SPRING 2024

THE MAVEN REPORT

The GREEN Awakening

Harvesting the business value of environmental sustainability

IN THIS ISSUE:

KKR's Alison Fenton-Willock on the ROI of ESG

Dell Technologies' Alyson Freeman on greening the data center

NZero's Valérie Mitan on data-centric decarbonization

THE MAVEN REPORT

2023 MARCOM PLATINUM WINNER

The Maven Report is an award-winning thought leadership journal providing pragmatic, actionable advice from industry experts who have led large teams through periods of serious disruption. Our Mavens believe no business problem is insurmountable if you leverage smart people who know how to harness the power of better technologies.

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In this issue

FOREWORD

Do you have the wrong view of sustainability?

You do if you're still pitting Environmental, Social and Governance (ESG) initiatives against economic growth. Our Mavens challenge that false dichotomy in this issue by shining a light on the positive fiscal implications and benefits of corporate sustainability. As you'll discover, conscientious stewardship and profitability are mutually reinforcing, not mutually exclusive.

Leading us off is Alison Fenton-Willock with an extremely enlightening look at how investors—including her company, KKR—factor corporate sustainability into their valuations. Spoiler alert: *To a significant degree*. As Alison says, there's one primary reason for this: "Sustainability creates value." (KKR is the parent company of Ensono. You can read about our ESG commitment at ensono.com/company/corporate-social-responsibility.)

Data centers are inarguably big energy consumers. They're also essential infrastructure. Within that tension lies an opportunity to do right by the environment, regulators and stakeholders. In our first of two articles on the topic, on page 10, Dell Technologies' Alyson Freeman explores a six-step approach for evolving the modern data center to become both environmentally and economically sustainable.

Few enterprises are strangers to technical debt, but too few are taking a broad enough view of the benefits of addressing it. Ensono's Tim Beerman offers an expanded blueprint for turning technical liabilities into assets aligned with sustainable objectives on page 14.

We head back into the data center with NZero's Valérie Mitan for a deeper dive into the "how" of decarbonization. Valérie makes the case for an automated data-driven approach to create net-zero goals that are smart, targeted, achievable and impactful. Ensono's success with this approach in our own data centers is detailed on page 23.

Wherever you think your organization stands relative to AI readiness, the reality check from Ensono's Oliver Presland is worth reviewing. The model on page 28 will help you locate your current position on the path to AI maturity, and the strategic approach his article lays out will give you guidance to close the gap.

Empowering digital citizenship is a critical mandate for state and local government agencies. North Carolina's Jim Weaver shares some of the steps his state has taken, and others can take inspiration from, to ensure equitable experiences and outcomes for citizens and businesses alike (page 32).

Millennial and Gen Z employees raised on ESG principles have high expectations of employers on this front (page 36). Ensono's Robin Monical explores how your commitments can either be a magnet for the next-generation workforce or send top talent running to your competitors. And Ensono's Steve Veitch closes the issue by answering a query about the link between cloud adoption and enhanced ESG performance—a question on the mind of many IT leaders tasked with reducing their company's carbon footprint.

It's past time that we shed the idea of sustainability as an albatross around the neck of profitability. Let's redefine responsible business together!

All the best!
jb

Jonathan Bumba,
Editor-in-chief

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Seeing the gold in going green

Sustainability practices are more than just a compliance hurdle or reputational requirement. Viewed correctly, they are a highly strategic asset that drives innovation, resilience and long-term economic value.

By Alison Fenton-Willock

Alison Fenton-Willock
Director of Sustainable Investing, KKR

Enterprise leaders, particularly those in heavily regulated industries, often consider ESG practices to be little more than a list of financially burdensome boxes to tick—the unavoidable cost of doing business in today's market. Investors, however, take a very different view.

From the vantage point of entities whose business model is buying companies, supporting their growth, and selling them at a profit, sustainability is not merely a set of earth-friendly policies or compliance fulfillments, but an integral source, driver and predictor of corporate financial success.

My own role is testament to this assertion. As Director of Sustainable Investing for the global investment firm KKR, I am involved daily in shaping and driving our sustainability agenda and ensuring that ESG considerations are embedded across all aspects of our investment process, from strategy development and due diligence to portfolio management, policy advocacy, stakeholder engagement and more.[1] My company invests in functions like mine and we hold ourselves—and our nearly $300 billion portfolio of companies—to extremely high ESG standards for one simple reason: KKR exists to create and protect value for our stakeholders, and sustainability creates value.

ESG considerations connect to all the various dots on this map, influencing investment decisions in ways that are both obvious, and perhaps less so.

If your organization still primarily sees ESG as a cost center, whether or not you believe it to be a morally imperative one, it's time to look at it through an investor's lens. Doing so will reveal entirely new dimensions to this aspect of your business, including areas of risk and opportunity, that may otherwise have flown under the radar and left revenue on the table.

Understanding your sustainability ecosystem

For firms like KKR, the process of evaluating potential investments goes far beyond analyzing a company's financial statements. It involves mapping the broader landscape within which that company is operating—including its industry peers, partners, suppliers, regulatory environment, geopolitical situation, geographic setting and a host of other factors—then studying the company's relationship to that terrain in detail to build a holistic and nuanced picture of its viability, performance and potential returns.

ESG considerations connect to all the various dots on this map, influencing investment decisions in ways that are both obvious, and perhaps less so.

For example, proactive and effective policies for managing carbon emissions, waste and resource use bode well for a company's ability to adapt quickly to evolving regulatory requirements. That's a strong positive from an investment standpoint. On the other hand, a company situated in an area vulnerable to rising sea levels may have outstanding financials, terrific brand loyalty and a solid ESG posture today, but if they haven't adequately accounted and planned for the impacts of future weather events on their operations, investors might take a dim view of their long-term viability and returns—and consequently take a pass on the purchase.

The questions investors ask when evaluating companies are the same questions leaders should be investigating in their own organizations. Expanding the borders of your company's position beyond the limited territory of profit and loss, and recognizing the ESG thread that runs through it, can give you the fullest possible understanding of your operations, financial health, market position and growth prospects.

Mapping sustainability to profit across your business

One of the most effective starting points we've found for understanding where your company stands relative to the pace of change and its commercial impacts is the ROSI™ framework.[2] Developed by the NYU Stern Center for Sustainable Business (CSB), this framework identifies nine specific areas of business that can be positively impacted when ESG considerations are integrated into strategy and decision making.

[1] 2022 Sustainability Report, KKR.

[2] Return on Sustainability Investment (ROSI™) Methodology, NYU Stern Center for Sustainable Business, stern.nyu.edu.

3 recommendations for increasing ESG impact

Flip the script on global frameworks

The very phrase "global framework" may elicit a collective groan from leaders who see only increased operational complexity ahead. But viewed from a different vantage point, these can be powerful strategic assets. Initiatives like the IFRS's sustainability disclosure standards and Europe's CSRD regulations enable you to perform robust comparative analyses and benchmark your operations against your peers, turning compliance into a competitive edge and enhancing your business resilience and credibility on a global scale.

