that we're falling behind on its goals

Understanding Climate Risks

Extreme weather, rising sea levels, and food and water scarcity are becoming a reality

Below is an excerpt from the transformation map for Board Sustainability, ESG & Climate Governance, with key issues shown at the centre and related topics around the perimeter. You can find the full map later in this briefing.



Latest insights

A synthesis of the most recent expert analysis.

Below are your latest updates on the topic of Board Sustainability, ESG & Climate Governance spanning 19 different sources.

1.1 Current perspectives



Next City

How These Partnerships Are Helping to Combat Playspace Inequity

04 December 2024

The nonprofit organization KABOOM! is working to address playspace inequity by building community-based playspaces. By incorporating climate sustainability features such as rain gardens and recycled materials, KABOOM! has gained access to more funding opportunities. Their partnership with Emerson Collective and Congress Heights Community Training and Development Corporation resulted in the creation of a sustainable playspace in Washington D.C. KABOOM! has also secured a grant from Clifbar's ZBar brand to continue creating climate-resilient playspaces. They are conducting research, forming partnerships, and training staff to create regenerative and sustainable playgrounds.



INSEAD Knowledge

Beyond ESG: Why We Need A Novel Approach

28 October 2024

ESG ratings are being questioned for their effectiveness in measuring a corporation's impact on sustainability. The three components of ESG (environmental, social, and governance) cannot be accurately evaluated using a single rating system. Governance is fundamentally about processes and accountability, while environmental and social metrics focus on impact. Standardization and transparency are needed to separate companies making real impact from those that merely engage in "ESG-washing". A "triple bottom line" approach, with standardized impact measures, offers a more

credible way to assess and compare corporate sustainability efforts. Indicators such as greenhouse gas emissions and resource consumption can provide a clearer picture of a company's impact on sustainability and the climate emergency.



Frontiers in Digital Health

Smartwatch Step Counting: Impact on Daily Step Count Estimation Accuracy

08 August 2024

A study investigated the impact of smartwatches on the accuracy of daily step-count estimation and the underlying psychological factors. Participants wore smartwatches for 4 weeks and were instructed to estimate their number of steps. The study found that displaying and reporting daily step counts on smartwatches improved the accuracy of step-count estimation. The effect lasted for at least 6 weeks. Individuals who tend to suppress their bodily sensations were less accurate in their daily step-count estimation before using the smartwatches. This research highlights the potential of smartwatches in promoting physical activity.



YiCai Global

Fostering Carbon-free Sources of Energy in The World: China, The EU, and The US at The Forefront

22 July 2024

The International Finance Forum (IFF), the European Task Force on Carbon Pricing, and the Paulson Institute are hosting an online event on July 23 to explore the current state and development of renewables and nuclear energy with a focus on the price of carbon. The forum will address the

successes and obstacles of renewables, particularly in China, and discuss the growing momentum of nuclear power. The event aims to highlight the importance of these carbon-free energy sources in fighting global warming and the role of the price of carbon in their development.

Climate Insider



BluSky Carbon Launches CO2 Removal and Secures Initial US \$1.94 Million in Sales

02 July 2024

BluSky Carbon Inc. has secured \$1.94 million in sales from carbon removal credit offsets and new equipment sales. This includes a \$1.25 million agreement with SQUAKE and a \$686,155 contract with the City of Minneapolis. The company's IPO was accepted on the Canadian Securities Exchange. BluSky aims to increase outputs with the activation of its Vulcan Heavy system by the end of 2024. The company's biomass pyrolysis system can remove up to 800 tonnes of CO2 per year.



Comision Economica para America Latina (CEPAL)

ILPES/CEPAL coorganizó el Primer Congreso Internacional de Estado Abierto y Gobernanza

02 July 2024

El Instituto Latinoamericano y del Caribe de Planificación Económica y Social (ILPES) de la Comisión Económica para América Latina y el Caribe (CEPAL) coorganizó el Primer Congreso Internacional de Estado Abierto y Gobernanza. El objetivo de la reunión fue proporcionar un espacio de diálogo y reflexión sobre el Estado abierto y la nueva gobernanza, con la participación de representantes de la academia, gobiernos, sociedad civil, sector privado y organismos multilaterales. Durante el evento, se abordaron cinco áreas temáticas relacionadas con el gobierno abierto y se promovió la creación de redes de colaboración. También se reconocieron buenas prácticas académicas en estado abierto y se lanzó un libro sobre el tema por parte de la CEPAL.



World Resources Institute

Combating Open Waste Burning to Reduce Air Pollution

02 July 2024

Municipal solid waste burning is a significant contributor to air pollution, releasing harmful particulate matter and toxic fumes. Studies show that 2% to 24% of municipal solid waste in cities gets burned, even in clean cities. To combat this issue, it is crucial for municipal corporations and city governments to acknowledge the problem and take proactive steps throughout the year. Measures include waste segregation, decentralization of

waste management, addressing behavioral issues, and implementing technological solutions. Municipal authorities can verify the extent of waste burning, establish a robust workforce, encourage waste segregation, decentralize waste management, prevent fires at dumpsites, create behavioral nudges, and adopt technological solutions.



Frontiers

The (re)production of health in climate change

10 July 2024

Climate change and its impact on health have primarily been approached from a biomedical perspective, focusing on health risks and promoting individual solutions. This article explores health in the context of climate change from the perspective of Urban Public Health and political science. It examines existing constructions of health, particularly the design of urban environments, and their implications for addressing the climate crisis. The analysis reveals that current understandings of health in climate change discourse often overlook the causes of climate change and hinder broader socio-ecological transformations. To effectively address climate change as a public health issue, there needs to be a shift towards structural health promotion and the development of health-promoting, just, and climate-friendly urban environments. This requires rethinking the boundary between the private and public spheres and considering health as a political issue.



The Conversation (Spanish)

La música como consuelo ante la crisis: himnos felices contra tiempos difíciles

02 July 2024

La música se ha convertido en un consuelo durante tiempos difíciles, como se observa en situaciones de crisis socioeconómicas en diferentes países. Durante la pandemia de COVID-19 en España, la canción "Resistiré" del Dúo Dinámico se convirtió en un himno positivo que brindó apoyo emocional a las personas durante el confinamiento. Este fenómeno de buscar himnos felices en momentos complicados es global y se ha demostrado que el consumo de música optimista aumenta en situaciones económicas o sanitarias adversas. La cultura, incluyendo la música, puede tener un impacto significativo en el bienestar emocional y puede ser una herramienta poderosa en la gestión de crisis sociales y económicas. Se sugiere que desde el sector público se fomente el acceso a productos culturales que se adapten a las necesidades psicológicas de los ciudadanos. También se destacan las aplicaciones y programas de apoyo terapéutico basados en música para mejorar el bienestar personal.

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CGAP Research

Empowering Small Giants: Inclusive Embedded Finance for Micro-retailers

02 July 2024

B2B e-commerce companies are improving financial inclusion for micro-retailers by digitizing the last mile of the FMCG supply chain. These companies offer digital ordering platforms that provide convenience, transparency, and a wide range of products to micro-retailers. Through these platforms, micro-retailers can access tailored inventory financing, such as buy-now-pay-later products, on reasonable terms. The success of these models depends on scalability and addressing challenges like digital literacy and infrastructure. Collaboration is needed to overcome funding constraints and ensure equitable access. These findings are based on research conducted by CGAP, involving interviews with B2B e-commerce companies, fintech providers, and impact investors in Africa, Asia, and Latin America.

Smithsonian Magazine

Smithsonian

Scientists Are Trying to Make Whiskey Using Rye Seeds That Were Submerged in a Lake Huron Shipwreck for Nearly 150 Years

25 November 2024

Scientists, distillers, and divers are collaborating to retrieve rye seeds that have been submerged in Lake Huron for 146 years from a shipwreck called the James R. Bentley. The team hopes to germinate the seeds and ultimately create a unique variety of rye for distilling whiskey. The project may also lead to a revival of rye agriculture in Michigan and the establishment of a Michigan Rye Trail, similar to the Kentucky Bourbon Trail.



