WORLD ECONOMIC FORUM

Digoshen Recommends

STRATEGIC INTELLIGENCE BRIEFING

Generated for Team Digoshen on 13 July 2023

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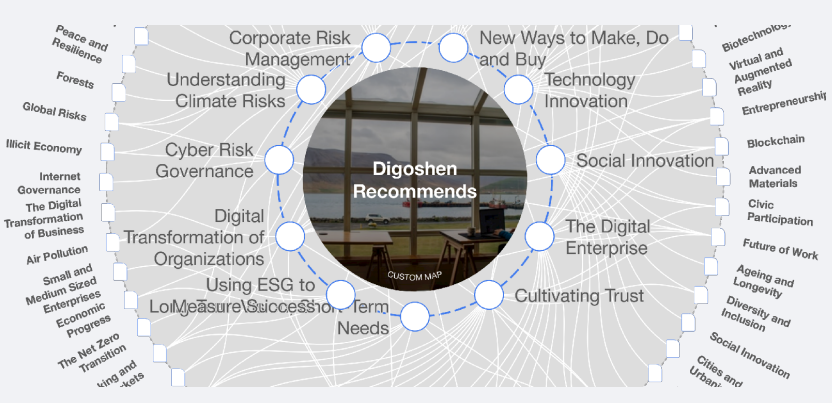
Below is an excerpt from the transformation map for Digoshen Recommends, with key issues shown at the centre and related topics around the perimeter. You can find the full map later in this briefing.



1 Latest insights

A synthesis of the most recent expert analysis.

Below are your latest updates on the topic of Digoshen Recommends spanning 12 different sources.

1.1 Current perspectives

GreenBiz

A cheat sheet for managing refrigerants

13 July 2023

Refrigerants are vital to modern comfort and convenience — found in air conditioners, chillers, refrigerators and heat pumps (which in 2022 overtook the sale of gas furnaces in the U.S.)

Their primary function: absorb and release heat while transitioning from a liquid to a gas.

Pretty cool stuff except that most refrigerants in use happen to be super-potent greenhouse gasses. As the planet warms and the need for cooling increases, so does the use of these chemicals — creating a vicious cycle of global warming.

Here are the top three reasons to care about refrigerants:

ELIAMEP

MedTrends - Environment: CO2 emissions (metric tonnes per capita)

06 July 2023

Libya had the highest CO2 emissions per person at 8.6 metric tonnes in 2019, while Syria had the lowest at 1.3 metric tonnes. Countries like France, Spain, Italy, Greece, and Cyprus fell in the range of 4.5 to 6 metric tonnes per person. To reduce CO2 emissions, it is important for these countries t

The Diplomat

Facebook Suspends Cambodian PM's Account For Breach of Incitement Policy

30 June 2023

Advertisement

The Facebook page belonging to Cambodia's Prime Minister Hun Sen appears to have been deactivated, just hours after an independent watchdog recommended that it be suspended for breaching the platform's policy on violence and incitement.

In a decision released yesterday, the Oversight Board of Facebook's parent company Meta called for the Cambodian leader's busy account to be suspended for six months over a livestreamed speech in which he threatened his opponents with violence.

The speech in question took place at a road construction ceremony in January, when the 70-year-old leader attacked opposition politicians who accused his ruling Cambodian People's Party (CPP) of stealing votes. "There are only two options: one is using legal action, the other is using sticks… What do you want?" he said in the speech.

Carbon Brief

'Striking' new NASA videos show CO2 emissions rapidly building up in atmosphere

27 June 2023

Fast-rising concentrations of carbon dioxide in the atmosphere are the main driver of human-caused global...

The post 'Striking' new NASA videos show CO2 emissions rapidly building up in atmosphere appeared first on Carbon Brief .

SpringerOpen

A positioning algorithm based on improved robust extended Kalman filter with NLOS identification and mitigation

10 July 2023

With the development of the information age and the maturity of Internet of Things technology, wireless sensor network has been widely applied in indoor localization. However, the non-line-of-sight (NLOS) propagation in complicated environment and the inherent noise of the sensor will introduce errors in the measurements, which will seriously lead to inaccurate positioning. In this paper, a novel localization scheme based on the mean reconstruction method is proposed, which reconstructs the distance measurements from all beacon nodes by taking the average twice to weaken the adverse effects of NLOS. At the same time, the noise average is re-estimated when the distance difference is not too large. Next, the robust extended Kalman filter (REKF) is used to process the reconstructed distance measurements to obtain positioning results. To make the positioning results more accurate, hypothesis test is used as NLOS identification to classify the position estimates generated from all distance combinations by least-squares. Then, the residual weighting (RWGH) method is utilized to combine the position estimates that fall into the validation region. At last, we merge the results from RWGH and REKF. The simulation and experimental results show that the proposed algorithm has high positioning accuracy and strong positioning robustness.

