Research Insights

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Sustainability as a transformation catalyst

Trailblazers turn aspiration into action

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By Wayne Balta, Manish Chawla, Jacob Dencik, and Spencer Lin

Lots of talk is happening, but not enough action

While 86% of companies have a sustainability strategy, only 35% have taken action on that strategy.

Sustainability is a catalyst for transformation

63% more of our respondents who are trailblazers in sustainability outperform on innovation compared to all others surveyed.

The critical lever: Integrating sustainability and digital transformation

Digital technologies support a broad range of sustainability initiatives. And 70% of sustainability trailblazers are using hybrid cloud to advance their sustainability objectives.

Introduction

Sustainability has roared to the forefront of corporate priorities, with 73% of surveyed executives saying their organizations have set a net-zero carbon emissions goal. Customers, employees, investors, business partners, and governments are pressuring corporate management and boards to place sustainability at the top of their corporate agendas. In fact, recent IBV consumer research revealed that more than 2 in 3 global respondents consider environmental issues to be significantly important to them personally—and they say they are willing to change their consumer behavior accordingly.[1]

Companies are taking notice. 53% of surveyed organizations view environmental sustainability as one of their top priorities within 3 years, up from 39% that consider it a top priority today.

But talk is one thing, action and outcomes another. Becoming a truly sustainable enterprise is hard. Only 50% of those organizations that see sustainability as a top priority are effective in achieving their environmental sustainability goals. Dabbling at the edges no longer suffices. Achieving sustainability demands transformation.

To understand how organization executives are addressing sustainability, the IBM Institute for Business Value (IBV) and Oxford Economics surveyed 1,958 executives across a variety of manufacturing-oriented industries. These executives, located in 32 countries around the world, are significantly involved in defining or executing the sustainability strategies at their organizations (see “Study approach and methodology” on page 20). Our study found that 13% of executives are serving as trailblazers among their peers, helping ensure environmental sustainability is front and center as an enterprise strategy, and integrating sustainability with digital transformation.

Perspective: Focus on your core environmental SDGs

Our respondents shared their priorities for the 17 United Nations (UN) Sustainable Development Goals (SDGs) (see “Appendix” on page 21). Of the SDGs associated with the environment, their top 3 are Affordable and Clean Energy (cited by 47%); Industry, Innovation, and Infrastructure (42%); and Climate Action (36%).

These priorities are critically important to, and directly impacted by, the activities of manufacturing companies, suggesting pragmatism in how these companies approach sustainable development. In terms of setting SDG priorities, manufacturing-oriented companies are aligning sustainability efforts with their business activities. Using clean energy and driving energy efficiency are key to business operations. At the same time, increasing investment in innovation is essential. These initiatives are also central to tackling climate change.

Less conversation, more action, please

Sustainability has become a hot topic for boardroom discussions and corporate strategy. Hardly a day passes without corporations announcing environmental pledges or framing sustainability as central to future success. Sustainability is set to define a new corporate agenda and fundamentally recalibrate the relationship between business and society. These developments should be welcomed, and corporate leadership is needed more than ever.

However, the walk has not always followed the talk. Only 35% of companies have acted on their sustainability strategy (see Figure 1) and only 37% have aligned sustainability objectives with their business strategies. As few as 4 in 10 companies have identified either the initiatives to close their sustainability gaps or sustainability drivers for change. And only one-third have integrated sustainability objectives and metrics into business processes.

And it’s not only action that has been limited. Acknowledgment of the need for fundamental change has been less than forthcoming. In fact, fewer than half of the business leaders we surveyed indicate they are willing to change existing business practices at the expense of profits to improve sustainability. And only 27% of executives view sustainability as a core element of their business value.

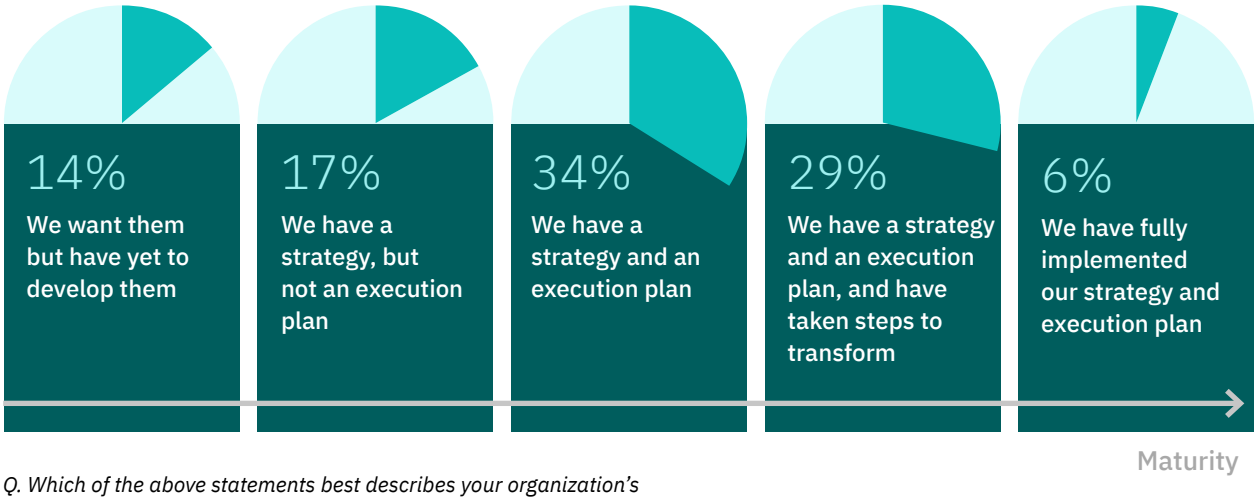
These findings highlight the immense sustainability challenge companies face in converting their intentions and pledges into reality. Achieving change at scale requires a fundamental reconfiguration of how value is created. And businesses have to lead rather than follow.

Organizations need to reconceive sustainability as a business opportunity and catalyst for transformation.

Figure 1

The strategy continuum

Most organizations are progressing toward an enterprisewide environmental sustainability strategy and execution plan



Q. Which of the above statements best describes your organization's enterprisewide environmental sustainability strategy today?

The mindset needs to shift from viewing sustainability as simply a regulatory requirement or a stakeholder expectation to reconceiving sustainability as a business opportunity and catalyst for transformation.

Increasingly, companies need to incorporate into their pricing both the full environmental impact of what they produce, and how they consume goods and services. These efforts are already becoming more prominent, with several jurisdictions introducing carbon taxes and other environmental tariffs. Such a transition can lead to significant changes in how individual companies achieve competitive advantage—and disrupt supply chains across production, distribution, marketing, and sales.

As many as 7 out of 10 companies expect environmental pricing to negatively impact their businesses while only 2% see such changes as a positive opportunity for their businesses. Supply chain restructuring (54% of respondents), loss of price competitiveness (53%), and increased operating costs (52%) loom as greater concerns for executives than the possibility of charging a premium on more sustainable goods and services. Becoming a sustainable enterprise is not easy.