GlobalData

Financial performance main motivator behind ESG strategies for first time

07 August 2024

A survey on ESG sentiment found that companies now view financial performance as the main motivator for implementing environmental, social, and governance (ESG) strategies. The survey revealed that 33% of respondents cited improved financial performance as their primary reason for adopting ESG strategies, surpassing the importance of legislation and government pressure. Several studies have shown that ESG action can positively impact a company's financial performance, leading to benefits such as access to new capital, tax benefits, and higher stock prices. However, the survey also highlighted the need for greater employee engagement and transparency regarding ESG strategies.



GreenBiz

Science Based Targets initiative CEO resigns, citing personal reasons

02 July 2024

Luiz Amaral, CEO of the Science Based Targets initiative (SBTi), is resigning for personal reasons after over two years in the role. Susan Jenny Ehr, SBTi's chief legal officer, will serve as interim CEO while the board searches for Amaral's replacement. SBTi was established in 2014 to help companies set voluntary targets aligned with the Paris Agreement. Amaral's departure follows controversy over SBTi's consideration of allowing companies to use carbon credits to offset emissions.

WORLD F ECONOMIC FORUM b

World Economic Forum

From boardroom to biodiversity: The evolving role of directors in a 'nature positive' world

27 August 2024

The concept of "nature positive" is emerging as a crucial strategy for businesses to halt and reverse biodiversity loss. A nature positive business strategy involves assessing impacts on nature and implementing policies to restore and enhance natural ecosystems. Embracing nature positive practices improves operational efficiency, resilience, regulatory compliance, and company reputation. Corporate directors play a pivotal role in driving nature positive outcomes by setting a vision, implementing effective governance, and applying nature-inclusive risk management. Legal obligations and global frameworks are increasingly placing responsibilities on corporations to prioritize nature positive strategies. The Taskforce on Nature-related Financial Disclosures provides guidance for companies to report and manage their impacts on nature.



The Conversation

Renationalising water could fix sewage crisis – but no major party will do it

02 July 2024

Water companies in England and Wales have discharged raw sewage into rivers and the sea for 3.6 million hours in 2023, double the previous year's total. The Environment Agency, responsible for regulation in England, has been unable to monitor and control offenders due to a significant budget reduction. The Conservative and Labour parties propose fines and improved monitoring, while the Liberal Democrats want to ban sewage dumping and transform water companies into public benefit companies. The Green party supports nationalisation, estimating the cost to be £5 billion. Reform UK suggests bringing 50% of utilities back into public hands, while Plaid Cymru wants more public control over Welsh resources.



Ulsan National Institute of Science and Technology (UNIST)

New Study Reveals Al-Driven Approaches for Predicting Heatwaves in South Korea Using Snowfall Data from Mongolia and China

27 August 2024

Researchers from the UNIST have developed an Al model that can predict heatwaves in South Korea. The model analyzes various global climate factors, including snow depth in Mongolia and China, and has identified an increase in snow depth in the Tianshan Mountains and a decrease in snow depth in the Gobi Desert as critical factors in forecasting the number of heatwave days in South Korea. The research highlights the importance of teleconnection and its impact on heatwave patterns. By monitoring these teleconnection factors, the accuracy of heatwave predictions can be enhanced.



Institute for New Economic Thinking Why Global Supply Chains Remain Vulnerable

02 July 2024

Global supply chains remain vulnerable due to prioritizing cost-cutting and Wall Street profits, warns journalist Peter Goodman. The COVID-19 pandemic highlighted the vulnerabilities in supply chains, leading to shortages of essential items like PPE and medications. Decades of prioritizing efficiency and shareholder returns have compromised supply chains, leaving them susceptible to disruptions. The Just-in-Time manufacturing principle, while efficient, can leave supply chains open to catastrophic disruptions. Goodman urges an overhaul of supply chains to prioritize human welfare and environmental sustainability. Resilient supply chains are necessary to prevent future crises.



Inside Climate News

As Climate Change Dries Out the West, Fourth of July Fireworks Spark Increased Wildfire Risk - Inside Climate News

02 July 2024

Fireworks during Fourth of July celebrations in the U.S. pose an increased wildfire risk due to climate change. Research shows that fireworks trigger tens of thousands of accidental fires each year, and the majority of them occur on July 4. Droughts and heat waves caused by climate change have created dry conditions that make vegetation highly susceptible to ignitions from fireworks. The changing climate has turned shrubs and grasslands across the West into a tinderbox for fires. Some experts are advocating for the use of drone displays as a safer alternative to traditional fireworks.



Science Daily

Watching others' biased behavior unconsciously creates prejudice

02 July 2024

Observational learning plays a significant role in the formation of prejudice, according to research from the University of Amsterdam. The study found that when individuals observe biased behavior during social interactions, they unconsciously adopt the same prejudice. This mechanism helps explain how societal prejudices spread so easily through media platforms like TV programs and social media. The research also revealed that observers were not aware of being influenced by the biased actor and misperceived worse behavior from the targeted group. This suggests that individuals may not question or control their prejudices if they believe it is based on objective evidence.

1.2 Potential scenarios

In this section, we use experimental artificial intelligence to surface a range of scenarios related to the topic. These are not predictions but are provided to anchor discussions and help you think through and anticipate potential opportunities and risks.

Please note that this section is part of our ongoing trials using experimental artificial intelligence technology to enrich our user experience and bring our members the very latest developments and trends. We'll continue to innovate and refine our efforts based on these pilots.

1. A major ESG rating agency is accused of bias

A major ESG rating agency is accused of bias and conflicts of interest, leading to a loss of trust in ESG ratings and rankings. The incident prompts calls for greater transparency and accountability in the ESG rating industry, as well as increased scrutiny of the methodologies used by rating agencies. The incident also highlights the need for companies to develop strong ESG skills and capabilities in order to accurately measure and report on their ESG performance.

Related topics: ESG Reporting, Comparability and Assurance, ESG Skills and Capabilities, ESG Ratings and Rankings

3. A coalition of developing countries demand greater financial support for climate action

A group of developing countries form a coalition to demand greater financial support from developed countries to help them transition to a low-carbon economy and adapt to the impacts of climate change. The coalition is successful in securing significant new funding commitments from developed countries, but there is also criticism that the funding is not sufficient to meet the scale of the challenge. The coalition continues to push for more ambitious action on climate change, and becomes a powerful voice for climate justice on the global stage.

Related topics: Building Climate Coalitions, Investing in Climate Action, The Paris Agreement

A major ESG lawsuit shakes investor confidence

A major ESG lawsuit is filed against a company, alleging that it has misled investors about its ESG performance. The lawsuit leads to a significant loss of trust in the company and in ESG more broadly, as investors and the public question the reliability of ESG data and reporting. The incident prompts calls for greater regulation and oversight of ESG practices, but also highlights the need for companies to develop strong ESG skills and capabilities in order to avoid similar lawsuits in the future.

Related topics: ESG Reporting, Comparability and Assurance, ESG Skills and Capabilities

4. A breakthrough in healthcare technology leads to greater health equity

A major breakthrough in healthcare technology leads to significant improvements in access to healthcare for marginalized populations. Governments and international organizations work together to ensure that the benefits of the technology are shared equitably, leading to greater health equity and social justice.

Related topics: Diversity, Equity and Inclusion

5. A major energy company launches a blockchain-based platform for trading renewable energy credits

A major energy company launches a blockchain-based platform that enables consumers to buy and sell renewable energy credits. The platform provides a secure and transparent way for consumers to access and trade renewable energy, and encourages businesses to invest in sustainable energy sources. This will have a significant impact on the way businesses approach sustainability and the transition to renewable energy.

