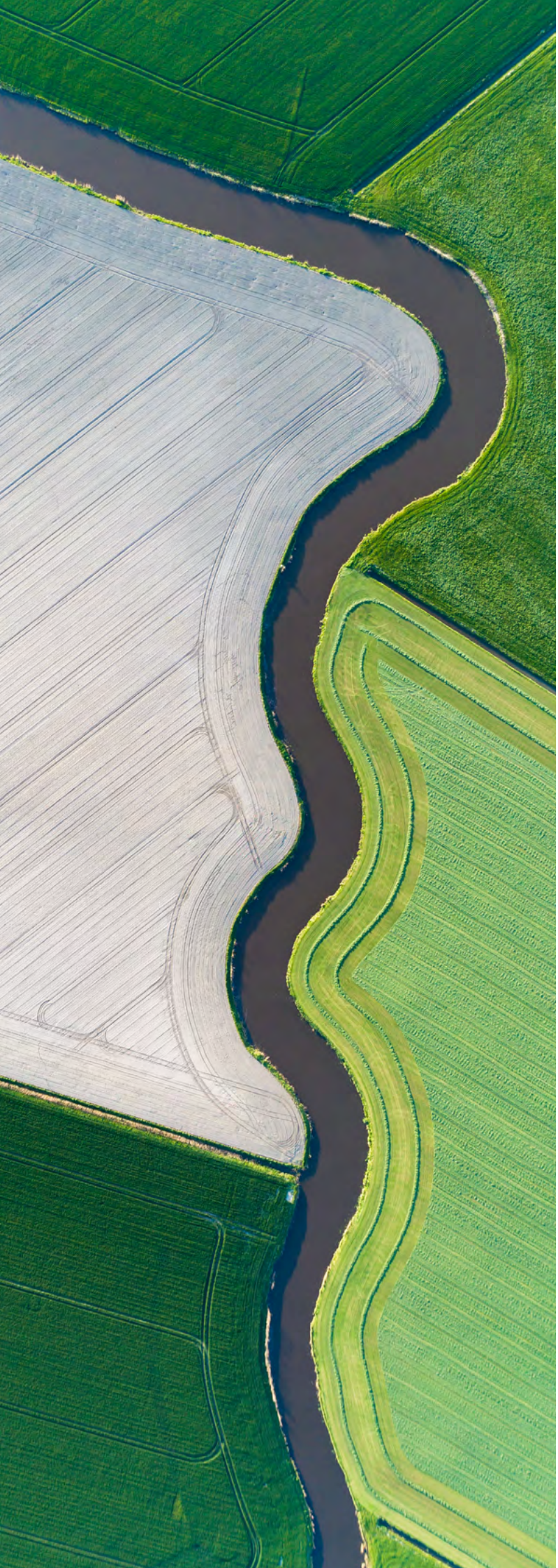

Expert Insights

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The rise of the sustainable enterprise

Using digital tech to respond to the environmental imperative

In collaboration with:

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IBM Center for The Business of Government

IBM **Institute for Business Value**

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Experts on this topic

Wayne S. Balta

Vice President
Corporate Environmental Affairs,
Product Safety and Chief
Sustainability Officer
balta@us.ibm.com

Wayne has global responsibility at IBM for environmental affairs, energy efficiency, and toxicology and chemical management. He also leads product safety and related hardware compliance functions. He has been with IBM since 1984.

Jacob Dencik, Ph.D.

Economic Research Leader
IBM Institute for Business Value,
Global Business Services
linkedin.com/in/jacob-dencik-126861/
jacob.dencik@be.ibm.com

Jacob is the Global Economic Research Leader in the IBM Institute for Business Value (IBV). Jacob is responsible for leading the IBV's research on topics related to technology and implications on the global economy. Jacob has extensive experience advising companies around the world on their global operations and location strategies. He has also advised governments around the world as an expert and economist on competitiveness, FDI, sector/cluster analysis, and innovation. Jacob holds a PhD in Public policy and Economics from Bath University.

Daniel C. Esty, J.D.

Hillhouse Professor
Environmental Law and Policy,
Yale University
environment.yale.edu/profile/esty
daniel.esty@yale.edu

Dan has primary appointments at Yale University in the Environment and Law Schools and a secondary appointment in the School of Management. He is the author or editor of 13 books and numerous articles on environmental law and policy, corporate sustainability strategy, regulatory reform, sustainable investing, and sustainability metrics.