Perspective: Sustainability reporting improves—but operations and innovation languish

More than half of companies in our study have initiatives in place to improve sustainability reporting. For example, 54% use recognized frameworks, standards, metrics, and data, and 52% have current initiatives to measure contributions and progress toward sustainability goals. But only 38% are currently working to quantify physical, operational, financial, and environmental risks.

The number of actual initiatives for more sustainable operations lags behind reporting efforts. For example, only a third of organizations are currently working on improving energy efficiency of equipment, assets, and facilities, or working on electrification of current fuel use. Meanwhile, just 40% are working to reduce greenhouse gas emissions through monitoring, detection, modeling, and action planning. Perhaps more disconcerting: action in these areas is not expected to increase substantially in the next 3 years.

Innovating toward more sustainable products and services is equally limited. Only 39% of companies are developing more energy-efficient products and services. Just 37% have initiatives in place to create products and services that support energy transition. The development of lower-waste products and services and greater re-use of materials and components are acted on by only 31% and 32% of organizations, respectively. However, executives do expect increased action on product and service development for sustainability in the next 3 years. For example, the percentage of organizations that develop new zero/lower waste products is forecast to grow by 48%, and the percentage of organizations that increase the use of recyclable/biodegradable materials/packaging is expected to increase by 44%.

Sustainability in operations is progressing—but slowly

Organizations see more opportunities to embrace environmental sustainability initiatives

	Today	In 3 years
Reduce greenhouse gas emissions through monitoring, detection, modeling, and action planning	40%	45%
Adopt electric technologies for current fuel use where feasible	33%	41%
Monitor restoration of natural resources such as soil, water, and biodiversity	33%	38%
Improve energy efficiency of equipment, assets, and facilities	33%	36%
Drive transparency in environmental impact of goods and services throughout the supply chain	33%	41%
Transform sourcing practices toward low emissions, pollution, and waste	32%	36%
Optimize production and proactively maintain equipment, assets, and facilities to reduce pollution	28%	39%
Change suppliers and vendors based on their sustainability profiles	28%	38%
Increase resource recovery, recycling, and efficiency of disposal operations	25%	36%
Re-use natural resources and materials	20%	27%
Increase composting where feasible	5%	7%

Q. What environmental sustainability initiatives has your organization undertaken or will it undertake in its operations—today and in 3 years?

Interestingly, companies see customer resistance as one of the top barriers to sustainability.

Among barriers to achieving more sustainable outcomes for the enterprise are resistance from customers, technological barriers, regulatory barriers, and lack of data and insight (see Figure 2).

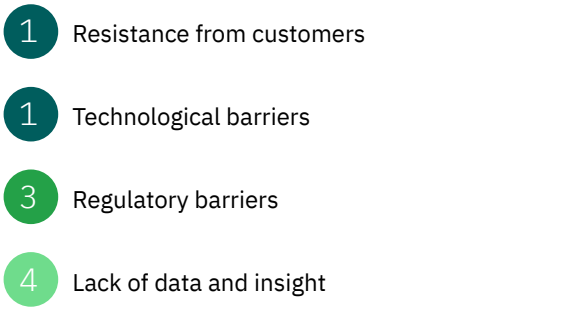
Interestingly, companies see customer resistance as one of the top barriers to sustainability. This contradicts much customer research, along with our own consumer sustainability data that suggests customers want more sustainable products and services. This is particularly true in the B2C space but also applies in the B2B markets where companies are driving their suppliers to become more sustainable. However, while intentions may be to purchase more sustainably, acting accordingly can be more complicated. Increased prices or changes to products and services may be less palatable to consumers when they make actual purchasing decisions.

Regulations are seen as a barrier to—rather than an enabler of action on—sustainability. This indicates that the current environmental oversight paradigm may need to be revisited. For too long, the regulatory approach to sustainability has focused on command and control rather than looking for collaborative ways to incentivize and enable business change. Fortunately, many governments are now looking to partner with the private sector to drive progress on sustainability. This includes developing new innovative methods and perspectives on environmental oversight.

Figure 2

Challenges to changing

Biggest roadblocks to progressing environmental sustainability objectives



Q. What are the biggest challenges for your organization progressing toward your environmental sustainability objectives?
Note: Resistance from customers and technological barriers were tied for first place.

Perspective: Using data to build a bridge to communities

Regulatory policy aimed at reducing pollution and advancing sustainability has its limits.

Compliance can foster a "meets minimum" mindset, both for companies that must comply and in the public's perception of their efforts. A new data-centric approach may help shift mindset and perception to greatly improve the relationship between industry and local communities.

One example: Envirosuite, a global environmental intelligence leader based in Australia, uses monitoring systems, analytics, and the data and insights they generate to help companies pinpoint potential problems as they arise. This allows airports, wastewater plants, mining operations, and industrial facilities to monitor noise, water and air quality, odor, dust, and vibration.[2]

An interesting innovation arising from this use of environmental data is the potential for organizations to make it accessible to the surrounding community. This could enable the community to see what is happening in real time.

For example, consider the challenges created as residential and commercial developments have brought residential areas closer to airports than ever before. Making airport data available to these communities could help build trust and tolerance. A portal to access airport flight tracker data could enable self-investigation to understand the potential source of noise and other issues before lodging complaints.

Building a data bridge between the facility and nearby residents could create, in a sense, a new governance model that is less dependent on government presence and intervention. The primary relationship is no longer between government and the regulated entity, but rather between the entity and the community. This could engender greater public confidence. The public could assume a proactive role in the accountability and response mechanism, enabling industries to grow and co-exist with communities in a more sustainable relationship.

The fact that technology barriers rank as a top challenge is noteworthy. Leaders may assume that they have the technology solutions to enable sustainability—but our findings reveal that technology solutions are not deployed sufficiently.

While technologies are advancing rapidly, their effective deployment, integration, and use at scale within organizations and supply chains remain challenging. For example, the underlying technology for electrification of much industrial activity may exist. But the required changes across energy production, distribution networks, and storage, as well as changes to end-use manufacturing technologies and processes, make such efforts very complex.

As executives grapple with the challenge of sustainability, ongoing developments in digital technologies open new opportunities. These digital technologies can create new paths for tapping into the power of data and information, gaining visibility into the environmental implications of economic activity. They also provide insight into opportunities for process improvements that drive better business outcomes and reduce environmental impact.