Add sustainability to the agenda

One of the simplest ways of keeping an active, holistic perspective on sustainability—beyond regulatory box-checking—is to include it as a standing point of discussion. Embedding these considerations into regular board, executive and management-level dialogues will help ensure the ESG lens doesn't slip, and keep it a top-of-mind topic outside of quarterly meetings—which will in turn spark fresh thinking and surface new opportunities and risks across the areas discussed here.

Prioritize data responsibility

The significance of data responsibility—a term we coined at KKR to encompass both data privacy and cybersecurity—cannot be overstated. Beyond mere compliance with ever-tightening regulations, it's about creating trust and ensuring operational integrity. Championing robust data governance and embedding data management practices across the organization will not only protect your corporate and customer data. It will enhance your accountability and transparency in an increasingly digital world.

Each of these is an area in which you are already investing time, talent and treasure. A robust ESG approach ensures those investments yield an even bigger return, particularly when it comes to the following:

Identifying and mitigating risk – The earlier example of a healthy company sitting in a physically vulnerable area is a great illustration of how factoring in ESG objectively leads to a more comprehensive risk management process. Considering the potential impacts of weather or environmental events, regulatory policies or local political dynamics alongside other factors will give you information you weren't taking in before. That will enable you to better predict future scenarios and better insulate your company from potential disruptions that would have very real dollars-and-cents costs. The financial fallout of the 2011 BP Deepwater Horizon spill, which included over $65 billion in costs and fines and a 51 percent drop in stock value,[3] underscores the economic benefit of seeking out and addressing sustainability red flags before they flare. Likewise, brands working with suppliers who, unbeknownst to them, engage in poor labor practices have faced costly lawsuits and targeted negative campaigns which may have been avoided with a more vigilant supplier vetting process focused on ESG alignment.

See whether your risk profile changes when you add ESG-related factors into your evaluation. If it does, strategize what you can do today to preempt ESG-related risks that may be waiting down the line.

Increasing operational and financial efficiency – Lower operational costs are one of the easier ESG benefits to quantify. Global management consultant McKinsey & Company has found ESG strategies aimed at addressing operating expenses such as raw materials costs can positively impact operating profits by as much as 60 percent.[4] (See also, "Transforming technical debt into sustainability success," page 14.) Less obvious, but extremely significant, are the reduced capital costs ESG practices can lead to. Investors, governments and private lenders are increasingly offering access to pools of funding and powerful financial incentives—actual money on the table—to companies that can prove a commitment to sustainability and responsible governance. U.S. financial giant Bank of America has issued $13.85 billion in green and sustainable bonds since 2013.[5] And in 2022, half of the European leveraged loans examined by data and analytics firm Reorg featured sustainability-linked interest margins, adjusted according to how well the borrower met predefined ESG criteria.[6]

Make sure your investor pitch includes a compelling portrait of your ESG efforts and their impacts, and seek out funding sources that reward companies who commit to and prioritize sustainability.

[3] Passwaters, Mark, "Deepwater Horizon disaster, 10 years later: Changes made but scars remain," S&P Global Market Intelligence, spglobal.com.

[4] Henisz et al., Witold Tim Koller, and Robin Nuttall, "Five ways that ESG creates value," McKinsey Quarterly, mckinsey.com, November 2019.

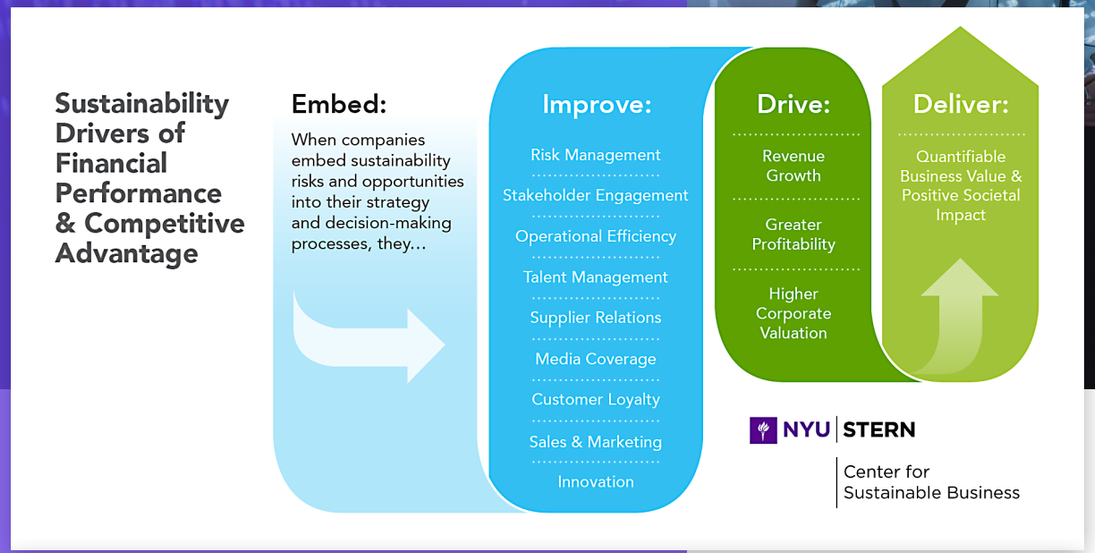
[5] Manning, Tom, "Financing Mechanisms to Support Sustainable Practices," NYU Stern Center for Sustainable Business, stern.nyu.edu, November 2023.

[6] "2022 European Sustainability-Linked Loans Wrap: Sustainability-Linked Loans Continue to Gain Prominence in 2022 but Margin Adjustments Remain Modest," reorg.com, January 2023.

Return on Sustainability Investment (ROSI™) Framework

While many ESG outcomes are measurable—reduced emissions, improved waste management, increased board diversity—connecting them to the kind of concrete dollars-and-cents results finance leaders and boards of directors look to as indicators of fiscal success has historically been a challenge.

Applying the ROSI™ methodology developed by the NYU Stern Center for Sustainable Business, companies have been able to quantify the ROI impact of their ESG initiatives in terms a CFO can love—offering a compelling counternarrative to the old story of ESG as a cash drain rather than a value driver.



~$2.1M net benefit

A utility company realized a ~$2.1M total net benefit by investing in energy efficient projects in multiple facilities.

$31M net benefit

An electricity generator is projecting a cumulative $31M in net benefits over a nine-year period through improved retention, productivity and lower capital costs driven by a move from coal-generated electricity to renewable sources.

$100M EBIT savings

An auto manufacturer started a program of recovering and recycling materials from end-of-life vehicles. This initiative resulted in reduced virgin material use, improved process efficiencies, lowered disposal costs and incremental revenues yielding $100M in EBIT savings.