Scott Fulton, J.D.

President
Environmental Law Institute
linkedin.com/in/scott-fulton-62a59853/
fulton@eli.org

Scott is ELI's fifth President since 2015. Previously, Mr. Fulton was a Principal at the environmental law firm Beveridge & Diamond, P.C., and served as General Counsel of the U.S. Environmental Protection Agency (EPA) and in a number of other high-ranking government leadership positions. In addition to his role as EPA's General Counsel, Mr. Fulton served in a number of other key leadership roles, including as Acting EPA Deputy Administrator, head of EPA's Office of International Affairs, Judge on the Environmental Appeals Board, and head of the Agency's enforcement program.

No longer can “environmental issues” remain a discrete set of concerns outside the core of a company’s primary focus.

Key takeaways

Digital acceleration

Progress in achieving environmental objectives has stalled because of systemic inertia, policy, priorities and choice—not because of a lack of technology. Digital transformation can help change that.

Change as opportunity

Leading companies are now using digital technologies to turn environmental challenges into major business opportunities.

Insights for better behavior

Insights from data are changing business and societal behaviors and leading to the emergence of the sustainable enterprise.

Governance as collaboration

Digital technologies are enabling a new model of environmental governance where the private sector and governments work in collaboration as partners.

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What’s driving today’s environmental imperative

Environmental sustainability is no longer just a corporate social responsibility (CSR) issue. Nor is it important only for compliance and reporting purposes. It is, in fact, an imperative in the fullest sense of the word.[1]

Opportunities and risks related to the environment now challenge the strategies and operating models of organizations across all sectors and functions. Whether it’s new market opportunities, operational efficiency, risk management, changing customer expectations, supply chain disruptions or the like, environmental objectives will directly affect how a company operates and defines its competitive advantage (see Figure 1).[2]

This will be especially true as the world recovers from the COVID-19 pandemic. It’s now impossible to deny the speed at which developments in one area can spread across the entire world, nor their potential for economic devastation. No longer can “environmental issues” remain a discrete set of concerns related to sustainability, climate change, air and water quality, waste management, alternative energy, or other admirable goals outside the core of most companies’ primary focus.

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Figure 1

The environmental agenda: converging forces make it a central feature of corporate strategy.

Source: Based on Institute for Business Value analysis

Insight: Defining "sustainability"

Sustainability is a complex and sometimes nebulous concept that may have different meanings to different people. For some, it clearly signals environmental objectives. But others take a broader view of the concept to encompass social, economic and political dimensions. For example, the UN's Sustainable Development Goals include objectives on climate change, environmental degradation, poverty, inequality, peace and justice.[3]

The individual elements of this broader definition of sustainability will have different implications for business strategies and operations—as companies seek to address the new environmental imperative, they will also have to understand the connections to the broader dimensions of sustainability and act in a manner that advances both its environmental and broader elements. This report focuses specifically on the environmental dimension of sustainability.

In fact, environmental strategy choices—as a subset of a broader sustainability agenda, which also includes economic sustainability and social challenges such as racial justice, structural inequality, and access to healthcare—increasingly define a company's prospects in today's competitive marketplace (see sidebar, "Defining sustainability").

In the latest Global Risk Report 2020 by the World Economic Forum, the top five business risks were linked to environmental challenges: extreme weather, climate action failure, natural disasters, bio-diversity loss and human-made environmental disasters.[4] Consequently, companies are beginning to include environmental challenges as part of their overall risk management and business continuity planning.

But now, investors and financial managers are becoming increasingly discerning in their allocation of capital, incorporating sustainability criteria in their investment decisions. For example, according to a recent survey, more than half of global asset owners are currently implementing or evaluating environmental, social and governance (ESG) considerations in their investment strategy.[5] In early 2020, Blackrock, the largest money manager in the world, announced "that sustainability should be our new standard for investing."[6] To raise capital for future growth, it will thus be increasingly important that companies align their business activities with sustainability objectives.

