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Top Strategic Technology Trends for 2024: Sustainable Technology

Autumn Stanish, Kristin Moyer

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Top Strategic Technology Trends for 2024: Sustainable Technology

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By Analyst(s): Autumn Stanish, Kristin Moyer

Initiatives: Executive Leadership: Sustainability; CIO Technology and Innovation Leadership

Technology is a necessary and powerful tool for delivering sustainability-related outcomes at scale. IT leaders must harness sustainable technology to improve the sustainability of IT and enhance business sustainability with IT.

Overview

Opportunities

- Generative AI has brought concerns about energy consumption and the interrelation between technology and sustainability to the fore. AI has the potential to scale positive sustainable outcomes, but only if applied to the right use cases, such as autonomous recycling and emissions measurement.
- Social and environmental responsibility are key drivers for attracting and retaining next-generation talent and customers. Organizations can outperform competitors by engaging with stakeholders through technology-enabled sustainable products and services.
- Established technologies, such as ERP, cloud computing and AI, can be used to improve sustainability. However, using a new framework of sustainable technology will further elevate the sustainability efforts of IT, the enterprise and customers.

Recommendations

IT leaders should use sustainable technology to:

- **Make IT more sustainable.** Identify and remediate inefficient infrastructure, IT operations and software by managing the energy and carbon efficiency of IT infrastructure and workplace services.

- **Help the rest of the enterprise become more sustainable.** Maximize positive environmental, social and governance impact by reviewing the enterprise materiality strategy and prioritizing sustainable technology investments on the issues identified as most important to achieving long-term sustainable business performance.
- **Help customers become more sustainable.** Enable customers to measure, track and improve their sustainability impact by using digital solutions to provide new products, services and capabilities.

Strategic Planning Assumption

By 2027, 25% of CIOs will have compensation linked to their sustainable technology impact.

What You Need to Know

This research is part of Gartner's Top Strategic Technology Trends for 2024.

Download the Executive Guide to Sustainable Technology.

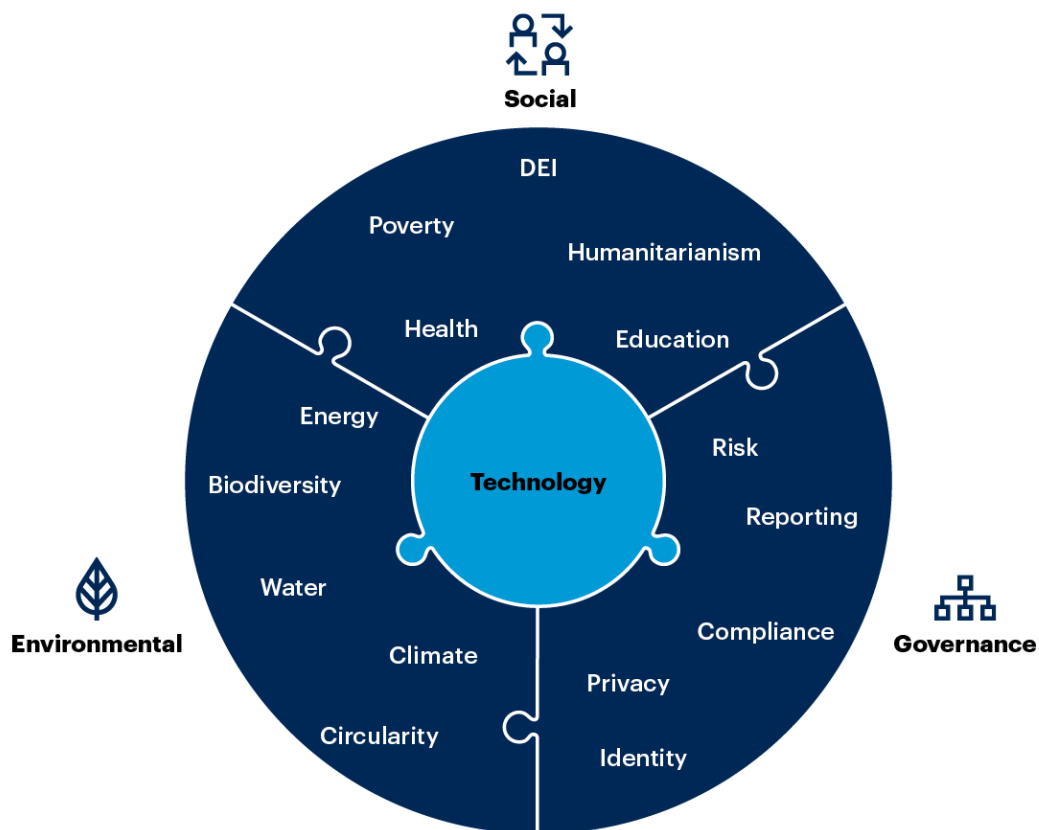
IT leaders are consistently being tasked with using technology to drive environmental, social and governance outcomes within and beyond the business. In Gartner's 2022 sustainability survey, 90% of executive leaders agreed that digital technology is essential to improving sustainability. ¹