Recruiting and retaining talent – At the end of the day, your employees drive the success of your company. ESG practices and policies aligned with their expectations and preferences will make them inclined them to stick with you, as well as attract new talent with similar values. Those who fall short may send top performers elsewhere. There are measurable cost benefits to retaining top employees, and significant expenses—both hard and soft—associated with recruiting new ones. 2022 data from The Society for Human Resource Management (SHRM) found the average cost to recruit and hire a single new candidate was close to $4,700; some estimates put that number two to three times higher.[7] (See also, “The ESG key to unlocking Millennial and Gen Z loyalty,” page 36.)

Imagine what an audacious ESG commitment could push your teams to conceive of and achieve, that would transform outcomes for your customers and drive new revenue for your organization.

Open employee dialogues to make sure your ESG practices are aligned with your current employees’ desires and expectations—or are on track to—and integrate your ESG story into your recruitment programs and interviewing process. Have they factored into hires decisions to join you, or played a part in candidates rejecting your offers?

Attracting and keeping customers – Like employees, customers increasingly want the brands they transact with to reflect their values, which often include environmental and social responsibility. According to the 2022 NYU Stern CSB Sustainable Market Share Index™, sustainability-marketed products grew two times faster than conventionally marketed products between 2017 and 2022, and delivered 30 percent of CPG growth in that time—despite representing just 17 percent of market share.[8] In line with these findings, 51 percent of respondents in the 2022 IBM Institute for Business Value consumer survey said environmental sustainability was more important to them today than it had been 12 months prior; 76 percent said they would maintain or increase spending on sustainable brands.[9]

Let your customers know about your ESG story. Integrate it into your brand messaging, marketing and enablement materials, and make sure your PR, communications, sales and marketing teams, and partners understand how to communicate it effectively—and why it matters to revenue. Just as importantly, educate yourself on how your sustainability practices and your message around them compare to those of your competitors—because consciously or not, your customers are doing just that.

Igniting and fueling innovation – ESG goals can be an incredible catalyst for innovation, sparking creativity and inspiring new products, services and business models that address

[5] Manning, Tom, “Financing Mechanisms to Support Sustainable Practices,” NYU Stern Center for Sustainable Business, November 2023.

[6] “2022 European Sustainability-Linked Loans Wrap: Sustainability-Linked Loans Continue to Gain Prominence in 2022 but Margin Adjustments Remain Modest,” Reorg, January 2023.

[7] Navarra, Katie, “The Real Costs of Recruitment,” SHRM, April 2022.

[8] Kronthal-Sacco, Randi and Tensie Whelan, “Sustainable Market Share Index™,” NYU Stern Center for Sustainable Business, 2022 (updated June 2023).

[9] “Consumers want it all: Hybrid shopping, sustainability, and purpose-driven brands,” IBM Institute for Business Value in association with NRF, January 2022.

environmental and social challenges while tapping into customer preferences for sustainable options.

One inspiring example is Atlanta-based flooring company Interface. They set a bold “Mission Zero by 2020” carbon-neutrality goal back in 1994, when corporate sustainability was in its infancy. That ambitious target spurred a host of industry-first innovations, including a fully carbon neutral (and in some cases, carbon negative) product line that, in turn, helps their customers meet their ESG targets through eco-friendlier-built environments.[10] In 2022, they also became the first enterprise in the industry to be fully carbon neutral—all the way through their supply chains—and in 2023 they were named one of Time magazine’s 100 most influential companies.[11] Talk about competitive advantage!

Devote serious, collaborative thinking to what opportunities for significant product evolution and powerful industry differentiation lie just beyond the tactical horizon of your sustainability requirements. Imagine what an audacious ESG commitment could push your teams to conceive of and achieve, that would transform outcomes for your customers and drive new revenue for your organization.

It’s time to capitalize on sustainability

You don’t need to be a climate change activist to accept that business success in the twenty-first century is indelibly linked to sustainability. With regulatory and societal pressures increasing by the day, ESG is no longer a niche interest or something to give a perfunctory, performative nod to.

Fortunately, you’re also not faced with a stark choice between meeting mandatory compliance requirements and upholding the tenets of capitalism. By adopting a comprehensive and strategic view of ESG—the same way investors do—you can keep your business on the right side of regulations, do the right thing for the planet, and deliver the bottom-line value your customers, employees and stakeholders expect and deserve.

[10] Sustainability Overview, Interface.

[11] Time100 Most Influential Companies 2023, Time magazine.

Six steps to creating a sustainable data center

Alyson Freeman, Ph.D.
Customer Innovation Lead, Sustainability & ESG, Dell Technologies

IT leaders can transform their data center operations into pillars of sustainability without compromising on business value and growth. Here's where to start.

Today's data centers are the backbones of the digital age, supporting everything from social media to serious scientific pursuits. However, their impressive capabilities come with a significant environmental cost. According to IDC, global data center energy consumption reached 382 terawatt hours (TWh) in 2022; it is projected to reach 803 TWh by 2027 with a compound annual growth rate (CAGR) of 16 percent.[1]

Global demand for enterprise-level computing will continue to rise. Without a new approach, this increase will only add costs for companies and further strain the grid. Coupled with stricter environmental regulations and risks associated with climate change, companies need solutions to help them meet new energy, efficiency and sustainability requirements.

[1] "Datacenter Dilemma: Balancing Capacity Demand with Environmental Responsibility," DC Blog, July 2023.

Fortunately, emerging energy solutions ensure that data center efficiency, performance and sustainability go hand in hand, enabling companies to reduce their carbon footprints while reducing their bottom lines.

Why the focus on data center efficiency?

Improving data center efficiency enables a win-win solution for the competing priorities of costs and compute needs, all while improving sustainability at the same time. Rising energy prices and growing internal demand for compute power mean that data management can have an outsized impact on a company's overall costs, given the amount of energy each data center requires. Enhanced efficiency can lead to significant energy savings, even as performance requirements increase. Optimizing data centers enables companies to align with global sustainability efforts as well, reducing or stabilizing their carbon footprint and meeting both consumer and regulatory expectations for greener operations.

Energy costs from running and cooling data center equipment already make up 40 to 60 percent of a data center's total operating costs.[2] With data volumes increasing significantly every year, traditional energy models for data centers will become too expensive, environmentally unrealistic, or both. As data-hungry processes driven by AI grow more important to core business functions, a more sustainable approach to data center operations becomes a priority in terms of ethics, economics and competitive value.

Putting data center sustainability into practice

The following six-point prescription can help organizations create more efficient, environmentally friendly and compliant data centers in the future, both in terms of adopting new technologies and retiring old ones.