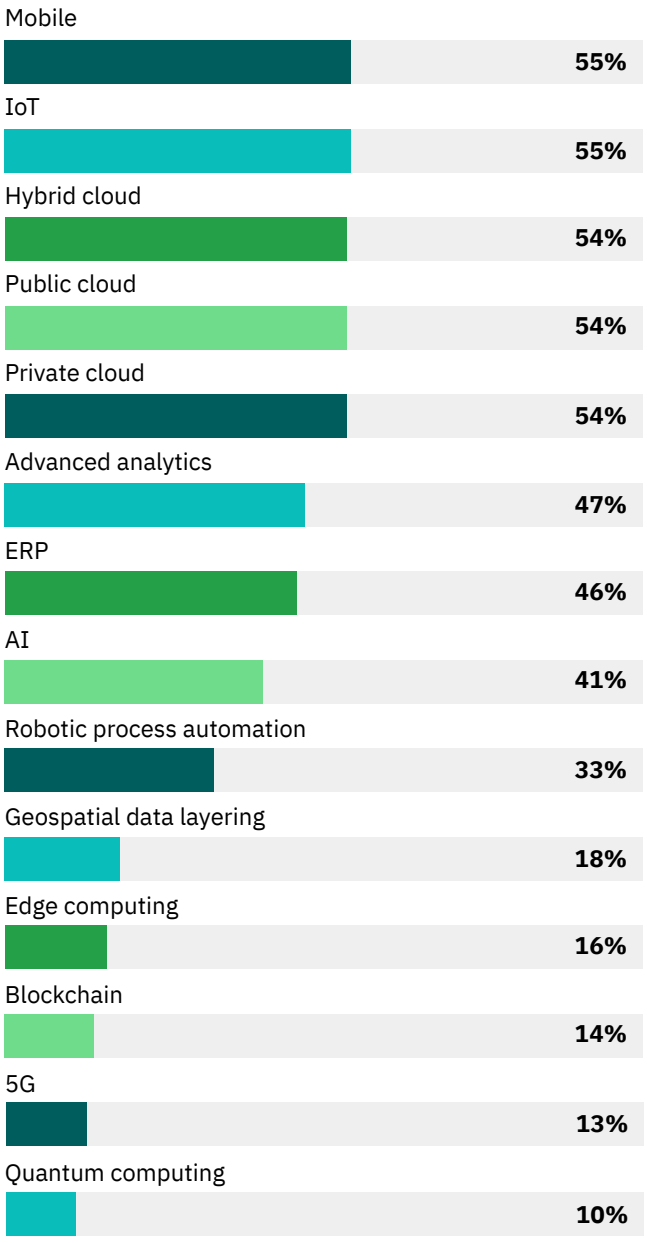
Executives increasingly understand the potential of digital technologies in the context of sustainability. For example, more than half of organizations cite mobile, Internet of Things (IoT), and cloud technologies as important to advancing their sustainability objectives. Advanced analytics, enterprise resource planning (ERP), and artificial intelligence (AI) are also seen as essential for sustainability by more than 4 in 10 companies (see Figure 3).

However, some leaders go further than merely recognizing the potential of digital technologies. *They actually integrate their sustainability and digital transformation efforts*. In so doing, they can align sustainability and business outcomes in ways that elude their peers. Let's explore how (see case study, "Signify").

Figure 3

Technology to the rescue

Important technologies for advancing sustainability objectives



Q. What is the importance of each of the above technologies in advancing your sustainability objectives? Percentages show responses of 4 and 5 on a 5-point scale where 1=not at all important and 5=critical.

Signify: Transforming light into a tool for progress[3]

Search for an icon for the word "light" and you'll find lots of light bulbs. Signify (formerly Philips Lighting), with 2020 sales of EUR 6.5 billion, is a world leader in lighting for professionals and consumers, as well as lighting for the IoT. Yet the company would probably try to dissuade you from fixating on light bulbs. Instead, it would urge you to consider 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.

Signify's ambitions are embedded in a strategy 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—such as light bulbs—from the actual function of those devices: illumination. It expects that by moving to a new business model, lighting as a service (LaaS), the company can nudge lighting into the circular economy. In Western Europe, currently only 10% of discarded light sources is collected and registered. Circular lighting, a concept Signify says would extend the LaaS model, could increase the amount of lighting equipment collected, repurposed, and recirculated, as well as reduce investment, maintenance, and headaches for businesses.

Transformation Trailblazers stand out in their ability to achieve significantly better environmental outcomes combined with superior business performance.

Sustainability as business opportunity

To better understand how leading organizations approach sustainability, we segmented our respondents based on 3 criteria:

- *Sustainability commitment* among members of the organization's Board of Directors and C-level executives
- *Sustainability effectiveness* as measured by organization performance on environmentally sustainable business processes in comparison with competitors
- *Sustainability integration* as measured by alignment of the organization's sustainability strategy with the digital transformation/IT strategy.

This segmentation yields 4 sustainability archetypes (see Figure 4).

Commitment Sideliners, which consist of 40% of companies, lack a strong commitment to sustainability at Board and executive levels. Execution Stragglers (38%) are committed at the highest levels but lack effective execution on environmental sustainability. Sustainability Strivers (10%) are committed and effective but have not integrated their sustainability efforts with digital transformation.

Figure 4

Sustainability archetypes

Using 3 criteria, our analysis revealed organizations with much in common

	13% Transformation Trailblazers	**10%** Sustainability Strivers	**38%** Execution Stragglers	**40%** Commitment Sideliners
Sustainability commitment	Strong Board and C-suite commitment to sustainability	Strong Board and C-suite commitment to sustainability	Strong Board and C-suite commitment to sustainability	Less Board and C-suite commitment to sustainability
Sustainability effectiveness	High effectiveness at environmentally sustainable business processes	High effectiveness at environmentally sustainable business processes	Limited effectiveness at environmentally sustainable business processes	
Sustainability integration	High alignment of sustainability and digital strategy	Limited alignment of sustainability and digital strategy		

Note: Due to rounding, percentages may total slightly above or below 100%.
Source: IBV analysis.

Transformation Trailblazers are committed and effective on execution of sustainability. They have integrated these efforts with their digital transformation. This archetype stands out in terms of their ability to achieve significantly better environmental outcomes as indicated by carbon reduction relative to competitors. Transformation Trailblazers also have superior business performance in revenue growth.