However, current information technologies still have only an early-stage reliable open telemetry capability for capturing the necessary performance and efficiency data, and for assessing IT's ecological footprint. This is further complicated by the fact that powerful technologies, such as AI and blockchain, also have a large environmental footprint. Sustainable IT is a balancing act between driving higher business performance and not adversely hindering sustainability goals.

To ensure organizations can achieve this balance, regulations and consortiums are emerging across the globe to both challenge and help IT leaders track their sustainable technology performance. For example, the Green Software Foundation (GSF) and Responsible Computing Consortium are made up of members from leading technology vendors committed to standardizing sustainability metrics across IT. Other regulations, such as the EU’s Corporate Sustainability Reporting Directive (CSRD), will require the use of technology to help enable real-time measurement and tracking of both digital and operational environmental performance. As these standards mature, sustainable technology will become a necessity from both a regulatory and commercial standpoint (see Figure 1).

Figure 1. Sustainable Technology Framework

Sustainable Technology Framework



Source: Gartner
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Profile: Sustainable Technology

Description

Sustainability covers social, economic and environmental impacts. It involves making decisions about the use of technology and business practices that support long-term ecological balance and human rights.

Sustainable technology is a framework of digital solutions that can be used to enable environmental, social and governance (ESG) outcomes. It consists of:

- **Environmental technologies** that prevent, mitigate and adapt to risks in the natural world
- **Social technologies** that improve human rights outcomes, well-being and prosperity
- **Governance technologies** that strengthen business conduct, oversight and capacity building

Why Trending

The use of digital technologies, such as AI and cloud computing, is driving more concern about the energy and environmental impacts of such innovation. Gartner predicts that, by 2027, IT leaders will begin facing electricity shortages because IT's relentless increase in demand for electricity will outpace the production and supply of energy sources (both renewable and nonrenewable). This makes sustainable IT even more critical, thus driving greater environmental performance.

As IT and executive leaders act on sustainability objectives, they simultaneously gain indirect benefits from these strategies. For example:

- Seventy-four percent of IT and executive leaders agree that sustainability is increasing their enterprise's overall digital maturity (see Note 1).
- Eighty-six percent agree that sustainability investments protect from disruptions (e.g., long-term renewable energy contracts can insulate organizations from energy price fluctuations).
- Forty-two percent of organizations drive innovation, differentiation and create strategic value from sustainability initiatives. ¹

The increasing demand for sustainable transparency has required greater monitoring and telemetry data collection with, for example, observability platforms, digital employee experience (DEX) tools and data center infrastructure management (DCIM) tools. It has also required the use of ERP to track and maintain performance. The visibility these technologies offer extends value beyond sustainability, providing the insights necessary for improving overall IT performance.