Step 1: Embrace energy-efficient hardware

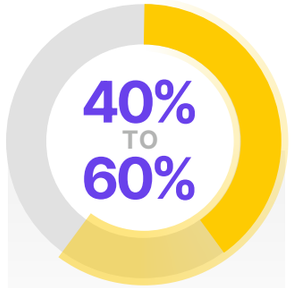
The foundation of a sustainable data center rests on the hardware that powers it. Despite some upfront costs, adopting modern, energy-efficient servers and equipment can both help reduce the environmental impact of a data center and give companies an edge in terms of economic and operational performance.

The savings come from the accumulated efficiencies across all aspects of a data center's technology stack and greater performance per unit of energy, or power usage effectiveness (PUE).

Step 2: Leverage platform power management for sustainability

Software solutions can be as impactful as hardware in the quest for sustainability. On the positive side, modern platform power management (PPM) solutions enable data centers to adjust CPU performance dynamically, balancing power consumption with workloads. By implementing smarter PPM, businesses can slash their energy usage without compromising operations.

Specifically, sophisticated PPM solutions can provide real-time insights into server power consumption and carbon emissions, helping IT leaders optimize and even automate key aspects of



Energy costs from running and cooling data center equipment make up 40 to 60 percent of a data center's total operating costs.[2]

[2] Dell Technologies Inc. Corporate Sustainability Investor Call, Dell Technologies, July 2023.

power management and sustainability. They can fine-tune energy usage to match business demands, driving savings and giving companies greater flexibility in terms of how and when they budget their energy. (See also, “Driving decarbonization with a data-centric approach,” page 20.)

As data-hungry processes driven by AI grow more important to core business functions, a more sustainable approach to data center operations becomes a priority in terms of ethics, economics and competitive value.

Step 3: Migrate workloads strategically for efficiency

Not all data is created equal, and companies waste valuable energy and computing resources on unnecessary data processes. Strategic workload migration can redistribute data processing to optimize efficiency, reduce idle capacity and minimize power consumption.

Migrating workloads can be a complex endeavor, but with the right approach, the environmental and cost benefits are well worth the effort. Dell recommends a detailed analysis of workloads to identify opportunities for consolidation and relocation. IT leaders can adopt a multistage process for assessing, planning and executing workload migrations, ensuring that efficiency and sustainability are at the heart of their new data center strategies.

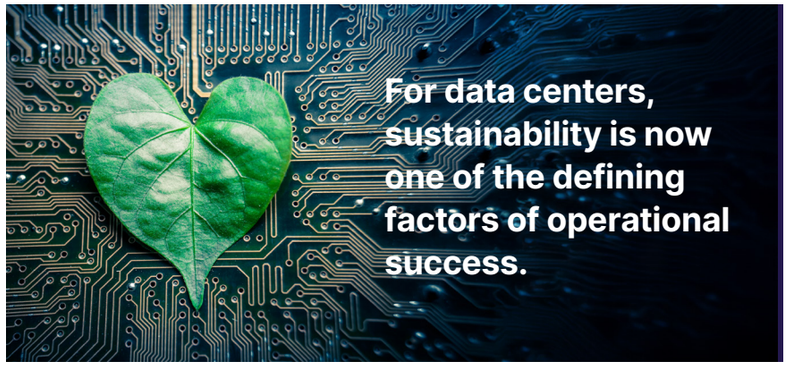
Step 4: Implement responsible retirement of technology

Decommissioning old hardware in an environmentally conscious way is a critical, yet sometimes overlooked, aspect of sustainability. Responsible technology retirement ensures that old hardware is repurposed, recycled or disposed of in a cost-effective way with minimal environmental impact. A structured approach to technology retirement can help companies adhere to legal and regulatory requirements and protect their data as they part ways with heavily used data tools.

By adopting this circular lifecycle approach to technology use, enterprises can recover value from their decommissioned technology. For example, vendors can help companies unlock value from retired IT assets and then redirect that value to fund new data center technologies or services.

Step 5: Advance DC power management techniques

Although legacy power grids use alternating current (AC) systems, direct current (DC) power distribution can be more energy efficient and provide a more modern, sophisticated approach. Specifically, incorporating advanced DC power management techniques can reduce energy loss in data center power supplies, distribution and conversion. DC power also allows for simpler integration of renewable energy, such as photovoltaic, because there are fewer places where a conversion is necessary to transfer from one voltage to another or from AC to DC.



Understanding the benefits and challenges of DC is the first step. For example, IT leaders can work with providers to take a phased approach to DC adoption, starting with high-efficiency power supplies and gradually transitioning to a fully DC-powered data center. The potential for energy savings is immense, as is the potential reduction in the environmental impact of data center operations.

Step 6: Optimize data center thermals for energy conservation

Efficient cooling is critical to a data center’s operation, and it accounts for a significant portion of its energy usage. Optimizing data center thermals through strategic cooling techniques reduces energy expenditure, enhances equipment longevity and supports sustainability in data center operations.

For example, liquid cooling can be more efficient than traditional air cooling, and a combination of both methods can maximize efficiency while minimizing costs. New techniques can also introduce new opportunities for offsetting other energy costs, such as heat reuse from a cooling system for temperature control applications in greenhouses, farms and industrial manufacturing operations.

IT leaders may also wish to consider data center layout, airflow management, humidity control and other factors to optimize thermals. Best practices for thermal management containment solutions—such as hot and cold aisle strategies and intelligent cooling systems—can also drive tangible business and environmental benefits.

A new measure of success

For data centers, sustainability is now one of the defining factors of operational success. Although the path to a truly sustainable data center is complex and nuanced, it also offers many opportunities for improvement, innovation and growth. The task at hand is monumental, but collective, strategic actions can create data-driven futures that are as environmentally respectful as they are sufficiently advanced to meet the data requirements of modern business.

From technical debt to sustainable success

Tim Beerman
Chief Technology Officer, Ensono

It's time to see the full financial upside in tackling one of the enterprise's most persistent challenges.

Technical debt is a common and pervasive problem within large enterprises, impacting everything from end-user experience to the efficiency of the company's technical teams. It's a costly issue, hindering both current and future performance.

According to global management consultant McKinsey & Company, technical debt can account for as much as 40 percent of the total value of the technology estate within large enterprises, with one company reporting that they spend anywhere between 15 and 60 percent of every IT dollar on maintaining technical debt.[1] This burden directly impacts a company's growth and agility.

As a result, Accenture reports that 84 percent of surveyed companies acknowledge that technical debt significantly impairs their ability to innovate. The business benefits are clear as well—that same research also found that companies with more advanced technical debt strategies foresaw a 32 percent increase in their speed to market.[2]

[1] "Demystifying digital dark matter: A new standard to tame technical debt," McKinsey Digital, June 2022.

[2] "From survive to thrive: Tech transformation for CSPs' future," Accenture, February 2024.