Science Daily

Potent greenhouse gas produced by industry could be readily abated with existing technologies: Affordable and available technologies can curb rising nitrous oxide emissions

05 July 2023

Researchers have found that one method of reducing greenhouse gas emissions is available, affordable, and capable of being implemented right now. Nitrous oxide, a potent greenhouse gas and ozone-depleting substance, could be readily abated with existing technology applied to industrial sources.

Frontiers in Virtual Reality

Feedback in augmented and virtual reality piano tutoring systems: a mini review

29 June 2023

Researchers in music education are exploring the use of virtual reality (VR) and augmented reality (AR) to support piano instruction. Beginner piano students tend to receive short, infrequent lessons, which they practice on their own. This lack of instructor feedback creates opportunities for students to develop improper technique. Current strategies for using AR and VR to guide solo practice use moving shapes to help students to identify what notes to play. Improvements in commercial AR/VR technology will be needed to provide more detailed real-time feedback.

Frontiers

University students' experiences of sexual harassment: the role of gender and psychological resilience

13 July 2023

This study aimed to investigate university students' experiences of different types of sexually harassing behaviors, within academia, as well as the role of gender and psychological resilience regarding their victimization and its consequences. Overall, 2,134 students (70.5% women), both undergraduates (81%) and postgraduates (19%), completed a self-reported online questionnaire regarding the variables involved (sexual harassment, consequences, and resilience). According to the results, the most prevailing types of sexually harassing behaviors, which were experienced mainly by women students, included offensive sexual comments/jokes/stories, inappropriate comments about one's body/appearance/sex life, as well as obscene ways of staring, obscene gestures, and/or exposure of body parts causing embarrassment. Accordingly, the perceived psycho-emotional and academic consequences of sexual harassment were more pronounced in the case of women. Furthermore, psychological resilience was negatively associated with gender, making women with low resilience more vulnerable to experiences of sexual harassment and more affected by its consequences. This study highlights important aspects of this gender-based aggressive behavior in academia and emphasizes the necessity for the implementation of appropriate policies and interventions in higher education institutions against sexual harassment.

The Conversation (French)

La réalité virtuelle va-t -elle se démocratiser maintenant qu'Apple est de la partie ?

12 July 2023

Le manque de contenus ou encore l'inconfort ressenti avec les casques freinent l'essor de la réalité virtuelle. Apple entre aujourd'hui sur le marché avec l'ambition de lever ces obstacles.

Try translating with Google

Wired

Ryuichi Sakamoto's Final Performance Is a Virtual-Only Engagement

28 June 2023

The performance lasts about 45 minutes. The Oscar-winning composer plays 10 of his own compositions, and at the end of every piece, people clap. Not me at first, but I make up for it with tears, which first build up in my throat, then stream down my cheeks. When it's over, Sakamoto doesn't bow and walk off the stage; he passed away in March this year after a years-long battle with cancer. He just fades into black as I take off the headset I am wearing.

SpringerOpen

5G millimeter wave wideband MIMO antenna arrays with high isolation

10 July 2023

In this paper, a compact two-port MIMO antenna array system is described. The antenna array spans the range from 27 to 40 GHz, whereas the impedance of the antenna element is matched at 50 Ω. The gain of the antenna element is between 5.5 and 8.5 dBi, and its radiation efficiency is between 65 and 90%. With high impedance matching for 5G MMW (Millimeter Wave), particularly at 28 GHz and 38 GHz, the 2-port antenna array operates in the frequency range of 27–40 GHz. The suggested MIMO array operates effectively with a gain of approximately 10 dBi and a radiation efficiency of approximately 95%. The antenna array's overall dimensions are a length of 55.27 mm, a width of 27.635 mm, and a depth of 1.6 mm with partial ground. A FR-4 substrate is used in the antenna's fabrication, greatly reducing the cost. In the antenna array, a decoupling surface is used between the antennas, with orthogonality being maintained between the ports to reduce mutual coupling. The results of the modelling show a reduction in the measured mutual coupling between array ports of less than – 35 dB. An envelope correlation coefficient (ECC) of less than 1 × 10–4 is preferable. Additionally, the channel loss capacity is less than 0.3 bits/s/Hz, the mean effective gain is approximately – 6 dB, and the total active reflection coefficient is upgraded to be less than – 30 dB. Moreover, a diversity gain of...