From an operational standpoint, new processes designed with sustainability as a key consideration have improved vendor/resource independence and provided greater cost efficiencies. They have optimized consumption, harvested value from waste and returned it to the business. Additionally, digitally-enabled employee engagement and customer marketplace platforms scale sustainable practices and incentivize stakeholders to contribute, both socially and environmentally.

The strategic benefits of sustainable technology can significantly outweigh its potential drawbacks if executed successfully. IT leaders must harness the opportunities sustainable technology presents to improve three critical areas of the business:

- Internal IT operations (making IT more sustainable)
- Enterprise operations (helping the enterprise become more sustainable)
- Customer operations (helping the world become more sustainable)

Implications

Internal IT Operations

Using sustainable technology to improve the internal IT ecosystem ensures that leaders can efficiently meet sustainability goals. This means working with the right tools, hardware and vendors that deliver the maximum possible output using the minimum viable resources that help reduce IT greenhouse gas (GHG) emissions. This also entails focusing on critical subjects, such as human rights, ethical sourcing and supply chain transparency.

Solutions may include moving to more dynamic and efficient methods for balancing power distribution in data centers. For example:

- T-Systems used predeployed power distribution features in its hybrid cloud for rack deployments. This enabled local staff to perform power delivery additions, changes and removals easily and without the need for more electricians or customer disruption. ²
- Vodafone used DCIM software as a sustainable technology solution to plan, measure and document sustainable data center operations. This helped Vodafone do a 4-to-1 server consolidation that saved 75% of power in its facilities, which helped defer building new ones. ³

Enterprises using sustainable technology to improve IT operations may also benefit from new procurement models and services for IT delivery. Examples include consumption-based models that tie costs to resource utilization and performance analytics software that manages equipment life cycles and defers premature hardware refreshes, avoiding unnecessary spending and e-waste.

Enterprise Operations

Sustainable technology further enables leaders to look beyond the IT organization to advance ESG goals across the business.

For example, Cisco has reevaluated its approach to the role of real estate in its San Jose offices, using technology and networking solutions to reduce office building demands on the environment. Cisco ran a proof of concept on a Connected Workplace project, which addressed environmental sustainability by reducing the number of redundant electronic devices per employee. As a result, Cisco reduced equipment wattage and e-waste disposal. ⁴

Beyond simply using IT to make the enterprise more sustainable, individual employees can also use technology to adopt and scale sustainable practices themselves. For example, P&G enabled employees working from home with a Sustainability@Home virtual channel to share videos with one another about eco-conscious habits. P&G posted several of these videos on its social media accounts to promote and encourage these behaviors, which were liked and reposted by employees and customers. ⁵

Customer Operations

Creating a sustainable business is about more than ensuring that the enterprise responsibly manages its resources. It's also about enabling customers with sustainable products and services that will help them become more sustainable by association.

For example:

- AgroScout has developed an AI system that gives food processing companies, farm managers and farmers control of climate management. This system fuses satellite, multispectral and agronomic images into an agro-data bank. It detects field stress anomalies and verifies the findings with data, turning them into reports and dashboards on field crop health and supply risks. Customers have saved up to 85% on pesticide use as a result. ⁶
- BMW started working with city planners to help reduce emissions – 60% of the world’s population lives in cities and urban areas, generating 70% of GHG emissions. BMW and the city planners used machine learning models to predict how traffic regulations can help reduce traffic emissions. ⁷

Extending sustainability beyond the enterprise requires an understanding of customers’ key priorities and a balancing of their sometimes conflicting desires. For example, customers may want a sustainable product, but are unwilling to compromise on quality and cost. Customers need easy ways to become sustainable and to see how these methods contribute to their goals.

Actions

- Contextualize the issues that your enterprise has identified as most important for long-term social and environmental performance by reviewing its materiality assessment (see Note 2).
- Review the current ecosystem of technology and determine where investment in further digital solutions is needed.
- Examine the following technologies that could help drive sustainability in your industry, and invest in one or more that you identify as material for the business and key stakeholders:
 - **Cloud services:** The elasticity of cloud service models enables organizations to use only what they need, which increases utilization rates of shared resources and reduces environmental impacts.