Most companies look at the business value of technical debt reduction through the lens of those immediate hard costs. But there's another angle here that's often missed—one that relates to sustainability. Bloated systems and software consume significant amounts of energy and resources. That has a direct impact on the environment and broader sustainability efforts with associated costs of their own. When thinking about technical debt reduction, companies should widen their gaze and consider the full range of benefits—environmental and economic—that more agile technology and processes can bring.

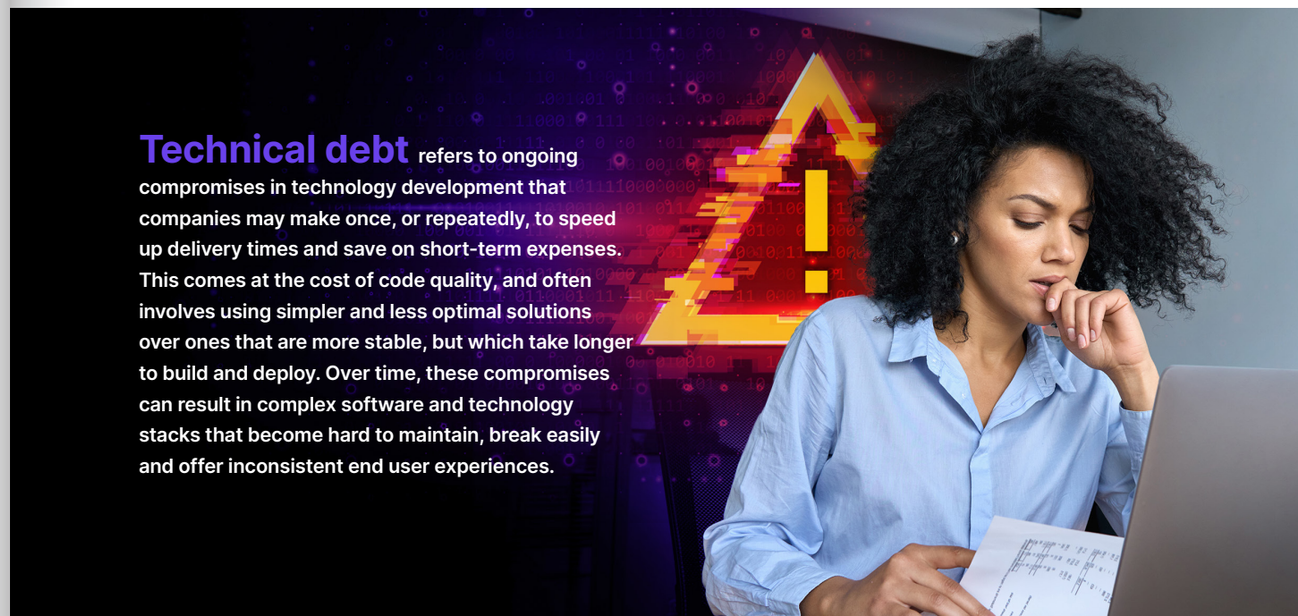
The hidden costs of technical debt

Traditionally, evaluating the impact of technical debt has focused on the quantifiable (i.e., monetary) cost of overloaded technical systems, specifically:

- Maintenance costs, quantified by the time and resources spent on fixing bugs and making updates, rather than on new development.
- System inefficiencies, such as slow response times and frequent downtimes.
- Technical debt ratio, which measures the cost of remediations against the cost of development, with the goal of quantifying the level of technical debt in relation to the entire code base.
- Dependencies within a tech stack, with the goal of identifying areas of high coupling and complex dependencies that make the codebase hard to maintain and evolve.
- Frequency of bugs, tracked via the volume and frequency of reported issues from developers and end-users.
- Architectural efficiency, specifically focusing on the tech stack's scalability, performance and alignment with current business needs.

While these traditional methods of measuring technical debt are effective at quantifying hard costs and impact on business output, they overlook the wider and more long-term issues of operational agility and environmental impact. Specific limitations of this traditional approach include:

Overemphasis on immediate cost – They often focus solely on direct financial metrics, rather than how technical debt restricts the company's ability to innovate.



Technical debt refers to ongoing compromises in technology development that companies may make once, or repeatedly, to speed up delivery times and save on short-term expenses. This comes at the cost of code quality, and often involves using simpler and less optimal solutions over ones that are more stable, but which take longer to build and deploy. Over time, these compromises can result in complex software and technology stacks that become hard to maintain, break easily and offer inconsistent end user experiences.

Neglect of system scalability and flexibility – They may not adequately measure technical debt's impact on the system's scalability and flexibility in the long term, which is crucial for operational agility.

Lack of focus on proactive management – The focus is often on reactive measurements and interventions once problems have already affected system performance, rather than proactive steps to mitigate barriers to performance in the future.

Failure to consider environmental impact – They rarely consider the energy consumption, resource usage and carbon footprint associated with maintaining inefficient and outdated systems.

By expanding their impact assessment of technical debt, and having an eye on the long-term, companies can not only solve for immediate costs, but create more agile and sustainable IT practices for the future.

Making the case

For many companies, ESG initiatives are a high-priority area of concern for senior management. They receive attention and funding and are closely tied to the company's future strategic direction, brand positioning and compliance efforts. To frame technical debt retirement through this lens and help prioritize it, IT leaders should emphasize the following:

Immediate and long-term cost savings

Present a clear analysis of the cost savings associated with energy reductions from retiring outdated systems. Use data from energy audits to project the reduction in utility bills and maintenance costs associated with more efficient, modern systems.

Risk mitigation

Point out the risks associated with continuing to operate with significant technical debt, such as increased system failures, security vulnerabilities and higher operational costs. Explain how modern systems can mitigate these risks and lead to a more resilient business operation.

Future scalability

Stress the importance of scalability and flexibility in new IT investments, which can adapt to future technological advances and environmental standards without accruing new technical debt. This ensures that the company remains agile in the face of new market entrants or significant pivots from close competitors.

Sustainability-driven technical debt reduction requires an ongoing and concerted effort, coupled with transparent reporting and check-ins with key stakeholders. IT leaders should be prepared to track and measure quantifiable achievements from their technical debt reduction efforts and be able to tie those back to sustainability, efficiency and savings.

The energy dimension of technical debt

The energy costs associated with technical debt are taking on more urgency for many enterprise organizations in the face of growing traction around ESG initiatives. According to a recent report, the global technology industry accounts for roughly two to three percent of the world's CO_2 emissions—primarily from any consumption related to maintaining data servers and other infrastructure.[3]

As a result, many companies have committed to working toward net-zero sustainability strategies, along with e-waste initiatives to reduce their carbon footprints. Reducing technical debt is a major piece of this quest toward net-zero. Maintaining old hardware, running legacy data centers, and maintaining inefficient codebases incur significant energy costs, which widens a company's carbon footprint. Here's how:

Outdated technology – Systems dragged down by technical debt are generally less efficient than modern equivalents. As a result, they require more power to perform the same tasks.