Frontiers in Virtual Reality

MetaReality: enhancing tactile experiences using actuated 3D-printed metamaterials in Virtual Reality

28 June 2023

During interaction with objects in Virtual Reality haptic feedback plays a crucial role for creating convincing immersive experiences. Recent work building upon passive haptic feedback has looked towards fabrication processes for designing and creating proxy objects able to communicate objects' properties and characteristics. However, such approaches remain limited in terms of scalability as for each material a corresponding object needs to be fabricated. To create more flexible 3D-printed proxies, we explore the potential of metamaterials. To this aim, we designed metamaterial structures able to alter their tactile surface properties, e.g., their hardness and roughness, upon lateral compression. In this work, we designed five different metamaterial patterns based on features that are known to affect tactile properties. We evaluated whether our samples were able to successfully convey different levels of roughness and hardness sensations at varying levels of compression. While we found that roughness was significantly affected by compression state, hardness did not seem to follow the same pattern. In a second study, we focused on two metamaterial patterns showing promise for roughness perception and investigated their visuo-haptic perception in Virtual Reality. Here, eight different compression states of our two selected metamaterials were overlaid with six visual material textures. Our results suggest that, especially at low compression states, our...

Fraunhofer-Gesellschaft

Transforming online hearings with avatars

03 July 2023

Since the coronavirus pandemic, video conferences have become an everyday occurrence across a variety of professions. Online court hearings are also becoming increasingly important around the world. In large countries such as Canada and Australia, virtual court hearings have become commonplace to avoid long journeys. A research team at Fraunhofer Austria is currently working on software to take online court cases to a new level: The aim is to develop virtual avatars that will represent participants in the online courtroom. The participants' facial expressions and eye movements are recorded by a webcam and then transferred to the avatars. This makes it possible for all participants to make eye contact with each other, simulating face-to-face communication.

Science Daily

Soft, ultrathin photonic material cools down wearable electronic devices

29 June 2023

Overheating of wearable skin-like electronic devices increases the risk of skin burning and results in performance degradation. A research team has now invented a photonic material-based 'soft, ultrathin, radiative-cooling interface' that greatly enhances heat dissipation in devices, with temperature drops more than 56°C, offering an alternative for effective thermal management in advanced wearable electronics.

The Conversation (Spanish)

Un videojuego para replantearnos los estereotipos de género

26 June 2023

Un proyecto de investigación para la igualdad propone un videojuego para desvelar y reflexionar sobre los prejuicios y estereotipos que el arte transmite y de los que no somos conscientes.

Try translating with Google

Frontiers

Air-sea flux and SST variability associated with atmospheric rivers in the southeast Indian Ocean

12 July 2023

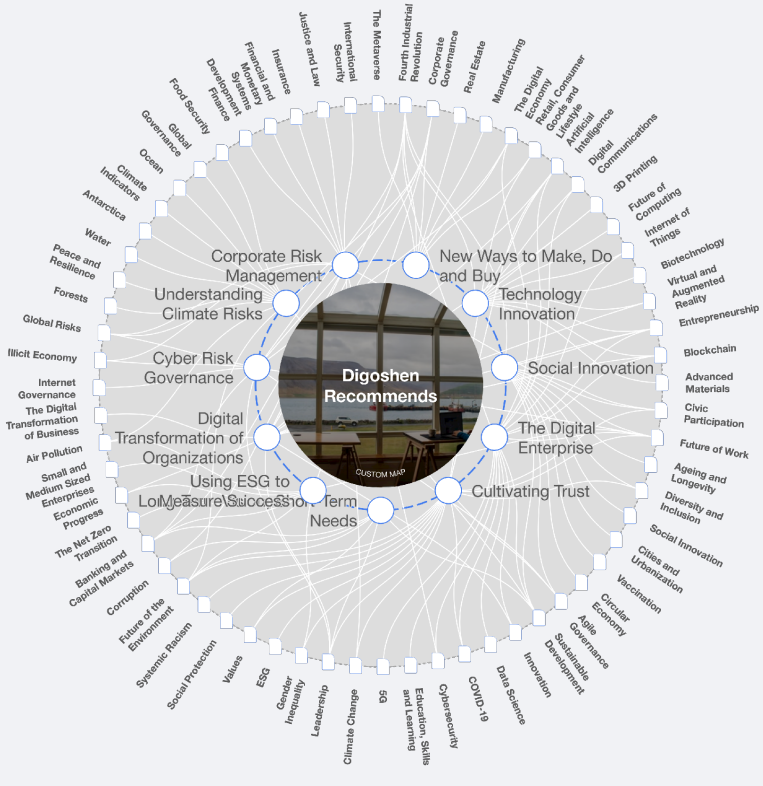
A previous study demonstrated that atmospheric rivers (ARs) generate substantial air-sea fluxes in the northeast Pacific. Since the southeast Indian Ocean is one of the active regions of ARs, similar air-sea fluxes could be produced. However, the spatial pattern of sea surface temperature (SST) in the southeast Indian Ocean, especially along the west coast of Australia, is different from that in the northeast Pacific because of the poleward flowing Leeuwin Current, which may cause different air-sea fluxes. This study investigates AR-associated air-sea fluxes in the southeast Indian Ocean and their relation with SST variability. The large-scale spatial pattern of latent heat flux (evaporation) associated with ARs in the southeast Indian Ocean is similar to that in the northeast Pacific. A significant difference is however found near the coastal area where relatively warm SSTs are maintained in all seasons. While AR-induced latent heat flux is close to zero around the west coast of North America where the equatorward flowing coastal current and upwelling generate relatively cold SSTs, a significant latent heat flux induced by ARs is evident along the west coast of Australia due to the relatively warm surface waters. Temporal variations of coastal air-sea fluxes associated with landfalling ARs are investigated based on the composite analysis. While the moisture advection reduces the latent heat during landfalling, the reduction of air humidity with strong winds enhances...