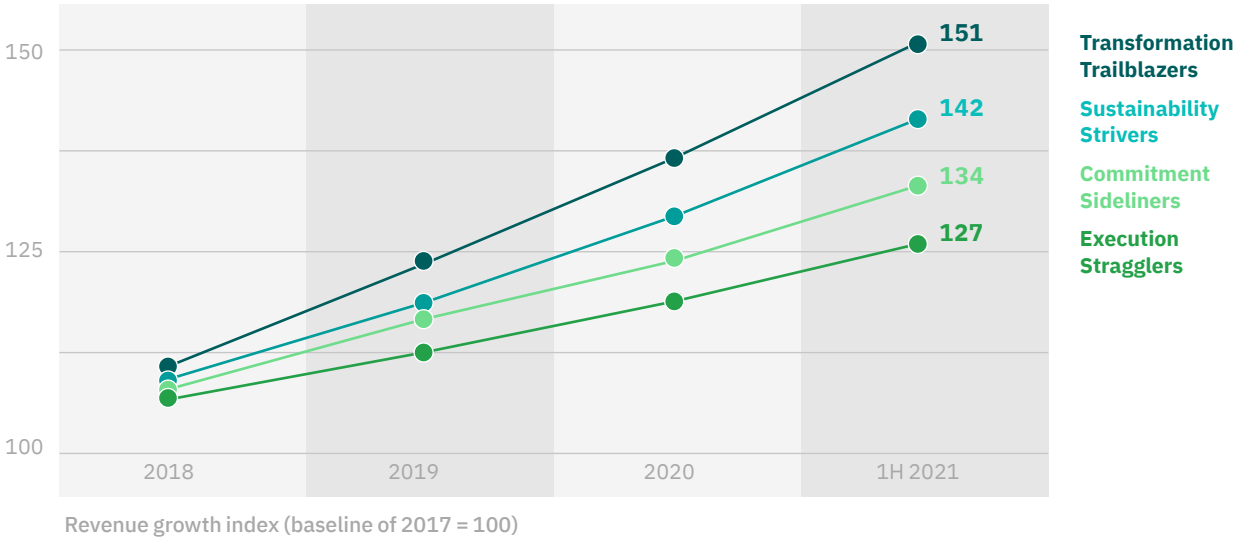
Commitment Sideliners and Execution Stragglers do not differ substantially in their outcomes, whether business- or sustainability-related. In fact, the Commitment Sideliners perform better on both business performance and sustainability outcomes compared to the Execution Stragglers. This suggests that the act of committing to sustainability is not going to differentiate organizations substantially from those not explicitly committed to sustainability but merely executing minimum requirements.

Sustainability Strivers see better business and environmental results than both Execution Stragglers and Commitment Sideliners. However, they are significantly less successful than the Transformation Trailblazers that leverage digital transformation in achieving better environmental outcomes or better business performance, and the gap is substantial (see Figures 5 and 6).

Figure 5

Off the charts

Transformation Trailblazers excel in revenue growth



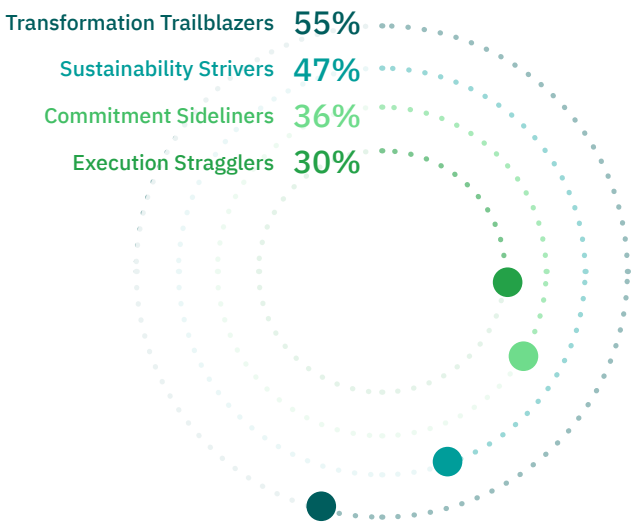
Q. What was your organization's average annual revenue growth in 2018, 2019, and 2020? How do you expect your organization's 1H 2021 annual revenue to compare to 1H 2020?

Transformation Trailblazers lean into the sustainability opportunity and actively embrace its transformational potential. For them, sustainability is not a "nice to have" or an additional objective to pursue. They integrate sustainability into the very core of their business value. Sustainability is the prism through which corporate success is defined and achieved.

Figure 6

Carbon reduction outperformance relative to peers

Transformation Trailblazers are reaping rewards



Q. How does your organization's performance compare with that of your competitors (other similar organizations) over the past 3 years for carbon reduction? Percentages show responses of 4 and 5 on a 5-point scale where 1=significantly underperformed and 5=significantly outperformed.

Crucially, organizations combining a strong commitment to sustainability with execution capabilities—and integrating this effort with digital transformation—create win-win situations that align business objectives with improved environmental outcomes. *These outcomes are driven through a focus on innovation and transformation rather than through compliance.* Sustainability is viewed as differentiation in the marketplace and central to how value is created.

More specifically, Transformation Trailblazers stand out from their peers in 6 primary areas:

1. Leveraging sustainability as catalyst for transformation.
2. Tapping the potential of emerging technologies and data.
3. Embedding sustainability within operations and the wider organization.
4. Broadening C-level and CEO involvement and responsibility.
5. Collaborating with ecosystems and supply chains.
6. Engaging employees and customers.

Organizations combining commitment to sustainability with execution capabilities—and integrating this effort with digital transformation—create win-win situations.

1. Leverage sustainability as catalyst for transformation

Transformation Trailblazers understand that sustainability is a transformation opportunity, and they leverage the power of data and digital technologies to drive change and innovation (see Figure 7). This, in turn, results in a deep recalibration of the relationship between business and society, enabling a new transformational approach to sustainability at unparalleled speed, scope, and scale.

In the context of sustainability, an emphasis on open innovation is crucial and needs to extend beyond specific industries. The environment doesn't distinguish between chemicals, consumer products, transportation, retail, and other industries.

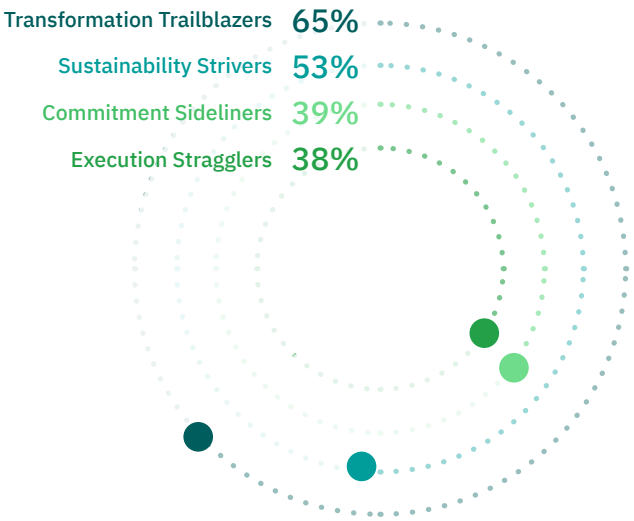
Take plastic, for example. A chemical company cracks ethane that a manufacturer uses to make a plastic bottle. A consumer products company takes the bottle and fills it with a beverage that's sold to a consumer. If all goes well, the consumer places the emptied plastic bottle in a recycling bin, from which a transporter collects it and moves it to a waste management company. There it's sorted and sent to a recycling company, which transforms it into recycled polyester. A clothing company spins the polyester into a fleece jacket for sale at a sporting goods store.

Reducing plastic waste demands cross-industry collaboration and innovation. And this is where Transformation Trailblazers lean in. 73% of this archetype say they are effective at conducting open innovation, compared to 61% for Sustainability Strivers, 58% for Execution Stragglers, and 51% for Commitment Sideliners.

Figure 7

Innovation outperformance relative to peers

Transformation Trailblazers integrate sustainability—with impressive results



Q. How does your organization's performance compare with that of your competitors (other similar organizations) over the past 3 years for innovation? Percentages show responses of 4 and 5 on a 5-point scale where 1=significantly underperformed and 5=significantly outperformed.