Increased cooling needs – Legacy hardware often requires more processing power and longer run times, meaning that they generate more heat than newer, more efficient systems. This requires more energy-intensive cooling solutions to prevent overheating, adding to overall energy consumption.

Inefficient resource usage – Systems burdened with technical debt may not optimize their resource allocation efficiently, leading to underutilized data centers running at a capacity below optimal capacity. That leads to energy waste, as resources are consumed without an efficient level of output.

Lack of integration – Systems with significant technical debt are often much harder to integrate with newer, energy-efficient technologies, and lack of integration can prevent the adoption of more energy-efficient management and automation systems that can help reduce overall energy usage in a tech stack.

Failing to get a handle on technical debt prolongs and worsens the issues mentioned above, increasing a company's carbon footprint over time. This is particularly problematic for companies that need to deploy hundreds or thousands of applications or workflows on a continuous basis, leading to a compounding effect of energy usage.

Sustainability as a catalyst for change

Thinking of technical debt reduction alongside sustainability goals helps to expand and clarify the importance of these initiatives, and drive interest and adoption across the organization. Infrastructure consolidation, platform modernization and reducing technical debt are three ways that companies can positively influence their immediate and long-term environmental impact and drive sustainability. This can come from modernization and consolidation initiatives like:

Server virtualization – Consolidating multiple older servers onto a single, more powerful and energy-efficient server using virtualization technology, thereby reducing the overall physical infrastructure and energy consumption.

A comprehensive technical debt retirement plan balances risk, reward and the cost and effort associated with intervention.

[3] Navarro, Rodrigo, "The Carbon Emissions of Big Tech," ElectronicsHub, February 2023.

Cloud migration – Transitioning from on-premise data centers to cloud services where and when it makes sense, leveraging the scale and efficiency of modern cloud providers who deploy advanced cooling and energy management technologies.

Storage optimization – Implementing data deduplication and compression techniques to reduce the storage footprint, allowing for the decommissioning of excess storage devices which directly lowers energy usage.

Network upgrades – Upgrading to newer networking technologies that support better energy management features such as advanced power saving modes, leading to reduced power consumption during periods of low data traffic.

Together, technical debt reduction and platform modernization have a direct impact on both wider ESG goals and cost savings by creating more energy efficient systems, optimizing resource allocation, maintaining environmental compliance and extending the lifespan of technical assets and platforms. (See also, "Six steps to creating a sustainable data center," page 10.)

Actionable strategies for addressing technical debt with a sustainability lens

Green IT initiatives have become increasingly popular vehicles through which large enterprises can make their technology platforms and infrastructure more environmentally friendly. This is the process of incorporating environmental sustainability goals into the purview of IT asset management, thereby prioritizing and incentivizing more energy-efficient hardware and software.

Reducing technical debt should be a core component of any green IT initiative. This is a bottom-up effort that helps companies identify and solve inefficiencies, and build a more stable foundation on which to deploy future products and technologies.

Understanding the scale of the challenge and setting a roadmap for success is easier said than done. The very definition of technical debt means that a company's systems are likely tangled up in cobbled-together codebases and complex infrastructure. Change one and several others might fail. To solve for this, companies need to develop a comprehensive technical debt retirement plan that balances risk and reward by carefully planning the cost and effort associated with the intervention. Structured through a sustainability lens, such a plan might include the following steps:

Conduct a comprehensive audit – Begin by assessing the entire IT infrastructure to flag outdated systems, redundant processes and energy-inefficient technologies. This audit should note all systems and hardware showing signs of technical debt and note their associated energy usage and environmental impact.

Prioritize interventions based on energy consumption – Evaluate the energy consumption of different systems and prioritize the retirement or upgrade of those that consume the most energy.

Identify and assess compliance risks – Consider the environmental regulations and compliance risks associated with the chosen intervention and technical debt retirement strategy. Prioritize projects that will align the company's operations with current and upcoming environmental laws, such as the EU Ecodesign Directive or the U.S. Clean Air Act.

Evaluate the scalability and flexibility of new solutions – When planning to retire technical debt, choose solutions that are not only more energy efficient but also scalable and flexible. This ensures that the new systems can adapt to future environmental standards and technologies without accumulating new technical debts.

Implement sustainable procurement policies – Integrate sustainability criteria into the procurement process for new IT systems. Opt for vendors and products that have strong environmental credentials, such as energy-efficiency certifications or those made from recyclable materials.

Monitor and report on progress – Establish monitoring systems to continuously assess the performance and environmental impact of IT systems. Regular reporting on these metrics can help maintain transparency with stakeholders and guide further improvements in sustainability practices.

Leading with sustainability in mind

Reducing technical debt isn't just about immediate cost savings, reducing bugs and addressing customer consumers. Inefficient systems have wide reaching impacts that touch everything from quarterly revenue reports to ongoing operational efficiency to the sustainability initiatives at a company.

IT leaders are well positioned to take a significant role in driving corporate sustainability through green IT initiatives that reduce technical debt and improve energy efficiency from technology platforms and infrastructure. More than an ethical consideration, this is a strategic investment in the company's future and the planet's health.

Start small, with a targeted and manageable project that aims to modernize a particularly energy-intensive system or piece of hardware. Learn from that process and note the immediate and long-term benefits of that effort. Make this the catalyst for large technical debt retirement initiatives in the future.

Driving decarbonization with a data-centric approach

Valérie Mitan
Executive Vice President and Head of Sustainability, NZero

How do you satisfy growing energy demand while also lowering emissions, managing costs and meeting regulatory requirements? It starts by measuring *everything*.

From ordering coffee on a mobile app to filing an insurance claim to accessing medical records to uploading an Instagram photo, there is scarcely a transaction or interaction in our lives that isn't dependent on data centers in some way. Were they to magically disappear tomorrow, our day-to-day experiences would be radically different.

Yet, while they're critical for enabling modern conveniences and business operations, data centers are also massive energy consumers. Estimates put their total global electricity usage at anywhere from 1 to 1.3 percent[1]—a figure continually rising in tandem with the digital economy and one that has placed them squarely in the crosshairs of sustainability discussions. A March 2024 *New York Times* article shone a glaring light on data centers' environmental impact, citing research that suggests data center electricity demand could triple by 2030 in the United States alone.[2]

This stark prediction likely came as no surprise to enterprise leaders who have been struggling for years to balance increasing customer energy demand with ever more stringent regulatory requirements and intensifying stakeholder insistence to do better by the environment. These converging pressures, along with mounting evidence that sustainability makes bottom-line business sense have led many organizations to make concrete, often aggressive and, in many cases, very public "net-zero" commitments—pledging to fully neutralize their carbon emissions by a set future date.[3,4] (See also, "Seeing the gold in going green," page 2.)