Customers and employees have also become much more environmentally conscious. A recent study by IBM found that nearly 80 percent of consumers indicate sustainability is important to them and 60 percent are willing to change their shopping habits to reduce environmental impact. Among the most purpose-driven customers, who emphasize the societal and environmental impact of their consumption, over 70 percent would pay a premium of 35 percent, on average, for brands that are sustainable and environmentally responsible.[7]

Talk is one thing. Finding a path to successful action another. Digital transformation will help make the difference.

Research indicates employees also care: 64 percent of Millennials consider a company's social and environmental commitments when deciding where to work; 83 percent would be more loyal to a company that helps them contribute to social and environmental issues.[8] Indeed, leading companies are actively engaging their employees in shaping environmental sustainability strategy and initiatives. For example, Unilever has sustainability "ambassadors" throughout the organization. As a result, 76 percent of Unilever's 170,000 employees feel their role at work enables them to contribute to delivering to the sustainability agenda.[9]

These findings demonstrate that investors, consumers and employees view sustainability as a critical issue. While this data set is based on their views of sustainability in its broadest sense, clearly environmental objectives are a central part of their concerns.

And then there's government—legislation, regulation, policy. The backbone of environmental action for decades, its approach, too, is changing to adapt to today's reality. In addition to regulatory constraints, governments are offering incentives for innovation and improved, "greener" business processes. Increasingly, governmental efforts to tackle environmental problems will in themselves create new opportunities, as government funding flows to those developing and implementing innovative solutions, including new ways for the private and public sectors to collaborate.

With continuing pressure on public resources to do the traditional work of environmental protection, government increasingly sees private sector leadership as key to future success and is looking for opportunities to catalyze and optimize that leadership. And to the extent that regulatory strategies shift from 20th century "command and control" mandates toward greater use of market mechanisms—as many governments around the world are doing—the premium on innovative solutions and the deployment of breakthrough technologies will be even greater.

The need to address environmental problems, therefore, constitutes a major business opportunity in its own right. The total global market opportunity associated with environmental sustainability is estimated at more than USD 12 trillion.[10] Energy spending across the world tops USD 6 trillion annually, making the transition to a clean energy economy that promises to unfold over the next few decades an especially significant market opportunity.

Together these forces are shaping a new corporate agenda, with 62 percent of executives considering a sustainability strategy not as nice-to-have but, in fact, essential in order to be competitive. Another 22 percent think it will be a requirement in the future.[11] The environmental imperative has rightly planted itself in the heart of boardroom and operational management conversations.[12]

Talk is one thing. Finding a path to successful action another. Digital transformation will help make the difference. Exponential technology innovations unavailable to previous generations—artificial intelligence (AI), 5G, Internet of Things (IoT), cloud, blockchain and others[13]—will accelerate this progress in three ways:

1. Capitalize on data to reveal new insights and underpin new solutions to existing problems right now;
2. Help change business practices and drive the emergence of the "Sustainable Enterprise;"
3. Support a new level of public, private, and not-for-profit collaboration to forge a new governance model for the environmental imperative.

We can now measure environmental costs associated with different types of economic activities and, effectively, internalize them—help incorporate these real costs using exponential technologies.

More data, more insight—more progress

Data and information underpin the ability of economic actors to drive change in business priorities and practices. Greater transparency and insight allow consumers, companies, investors and governments to change the way they buy, produce, sell, transport, consume and govern, which in turn has the potential to transform the way economies operate. Moreover, data can be infused into business processes and decision making and drive improved environmental outcomes. With vast quantities of structured and unstructured data available to them—often in real time—organizations can tap into unprecedented levels of actionable insight for transformation and innovation.

For example, some organizations and industries are using data and digital technologies to apply the principles of a circular economy—a systemic, regenerative approach to economic development designed to benefit businesses, society, and the environment.[14] It represents a fundamental change in how value is created, aiming to re-use resources in a continuous circular loop rather than the traditional linear approach of extract, use and dispose, and the increased availability of data is a paramount enabler. If successful, this could dramatically reduce resource consumption and add substantial value to our economies. For example, the estimated potential value of the circular economy in Europe alone is EUR 1.8 trillion.[15]

Digital technologies—underpinned by data—can help unlock this potential by improving the flow of information. For example, several large automotive companies have established the International Material Data System, a global data repository that contains information on materials used in the industry to facilitate recycling of end-of-life vehicles and their materials.[16] Or the Excess Materials Exchange (EME), an online platform that enables companies to exchange excess materials with each other. For example, EME uses "resources passports" and tracks and traces materials by using Quick Response (QR) codes and chips to support matchmaking.