Yara: Using a digital farming platform to feed a growing planet[4]

The world's population is expected to reach 9.7 billion by 2050, putting unprecedented strain on food production. Norway-based Yara, one of the world's largest fertilizer producers, is on a mission to create a sustainable world without hunger.

To do this, Yara is building the world's leading digital farming platform. The cloud-agnostic solution provides holistic digital services, including weather and crop yield data, and virtually instant agronomic advice to farmers across the globe.

The platform ultimately helps avoid deforestation by increasing food production on existing farmland. Yara aims to use the digital platform to cover 7% of arable land worldwide.

2. Tap the potential of emerging technologies and data

Transformation Trailblazers are significantly more likely to take advantage of emerging technologies such as AI and blockchain while also tapping into advanced hybrid cloud capabilities (see Figure 8). They are pushing forward on the technology frontier and taking advantage of the latest developments to integrate sustainability efforts into their digital transformation plans, thereby driving technology innovation.

The ability of Transformation Trailblazers to explore the technology frontier is underpinned by strong data management and governance (see Figure 9). Advanced data management capabilities are critical to effectively using digital technologies that improve business processes and drive innovation for improved sustainability outcomes. Nearly two-thirds of Transformation Trailblazers aggregate sustainability data into an enterprise data warehouse or lake and establish common sustainability metrics. Moreover, turning data from disparate sources into analytical outcomes requires interoperability and ease of moving data among organizations and systems, which in turn requires open standards.

The closer integration between sustainability efforts and digital transformation translates into a more innovative technology focus.

Figure 8

Advancing sustainability objectives with technology

Cloud, analytics, mobile, and AI lead the pack

	Transformation Trailblazers	Sustainability Strivers	Execution Stragglers	Commitment Sideliners
Private cloud	71%	60%	57%	45%
Hybrid cloud	70%	51%	50%	53%
Advanced analytics	63%	60%	45%	40%
Public cloud	63%	52%	55%	52%
Mobile	61%	52%	59%	49%
AI	60%	50%	37%	37%
ERP	57%	58%	51%	36%
IoT	57%	51%	59%	52%
Robotic process automation	52%	42%	36%	22%
Geospatial data layering	34%	25%	16%	14%
Blockchain	20%	12%	14%	12%
5G	19%	16%	14%	10%
Edge computing	18%	14%	15%	16%
Quantum computing	15%	7%*	10%	9%

**Results using low counts are statistically unreliable but can be considered directional. Q. What is the importance of each of the above technologies in advancing your sustainability objectives? Percentages show responses of 4 and 5 on a 5-point scale where 1=not at all important and 5=critical.*

Figure 9

The data doctrine

Supporting sustainability through data initiatives

	Transformation Trailblazers	Sustainability Strivers	Execution Stragglers	Commitment Sideliners
Established an enterprise data warehouse/ lake for data	65%	51%	46%	44%
Established consistent definition of sustainability metrics and common data sourcing	64%	53%	41%	44%
Established enterprisewide information standards for sustainability	61%	59%	52%	45%
Put in place data governance to share data	61%	49%	48%	45%
Helped ensure openness through a hybrid cloud environment	53%	50%	34%	40%

Q. In the context of data/IT supporting your sustainability strategy, to what extent has your organization made progress against each of the above goals? Percentages show responses of 4 and 5 on a 5-point scale where 1=not at all and 5=to a very large extent.

BP: Using quantum computing to reduce emissions[5]

BP is an integrated energy business with operations in Europe, North and South America, Australasia, Asia, and Africa. The company plans to use quantum computing to help reduce emissions and neutralize its carbon footprint by 2050 or sooner. By the end of this decade, it aims to develop about 50 gigawatts (GW) of net renewable energy generating capacity, a 20-fold gain; increase its annual low-carbon investment 10-fold to about $5 billion; and decrease its oil and gas production by 40%.

For help in reaching these goals, BP has joined the IBM Quantum Network, a global community of Fortune 500 companies, academic institutions, research labs, and startups working to advance quantum computing and explore practical applications.

BP is exploring quantum computing to solve engineering and business challenges and help create greater efficiencies and lower carbon emissions. Quantum computing can potentially help model the chemistry and buildup of various types of clay in hydrocarbon wells, improve efficiency in hydrocarbon production, manage and analyze the fluid dynamics of wind farms, and optimize autonomous robotic facility inspection.

3. Embed sustainability within operations and the wider organization

One important point of differentiation for Transformation Trailblazers: their approach to integrating sustainability into the core fabric of their organization (see Figure 10). Their sustainability efforts are closely connected with other business priorities and activities. This can keep sustainability from being sidelined or treated as a "nice to have." Instead, sustainability is addressed as an integral part of the business strategy and operations.

4. Broaden C-level and CEO involvement and responsibility

Transformation Trailblazers recognize how sustainability spans virtually all areas of their businesses. And their CEOs assume responsibility for sustainability leadership far more often than CEOs from the other archetypes (see Figure 11).

Among Trailblazers, the CIO has primary responsibility for the sustainability agenda in collaboration with the COO and CEO. The extensive involvement of the CIO shows that these organizations integrate sustainability and digital transformation operationally as well as in their corporate governance. This isn't surprising given that our recent research among CIOs reveals they view sustainability as the top area that will leverage digital technologies in the future.[6] This connection between sustainability efforts and digital transformation may be the essential ingredient in driving enterprise value.

Successful execution of the sustainability agenda requires appropriate governance and leadership.

Figure 10

Sustainability starts here

Incorporating environmentally sustainable initiatives into functional activities

	Transformation Trailblazers	Sustainability Strivers	Execution Stragglers	Commitment Sideliners
Product innovation/design/development	69%	47%	55%	39%
Ecosystem engagement	59%	55%	54%	45%
Manufacturing	55%	46%	48%	42%
Supply chain operations	53%	50%	55%	44%
Customer engagement/experience	52%	44%	47%	41%
Procurement/sourcing	50%	44%	34%	42%
Digital transformation and IT	49%	47%	39%	33%
Demand and supply chain planning	47%	44%	45%	44%
Brand strategy	37%	45%	36%	40%
Finance	35%	35%	37%	36%
Talent management	31%	28%	29%	34%
Sales and marketing	30%	41%	42%	39%

Q. To what extent are your environmental sustainability initiatives incorporated into the above functional activities? Percentages show responses of 4 and 5 on a 5-point scale where 1=not at all and 5=to a very large extent.

Figure 11

Who's in charge?

The C-suite executive responsible for environmentally sustainable operations

	Transformation Trailblazers	Sustainability Strivers	Execution Stragglers	Commitment Sideliners
Chief Information Officer	24% 1	15% 2	14% 3	8% 4
Chief Operations Officer	17% 2	29% 1	24% 1	37% 1
Chief Executive Officer	14% 3	10% 4	9% 5	5% 5
Chief Sustainability Officer	9% 4	12% 3	13% 4	11% 3
Head of Line of Business	3% 5	5% 5	15% 2	13% 2

Q. Which members of the C-suite are primarily responsible for environmentally sustainable operations?

Transformation Trailblazers work with their ecosystem of business partners to co-create new ways of working.