But between that looming deadline and present-day reality, there can be a yawning chasm of confusion, frustration and uncertainty. Leaders charged with reducing their carbon footprint know what they need to do. They *want* to do it. They hear the clock ticking. But often, they aren't seeing fast enough progress from their efforts… or they simply don't know where to start.

The solution to both challenges can be found in the same source organizations rely on to inform decisions and drive action across virtually every other area of the business: Data, Finance, Operations, Sales, Marketing, Human Resources—they all depend heavily on rich, reliable, relevant, up-to-date data to achieve their target outcomes, often deploying highly sophisticated mechanisms to capture, measure and analyze it. Applying the same rigorous and advanced data-centric approach to decarbonization in the data center and beyond is the key to fulfilling your plans and pledges.

nzero™

Innovator at-a-glance:

Company name:
NZero

Founded:
2017

Focus:
Advanced AI-powered data and decarbonization platform that helps business leaders achieve their sustainability and operational goals by automating data collection, streamlining regulatory compliance and enabling more accurate recommendations.

Benefits by the numbers:

60%	77M	35%
savings on onsite energy audits	metric tons of CO_2e tracked	more accurate than competitors

An historic first in 2024:
For the first time in history, football's biggest game was powered by 100% renewable, carbon-free energy. NZero was the data platform behind Allegiant Stadium and the Las Vegas Raiders' historic achievement. To learn more, read, "The Las Vegas Raiders and Allegiant Stadium Turn Football's Biggest Game Green" at NZero.com.

[1] "Data Centres and Data Transmission Networks," iea.org.

[2] Plumer, Brad and Nadja Popovich, "A New Surge in Power Use Is Threatening U.S. Climate Goals," The New York Times, March 2024.

[3] TheClimatePledge.com

[4] Race to Zero campaign, ClimateChampions.unfccc.int

Three advantages of a data-driven journey to net-zero

Many enterprises rely on internal teams, usually working outside the scope of their roles, to patch together a disparate blend of manual processes, outdated static averages, and automated but disconnected reports to arrive at a picture of their consumption across the data center. This can leave substantial room for error including missed decarbonization opportunities, inaccurate emissions accounting and a costly lack of alignment between efforts and real-world conditions. My company, NZero, has seen reporting error rates as high as 25 percent for clients using such processes. These kinds of miscalculations can come with a hefty price tag: regulatory penalties, increased insurance premiums, misspent investment—the list goes on.

A complete, honest, data-backed accounting of your current emissions enables you to see much more clearly where the highest-impact changes can be made.

Independent, comprehensive assessment tools that integrate real-time data collection with analytics can significantly reduce those vulnerabilities. The right information, expertly collected, measured, analyzed and reported through an automated, repeatable, transparent and scalable process will give you three key advantages in carving a net-zero path that is ambitious, actionable, achievable and sustainable at every step of the way:

1) An accurate, clear-eyed starting point

As with any journey, getting your data center to net-zero requires knowing how far from that destination you are today. That means comprehensively assessing all aspects of your present-day energy consumption—everything from IT equipment load, power usage effectiveness (PUE) energy sources and cooling systems to equipment efficiency, virtualization and server utilization, as well as building and infrastructure design.

Advanced carbon management platforms can give a deeply granular view of your direct environmental impacts—or more broadly, one that encompasses indirect emissions (known as Scope 2 and 3) as well—and reveal areas ripe for targeted intervention. NZero, for example, automatically gathers hourly energy usage data for each asset, then refines and normalizes it to display emissions and costs across locations. By continuously tracking emissions targets and changes over time, you'll have a thorough, highly precise overview of your current carbon footprint and validated guidance for the path forward.

2) A realistic, responsive blueprint for action

A complete, honest, data-backed accounting of your current data center emissions enables you to see much more clearly—and with far more confidence—where and when the highest-impact changes can be made. From that vantage point, you can set decarbonization goals that are right sized to your unique circumstances, strengths and limitations, ambitious enough to drive meaningful change, and more readily endorsed by stakeholders.

From there, it's time to act. Hyper-accurate real-time data, combined with advanced AI-powered algorithms provides deep insight into your unique load profile and seasonality, and can reveal countless ways to streamline operations and unlock ROI. Predictive analytics, for example, might adjust cooling systems preemptively or shift workloads based on renewable energy availability, enhancing operational efficiency and sustainability. Machine learning algorithms can optimize server usage, consolidating tasks during low-demand periods.

Achieving data center sustainability isn't a one-and-done proposition. The sustainability landscape is constantly evolving, as are customer demands and business priorities, and your data center needs to keep pace with it all. Advanced carbon management platforms can continually track progress across scopes, targets and points in time, validating the effectiveness of your sustainability efforts, maintaining your progress, and identifying new areas of risk and opportunities for improvement that may arise.

Ensono + NZero: Data-driven sustainability success

As a leading managed service provider with a significant data center investment, Ensono has made reducing electricity consumption and carbon emissions across its global operations a top corporate priority, aiming for a 60 percent emissions reduction by 2030 as part of its ultimate net-zero goal.

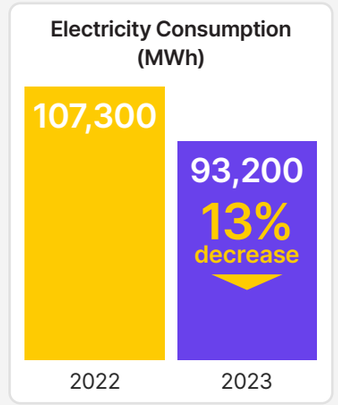
To reach that ambitious target, Ensono partnered with NZero, utilizing the company's advanced technology to accurately track electricity use and other environmental emissions items across its data centers.

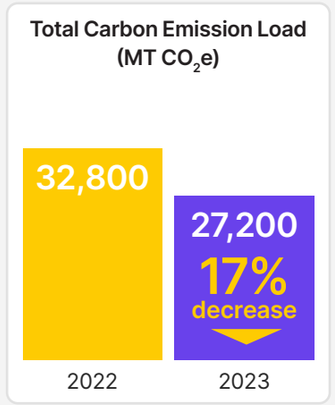
GOAL

60%

Emissions reduction by 2030

By integrating NZero's detailed, location-based data analysis, Ensono has achieved over a 13 percent reduction in electricity consumption and a 17 percent decrease in total carbon emission load from 2022 to 2023. With NZero, Ensono is setting a new standard for environmental responsibility in the managed services sector, proving that responsible stewardship and IT client service excellence can go hand in hand.





3) Enhanced credibility and audit-readiness

In today's generalized climate of misinformation and generative AI-fueled suspicion, transparency and trustworthiness are invaluable commodities. And when it comes to sustainability in particular, the prevalence of greenwashing—companies misleading the market about their ESG practices through false or unsubstantiated claims—has only intensified the scrutiny applied by regulators and stakeholders. The ability to deliver concrete, objective, up-to-the-minute details on your data center decarbonization progress and outcomes will strengthen your reputation as a committed sustainability leader, which can increase your attractiveness to customers and investors.