Related topics: Leading on Inclusion, Sustainability and Trust

6. A major oil-producing country announces plans to phase out fossil fuel production

A major oil-producing country announces plans to phase out fossil fuel production and transition to a low-carbon economy. This announcement is met with skepticism by some, who question the country's commitment to the transition and its ability to follow through on its promises. However, others see it as a positive step towards a more sustainable future, and hope that it will inspire other countries to take similar action.

Related topics: Building Climate Coalitions, Investing in Climate Action, The Paris Agreement

A variety of articles have been used by our artificial intelligence in order to formulate these scenarios. These acted as our "signposts" and provide clues or hints about what the future may entail. We recommend reading them for further context:

- Central banks' rate push a risk to growth, and other economy stories to read this week, World Economic Forum
- Research on improving teaching and learning often lacks a holistic focus—a new collaborative research
 project hopes to change this, The Brookings Institutions Center for Universal Education
- Global Governance in an Age of Fracture LSE Phelan US Centre Event Review, London School of Economics and Political Science
- A troubling turn in Darfur violence, Ethiopia food aid suspension fallout, and the EU's deadly borders: The Cheat Sheet, The New Humanitarian
- Respecting human rights: Why the CSDDD needs to go beyond social auditing, Business and Human Rights
 Resource Centre
- Why U.S. Regional Banks Are Still in Crisis, Kellogg School of Management
- What the GDPR can teach us about Al regulation, World Economic Forum
- Tech Companies Are Fighting for Ukraine. But Will They Help Save Lives in Other Global Conflicts?, International Crisis Group
- Is your industry at risk of a cyberattack?, World Economic Forum
- Climate change is changing the way trees grow. Here's how, World Economic Forum
- Bonn climate talks: Key outcomes from the June 2023 UN climate conference, Carbon Brief
- Preserving forests to protect deep soil from warming, Science Daily
- DeBriefed 16 June 2023: Bonn talks close; Shell sticks to fossil fuels; Record ocean heat, Carbon Brief
- Will Al Replace the Front Office in Pro Sports?, Harvard Business Review
- Key enforcement issues of the Al Act should lead EU trilogue debate, Brookings
- Al is a powerful tool, but it's not a replacement for human creativity, World Economic Forum
- How to Scale Local Innovations in Big Companies, Harvard Business Review
- "Efficiency Culture" Harms Indigenous Partnerships, Network for Business Sustainability

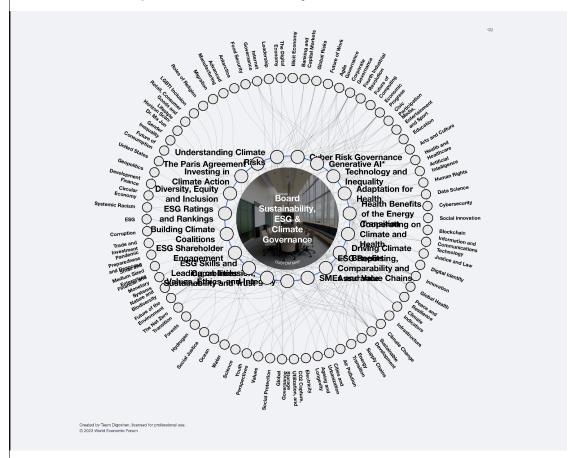
2 Strategic context

The key issues shaping Board Sustainability, ESG & Climate Governance.

The following key issues represent the most strategic trends shaping the topic of Board Sustainability, ESG & Climate Governance. These key issues are also influenced by the other topics depicted on the outer ring of the transformation map.

FIGURE 1

Transformation map for Board Sustainability, ESG & Climate Governance



Cyber Risk Governance 2.1

The number of corporate boards with a dedicated cybersecurity committee is expected to increase sharply by 2025

Governance relies on risk-based decision making as a fundamental means to both drive the efficient use of resources, and to improve confidence in an organization's ability to achieve strategic objectives. All organizations rely on their employees' ability to navigate a world of growing uncertainty, and to dodge threats to their ability to achieve its collective goals. Unfortunately, complex organizations can easily be overwhelmed; each risk demands a distinct analysis and potential investment of additional resources, to respond in ways that adequately reduce exposure. A good governance structure will provide a framework that enables the right managers to make the right decisions, which will help prioritize and allocate resources as needed. All risks don't necessarily require analytic rigour or subsequent investment - immediate hazards like icy sidewalks or commonplace cyber incidents like phishing emails can be addressed at lower management levels. That is not the case for strategic risks like global pandemics or advanced, persistent cyber threats that have the potential to disrupt or damage an organization indefinitely. A structure that effectively prioritizes and adjudicates risks to the right organizational level is required.

Responsibility for risks is typically apportioned in accordance with an organization's willingness to accept them, also called "risk appetite." A risk-appetite statement can be used to direct employees and clarify who has the necessary level of authority to decide how to respond to any given situation. The National Institute of Standards and Technology Special Publication 800-37 addresses the divvying up of risk with a three-tier structure including the organization, the mission, and the system. Meanwhile the ISO 27000 series of standards provides recommendations for the use of policy and organizational structure to reduce risk, and the COSO framework connects governance to culture by highlighting the importance of board oversight, culture requirements, core values, and human resource development. Vigorous, board-level engagement in risk governance is essential for success. Thankfully, boards are increasingly recognizing the importance of cyber risk governance; a study published by Ernst and Young in 2020 found that 81% of board members categorize cybersecurity as "highly relevant," and Gartner researchers predict that 40% of all boards will have a dedicated cybersecurity committee by the year 2025 (currently, just 10% of boards have one).

Related topics: The Digital Economy, Banking and Capital Markets, Leadership, Agile Governance, Corporate Governance, Internet Governance, Illicit Economy, Fourth Industrial Revolution, Future of Work, Global Risks

2.2 Generative AI*

Generative AI is a type of artificial intelligence that creates new content based on patterns and data it has learned from

Unlike other forms of AI that are designed to perform specific tasks, such as recognizing objects in an image, generative AI creates new and unique outputs, such as images, texts, music, or even computer code. The opportunities provided by generative AI are numerous and exciting. For example, it has the potential to revolutionize many creative industries, such as graphic design, writing, and music composition, by automating tasks and freeing up more time for human creativity. In healthcare, generative AI can assist in drug discovery and disease diagnosis. In education, it can help generate personalized study materials for students. The potential for generative AI is vast and varied, and its applications are limited only by our imagination. However, despite its potential benefits, there are also key concerns about generative AI.

One of the most pressing concerns is the potential for Al-generated content to spread misinformation, particularly in areas like fake news or deepfake videos. Another concern is the impact that generative Al may have on job markets, as automation could potentially displace human workers. Additionally, there are ethical concerns around the use of Al-generated content, such as questions around who is responsible for its creation and the potential for it to be used in harmful ways. In conclusion, generative Al is a fascinating and rapidly evolving field that has the potential to bring about many positive changes in various areas of society. However, as with any new technology, it's important to approach it with caution and carefully consider the potential consequences of its use. By balancing the potential benefits and risks of generative Al, we can ensure that it is used in a responsible and ethical manner, for the greater good of society as a whole.

*The text for this key issue was entirely generated by OpenAl's ChatGPT chatbot using the following prompt: "Write a 300 word text providing a non-technical description of generative Al, its opportunities, and key concerns about it."