Other archetypes tend to place responsibility for the sustainability agenda with the COO, the Chief Sustainability Officer (CSO), or even with the line of business leaders. In these scenarios, the CEO or CIO is involved less often—perhaps indicating a disconnect between sustainability and the broader transformation agenda. Rather, these organizations may view sustainability as an operational or compliance issue and allocate the sponsorship of this agenda accordingly.

5. Collaborate with ecosystems and supply chains

Transformation Trailblazers activate sustainability capabilities across their ecosystems in pursuit of value and impact for their enterprise and stakeholders. They work with their business partners to co-create new ways of working that advance the sustainability agenda (see Figure 12).

Importantly, they work with supply chain partners to help reduce the full impact of their enterprise business activity on the environment. Transformation Trailblazers aim for greater visibility into the role of each step of the supply chain and collaborate with partners to develop and implement more sustainable solutions (see case study, “Iberdrola”).

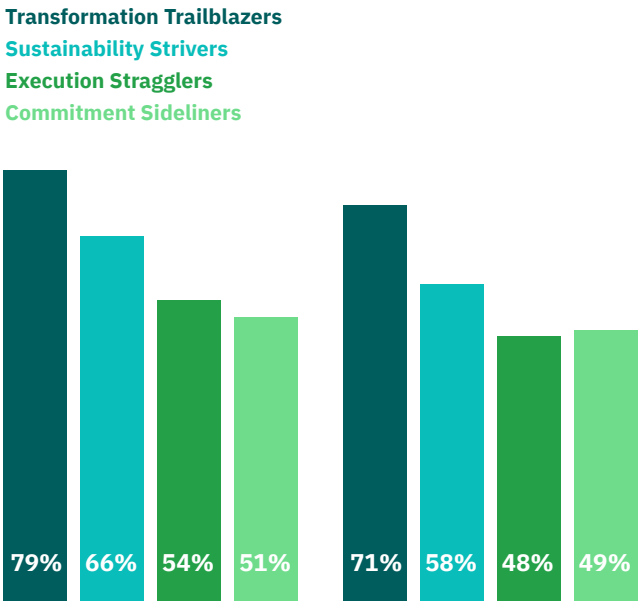
Instead of vertically integrated manufacturing, we’re in an era of global supply chains. Not surprisingly, operational impacts on the environment, such as greenhouse gas emissions, are created by a broad swath of individual companies across global economies. This makes it clear that each entity—large and small—across virtually all tiers of supply chains, not just the Fortune 1000s, needs to develop effective capabilities to reduce its environmental footprint.

Actions taken by the organizations that generate emissions are direct and demonstrable, and the results they produce are deterministic. When each company takes responsibility and integrates it into their business, sustainability can be sustained.

Figure 12

Encouraging the ecosystem

Working with partners on sustainability initiatives



Q. To what extent do you agree with the above statements about your organization?

Iberdrola: Powering the future with sustainable energy[7]

Iberdrola is a leading global energy supplier—the third largest in the world by market capitalization and a leader in renewables. Building on its commitment to reach carbon neutrality by 2030 in Europe and 2050 globally, the company set the ambitious goal of helping ensure that its core suppliers will have implemented effective sustainable development policies and standards. To achieve this, the company looked for ways to enhance its supplier relationships, measure and monitor progress, and make more efficient, smarter purchasing decisions.

Iberdrola decided to retire its on-premises supplier relationship management system and migrate to an all-cloud solution. The solution integrated with the existing ERP, making it much easier to integrate procurement with core business processes such as finances and capacity and resource planning.

Iberdrola lowered the risk related to supplier spend and boosted procurement efficiency. With guided buying protocols and catalogs of pre-approved products and services, the company can verify that each department makes purchases at a unified price and the correct contract conditions. Iberdrola implemented a third-party solution with API connectivity that helps the company score suppliers on their commitment to sustainability and responsible corporate governance. For suppliers that don't meet Iberdrola's sustainability objectives initially, the scoring tool is used to provide a clear set of actions to improve their business model sustainability.

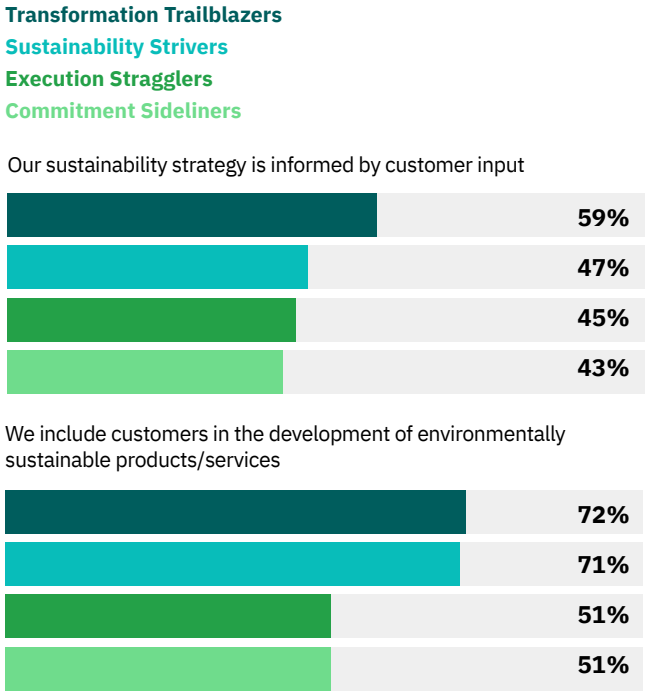
6. Engage employees and customers

As Transformation Trailblazers expand their sustainability efforts, they engage with customers to a greater extent than other archetypes (see Figure 13). In turn, they're rewarded with crucial input for shaping their sustainability agenda and identifying the best opportunities for innovative new products and services. Employees, of course, are also important, providing inspiration, commitment, and shared purpose in the pursuit of sustainability outcomes (see Figure 14).