Then there is the European database Urban Mine Platform that shows valuable materials made available from high-tech products (such as vehicles, electronics, batteries). It aims to improve the traceability, recovery and value retention of secondary raw materials by creating a harmonized inventory of products, materials and waste. The database records the quantities and compositions of products (for example, product type, materials, components, elements) put on the market and flows of waste generated per year.[17]

These examples underscore a central feature of many environmental challenges: a lack of information that would enable internalization of the full cost of environmental resources and their damage to the environment, so that these costs and damage are not currently reflected in the prices that economic actors pay for goods and services. Economists, therefore, refer to environmental costs as an "externality" caused by the inability of pricing mechanisms to incorporate such societal costs.[18] The availability of big data and advanced analytics address this problem in new ways– making it possible to "internalize" externalities in ways that could not be imagined in the past and transform strategies of pollution control and improved natural resource management.[19]

Specifically, we can now measure many environmental costs associated with different types of economic activities and, effectively, internalize them—help incorporate these real costs using exponential technologies, such as IoT and AI. These costs can be incorporated into economic decision-making in real time and become an integral part of economic transactions and corporate operations.

From a business perspective, this means we can turn environmental challenges into marketplace opportunities.

For example, Plastic Bank is using digital technologies to reveal the value of plastic waste. Highlighting this potential "lost" value, in turn, can incent resource recovery systems that interrupt the flow of plastic waste to the ocean and instead make it available for companies to use in new products. Plastic Bank uses blockchain technology to track the entire journey of recycled plastic from collection, credit and compensation through delivery to companies for re-use.

It also uses a system of token rewards based on blockchain to monetize plastic waste and records transactions at the micro-level. As these micro-transactions add up, they form credits that waste collectors can use to earn useful goods. This can help turn citizens in the world's poorest countries into recycling entrepreneurs, potentially lifting millions out of poverty across the world while cleaning up the its oceans.[20]

Data and digital technologies—especially the ability to capture data in real time with an unprecedented degree of granularity—provide new levels of insight into changes in the physical environment. For example, by using sensor technology, many cities can now monitor air pollution levels in real time. By combining pollution data with weather and transport data and applying analytics, they can identify underlying causes and then take steps to rectify them.

Similarly, by instrumenting utility infrastructure and networks with sensors, utility companies are using data to monitor the use of water and other critical natural resources. They can detect anomalies such as leaks, fix them, and reduce water loss. In short, the availability of data fundamentally changes our understanding of and approach to meeting a wide range of environmental objectives.[21]

Combining data with exponential technologies, therefore, creates immense opportunities to generate insight and apply it to activities, processes and decision making (see Figure 2).

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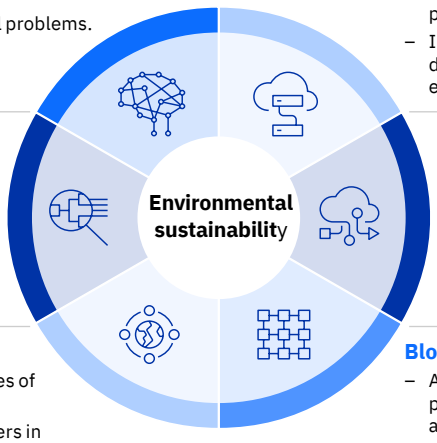
Figure 2

Exponential technologies and environmental sustainability



Artificial intelligence
- Applies learning algorithms for better environmental models.
- Improve and refine responses to environmental problems.
- Optimize resource consumption and business processes while minimizing pollution.

Advanced analytics
- Processes huge volumes of data
- Better understand environmental anomalies, vulnerability and risk susceptibility.
- Refine operations and supply chains for reduced environmental impact and improved resilience.

5G and mobile technologies
- Faster connectivity and sharing of vast quantities of data and insight.
- Connects communities and engages stakeholders in support of environmental objectives and innovative solutions.

Hybrid multi-cloud
- Seamless integration and aggregation of complex data on proprietary systems as well as on public, private, or managed cloud services.
- Integrated data from across a wide ecosystem drives reliable insight faster to build more accurate environmental models.