- **AI for sustainability:** This can improve business operations and optimize difficult-to-abate processes to reduce the organization's carbon and environmental footprint and mitigate material risks. AI can be made environmentally sustainable with the use of AI techniques that help create and run models at the lowest carbon footprint without compromising accuracy. This extends to the use of AI to monitor, predict, mitigate and improve environmental issues in a way that can offset the negative impacts of AI training.
- **Sustainability and ESG software:** This consists of sustainability-related data discovery, collection, analysis, insight and reporting tools, which may take a variety of forms. For example:
 - Supplier sustainability applications help companies assess suppliers' ESG performance.
 - Life cycle analysis software enables the end-to-end assessment of environmental impacts of products, assets or services by reducing the complexities of collecting data and enabling organizations to assess trade-offs and make quicker strategic decisions.
- Use the Hype Cycle for Environmental Sustainability, 2023 to find the right balance between well-established and leading-edge technologies for your enterprise's sustainability.

About Gartner's Top Strategic Technology Trends for 2024

This trend is one of our Top Strategic Technology Trends for 2024. These are the trends we consider most relevant and impactful. Our trends fall into three main themes:

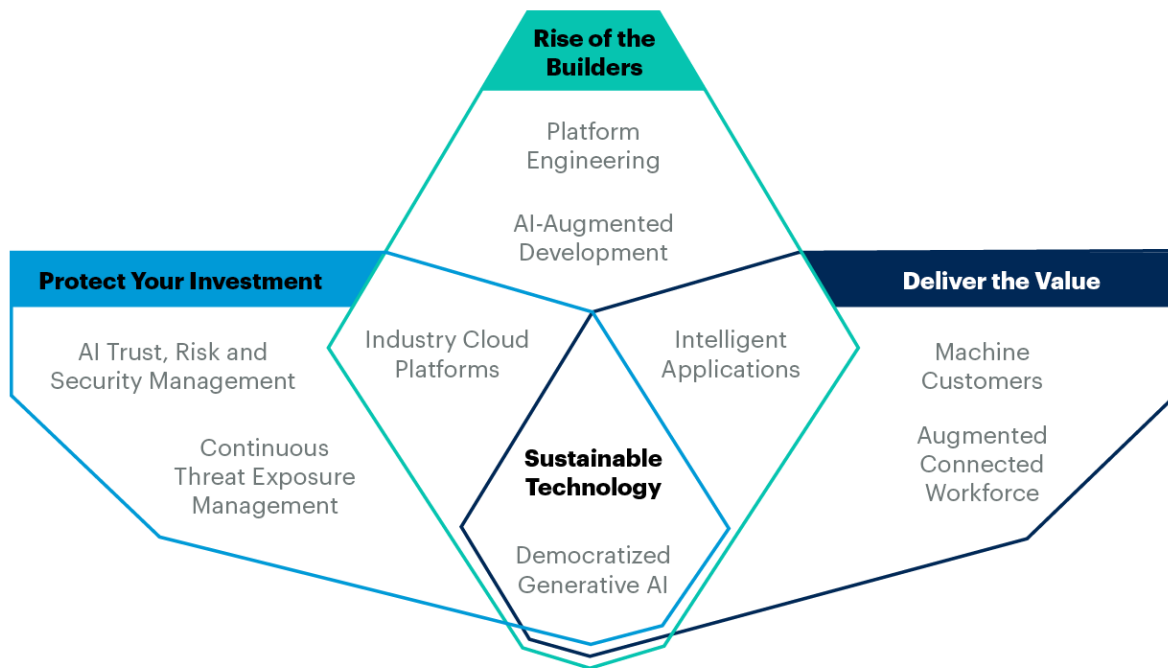
- **Protect your investment.** Preserve your investments and secure the benefits from past and future strategic technology decisions to make them durable.
- **Rise of the builders.** Unleash creative powers by using the appropriate technology for the appropriate functions.
- **Deliver the value.** Refine and accelerate value optimization, built on top of durable operational excellence.