Figure 13

Canvassing the customer

Customer engagement on sustainability



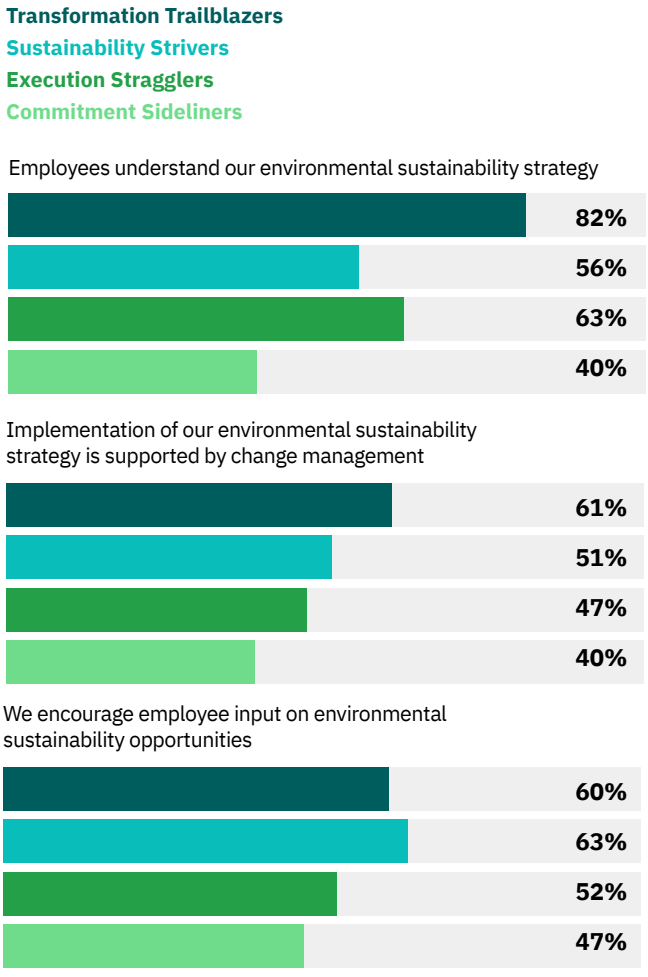
Q. To what extent do you agree with the above statements about your organization?

Our findings are clear: talking about sustainability is easy, achieving it is hard. Organization executives are faced with a pressing need to make progress. The actions they take—or choose not to take—over the next decade could be critical in determining the future course of our societies and economies. Our action guide provides a way forward.

Figure 14

Educating the employee

Employee involvement in sustainability



Q. To what extent do you agree with the above statements?

Groupe Chantelle: Reinventing its consumer business model[8]

Groupe Chantelle, headquartered in France, is a leading global manufacturer, wholesaler, and retailer of lingerie.

To create a customer-led business model, Groupe Chantelle is integrating its in-store and online channels more closely. In response to consumer passion for sustainability and its own corporate social responsibility, Groupe Chantelle plans to pioneer a completely recyclable brassiere: an innovation that introduces new challenges at every level, from supply chain to customer service. The company is also implementing a direct fulfillment model, shipping products from its warehouses to customers who purchase through third-party e-commerce partner websites.

Enabling these new ways of working depends on agile internal systems that can move quickly to support new retail offerings. The company decided to adopt a technology platform that drives omnichannel digital transformation. This platform results in:

- 25% boost in per-core performance, which facilitates greater responsiveness to customers
- 25% increase in price performance, which accelerates returns on IT investments
- The enablement of agile decisions about future IT, contributing to a competitive edge.

Action guide

Sustainability as a transformation catalyst

Reaching sustainability's full potential requires concerted action across the enterprise. It means strategic and operational implications for how you create value, position your organization in the marketplace, and tap into the transformative potential of digital technologies.

How you approach the sustainability imperative depends on where you are in your journey. First comes an honest appraisal of your organization's current state. Is there commitment to sustainability across Board and C-level management?

If so, are you executing effectively against your sustainability objectives? Are you integrating your sustainability and digital transformation efforts? The answers to these questions determine your organizational archetype. For each of the 4 archetypes, the focus is different.

Transformation Trailblazers. Build on momentum and continue to drive progress. Position your organization as a transformational sustainability leader within your industry.

Sustainability Strivers. Integrate your sustainability and digital transformation efforts strategically and operationally. Incorporate required data management capabilities to leverage the potential of digital technologies for improved business operations and greater sustainability impact. Embrace the transformational potential of sustainability for your business.

Execution Stragglers. Understand what is hampering successful execution. Implement required changes to your management system and operating model for better performance. Seek improvements that generate value for your business and more sustainable outcomes. Tap the potential of digital technologies.

Commitment Sideliners. Ascertain the implications of sustainability for your business. Where are the opportunities for new value and to what risks is your organization exposed? Think of sustainability as an opportunity to improve your business rather than something you "need to deal with." Commit to firmly entrenching sustainability in your organization.

As companies create their individual sustainability narratives, they must take advantage of the following levers for progress:

Sustainability as business and operations strategy
- Integrate environmental sustainability firmly within your enterprise strategy and operations.
- Re-examine where supplies are made and from where they must be transported. Implement sustainability-driven changes by optimizing for lower greenhouse gas emissions to transform your supply chains. Determine if, for example, changes to your global operating footprint can reduce environmental impact.

Integrated digital transformation and sustainability strategies
- Deploy digital technologies that provide insights from big data and analytics to tap into new market opportunities and manage potential risks.
- Apply open standards to your technology architecture and platforms to allow interoperability and sharing of data with ecosystem partners.

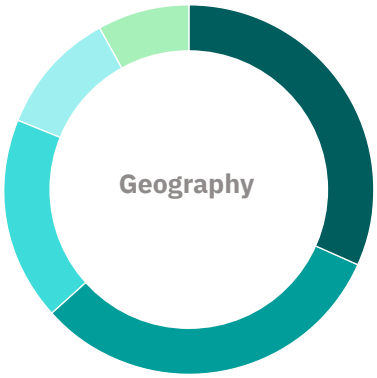
Data, digital, and automation for sustainability
- Assess how data and digital technologies can improve your operations and enterprise workflows while achieving more sustainable outcomes.
- Use data and digital technologies such as AI to find opportunities for improving environmental outcomes as well as operational efficiency. Where needed, find the right balance between efficiency and sustainability.

The potential of ecosystems
- Work with ecosystem partners from within and outside your industry to accelerate improvements to your workflows and the development of new, more sustainable products and services.
- Actively expand your ecosystem to include partners from the private, public, and not-for-profit sectors.

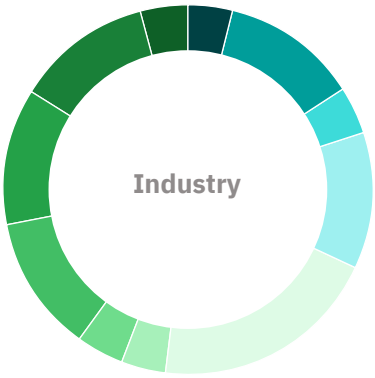
Operating model for open innovation
- Put in place the right capabilities, technologies, and processes to innovate openly for the success of your business and more sustainable outcomes.
- Break down internal and external barriers to cooperation where needed.

Study approach and methodology

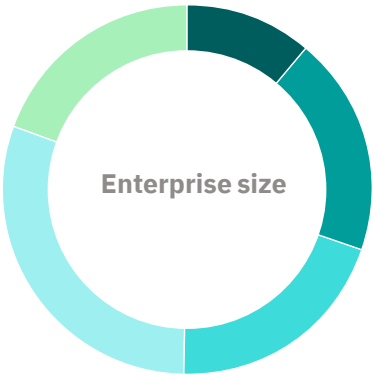
In cooperation with Oxford Economics, the IBM Institute for Business Value surveyed 1,958 executives in 32 countries from July to September 2021. Responses were collected from Chief Sustainability Officers, Chief Operating Officers, Chief Information Officers, Chief Technology Officers, Line of Business Heads, and Chief Innovation Officers. These executives come from different geographies, industries, and organizations of diverse sizes. All data is self-reported.