Internet of Things (IoT)
- Sensors and devices provide accurate data to optimize processes and reduce environmental impact.
- Triggers alerts and advice to help mitigate and manage environmental problems, such as wildfires or floods.
- Can balance use of flexible and renewable energy sources.

Blockchain
- A trusted shared digital ledger to track and authenticate provenance, use of resources, pollution and transactions across a supply chain.
- Assists in compliance with regulatory requirements, enabling more efficient emissions trading schemes.
- Can balance use of flexible and renewable energy sources.

Source: Based on Institute for Business Value analysis

Signify: Light as a tool for progress

Search for an icon for "light," and you can bet you'll find lots of light bulbs. Signify, formerly known as Philips Lighting, and with 2019 sales of EUR 6.2 billion, is the world leader in lighting for professionals and consumers, as well as lighting for the Internet of Things. Yet the company would probably try to dissuade you from this fixation with light bulbs. Instead, it would want you to think of what lighting can do: reduce the world's environmental footprint and resource consumption, enhance safety and well-being, and make communities and cities more enjoyable places to live.

Its ambitions are embedded in its strategy, one that relies heavily on data, analytics, IoT and other exponential technologies. By using digital technologies and light-points as nodes for data and information, Signify is transforming buildings, urban places, homes and even food production to increase energy efficiency and reduce environmental impact.

Moreover, the company is trying to decouple the notion of owning light-emitting devices—like light bulbs—from the function of those devices: illumination. It believes that by moving to a new business model, lighting as a service (LaaS), the company will be able to nudge lighting into the circular economy. Today in Western Europe, only 10 percent of discarded light sources are collected and registered. Circular lighting, a concept the company believes would extend the LaaS model, could increase the amount of lighting equipment collected, repurposed, and put back into circulation, as well as reduce investment, maintenance and headaches for businesses as they use lighting.

Accordingly, the improved information flows made possible by digital technologies not only inform, but also enable systemic change in economic activity. Put data and insights from it in the hands of businesses, governments and individual actors, and you spark change in business and societal behaviors. The opportunities inherent in such change suggest that the environmental imperative will be at the heart of the corporate agenda for the foreseeable future.

Exponential technologies and the Sustainable Enterprise

The same exponential technologies that are bringing data and insight to bear on the environmental imperative are also reshaping the very nature of a company's operations and business model (see Figure 3). Businesses are not just becoming "digital." They are applying AI, in particular, and other exponential technology to create new business platforms on which to compete and collaborate, and intelligent workflows to drastically improve their operations and customer experiences. They're also using these technologies to augment the capabilities of their people, and improve the employee and customer experiences of their organizations.

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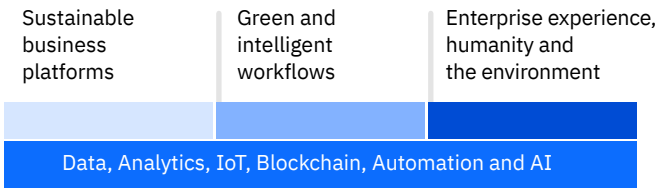
Figure 3

The digital and sustainable enterprise



Source: Based on Institute for Business Value analysis

Intelligent workflows present an unprecedented opportunity to make efficiency improvements that also align with environmental objectives.

These structural changes in corporations themselves give rise to new opportunities for advancing and aligning business and environmental outcomes. Specifically, they help leading companies realize the environmental imperative through three principal dimensions: sustainable business platforms; green, intelligent workflows; and enterprise experience, humanity, and a commitment to the environment.

Sustainable business platforms

Today, digitally enabled business platforms are emerging that support collaboration and co-creation in a manner hitherto impossible. In the context of environmental sustainability, these business platforms, which also draw on the same technologies used to reduce transaction costs between economic actors, also help drive innovation and enable internalization of environmental objectives, allowing for value creation that is more fully reflective of true environmental costs and benefits.

Data and improved insight make it possible to incorporate the environmental impact of economic activities into the transactions and interactions mediated by these new business platforms. The platforms also support new modes of working more sustainably by combining the collective capabilities of different stakeholders, augmented by technologies such as AI. Indeed, business platforms integrate not only actors but also different sources and types of data that contribute to improved actionable insights and new innovations.