Related topics: Arts and Culture, Fourth Industrial Revolution, Media, Entertainment and Sport, Future of Work, Education, Internet Governance, Economic Progress, Civic Participation, Health and Healthcare

2.3 Technology and Inequality

The world is divided between technology haves and have nots, and innovative tools can often compound social injustice

Countries that combined social and technological innovation were better able to protect the most vulnerable as COVID-19 spread. Estonia had made digital skills, internet access and infrastructure a national priority - going as far as classifying internet access a human right in 2001 - which helped it maintain education access during the pandemic. However, even in advanced countries, biases imparted to algorithms have created problems. In the US, for example, facial recognition technology can be as good as 99% accurate when reading white male faces, and as poor as 35% for dark-skinned women. Racial and gender bias built into systems perpetuates oppressive structures by increasing incarceration rates for people of colour, and generally worsens inequality and injustice. There has also been a significant increase in censorship and government control of the internet. When specific articles or social media posts cannot be blocked, entire websites may go down - restricting public access to vital information. Governments, often in the name of "protecting" social and cultural norms, can be quick to clamp down on political content - though the real aim is to preserve authority.

The artificial intelligence revolution is underway. The impact of large language models like ChatGPT on workers and economies is not yet clear. Certainly, some jobs will be automated, though new jobs will also be created. What is equally as certain is that despite their potential productivity benefits, large language models may also increase inequality in countries that do not have strong unions and redistribution policies. Al can easily be based on historical information full of bias and discrimination. It can also produce unlimited amounts of political content, which can increase polarization as it only becomes less clear what is true and what is not. In the wrong hands, these tools could be fuel for war and election manipulation. Another Al-related consideration is the considerable energy needed to create it, and resulting carbon emissions. Technology requires clear oversight and regulation to ensure its benefits reach everyone in ways that are productive for society, and not just for the private companies promoting it. The public needs to have more input on shaping Al's purpose; this cannot be left solely to large corporations and the market.

Related topics: Data Science, Digital Identity, Cybersecurity, Blockchain, Internet Governance, Fourth Industrial Revolution, Social Innovation, Justice and Law, Human Rights, Artificial Intelligence, Digital Communications

2.4 Adaptation for Health

Adapting societies to the warming climate should be transformational, but often remains incremental

Adaptation strategies like ensuring universal health care, future health impact projection, vulnerability and adaptability assessment, purposeful urban planning, and nature-based solutions are necessary to effectively limit the consequences of climate change for public health. Adaptation means adjusting to current or anticipated changes, to mitigate harm and harness potential benefits. The need for any particular place to modify its existing programs and measures in response to the warming climate depends on factors such as current health burdens, the relative effectiveness of current interventions, projections for climate's future impact on health and the feasibility of adding new programs, the influence of other stressors on resilience, and the broader social, economic, and political context. While many national climate adaptation plans now incorporate health considerations, investment in specific health initiatives has been sluggish. Overall, efforts to address the health impacts of climate change can be placed into three distinct categories: incremental, transitional, and transformational. "Incremental" adaptation focuses on gradual improvements to public health and healthcare services, in order to better address specific health issues associated with climate change.

However, this often does not explicitly consider broader, long-term climate impacts. Instead, it seeks to increase the capacity to respond to immediate health-related challenges. "Transitional" adaptation involves a shift in attitudes and perspectives; it can lead to more comprehensive initiatives that explicitly incorporate environmental factors into a healthcare framework, and related measures can include vulnerability mapping, improved disease surveillance systems, and early warning mechanisms. It represents a middle-ground approach - recognizing the need for systemic change, but often stopping short of what is required to fully address the consequences of the warming climate on health. "Transformational" adaptation, however, triggers fundamental and systemic changes in the healthcare sector and beyond. It involves reshaping public policies, strategies, and practices to proactively tackle evolving, climate-based health challenges.

Transformational adaptation often remains an aspirational goal, and its full implementation in healthcare

systems around the world is very much a work in progress. Achieving such a comprehensive level of adaptation requires not just innovative strategies, but also multi-disciplinary collaboration and a commitment to address root causes at a broad scale.

Related topics: Sustainable Development, Infrastructure, Peace and Resilience, Health and Healthcare, Economic Progress, Agile Governance, Climate Indicators, Climate Crisis, Innovation, Supply Chain and Transport, Global Health

2.5 Health Benefits of the Energy Transition

Slashing emissions can yield benefits not just for the environment, but also for public health

Adopting clean energy sources and methodically planting trees can hasten the global transition to a low-carbon economy; they can also result in cleaner air and invigorate ecosystems in ways that create significant public health benefits. Such "co-benefits" are often advantages directly derived from policy measures with simultaneous goals. They are a recognition that policies aimed at mitigating greenhouse gas emissions can also serve other, often equally significant objectives. Co-benefits include the reduction of air pollution's adverse health effects, better energy security through more diverse supply, and broadly applicable technological innovation. There is a growing recognition that accounting for such health-related co-benefits can help offset the cost of greenhouse gas mitigation; in other words, taking into account the health-related advantages stemming from climate change mitigation makes it possible to lessen overall economic and social burdens. Meanwhile an increasing number of researchers are focusing on the health co-benefits of emissions-reduction measures, and providing a scientific basis for comprehensive carbon-reduction decisions - which can in turn encourage countries to set more ambitious carbon-reduction targets aimed at bolstering the Paris Agreement on climate change.

Recognizing the need to consider health-related co-benefits in mitigation policies is paramount. Specific co-benefits can be diverse, and will hinge on the particular local context where a policy is being applied. Strategies aimed at reducing greenhouse gas emissions from the transportation sector, for example, can lead to notable improvements in air quality, which in turn may result in a reduced prevalence of respiratory and cardiovascular disease thanks to decreased exposure to harmful pollutants like fine particulate matter and nitrogen oxides. Such improvements in air quality can particularly improve public health in urban areas, where vehicular emissions are relatively significant contributors to poor air quality. Similarly, transitioning to renewable energy sources such as wind, solar, or hydroelectric power can substantially reduce emissions of harmful air pollutants like sulfur dioxide and mercury; a shift to clean energy sources can therefore lead to a decline in health burdens associated with respiratory disease and neurological disorders. This underscores the interconnectedness of environmental and public health concerns - which means that well-designed mitigation policies can yield multiple benefits.

Related topics: Supply Chain and Transport, Fourth Industrial Revolution, Electricity, Energy Transition, Global Health, Innovation, Cities and Urbanization, Ageing and Longevity, Health and Healthcare, CO2 Capture, Utilization, and Storage, Climate Crisis, Air Pollution

2.6 Cooperating on Climate and Health

Effectively addressing climate-related health issues will not be possible without broad, comprehensive collaboration

Tackling the health impacts of climate change cannot be done effectively without the cooperation of countries, business sectors, and a wide variety of other stakeholders. Greater sharing of knowledge, technologies, data, and funding could mean the provision of better public goods and more effective protection from the changing climate. The Intergovernmental Panel on Climate Change (IPCC) has emphasized the importance of cross-sectoral governance mechanisms for optimizing the health co-benefits of addressing climate change; these can result in more effective and far-reaching health interventions. Public health is influenced by multiple sectors, not least healthcare, agriculture, and transportation - by fostering greater cooperation across them, the public sector can formulate more comprehensive strategies to promote and safeguard well-being. More generally, cross-sectoral collaboration is recognized as a valuable tool for advancing sustainable development, integrating more diverse perspectives and expertise, and accumulating more resources. "Health and well-being would benefit from integrated adaptation approaches that mainstream health into food, livelihoods, social protection, infrastructure, water and sanitation policies

requiring collaboration and coordination at all scales of governance," the IPCC has said.