These technology trends don't exist in isolation – they interconnect (see Figure 2) and several fall into more than one theme. The trends' potential importance for your organization differs by organizational maturity, but also by industry, business needs and previously devised strategic plans.

Work with other executives to evaluate the impacts and benefits of our trends. This will enable you to determine which single trends – or strategic combination – will have the most significant impact on your organization, and the ecosystem in which it operates. Examine the trends' potential relative to your organization's specific situation, factor them into your strategic planning for the next few years, and adjust your business models and operations appropriately.

Figure 2. Top Strategic Technology Trends for 2024: Sustainable Technology

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Source: Gartner
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Evidence

¹ P-22037 2022 Gartner Sustainability Opportunities, Risks and Technologies Survey. 2022 Gartner Sustainability Opportunities, Risks and Technologies Survey: This survey was conducted to identify how sustainability can foster opportunities, mitigate risks, amplify responsible digital technologies and control energy costs. The research was conducted online from 21 June through 21 July 2022. In total, 221 respondents were interviewed across North America (n = 75), Europe (n = 77) and Asia/Pacific (n = 69). Respondents represented qualifying organizations in information technology, manufacturing, financial services, retail and other industries with reported enterprisewide annual revenue for fiscal year 2021 of at least \$250 million. Qualified organizations also were currently engaged in sustainability-related activities. Respondents were leaders or executives in director roles or above and were directly involved in making sustainability-related decisions.

Disclaimer: Results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.

² Case Study: Partnering with T-Systems Leverages Future-Proof, Sustainable Cloud Solutions, Stream Data Centers.

³ Sunbird's Powerful DCIM Software Helps Vodafone Drive Sustainability in Its Global Data Centers, Sunbird.

⁴ How Cisco Achieved Environmental Sustainability in the Connected Workplace, Cisco.

⁵ P&G Citizenship Report, P&G.

⁶ AgroScout Uses AI to Remotely Protect Global Crops, GreenBiz.

⁷ How BMW Group Has Embraced AI for Positive Use Cases and to Improve Sustainability, Venture Beat.

Note 1: Digital Maturity

Table 1 lists the characteristics of digitally mature organizations. The 2022 Gartner Sustainability Opportunities, Risks and Technologies Survey found that:

- Respondents with a high level of digital maturity agreed/strongly agreed with six or more of these characteristics.

- Respondents with an average level of digital maturity agreed/strongly agreed with three to five of these characteristics.
- Respondents with a low level of digital maturity agreed/strongly agreed with less than three of these characteristics.

Table 1: Characteristics of Digital Maturity

<i>Characteristics</i> ↓
Encourages risk taking with IT investment decisions
Focuses on creating new revenue sources, ventures and/or new business models
Focuses on investments in established technologies with proven outcomes
Scales our innovation initiatives across the organization
Leverages data and analytics in our organization to develop new products/services
Uses intelligent technologies (i.e., AI and machine learning) to automate decision making
Builds new digital metrics to measure performance of digital initiatives
Defines long-term (five- to 10-year) roadmap for digital initiatives

Source: Gartner (October 2023)

Note 2: Materiality Assessments

Organizational materiality assessments are guides for identifying the issues that are most important to stakeholders, and those that have the most significant impact on the business. Issues identified as having the highest business impact and being stakeholder priorities are the organization’s non-negotiables. Begin with the top three issues and, if possible, prioritize issues further down the list. Update materiality assessments annually to ensure that sustainability priorities align with business needs and stakeholder expectations.

Document Revision History

Top Strategic Technology Trends for 2023: Sustainable Technology - 17 October 2022

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