For example, the Norwegian company Yara has launched a global digital farming platform that applies artificial intelligence, machine learning, in-field data and weather data to unlock new insights for farmers to improve crop yields in a sustainable way. The platform will help link farms to the full food chain and support the development of holistic food production from farm to plate.

Another example is the Anglo-Dutch company Shell, which joined forces with IBM to introduce Oren, a new digitally enabled business-to-business marketplace for the mining industry to help develop new revenue streams and business opportunities. The platform will allow members to find field-tested products and services from across a trusted ecosystem. It will not only offer field-proven software, services and digital solutions, but also pilot pioneering technologies in a single location. The platform will include environmental management and compliance software programs that provide detailed analysis and reporting on pollutant inventories, greenhouse gas emission, energy consumption, environmental impact assessment, mine rehabilitation, and mine life cycle assessment. One-third of the solutions available on the marketplace will be related to sustainability.

Green, intelligent workflows

Companies are always looking for ways to cut costs, often by increasing efficiency and automation. Exponential technologies now enable them to devise intelligent workflows— comprehensive AI-powered processes that define a company's customer and employee experiences— to replace yesterday's siloed, often inefficient stand-alone business processes.

This presents an unprecedented opportunity to make efficiency improvements that also align with environmental objectives. Leading companies now transform their entire operating models, break down the silos of tasks and take a holistic approach. They incorporate all the capabilities, data and insight of their organization and ecosystem to achieve greater value creation while achieving positive environmental outcomes (see sidebar, "Signify: Light as a tool for progress on page 6").

Case in point: E&J Gallo Winery, a California company aiming to improve irrigation and conserve water using AI. Gallo already had sensors in its vineyards and analytics models to help with precision irrigation, but the winery wanted something even better. It added machine learning capabilities that allowed its models to adapt and get smarter over time. In the past, events like extended droughts or flooding required human intervention to assess what happened in the field and adjust the irrigation model based on this new data. By combining data from satellite imagery and machine learning, Gallo was able to create an intelligent irrigation system that can deliver water in a way that's situational, hyper-local, automated, and self-tuning. It cut water use by 25 percent over three years while also improving the quality of its wine.[22]

Enterprise experience, humanity and a commitment to the environment

A company's customers, employees, investors and partners increasingly expect compelling experiences, and can become quite vocal, using social media as an amplifying platform, when disappointed. They are also more aware than ever before of a company's environmental track record. This presents an opportunity as well as a risk.

When a company applies its human capabilities, newly augmented by exponential technologies, to advance environmental sustainability—and conveys this through compelling interactions with the company—it significantly differentiates itself in the marketplace (see Figure 4).

For example, in the fashion industry, companies are using AI to improve their customer experience, reduce their environmental footprint, and enhance their brand. As customers increasingly shop online, the inability to try items on leads to a high return rate. Forty percent of all online purchases are ultimately returned. This is both costly and creates significant additional transportation and CO2 emissions. However, by using AI to help customers purchase items that fit their physical dimensions and their preferred style, the return rate can be significantly reduced. The retailer Moosejaw is using such an approach to cut its return rate by nearly a quarter.[23]

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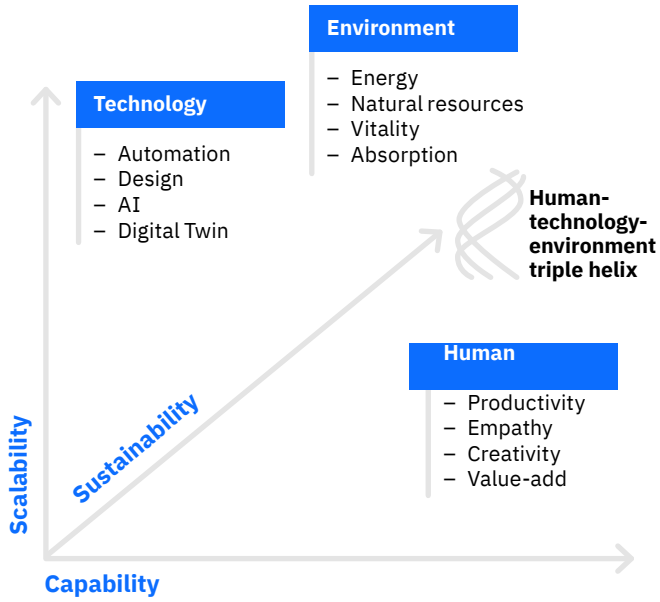
Figure 4

Human-technology collaboration advances environmental sustainability



Source: Based on Institute for Business Value analysis

Digital technologies will play a key role in enabling pricing mechanisms to function effectively, transparently, and in an integrated way.