However, attempting cross-sectoral collaboration aimed at protecting health presents a range of challenges. Some relate to communication and coordination issues, differing objectives and priorities, resource allocation dilemmas, power imbalances, structural issues with policy and legal frameworks, concerns about data sharing and privacy, the need for sustainability and long-term commitment, and simple resistance to change. Overcoming these challenges necessitates a multi-faceted approach. Proactive leadership is its linchpin, as it can drive the momentum necessary to unite sectors and stakeholders around common objectives. A commitment to cross-departmental cooperation is also essential; departments, agencies, and organizations all need to align on objectives and resources and work in tandem, transcending bureaucratic boundaries. In addition, it is necessary to establish robust governance structures. These provide the necessary framework for defining roles and responsibilities, decision-making processes, and accountability mechanisms. Effective communication and engagement strategies are meanwhile essential for ensuring uniform commitment. By addressing all of these challenges and fostering interdisciplinary and intersectoral collaboration, governments can advance genuinely sustainable development as they address complex health issues - ultimately guaranteeing improved well-being despite the changing climate.

Related topics: Agile Governance, Social Protection, Global Governance, Corporate Governance, Global Health, Youth Perspectives, Values, Health and Healthcare, Media, Entertainment and Sport

2.7 Driving Climate Benefits

According to the IPCC, large-scale carbon dioxide capture and removal is necessary to achieve our climate goals

To meet climate goals that will ensure an inhabitable planet for future generations, the Sixth Assessment Report of the Intergovernmental Panel on Climate Change described an inevitable need for large-scale - that is, at the gigatonne level on an annual basis - carbon dioxide capture and removal in concert with drastic emissions reductions. The report illustrated the impact, cost, and likely relevance of a wide range of courses of action; ultimately, according to the report, the fastest-possible action is required in order to achieve the crucial goal of limiting global warming to 1.5°C above pre-industrial levels, which was laid out in the Paris Agreement on climate change. Any delay will have lasting and increasingly-difficult-to-manage consequences. The climate benefits of carbon capture will depend in part on how quickly related technologies themselves become carbon-neutral in terms of their construction and operation. Beyond that, the downstream handling of carbon dioxide for utilization can be analysed using the Global CO2 Initiative's Track 1 and 2 classification, to understand how long the CO2 is being removed from the environment and what the resulting climate benefit is.

An increasingly visible amount of government support is driving interest in, and activity towards, the build out of a young but promising carbon capture, utilization and storage (CCUS) industry. In particular, sustainability efforts in the European Union, and the Inflation Reduction Act of 2022 in US, have outlined the means to provide significant additional resources necessary to develop, build, and operate carbon capture facilities with downstream storage, and at least some utilization of CO2. However, greater amounts of international coordination in terms of research, development, and deployment of CCUS is now needed in order to generate the maximum possible climate benefit. Some of the challenges that may inhibit the pace of growth of CO2 utilization include cost, and a lack of sufficient zero-carbon energy to power the removal process - though these vary depending on product category. Public sector decisions (and actions) can help spur greater economic interest in expanding CCUS efforts, for example through procurement requirements, or via preferences for CO2-based products - which can be a strong signal for both producers and consumers.

Related topics: Future of the Environment, Innovation, Social Justice, Agile Governance, Ocean, The Net Zero Transition, Fresh Water, Climate Crisis, Climate Indicators, Nature and Biodiversity, Hydrogen, Energy Transition, Forests, Sustainable Development, Science

2.8 ESG Reporting, Comparability and Assurance

Environmental, Social and Governance reporting occurs too infrequently to keep up with evolving expectations

Corporate sustainability reporting has become common practice for large firms, and is the most widely used source of information about ESG performance. A KPMG survey in 2020 found that among 5,200 top-earning

firms in 100 different countries, 80% were doing sustainability reporting - which rises to 96% for the world's 250 largest firms. However, generating sustainability reports can be labour-intensive and costly. The internal data collection necessary often requires dedicated staff and consultants, making it prohibitive for smaller firms. Even firms that do report on ESG factors only do so on an annual basis, even as quarterly reporting of financial results remains the norm. This lower frequency ESG reporting may be insufficient to keep up with rapidly increasing social and regulatory expectations on matters like greenhouse gas emissions. Another issue stems from the varying definitions of and expectations for ESG and sustainability. A firm may decide an issue is not worth disclosing, though investors and other stakeholders might disagree. As a result, if the only source of ESG data is corporate reporting, markets may not be able to react to some critical issues and stakeholders may seek out greater innovation in related data collection.

Another challenge is related to inconsistencies in data pulled from corporate reports, due to the different ways firms measure and reflect ESG factors. For example, firms might count greenhouse gas emissions only from their direct operations, or more comprehensively from their supply chains; those that are more rigorous and inclusive in their measurement might appear to be doing worse than those reporting in a more cursory way. For this reason, standards have been essential for the development of ESG reporting - such as the GHG Protocol, CDP, GRI, SASB, and the newly established International Sustainability Standards Board under the IFRS Foundation. There is also the issue of reliability and trustworthiness, given the incentive firms have to include in greenwashing that makes their operations appear less risky and more virtuous. One key related development has been an increase in the auditing and assurance of corporate sustainability reporting. The KPMG survey found that 2020 was the first year in which a majority of large firms had invested in the independent assurance of sustainability reports (51% of the 5,200 top firms in 100 in countries, and 71% of the world's 250 largest). As regulatory requirements for ESG reporting increase, these figures are also likely to increase

Related topics: Corporate Governance, Data Science, Supply Chain and Transport, Innovation, Values, Future of the Environment, Financial and Monetary Systems, Small and Medium Sized Enterprises, Economic Progress

2.9 SMEs and Value Chains

Plugging more small firms into global value chains can help accelerate the global net-zero transition

Small and medium-sized enterprises tend to have relatively limited inventories and supplier networks, making them more vulnerable to supply chain disruptions and price increases. According to a survey of European SMEs conducted in the first half of 2020, more than half of all respondents (51%) said that late payments were squeezing their liquidity amid the rapidly-worsening COVID-19 crisis, up from 39% who had reported the same in 2019. As supply chains have been relentlessly hit with pandemic-related disruptions, SMEs have had fewer and fewer alternatives - throughout the crisis, lockdowns implemented around the world have negatively impacted global trade, including in key geographical areas for most companies. This has limited market access disproportionately for SMEs relative to larger and potentially more capable corporations, according to a World Bank report published in 2020. Separately, the Organisation for Economic Co-operation and Development has found that participation in global markets and value chains is uneven within the SME population - relatively few are considered truly global and are fully integrated into international markets, often due to being highly innovative.

SMEs that are located in developing countries in particular struggle to reap the benefits of global value chains, as they tend to lack the capital and technology know-how necessary to navigate international markets. Participation in global value chains can enable SMEs to spread production internationally, and to increase outsourcing, develop greater specialization, and better target market niches. SMEs are also often a part of value chains that include bigger players, and must keep pace in terms of growing sustainability standards and efforts as a result - as more large corporations require suppliers to join in net-zero and decarbonization commitments. This dynamic helps companies of all types and sizes move in a similar, positive direction. Because SMEs account for the vast majority of all businesses worldwide, they may very well be the missing link necessary to accelerate the race to net-zero. However, these companies often struggle to meet decarbonization goals - making it more important than ever to zero in on efforts to better integrate SMEs into global value chains and help support the global green transition.

Related topics: Supply Chain and Transport, Sustainable Development, Pandemic Preparedness and Response, The Net Zero Transition, Climate Crisis, Trade and Investment, Innovation

2.10 Values, Ethics, and Integrity

Good faith efforts to do no harm and reduce negative externalities are necessary

Sound corporate governance is increasingly important for any company that wants to establish and execute a coherent integrity agenda - one that adequately encompasses its values, regulatory obligations, and voluntary commitments. Solid governance is the critical underlying bedrock for any strategic decision-making when it comes to executing environmental and social commitments. This means aligning rhetoric with action - and ensuring that leaders understand their responsibility for shaping employee behaviour and conduct, and for designing incentives and allocating power and resources in ways that effectively build a culture of integrity. These efforts require organizations to break down departmental divisions, and create more deliberate alignment and collaboration across critical functions, including environmental, social and governance (ESG) and sustainability, public affairs, risk, ethics, and compliance. Prevailing public concern about corporate hypocrisy and greenwashing is necessitating more carefully-planned and coordinated approaches to integrity commitments. Companies are being pressured as never before to take stands on social and environmental issues, but if that rhetoric is not accompanied by concrete, measurable action, allegations of duplicity and insincerity will only become more prominent.