2 Strategic context

The key issues shaping Digoshen Recommends.

The following key issues represent the most strategic trends shaping the topic of Digoshen Recommends. These key issues are also influenced by the other topics depicted on the outer ring of the transformation map.

FIGURE 1 **Transformation map for Digoshen Recommends**



2.1 New Ways to Make, Do and Buy

Virtual and augmented reality are helping to improve quality in innovative new ways

Virtual and augmented reality tools have been readily adopted by manufacturers aiming to improve efficiency, safety, and connectivity as they develop and repair their products. According to a report published by PwC in 2016, more than a third of US manufacturers surveyed were either already using virtual reality technology, or planned to do so in the next three years. In terms of product design, the technology facilitates remote collaboration, and many products can be “experienced” before they are actually made - potentially increasing product quality for consumers. In 2016, MIT Technology Review reported that commercial construction companies had begun using augmented reality technology to help them identify and avoid problems before

starting work at a site; one senior manager at a firm in Rhode Island was able to use a Microsoft HoloLens head-mounted display unit in order to look at a mockup of a project and see that steel frames he planned to order would actually be too long to fit the design. His company then asked the supplier to cut the frames shorter in advance of delivery, enabling it to save thousands of dollars in unnecessary labour costs.

While virtual reality can help businesses visualize store layouts before they are built, augmented reality can fundamentally change the way retailers deliver their products to consumers. The functionality and quality of products can be assessed from anywhere, anytime. A Harvard Business Review article published in 2016 presented several possible use cases: virtually trying on clothing in the comfort of one's own home; testing out the look and fit of furniture at home; and potentially enabling people in different locations to go shopping together. The free augmented reality app KabaQ, released in 2017, can render compelling 3D models of food - which enable people to preview their meals on a tablet before ordering. AR may ultimately prove to be the easiest option for retailers seeking to bolster their services, given that the technology can be accessed on any smartphone. Virtual reality, on the other hand, still requires special equipment and so may be more suitable for other types of businesses - at least, for now. However, as the technology inevitably matures, virtual reality shopping will likely take off.

Related topics: Real Estate, Manufacturing, Fourth Industrial Revolution, Corporate Governance, The Metaverse, Retail, Consumer Goods and Lifestyle, The Digital Economy

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 AI-generated content to spread misinformation, particularly in areas like fake news or deepfake videos. Another concern is the impact that generative AI may have on job markets, as automation could potentially displace human workers. Additionally, there are ethical concerns around the use of AI-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 AI 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 AI, 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 OpenAI's ChatGPT chatbot using the following prompt: "Write a 300 word text providing a non-technical description of generative AI, its opportunities, and key concerns about it."

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

2.3 AI and the Future of Work

How exactly will artificial intelligence impact jobs?