The need for a new environmental governance

For the past four decades, the environmental agenda has been, in fact, the agenda of government. Standard-setting, regulation, enforcement and, to a certain extent, incentives from various levels of government, have driven environmental progress. While such efforts have helped improve environmental quality in many parts of the world, a great deal remains to be done, and governments are increasingly challenged to muster the resources and political persistence needed to address remaining gaps and needs. It's time for a new model, one that is no longer so reliant on government to lead the way.[24]

This is not to dismiss the important role that governments will continue to play, but it acknowledges how important it is to engage all relevant actors in driving the required change. Fortunately, a new approach to environmental governance also has many new mechanisms available for engaging different stakeholders.

To achieve the substantial transformation of economic activity and innovation required for environmental sustainability, the full spectrum of economic actors—public, private and not-for-profit—must collaborate, taking advantage of today's data availability and technology to analyze and share it on a greater scale than ever before. Such transparency not only contributes to common understanding, and also allows for mutual accountability across a broader, multi-actor governance system.

Digital technologies—especially exponential ones—make possible many market-based mechanisms that drive change and innovation. In particular, they can support incentive mechanisms for action at a scale and speed that would be impossible through the traditional means of regulations and government intervention.

Not only are digital technologies critical for the monitoring, verification and reporting, but emerging technologies, such as blockchain, make it easier to share data and manage transactions that support, among other things, more efficient climate markets. As noted in a recent World Bank report, "Blockchain, Big Data, the Internet of Things (IoT), smart contracts and other disruptive technologies hold out the promise of addressing the needs of new generation climate markets post-2020."[25]

This is particularly important when resolving the market complexity associated with multiple jurisdictions, each promoting a variety of mechanisms for tackling it, such as climate change. For example, approximately 40 countries and more than 20 cities, states and provinces use carbon pricing mechanisms, such as emissions trading schemes or carbon taxes.[26] There is growing support for greater use of such mechanisms across the public, private and non-governmental sectors, with members of the Climate Leadership Council, which includes IBM, advocating for a fee on carbon emissions.[27]

Digital technologies will play a key role in enabling such pricing mechanisms to function effectively, transparently, and in an integrated way. Moreover, increased insight enables a deeper understanding of how different groups in our societies are affected by specific measures, allowing innovations to lessen—or even eliminate—the impact of any regressive or unwanted social outcomes.

Of course, change on this scale is never simple. The interaction between the environment and economic activity constitutes a complex dynamic system with a multitude of direct and indirect relationships. Generally speaking, individual actions in complex systems generate both anticipated and unanticipated consequences. And these consequences in one part of the system have implications for other parts of the system, which may, in turn, result in systemic feedback loops. This complex interplay can create uncertainty and lack of clarity concerning which factors generate which results. They also make it challenging to see how best to intervene in order to achieve the desired outcome.

Fortunately, a study of complex systems shows that improving information flows helps, especially broadening access to information.[28] Digital technologies also give us much more detailed information, and the ability to build better models and simulations than ever before, deepening our understanding of what is going on in a complex system. This can help economic actors navigate a rapidly changing landscape in order to achieve greater alignment between economic and environmental objectives.

Two even more important challenges in influencing the behavior of such complex systems for the benefit of the environment are: creating the right incentives for the desired change; and empowering actors to add to, adjust and evolve system structure. AI-enabled insights can guide more targeted policies and interventions, and also help engage and motivate action by relevant stakeholders.

The combination of business model transformation and a new environmental governance structure has the potential to bring about the societal transformation needed for environmental sustainability. Digital technologies can reshape what is possible, stimulate new innovations, and enable effective ways of working together. However, this transformation is not inevitable, nor technologically determined. It will demand a concerted effort by public, private and societal actors. But after years where environmental progress has seemed to stall, substantive change is finally within our reach.