One crucial imperative for companies is that they tie their integrity commitments directly to the ways in which they create value for stakeholders. This means making good-faith efforts to do no harm, and reduce negative "externalities" (another way of saying negative outcomes). The most visible evidence to date of efforts to tackle contemporary, multifaceted challenges has been the emergence of a designated senior leader at companies who is entrusted with the responsibility of overseeing the totality of integrity efforts and commitments. For other organizations, however, the aim may be not to appoint one, single individual to direct and lead integrity efforts, but to instead consciously drive broader alignment among departments including risk, compliance, governance, sustainability, investor relations, human resources, government affairs, and corporate affairs, in ways that have each setting both internal and external strategic organizational priorities. Integrity efforts need to be supported by strong oversight - to prevent systemic misconduct, and to sufficiently deter employees from breaking the law and thereby expose the organization to legal risk.

Related topics: Corruption, Future of the Environment, ESG, Economic Progress, Values, Sustainable Development, Climate Crisis, Leadership

2.11 Leading on Inclusion, Sustainability and Trust

Companies have a responsibility to deploy technology in a way that benefits everyone

Businesses must address growing concerns about how technology affects inequality, personal freedoms, and access to decent jobs. Many company leaders are faced with calls from their own customers and employees to make a more positive contribution to society. In 2019, the Business Roundtable, an organization that includes the CEOs of some of the most prominent companies in the world and once defined a company's purpose as serving shareholders, re-defined that purpose to include a commitment to all stakeholders. COVID-19 has underlined the risk of leaving half the world cut off from the internet and the digital economy - at a time when schools have closed, many people have lost jobs, and social media has been needed to both expose racial injustice and rally efforts to confront it. In a digital-first world, there is an opportunity to fundamentally redefine business and reinvent models with renewed purpose. Technology can help ensure the health and well-being of often-remote workforces, increase the transparency of supply chains, reduce carbon emissions, responsibly handle personal data, promote racial equality, and accommodate a more diverse array of potential customers and users.

Many companies have deployed digital tools to support the response to COVID-19. A smartphone app developed by South Korea's KT Corporation, for example, can inform users of outbreaks near their location, and educate them about symptoms and prevention. IBM has meanwhile provided access to its artificial-intelligence-powered technologies to help researchers develop potential treatments for the disease. Other companies have used technology to look after their own employees, such as Bank of Ireland's increased employee access to a wellness program that includes an app and interactive courses on mental, physical, and financial health. Companies can also advance digital transformation in ways that reduce environmental impact, and provide a means for more people to gain access to important information and services. Though roughly half of the global population still does not use the internet, businesses and governments have an opportunity to collaborate in a way that that better addresses this digital divide. Ultimately, research suggests that those companies that orient their digital transformation plans around a

higher purpose are likely to better gain the trust of users, and to be more competitive.

Related topics: Global Risks, Future of Work, ESG, Digital Communications, Leadership, Systemic Racism, Sustainable Development, Corporate Governance, Innovation, The Digital Economy, Climate Crisis, Fourth Industrial Revolution, Internet Governance, Circular Economy

2.12 ESG Skills and Capabilities

The employees required to assess new layers of corporate performance need a blend of competencies and skills

As the Environmental, Social and Governance marketplace grows, every firm involved is in need of people equipped with up-to-date sustainable business and investment skills. Banks and asset managers have been staffing up their ESG departments to help them analyse the non-financial performance of firms, and integrate that information with more traditional financial data in order to more comprehensively inform their investment decisions. Entirely new financial firms are also emerging, to supply the market with sustainable investment products like green bonds and access to activist shareholder funds and clean technology-focused venture capital investments. Their employees need a combination of foundational financial analysis skills and fluency in the language of carbon emissions, living wages, political activity, and other ESG matters - as well as an ability to critically consume related information. Non-financial firms need sustainability departments capable of measuring and monitoring firm performance, and communicating in an accurate and timely way to the capital markets and other stakeholders. The necessary related skillsets include an ability to engage and collaborate with business leaders while bringing a broader set of stakeholder concerns to the table.

To better connect businesses and disparate stakeholders, there is a growing industry of data providers, analytics and artificial intelligence firms, rating agencies, and other services designed to help process new layers of information about corporate performance. The necessary skillsets for this combine data analytics, computer science, and consulting with a deep understanding of sustainability. To develop a new generation of professionals equipped with these skills, business schools can further integrate sustainability into their curricula, and collaborate with operational and financial disciplines. Meanwhile academic programs in the environmental and social sciences can prepare people to apply their expertise to capital markets. Professional associations of investors, auditors, and accountants can provide continuing ESG education via organizations like the CFA Institute. Because ESG skills are often hybrid, the necessary certification and credentialing has been idiosyncratic - MBAs and Master of Finance degrees appear in credentials alongside degrees in environmental science or labour economics. While some people may have dual degrees covering such fields, others pursue specific sustainability certificates. As the ESG field matures and solidifies, employers may begin to seek more such harmonized certifications and credentials.

Related topics: Education, Banking and Capital Markets, Artificial Intelligence, Corporate Governance, Future of the Environment, Future of Work, Economic Progress, Sustainable Development, Data Science

2.13 ESG Shareholder Engagement

Environmental, Social and Governance-based engagement can help drive climate action and address public health issues

In addition to shaping their portfolios through ESG integration, investors may choose to actively drive related improvements at companies through greater shareholder engagement. Evidence suggests this is a far more effective way of shaping corporate behaviour than simply buying and selling stock. The ways in which investors can approach this depends on asset class, however. Private equity investors, for example, are likely to have relatively large ownership stakes and therefore more direct access to management teams (large PE funds like KKR and TPG regularly engage with senior and middle managers, as well as front line workers, to identify ESG issues and encourage development of related strategies, measurement, disclosures, and operational practices). For buyers of public equities, the style of engagement depends on their scale and objectives. Large asset managers with long-term investment styles are likely to have greater and more prolonged access to management teams, similar to what is afforded to private equity backers. Meanwhile activist hedge funds tend to take large stakes in firms for short periods of time, through leveraged capital and borrowing - and then use that time to mount aggressive campaigns.

Examples of ESG-centred shareholder engagement include Aviva Investors' push for Apple to address youth smartphone addiction, and Engine No. 1's campaign to drive stronger climate action at Exxon Mobil by

replacing board members. Smaller, socially-responsible asset management firms like Boston Trust Walden, and values-based asset owners like religious pension funds, often engage firms by initiating shareholder proxy votes that call for stronger ESG strategies. Individual retail investors can join campaigns mounted by larger activists, though most delegate their voting power to index fund managers like BlackRock or Vanguard (which tend to follow shareholder voting guidance from firms like ISS and Glass Lewis). ESG shareholder action tends to focus on three objectives: disclosure, target setting, and governance. Disclosure, the most common, relates to the frequency of, quality of, and auditor assurances behind ESG information. Target setting can occur once ESG data is made available, and can be used to improve things like greenhouse gas emissions. In terms of governance, investors may simply ask for more rigour from a firm - both for its own sake, and as an enabler of the greater good through instruments like aligning executive compensation with sustainability goals.