There has been a great deal of speculation and debate about the impact of artificial intelligence on the future of work - particularly in terms of the toll it will take on available jobs. Some argue it will eliminate a significant number, and will predominantly impact low-skilled workers in ways that exacerbate existing inequality. Others believe AI could create new job opportunities, by adding nuances to existing work and making it more creative. Generative AI is particularly likely to transform the workplace; its ability to create new and seemingly

original content can automate tasks ranging from editorial processes to the design of scientific experiments and software coding. Companies can potentially ease the impacts of AI integration in the workplace by developing programs to support employees during a transition period - such as retraining. To increase worker trust in AI systems, diverse teams of developers and data scientists must try to create systems using fair and unbiased training data. And policy-makers at multiple levels must set ethical, fair standards for the use of AI in the workplace.

Related topics: Education, Skills and Learning, Science, Future of Media, Entertainment and Sport, Taxes, Agile Governance, Future of Work, Economic Progress, Youth Perspectives, Corporate Governance, Justice and Law

2.4 Technology Innovation

The promise of emerging technologies is matched by a need to manage related uncertainty

Emerging technologies like quantum computing, augmented reality, and gene editing tools present many opportunities. At the same time, they are the cause of immense uncertainty. Some particular sources of that uncertainty include the market applications a new technology will serve, the users who will adopt it, the related activities that will support its expansion; and the business models that will be deployed to commercialize it. A holistic approach can help managers unbundle specific sources of uncertainty and the potential interaction among them, according to an article published in Strategy Science in 2021. For example, quantum computing has made several exciting technological advances, yet it can still be difficult to predict how it will evolve and create genuine value. Several questions remain regarding the technology, including at what point it can consistently and reliably outperform existing high-performance computing solutions. While some early-stage approaches have utilized “quantum annealing” technology - which is an alternative method of quantum computing that is already becoming commercially available - the next generation of the technology, dubbed universal gate-based quantum computing, is not expected to become widely-scaled-up for several years.

In terms of specific applications, quantum computing can serve many industries. Possible use cases include finance (for trading and risk management) and logistics (scheduling and planning), and eventually pharmaceuticals (drug development), security (encryption), and more. Still, there may be uncertainty about how various actors will contribute to the technology’s value proposition; quantum computing does not necessarily hold utility when used simply to solve current problems faster than existing solutions, so to realize its full potential reformulating old questions or raising new ones is needed (companies such as 1Qbit, which specializes in “recasting” questions and problems related to quantum computing, have grown in value). Cloud-based ventures, including those focused on data storage, will also be important for bringing quantum technology to commercial fruition. Ultimately, it will require a business model - though that is difficult to design when the technology is still rapidly evolving, and use cases are still not fully defined. It will likely be several years before its true potential becomes clear. Meanwhile governments via initiatives like the Barcelona Supercomputing Center (and its spin-off Qilimanjaro) and companies like IBM have been shouldering substantial related upfront investments.

Related topics: Entrepreneurship, Future of Computing, Biotechnology, Fourth Industrial Revolution, Blockchain, Digital Communications, 3D Printing, Advanced Materials, Artificial Intelligence, Virtual and Augmented Reality, Internet of Things

2.5 Social Innovation

Profit is not the only source of inspiration for innovators

Examples of social innovation are all around us; they include everything from kindergartens and hospices to Wikipedia, Kahn Academy, and microfinance (small loans made to entrepreneurs in the developing world who do not have access to traditional financing). Social innovation is often defined as innovation that aims to tackle both social problems and the means used to address those problems. This can take the form of new products, services, initiatives, business models, or simply novel approaches to accessing public goods - often achieved by creatively re-combining already-existing elements. The field has developed rapidly in recent years, according to a 2022 report published by the Academy of Management, as new sources of funding, public policies, academic research, and networks emerge. The everyday work of social innovation typically happens within social enterprises (organizations working to solve social problems using market-based

approaches), charities, non-governmental organizations, social movements, or patient groups. Universities, large companies, and governments also play roles, particularly in terms of validating ideas; results have included the construction of public playgrounds and the commercialization of community-developed, open-source software.

One notable development in the realm of social innovation is the deployment of pay-as-you-go (PAYG) technology. This enables companies to cater to people living in relative poverty, by accepting small individual payments for key services. As with prepaid phone services, customers can buy small and therefore more affordable amounts of credit. Solar energy companies like Angaza and affordable water organizations like eWater Services use PAYG technology to reach customers that might otherwise be denied such services. However, a lack of immediate commercial incentives can make it difficult to raise the capital needed to support such social innovation. As a result, organizations continue to experiment with frugal innovation - to make potentially scarce resources stretch further. One example of this is the M-Pesa mobile phone-based payment and micro-financing service, which has been deployed in countries in Africa, Asia, and Europe to facilitate banking services without requiring access to an actual bank. Due to their limited funding, social enterprises often adopt hybrid for-profit and non-profit legal structures - enabling organizations like Sanergy in Africa to supplement revenue with philanthropic donations.