32% Asia Pacific
31% Europe
18% North America
11% Latin America
8% Middle East and Africa



4% Agriculture
12% Automotive
4% Chemicals
12% Consumer Products
20% Electronics
4% Engineering and Construction
4% Industrial Machinery
12% Life Sciences/Pharma
12% Metals and Mining
12% Petroleum
4% Retail



11% $250 - 500 million
19% $501 million - 1 billion
20% $1+ - 5 billion
30% $5+ - 20 billion
19% $20+ billion

Note: Due to rounding, percentages may total slightly above or below 100%.

Appendix

A. Priorities of the United Nations Sustainability Development Goals (SDG)

	SDG	SDG #	Priority today	In 3 years
Social responsibility	No poverty	1	17%	27%
	Zero hunger	2	19%	26%
	Good health and well-being	3	41%	45%
	Quality education	4	21%	29%
	Gender equality	5	36%	42%
	Decent work and economic growth	8	42%	48%
	Reduced inequalities	10	31%	37%
	Sustainable cities and communities	11	28%	32%
Environmental	Clean water and sanitation	6	25%	29%
	Affordable and clean energy	7	47%	54%
	Industry, innovation, and infrastructure	9	42%	52%
	Responsible consumption and production	12	28%	32%
	Climate action	13	36%	41%
	Life below water	14	9%	13%
	Life on land	15	10%	18%
	Peace, justice, and strong institutions	16	11%	15%
	Partnerships for the goals	17	25%	27%

Q. Which of the UN Sustainable Development Goals are priorities to your organization?

B. Different technologies for different initiatives

Cloud is a foundational technology and critical for virtually all sustainability initiatives—reporting, operations, and products and services.

Cloud–a key technology for virtually all sustainability initiatives

	Sustainability initiative	Usage of cloud (private, public, hybrid)
Reporting	Measure contributions and progress toward sustainability goals	76%
	Use recognized frameworks, standards, metrics, and data	77%
	Quantify physical, operational, financial, and environmental risks	77%
Operations	Reduce greenhouse gas emissions through monitoring, detection, modeling, and action planning	76%
	Adopt electric technologies for current fuel use where feasible	77%
	Monitor restoration of natural resources such as soil, water, and biodiversity	78%
	Improve energy efficiency of equipment, assets, and facilities	78%
	Drive transparency in environmental impact of goods and services throughout the supply chain	76%
	Transform sourcing practices toward low emissions, pollution, and waste	79%
	Optimize production and proactively maintain equipment, assets, and facilities to reduce pollution	77%
	Change suppliers and vendors based on their sustainability profiles	77%
	Increase resource recovery, recycling, and efficiency of disposal operations	78%
	Re-use natural resources and materials	75%
	Increase composting where feasible	75%
Products and services	Bring more energy-efficient products and services to market	78%
	Develop new products and services that support energy transition	78%
	Increase the use of recyclable/biodegradable materials/packaging	79%
	Conduct full lifecycle design of materials and products	77%
	Re-use materials/components	79%
	Develop new zero/lower waste products and services	80%
	Implement product take-back programs	76%

Q. Which of the above technologies have you used in your sustainability reporting, operational sustainability, and products and services sustainability initiatives?

IoT, mobile, and ERP are also important for these initiatives. Not surprisingly, AI and advanced analytics are being implemented for operational sustainability initiatives. Edge computing is being used in product initiatives.

Key technologies for sustainability reporting

	Initiative		
Technology	**Measure contributions and progress toward sustainability goals**	**Use recognized frameworks, standards, metrics, and data**	**Quantify physical, operational, financial, and environmental risks**
IoT	**60%**	**60%**	**58%**
Mobile	**56%**	**60%**	**59%**
ERP	**59%**	**54%**	**58%**
Advanced analytics	31%	43%	42%
AI	38%	41%	40%
Robotic process automation	25%	28%	23%
Edge computing	24%	19%	20%
Blockchain	15%	11%	12%
Geospatial data layering	9%	10%	13%
5G	7%	5%	9%
Quantum computing	1%*	1%*	1%*

**Results using low counts are statistically unreliable but can be considered directional.*
Q. Which of the above technologies have you used in your sustainability reporting initiatives?

Key technologies for operational sustainability initiatives

Initiative	Technology						
	Mobile	**ERP**	**IoT**	**AI**	**Advanced analytics**	**Robotic process automation**	**Edge computing**
Adopt electric technologies for current fuel use where feasible	**65%**	**58%**	**59%**	39%	31%	30%	22%
Reduce greenhouse gas emissions through monitoring, detection, modeling, and action planning	**58%**	**59%**	**57%**	45%	36%	25%	23%
Monitor restoration of natural resources such as soil, water, and biodiversity	**63%**	**58%**	**54%**	40%	33%	23%	16%
Transform sourcing practices toward low emissions, pollution, and waste	**56%**	**66%**	**57%**	43%	34%	19%	18%
Improve energy efficiency of equipment, assets, and facilities	**59%**	**60%**	**62%**	39%	36%	20%	22%
Optimize production and proactively maintain equipment, assets, and facilities to reduce pollution	**70%**	**61%**	**57%**	39%	35%	26%	21%
Drive transparency in environmental impact of goods and services throughout the supply chain	**55%**	**65%**	**58%**	39%	37%	24%	23%
Change suppliers and vendors based on their sustainability profiles	**58%**	**53%**	**60%**	39%	35%	24%	19%
Increase resource recovery, recycling, and efficiency of disposal operations	**59%**	**58%**	**61%**	41%	33%	19%	18%
Re-use natural resources and materials	**51%**	**62%**	41%	40%	34%	22%	17%
Increase composting where feasible	**51%**	**54%**	40%	37%	37%	17%*	13%*

**Results using low counts are statistically unreliable but can be considered directional.*
Q. Which of the above technologies have you used in your operational sustainability initiatives?

Key technologies for product and service sustainability initiatives

Initiative	Technology						
	IoT	**ERP**	**Mobile**	**AI**	**Advanced analytics**	**Edge computing**	**Robotic process automation**
Bring more energy-efficient products and services to market	**53%**	**62%**	**54%**	40%	33%	33%	24%
Increase the use of recyclable or biodegradable materials and packaging	**62%**	**59%**	**53%**	37%	35%	26%	22%
Conduct full lifecycle design of materials and products	**59%**	**62%**	**55%**	40%	34%	26%	24%
Develop new products and services that support energy transition	**59%**	**64%**	**54%**	39%	33%	20%	19%
Develop new zero/lower waste products and services	**57%**	**64%**	**59%**	36%	32%	21%	21%
Implement product take-back programs	**61%**	**51%**	**60%**	43%	35%	21%	24%
Re-use materials/components	**57%**	**52%**	**51%**	34%	35%	23%	20%

Q. Which of the above technologies have you used in your product and service sustainability initiatives?

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