Action guide

The sustainable enterprise emerges to meet the environmental imperative

Integrate your digital transformation and environmental sustainability strategies and efforts

- Map out how different environmental challenges might affect customers, suppliers, employees and investors in different areas of your business. Use this insight as a basis for strategic action. Apply tools such as Component Business Modeling to help identify the links between environmental objectives, digital transformation and your business strategy.[29]
- Deploy digital technologies to provide the insight from big data and analytics to tap into new market opportunities and manage potential risks. Use exponential technologies, and notably AI, to give your organization greater agility and resilience.
- Use digital technologies as a catalyst for developing smart and innovative solutions to environmental challenges. Adopt methods such as Design Thinking and a “sustainability garage” to drive the environmental innovation agenda within your company and enable out-of-the-box thinking.[30]

Transform business processes into green intelligent workflows

- Define your data needs for integrating environmental objectives into your workflows and make sure it is accessible and ready for use.
- Infuse data and insight into a wider transformation of business processes to create resilient operations. Explore how exponential technologies such as IoT, blockchain, and AI can open up new ways of achieving outcomes.

– Redesign business processes with digital technologies to reduce the company's environmental footprint and harness the value of resources more efficiently. Use digital technologies to incorporate environmental data and KPIs in your process mapping and design.
– Use data and insight to monitor, manage and reduce operational exposure to environmental risks.
– Deploy digital and communication infrastructure and software to enable real-time access to relevant data by those managing operations to allow for rapid response to any observed environmental anomalies.
– Share data and engage with a wider set of external business partners and stakeholders in ways that allow environmental priorities to be an integral part of the entire value creation process. Shift to a hybrid cloud computing model to enable greater ease of collaboration and sharing of data within and outside your organization.

Infuse environmental sustainability into your enterprise experiences and culture

– Provide a sense of purpose and direction and help employees build the skills needed to capitalize on the new opportunities of the environmental imperative. Assess if your current organization and talent pool is able to drive the required transformation, then fill any identified gaps.
– Make environmental sustainability a key part of the experiences you create for customers, employees and other stakeholders. Translate these experiences into clearly defined outcomes that your organization must work toward. Assess if your current governance and organization promotes or inhibits the achievement of these outcomes and make the necessary adjustments.

Action guide

Recasting the role of government

Become an enabler and facilitator of change

– Work toward using the full spectrum of capabilities from different for sustainable innovation and transformation. Facilitate and encourage the involvement of all relevant actors to drive change and innovation. Think how actors can be engaged to positively contribute to resolving environmental challenges and legislate accordingly.
– Share relevant data in an open and secure manner. Put in place the necessary security and privacy regulations to enable the sharing of relevant data. Support the development of data-sharing platforms for development of innovative solutions to tackle environmental challenges and to offer system accountability through transparency.
– To facilitate real-time correction of environmental problems, develop a data communication superhighway. Use it to seamlessly connect data showing environmental anomalies with those responsible for implicated operations by using AI and machine analytics to enable data linkages and identify anomalies. Promote accountability by transparently showing whether corrective action was taken in response to such data and making related information available to the public and business affiliates (including supply chain managers, investors, and insurers).

Leverage data and insight for effective market mechanisms, and more precise regulation, policies, and interventions

- Use data and digital technologies to deploy effective market mechanisms for protecting environmental assets, pollution control and addressing climate change. Incentivize economic actors to innovate and transform by internalizing environmental costs in prices, for example, through a fee on carbon and other pollutants.
- Use digital technologies to create a more effective and efficient regulatory environment. Leverage insight from comprehensive, granular and timely data to identify the most appropriate levers for change. Use digital technologies to monitor the impact of regulations and interventions, and identify opportunities for improvement.

Drive sustainable innovation

- Lead by example and act as the catalysts for sustainable innovation. Governments should play an active role in driving sustainable innovation within governmental organizations, as well as invest in and channel funding toward improved environmental outcomes. This should include the ability of the public sector to use its procurement activities to encourage more environmentally sustainable business practices from its suppliers, and to digitally monitor and report on its performance in this regard.
- Collaborate closely with the private sector and other stakeholders to allocate resources and budgets toward environmental objectives. Governments should see the private and not-for-profit sectors as key partners in achieving the required change. This will require openness in terms of sharing of data but also in ways of working. Governments have a key role to play in embedding these new and more collaborative ways of working within the relevant public sector organizations.

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