Related topics: Sustainable Development, Agile Governance, Ageing and Longevity, Entrepreneurship, Social Innovation, Cities and Urbanization, Future of Work, Civic Participation, Vaccination, Fourth Industrial Revolution, Circular Economy

2.6 The Digital Enterprise

Becoming 'digital at the core' can potentially create more sustainable value

Millennials and Gen Z account for nearly half the global workforce, and are updating expectations for employers everywhere. Remote working is important to many millennials (who are now as old as 40), for example, and COVID-19's social distancing requirements have accelerated what had been a gradual shift to both more remote working, and more digitally-enabled customer experiences. Companies will need to be able to accommodate this with digital solutions that maintain engagement, health, and well-being. In addition, as workforces become more distributed, and connected devices and data networks are increasingly used, ensuring security will become more challenging - necessitating the management of more significant vulnerabilities. Companies will generally need to be open and flexible, to proactively plan for cybersecurity risks, and to be willing to take responsibility for helping employees acquire new and necessary digital skills. Other reasons for aggressively pursuing a digital transformation predate the pandemic; according to the MIT Initiative on the Digital Economy, the "digerati," or firms that excel both in digital intensity and transformation management capabilities, have been shown to be 26% more profitable than their peers.

In response, an estimated 87% of CEOs expect to see a change in their operating models within three years, according to research cited by Deloitte in 2019. Technology and data can help support demand forecasting, inventory stocking, tracking, and delivery. Amazon, for example, has used a shipping model meant to predict buying behaviour in order to have products on hand locally before they are ordered. As COVID-19 disrupted supply chains with lockdowns and border closures, many organizations looked for ways to bolster resilience and transparency, and many manufacturers turned to selling products through channels like Amazon. Increasingly, companies everywhere will make greater use of technologies such as blockchain, cloud computing, artificial intelligence, and robotics as part of efforts to build resilience - and Unilever and United Kingdom-based supermarket chain Sainsbury's have already sought to use blockchain to increase the sustainability and transparency of their supply chains. While the pandemic has led to revenue losses in many industries, investing in digital solutions can be one means to help better manage costs during a difficult time.

Related topics: Education, Skills and Learning, Blockchain, The Digital Economy, Data Science, Future of Work, 5G, Sustainable Development, Entrepreneurship, Artificial Intelligence, Digital Communications, Innovation, Cybersecurity, Internet of Things, Fourth Industrial Revolution

2.7 Cultivating Trust

Responsible corporate governance can create a culture of mutual trust

Trust is crucial for the long-term success of companies - especially at the board level. Genuine trust is underpinned by personal integrity, and by putting the interests of the organization (and of society) above

those of individuals. Boards need to be able to trust that management will bring full transparency into the boardroom, and that will only happen thanks to shared integrity. There is a strong sense of pessimism about leadership in both the private and public sectors, and anxiety related to job security is high - due to a general lack of training and increasing automation, and not least due to the global pandemic. This threatens to fuel the growth of nationalist and protectionist movements. According to the Pew Research Center, as of 2019 only about one-third of adult Americans had a great deal or fair amount of confidence in elected officials to act in the public's best interests, and less than half said the same about business leaders (attitudes were far more positive when it came to the medical professionals now grappling with COVID-19). In addition to the general public, employees increasingly expect their employers to do the right thing and take action on issues related to inequality, the environment, and climate change.

As people lose faith in their political leaders, it appears that they have higher expectations for CEOs. According to the 2019 Edelman Trust Barometer, more than three-quarters of the general population, or 76%, want CEOs to take the lead on necessary social and economic change rather than waiting for governments to act. While organizations must comply with legislation and regulation on everything from taxes to consumer protection, competition, corruption, and environmental protection, they can also be positively influenced in terms of corporate governance and trust by industry self-regulation and voluntary practices - such as a code of conduct. Most cases of fraud and breach of trust among stakeholders can be traced to corporate governance failures, and so corporate leaders have the ultimate responsibility for creating an organizational culture that supports trust - and ensures that management and employees embody and act on the stated values and mission of their organization. Particular areas of increased social expectations that require the attention of boards of directors include diversity (including gender diversity), transparency, equal opportunity, and eliminating all forms of harassment.