Related topics: Banking and Capital Markets, Global Health, Digital Communications, Corporate Governance, Youth Perspectives, Climate Crisis, Sustainable Development

2.14 Building Climate Coalitions

Effective action requires engagement with many different stakeholders

Effective climate action will require commitments from a wide variety of players - businesses, national governments, international organizations, cities and regions, just to name a few. Businesses, regions and cities in particular took centre stage during the past few years, after the announcement that the Trump Administration planned to withdraw the world's largest economy from the Paris Agreement on climate change. While that withdrawal effort was later reversed, it provided an opportunity for others to step forward. The We Are Still In coalition, which includes investors, companies, and cities, gathered thousands of signatures in support of a pledge to uphold the Paris Agreement. Meanwhile We Mean Business, a coalition of non-profit organizations dedicated to partnering with the private sector, has engaged more than 1,500 companies (representing nearly \$25 trillion in market value) to act on climate change. More than 150 of the companies affiliated with the effort have committed to a goal of 100% renewable power, and many have committed to establishing science-based targets for reducing emissions of greenhouse gases in their operations.

Public-sector coalitions engaging local and regional governments are also becoming more prominent. The C40 Cities Climate Leadership Group, for example, is made up of more than 90 cities that have committed to 10,000 distinct "actions" to combat climate change. C40 cities represent about one quarter of the global economy and roughly 8% of the world's population, and aim to stir a global conversation that hastens progress towards a low-carbon economy. The Global Covenant of Mayors for Climate & Energy provides a similar platform for more than 9,000 cities that in total comprise about 10% of the world's population. Climate Action 100+ is yet another example of a global initiative systematically engaging with major corporate greenhouse gas emitters around the world. In addition, the World Economic Forum's Alliance of CEO Climate Leaders has sought to foster public-private collaboration that can support the Paris Agreement and the United Nations' Sustainable Development Goals. By joining forces with these coalitions, policy-makers, organizations, and companies can demonstrate a real commitment to climate action, share best practices, and demonstrate leadership.

Related topics: Global Governance, Social Justice, Agile Governance, Civic Participation, United States, Development Finance, Geopolitics, Cities and Urbanization, Sustainable Development

2.15 Legal and Regulatory Evolution

Proactive engagement with global legal and regulatory developments can foster preparedness

Ethical practices are no longer just good to have, they are a must-have. Companies have realized that a lack of ethics and integrity not only creates regulatory risk, it can pose existential risk. They must keep pace with constant regulatory change related to matters including trade sanctions, anti-bribery and competition laws, ESG, anti-money laundering, and legislation like the EU's General Data Protection Regulation (GDPR). As more regional efforts emerge to promote sustainability and human rights, and regulate the use of artificial intelligence, it is crucial for companies to offer thoughtful input. This should align with corporate strategy, and ensure proactive, constructive engagement between industries and governments. Being proactive means staying abreast of legal changes, constantly adapting compliance programmes, and fostering greater

collaboration both between departments and functions, and externally. Continuous monitoring of global regulatory changes is essential, as is consistently updating employees on new regulations to ensure everyone has up-to-date compliance knowledge. Integrated assurance can be a powerful means to ensure compliance programmes are linked to enterprise risk management and internal controls throughout the enterprise - as opposed to a siloed approach that creates a risk of blind spots and unclear responsibilities.

Incorporating horizon scanning into a proactive stance can empower organizations to detect early signs of potentially significant developments. This sort of systematic examination of potential threats and opportunities, focused in particular on new technologies and their impacts, can serve as a strategic tool to anticipate future regulatory challenges and trends. Horizon scanning enables companies to adapt more swiftly and effectively to emerging regulations, and to mitigate potential risks before they materialize. Understanding the legal nuances and ensuring compliance are necessary before a company can effectively contribute to regulatory discussions - and assessing how proposed regulation might impact business operations, finances, and reputation is equally critical. Engaging with a broad spectrum of stakeholders can lend a more comprehensive perspective that helps companies account for diverse viewpoints. Adherence to industry standards and best practices is a necessary benchmark for regulatory engagement, and collaboration with like-minded organizations tends to amplify the benefits of collective contributions. Ultimately, adept management of the effects of regulatory evolution can help ensure that an organization's actions reflect its expressed commitment to sustainability and equity.

Related topics: Geo-economics, SDG 16: Peace, Justice and Strong Institutions, Geopolitics, Trade and Investment, Justice and Law, GovTech, Data Policy

2.16 ESG Ratings and Rankings

Useful Environmental, Social and Governance performance measurement relies on a shared definition of ESG

Due to the sheer abundance of ESG information about companies now being made available, investors and other stakeholders need distilled, actionable data - such as ratings or rankings. ESG ratings compress a variety of data points into a single score, or small set of scores, while rankings use performance to slot firms into an order. When stock or securitized debt in multiple companies is included in an investment fund, it is possible to combine the companies' collective ESG ratings to create ratings and rankings of different funds. The most common producers of ESG ratings and rankings are agencies like MSCI or Morningstar's Sustainalytics, and media publications like the Newsweek Green Rankings or Corporate Knights. Index providers, asset managers, and even asset owners are increasingly constructing their own proprietary rating and ranking schemes. However, these generally present three major issues: the "aggregate confusion" problem of rating divergence, value tradeoffs, and transparency. The aggregate confusion problem is most visible, because of the significant divergence between ESG rating agencies. For example, one MIT study found only a 46% correlation between the two most prominent agencies, MSCI and Sustainalytics.

This divergence means investors may have difficulty trusting ESG ratings, and one of its main causes is disagreement about how exactly to define ESG - one agency might include electromagnetic pollution, for example, while another includes lobbying, though both may agree on carbon emissions. Agencies may also disagree on measurement techniques. One firm might measure women's empowerment as the number of female board members, while another uses the number of sexual-harassment lawsuits filed. The value tradeoffs problem occurs because almost all ratings are constructed using weighted linear averages - so a firm can decrease ESG performance in one domain, increase it in another, and maintain the same rating. ESG rating schemes rarely disclose the weighting assigned to different factors, or incorporate investor preferences. This points to the third issue: transparency. Because rating agency business models involve selling proprietary datasets to investors, they have an inherent interest in maintaining strict control of that data. However, this lack of transparency makes it difficult for investors to properly interpret or use ratings and rankings - making appropriate oversight of rating agencies to ensure transparency a prominent topic in discussions about ESG regulation.

Related topics: Future of Consumption, Media, Entertainment and Sport, Corporate Governance, Economic Progress, Data Science, Retail, Consumer Goods and Lifestyle, Gender Inequality, Financial and Monetary Systems

2.17 Diversity, Equity and Inclusion

Whether based on race, caste, religion, or gender, discrimination is rampant

Entrenched structural shortcomings have made inequality a reality in just about every part of the world. While Apartheid in South Africa was easily recognized as abhorrent, similar types of systemic bias continue to sustain patriarchy and privilege - and are either not-well-understood or wilfully ignored. These systems are often presented as meritocratic and fair, while in fact they serve to keep certain groups of people far from power and influence. Despite the aspirations of human rights activists and policy-makers, humanity still has not realized its collective talent potential - as significant parts of the population remain effectively excluded from obtaining a quality education. Structural discrimination rests on the twin pillars of prejudice and failure to prioritise systemic change. Some of the many factors at play include race in the US, caste and religion in India, sexual orientation in Uganda, gender in Saudi Arabia, immigration status in Europe, and statelessness in Haiti. Societies constructed on explicit or implicit bias require a retracing of the steps that got them there, a recalibration of historical attitudes, and more forward-looking approaches.

Prejudice is born of insecurity, and ensures that particular groups dominate. It is perpetuated by people (usually men) from dominant ethnic, racial, religious, or linguistic communities, with any departure from their "norm" treated as deviant and harmful, In previous centuries this fuelled colonization and false notions of the value of one civilization over others. This legacy is deep-seated, and continues to enable the subjugation of native populations, making their ancestral territories and resources subservient to dominant political powers. The general exclusion of women and others deemed "deviant," such as the LGBTI community, has continued - though modernizing social norms are steadily outstripping ancient prejudices. Women's voices are coming to the fore, as seen in the #MeToo movement, racial intermixing and immigration are reshaping societies, and widespread support exists for the types of systemic change called for by Black Lives Matter and other movements. The scale and complexity of global problems requires tapping the broadest talent pool to find solutions; relying only on a relatively small portion of the population based on its privileged identity would be foolhardy.