Related topics: Civic Participation, Future of Work, Values, Climate Change, Agile Governance, Social Protection, ESG, Retail, Consumer Goods and Lifestyle, Future of the Environment, Leadership, Gender Inequality, Artificial Intelligence, Systemic Racism

2.8 Long-Term Vision, Short-Term Needs

Balancing short- and long-term pressures is one of the most difficult business leadership challenges

There is a commonly-held view that investors pursue short-term profit at the expense of long-term value. According to the results of a survey published by the Rock Center for Corporate Governance at Stanford University in 2019, 70% of CEOs and CFOs at S&P 1500 Index companies were facing pressure to maximize short-term returns at the expense of long-term growth. When firms focus on the short term, it often translates into lower investment in the long-term sustainability of a company at the expense of other stakeholders. Management has to be able to both articulate a long-term strategy and deliver sufficient short-term returns in order to ensure support and continued investment. Consistent metrics for measuring the success of long-term strategies are important. Corporate governance can play an important role in this regard by implementing incentives and pay aligned with these long-term metrics. Another means to tilt the balance towards a longer-term approach has been the increased adoption of Environment, Social and Governance (ESG) criteria in corporate strategies and investment decisions - which can draw the attention of shareholders zeroing in on firms with a longer-term, socially-conscious approach.

According to a white paper published by the World Economic Forum in 2019, quarterly reporting requirements are not the sole reason for short-termism - though corporate leaders describe them as a "necessary evil." According to the white paper, these leaders must become better storytellers about their companies, by framing each quarter as a step in a longer-term story. Management and their boards must engage in constant conversation about how the company will grow, and the risks it will take to get there. Leaders of global companies have been signing a World Economic Forum compact for responsive and responsible leadership, committing them to ensure that their boards oversee the definition and implementation of corporate strategies that pursue sustainable long-term value creation, to encourage the periodic review of corporate governance, long-term objectives and strategies at the board level, to promote meaningful engagement between the board, investors, and other stakeholders that builds mutual trust and promotes the highest possible standards of corporate conduct, and to implement policies, practices, and long-term strategies aimed at cultivating sustainable growth for the benefit of all stakeholders.

Related topics: Banking and Capital Markets, Corruption, Values, Sustainable Development, Future of the Environment, Leadership

2.9 Using ESG to Measure Success

Environmental, Social and Governance performance is not captured in quarterly earnings reports

At its root, ESG is about expanding our appreciation of a firm's performance and impact. While quarterly earnings reports might convey key figures, they leave much hidden related to both the causes and effects of the firm's success. By widening our view, we may see that a mining firm's profits come at the expense of workers, communities, and the environment, for example - while another firm in the same industry may be investing in worker safety and environmental efforts in ways that aid long-term performance, but do not show up in a balance sheet. This wider view helps determine whether firms can be considered "sustainable," and so it is essential to enable broad access to it. While firms can constrain their own future success if they negatively impact the people, customer and community trust, or natural resources they depend upon, one key challenge relates to how broad the view of these impacts and risks should be. What should be in scope when assessing "non-financial performance" for technology firms, relative to automotive companies, mining interests, or financial firms? And, how long should our time horizon be when considering related risks and impacts?

There are no easy answers to these questions, and different countries and institutions define sustainability differently. ESG has become an umbrella concept for hundreds of issues, practices, and metrics used to hold firms accountable. One MIT study of ESG rating agencies found that 50% of the significant divergence in ratings was caused by differences in scope and definition. The World Economic Forum and its partners have sought to lessen these differences by developing the "Stakeholder Metrics Initiative," designed to make ESG metrics comparable across industries and regions; more than 150 companies have so far adopted them. Writing and publishing reports may increase transparency, but it does not change practices. And while buying and selling equities based on ESG information is increasingly common, the effects on firms (and society in general) are indirect at best. ESG information can only improve the world under certain conditions: when C-suite executives actually use it to guide decision making, when it attracts the best employees, customers, suppliers, and capital, when it influences regulatory action, or when it impacts shareholder voting - which can make non-financial information truly material.

Related topics: The Net Zero Transition, Economic Progress, Future of Work, Small and Medium Sized Enterprises, Banking and Capital Markets, Corporate Governance, Gender Inequality, Air Pollution, Future of the Environment

2.10 Digital and Sustainable Transformation of Industries

The pandemic has accelerated both digital immersion and a digital transformation gap

COVID-19 catapulted organizations everywhere into the digital-first world. Greater access to connectivity and digital services had already been reshaping industries, business models, and supply chains; the pandemic accelerated these trends, requiring organizations of all types to rely more heavily on digital operations and business models to create new value and experiences. But while some organizations are making progress on their digital transformation goals, others have not. The pandemic widened this digital transformation gap; as some speed ahead, others struggle to survive, let alone thrive. Without a comprehensive government approach to digitally equipping an economy, including sustainable investment in connectivity infrastructure and services, inequalities widen. A complete and responsible digital transformation of industries requires careful consideration of digital infrastructure investments and related policies, to enable a transition across an entire economy - in ways that benefit society as a whole, and not just now but for years to come.

Governments have an opportunity to make step changes in terms of technological advancement across industries and in their own operations, through sound policy and investments in digital skills and infrastructure. Research shows that digital transformation could help reduce emissions in hard-to-abate sectors by as much as 20% by 2050. In addition, the World Bank estimates that the digital economy is equivalent to 15.5% of global GDP, having grown two-and-a-half times faster than global GDP over the past 15 years. Low productivity and scaled back growth, coupled with an inability to fully (and responsibly) benefit from technologies such as cloud computing, 5G, artificial intelligence, and high-performance computing will lead to a deteriorating quality of essential services - and block the transition to a more advanced economy. Interoperability will be vital for ensuring information exchange, and enabling collaboration.

Priorities for collaboration:

-Encourage a cross-sector, public-private dialogue on value creation to design new frameworks around sustainable investments in connectivity infrastructure and services.

-Stimulate growth through digitally enabled collaboration models that enable transformation of industries.

Related topics: 3D Printing, Leadership, Corporate Governance, Entrepreneurship, Fourth Industrial Revolution, Virtual and Augmented Reality, Blockchain, Artificial Intelligence, Innovation, Economic Progress, The Digital Transformation of Business

2.11 Cyber Risk Governance

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

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

2.13 Corporate Risk Management

For boards, the volatility of risk scenarios is only increasing

Every organization is confronted with some type of risk - operational, financial, technological, environmental, regulatory - which can have devastating consequences. Effective corporate governance requires continuous and systematic management of all types of risk, both current and anticipated. First, risks must be prioritized, and here the board of directors can play a key role by deciding in what priority they should be addressed, what is to be deemed simply unacceptable, and how they should be addressed from a structural perspective. For example, evidence gathered from the 2007 global financial meltdown indicates that banks with boards that had identified a need to establish a separate risk management committee managed the crisis better than those with integrated committees. The benefits of this type of separation have become only more evident as fiduciary duties have come to include oversight of a broad range of matters, including compliance with international accounting rules and stability measures that require banks to set aside capital in case of potential losses. Implementing a robust risk management system requires the integration of different parts of an organization, including the board's risk committee, internal auditing, finance, legal, and operations.

Increasingly complex and rapidly changing economic, environmental, social, and technological conditions have multiplied potential risk scenarios. Worsening climate change, geopolitical tensions, trade wars, and social upheaval like the protests that spread in Hong Kong in 2019 require corporate governance that is proactive when it comes to identifying risks and addressing them. Determining an appropriate board structure and approach to risk management will depend upon both a company's industry and stage of its life cycle; risk exposure is very different for financial institutions than it is for petrochemical firms. Even within the financial sector, different approaches are required - from insurers exposed to extreme weather events related to climate change, to retail banks making loans to small businesses during volatile periods. Organizations are dealing with complexity and litigiousness like never before, forcing their boards to assess current and past organizational exposure. Still, there are some strategic advantages to taking risks; after all, achieving sustained growth requires some degree of risk-taking. Incorporating risk management into corporate strategy is therefore crucial.

Related topics: International Security, Corruption, Financial and Monetary Systems, Global Risks, Civic Participation, Climate Change, Development Finance, Illicit Economy, Justice and Law, Insurance, Banking and Capital Markets, Cybersecurity

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In today's world, it can be difficult to keep up with the latest trends or to make sense of the countless transformations taking place. How can you decipher the potential impact of rapidly unfolding changes when you're flooded with information - some of it misleading or unreliable? How do you continuously adapt your vision and strategy within a fast-evolving global context? We need new tools to help us make better strategic decisions in an increasingly complex and uncertain environment.

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↓ A leading expert presenting a transformation map at our Davos Annual Meeting

Transformation maps

Our Transformation Maps are dynamic knowledge visualisations. They help users to explore and make sense of the complex and interlinked forces that are transforming economies, industries and global issues. The maps present insights written by experts along with machine-curated content. Together, this allows users to visualise and understand more than 250 topics and the connections and inter-dependencies between them, helping in turn to support more informed decision-making by leaders.

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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