Related topics: Peace and Resilience, Education, LGBTI Inclusion, Systemic Racism, Gender Inequality, Migration, Roles of Religion, Ageing and Longevity, Human Rights

2.18 Investing in Climate Action

Strategic investments can stimulate economies and build climate resilience

Investments in green transportation, sustainable agriculture, and climate-resilient infrastructure can have a multiplier effect. According to the Business Commission for Sustainable Development, investing \$320 billion annually in sustainable business models in developed economies could unlock \$2.3 trillion in additional annual investment by 2030. A report published by the Organisation for Economic Co-operation and Development found that better integrating economic and climate action could increase average economic output in G20 countries by almost 3% by 2050. And, the International Finance Corporation has identified nearly \$23 trillion in climate-smart investments in emerging markets through 2030. Investment in decarbonization surpassed \$500 billion for the first time in 2020, despite COVID-19, according to Bloomberg New Energy Finance, and direct investment in electrical power capacity from renewable energy exceeded \$300 billion for the second time (following 2017) - including \$50 billion in offshore wind. Corporations are signing long-term, large-scale renewable energy contracts, and the Green Climate Fund (an element of the Paris Agreement) is sponsoring nearly 150 projects in developing countries with over \$7 billion in committed financing - though still short of the \$100 billion targeted to be available annually by 2020.

Governments can catalyse private investment in climate resilience by providing incentives and funding innovation. Businesses can reinforce government action in turn, by making climate-smart investments and by supporting the United Nations 2030 Agenda for Sustainable Development. According to the New Climate Economy report published in 2018 by the Global Commission on the Economy and Climate, \$90 trillion will be spent globally through 2030 on new infrastructure - which exceeds the value of all current infrastructure stock. Developing countries are expected to account for roughly two-thirds of this new infrastructure investment, which can be made sustainable and compatible with climate goals through relatively modest additional upfront costs. Ultimately, these upfront costs can be more than offset by efficiency gains and fuel savings. The potential rewards are enormous; the Global Commission on the Economy and Climate's report projects an economic gain of \$26 trillion through the year 2030 if investments are made in low-carbon technologies and resilient infrastructure, rather than conducting business as usual. Such investments offer an

unprecedented opportunity to leapfrog the wasteful, polluting infrastructure of the past, and accelerate the global transition to efficient, climate-resilient, and low-carbon economies.

Related topics: Sustainable Development, Development Finance, Circular Economy, Innovation, Advanced Manufacturing, Fresh Water, Climate Indicators, Infrastructure, Energy Transition, CO2 Capture, Utilization, and Storage, Economic Progress, The Net Zero Transition, Financial and Monetary Systems, Cities and Urbanization

2.19 The Paris Agreement

It provides a framework for climate action, though COP26 demonstrated that we're falling behind on its goals

The Paris Agreement was negotiated at the annual United Nations climate summit in 2015, and provides a means for participating countries to respond to the environmental, social, and economic effects of climate change. The agreement was a significant milestone because it achieved consensus on the need to limit the rise in global average temperature to well below 2°C above pre-industrial levels. 181 countries ratified the deal and submitted initial pledges - called Nationally Determined Contributions - to reduce their own emissions and to help regions most vulnerable to climate change adapt. One of the UN's Sustainable Development Goals, adopted in 2015 to guide development for the next 15 years, encourages countries to incorporate their climate commitments into national policies, and urges companies to de-carbonize their operations and supply chains. In addition, the Kigali Amendment to the Montreal Protocol (on Substances that Deplete the Ozone Layer) bolsters the Paris Agreement by preventing the equivalent of an estimated one billion tons of carbon dioxide emissions every year (about 40 billion tons of yearly emissions currently result from human activity).

Public commitments targeting greenhouse-gas emissions have been gaining momentum, albeit unevenly. Unified progress on global climate goals was shaken in 2017, when the Trump Administration announced its intention to withdraw the US from the Paris Agreement at the earliest allowed date - which, ironically, was a day after the 2020 US presidential election. The Biden Administration promptly returned the US to the agreement. A new round of revised reduction pledges are expected in 2022, following a bittersweet COP26 climate summit that was held in Glasgow - which will signal how much real progress can be made. The COP26 Climate Pact does include provisions aimed at increasing transparency and accountability, and countries are expected to increasingly report on their actions and progress made on climate-change mitigation, on adaptation measures, and on related support that is provided or received. COP27 is expected to take place in November 2022 in Sharm El-Sheikh, Egypt, where activists hope more awareness will be raised about the severe climate impacts being felt in Africa, and more related support will be both promised and delivered.

Related topics: Innovation, Global Risks, United States, Social Protection, Climate Indicators, Civic Participation, Sustainable Development, Economic Progress, Future of the Environment, Global Governance, Justice and Law, Corporate Governance

2.20 Understanding Climate Risks

Extreme weather, rising sea levels, and food and water scarcity are becoming a reality

All ten of the hottest years on record have occurred since 2005. The global average temperature is now about 1°C above the pre-industrial average, and increasing at a rate of about 0.2°C per decade. This warming is largely the result of human activity. Carbon dioxide released by burning fossil fuels, and through agricultural activity like farming, has raised the pre-industrial concentration of carbon dioxide in the atmosphere by about one-third to more than 400 parts per million - which has in turn intensified the trapping of heat. Global warming is causing sea levels to rise and is changing precipitation patterns, with increased rainfall in some regions and more extreme drought in others. The world experienced a staggering number of climate-related disasters in 2020 - causing damage from hurricanes, wildfires, droughts, and floods that resulted in financial losses totalling more than \$200 billion, according to the German reinsurer Munich Re. The US National Climate Assessment issued in late 2018 projected yearly related losses of \$300 billion in the US alone by the end of this century.

The Paris Agreement on climate change aims to limit global average temperature rise to well below 2°C above pre-industrial levels. However, a 2018 report published by the Intergovernmental Panel on Climate Change vividly illustrated the need to limit warming to no more than 1.5°C; many ocean ecosystems, including the

majority of the world's warm water coral reefs, are likely to disappear if warming exceeds this level. The average global rise in sea level - which is projected to be about half a metre by 2100, if warming reaches 2°C - could be reduced by 20% by hitting the 1.5°C target, thereby protecting an estimated 10 million vulnerable people. A slower temperature rise would also help affected regions better adapt to climate change. In order to meet the 1.5°C target, however, countries must go well beyond their initial Paris Agreement pledges and commit to net-zero emissions by the year 2050. Achieving this will require far-reaching changes to many aspects of modern society as we know it, but would also help create a more sustainable, equitable world.

Related topics: Future of the Environment, Global Governance, Antarctica, Food Security, Sustainable Development, Ocean, Fresh Water, Climate Indicators, Forests, Peace and Resilience, Arts and Culture, Global Risks, Air Pollution, Corporate Governance

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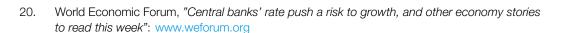
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The maps harness the Forum network's collective intelligence as well as the knowledge and insights generated through our activities, communities and events. And because the Transformation Maps are interlinked, they provide a single place for users to understand each topic from multiple perspectives. Each of the maps has a feed with the latest research and analysis drawn from leading research institutions and media outlets around the world.

At the centre of each map is the topic itself. This is surrounded by its "key issues", the forces which are driving transformation in relation to the topic. Surrounding the key issues are the related topics which are also affected by them. By surfacing these connections, the map facilitates exploration of the topic and the landscape within which it sits.

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