Committing to a path toward carbon neutrality is becoming less of an ideal for enterprises, and more of a must. But not all decarbonization efforts are created equal.

Some carbon tracking platforms only provide raw data, leaving users to manage their own reporting and absorb any associated costs. Others, such as NZero, incorporate greenhouse gas (GHG) reporting as a core feature. This can save you time and money by ensuring an audit-ready data trail is readily available. And a platform that allows the easy exportation of reports in alignment with global standards such as TCFD, GRESB, CDP, SASB and GRI, will help you stay compliant with environmental reporting regulations, even as they evolve and update.

Letting data lead the way

Given their centrality to modern business and life, data centers aren't going anywhere. Nor can they continue their current consumptive trajectory. Committing to a path toward carbon neutrality is becoming less of an ideal for enterprises, and more of a must. But not all decarbonization efforts are created equal.

Businesses long ago learned the immense value of a data-driven approach to solving problems, surfacing opportunities and making decisions. Decarbonization should be no exception, especially with the stakes as high as they are today. With the right partner, tools, technology, systems and support, your data center can meet the growing demands of the digital economy and rapid pace of regulatory changes while upholding your commitment to environmental sustainability—and your teams can be freed to focus on the activities that differentiate and drive value for your business.

So you think you're ready for AI?

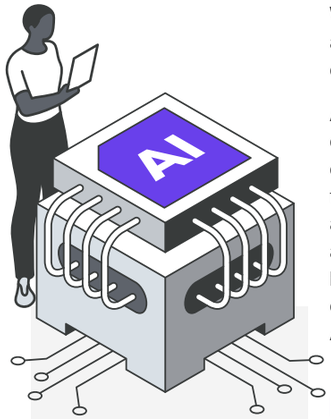
Your business won't achieve AI excellence without mastering these five essentials.

Just short of flashing neon lights, we're continually reminded of AI breakthroughs promising to transform our business data. AI's potential to drive innovation, improve efficiency, solve complex problems and enable true competitive advantage is seemingly endless—but only if you're ready to release it.

IT leaders are under growing pressure to tap into their data and leverage it to drive improved AI outcomes for their businesses. A recent survey conducted by the IBM Institute for Business Value of over 3,000 CEOs spanning over 20 countries shows that this pressure is not just coming from the board of directors, but also investors, creditors and even their own employees. 75 percent of the CEOs surveyed feel their organizations have the knowledge and skills to incorporate AI, but only 29 percent of their direct reports in the C-suite agree.[1] Where is the disconnect? How can organizations ensure they are making the most of all the data at their disposal to gain meaningful value from AI applications?

Oliver Presland
Senior Vice President of Consulting Services, Ensono

[1] "CEO decision-making in the age of AI," IBM Institute for Business Value, June 2023.



What is your AI maturity level?

The first step on the journey toward AI adoption is to identify your organizational and operational maturity across five key areas. See our Data and AI Maturity Model on the following spread to assess where your company stands.

What changes do they need to make across their technology infrastructure, culture and strategy?

As we learned back in the early days of public cloud adoption, focusing only on technology is a recipe for a failed transformation. To truly move the needle and build a culture of successful AI adoption, organizations must think more holistically. Let's dig a little deeper and consider the five essentials for achieving AI success.

Establish the economic upside

The creation of a well-articulated business case is not just a formality. It is a strategic imperative to gain stakeholder buy in from the beginning of your data and AI journey, identify and mitigate potential pitfalls, and surface opportunities for a competitive advantage.

As recommended in the Summer 2023 Maven Report article, "The AI Adoption Blueprint," digging deeply into questions like, "How can AI improve our products and services?", "Where can AI streamline operations?" and "How can AI generate new revenue streams?" will help you to crystallize and communicate the value proposition of AI in clear, quantifiable terms inclusive of KPIs and predicted enhancements. This will enable resource allocation to areas that offer the highest value and provide stakeholders with the insights needed to assess the ROI of AI initiatives, enabling them to distribute budget, talent and infrastructure effectively.

Once you've established the "why" of AI implementation with a solid business case, the next step is defining the "how" through a proof of concept (PoC). The previously mentioned blueprint offers guidance on exploring the right questions to achieve a successful result. The areas of opportunity identified in your business case should be your starting point for seeing, in more specific detail, where AI can enhance efficiency, effectiveness or customer experience. Tasks that are time-consuming, prone to human error, or require sifting through large amounts of data are areas where generative AI can often add substantial value. However, graduating to true AI/ML applications over time and ingesting your own proprietary data can lead to even greater outcomes. Business value drivers such as better customer experiences and greater predictive capabilities can ultimately lead to new revenue opportunities and greater brand affinity.

Building your PoC does not need to be a heavy lift. In fact, with widely available low-code AI tooling, simple prototypes can be whipped up in days against real-world or simulated scenario data. This will allow you to "fail fast" and iterate on the initial PoC based on feedback. Insights gained from testing and validation with a model can be fine tuned, adjusted and scaled to incorporate additional features or data sources to improve performance and robustness.

If this can succeed in a controlled environment, presenting a tangible PoC only bolsters confidence with key stakeholders and creates excitement across the business. In addition, you'll have the documented learnings, mitigated risks, best practices and learned insights to validate and prove the feasibility and scalability of your project.

Tighten your data practices

Data practice inefficiencies can slow down all aspects of a business' data journey, from ingestion, categorization and analysis to insights and, eventually, their AI initiatives. These problems can stem from a variety of sources including ill-fitting governance, technological inefficiencies and business unit ownership, leaving data increasingly siloed.

To fully leverage AI's potential, businesses must be able to rely on high-quality, trusted data with democratized access. Core to this is establishing clear data ownership and accountability with the cultivation and advancement of a robust data community. Just as it takes a village to raise a child, ensuring top-notch data quality requires the collective effort of an entire organization, from IT leaders through to operations.

For instance, organizing regular meetups for data owners and stewards can help coordinate activities that impact the data platform and, consequently, AI models and dependencies. These meetings also offer a valuable forum for discussing upcoming projects with AI and data experts, enabling early identification of data opportunities and understanding the associated requirements and workload.

Within this community, it is imperative not only to define roles and responsibilities for maintaining data integrity and implementing effective processes, but also to provide comprehensive support, training resources and skill development opportunities.

Invest in your technology

In an ideal world, businesses would have access to real-time analytics to allow them to apply good quality data to AI PoCs, react to events, and make informed and impactful decisions, fast. However, many organizations still face issues with the accessibility of their data.

It's commonplace to rely on an overnight export of data from legacy systems for reporting and analytics. By the time this data is accessible, it will be too late to react or pivot to the events of the day. The answer isn't necessarily shifting all that rich data from legacy platforms to the cloud. While some applications may benefit from being modernized and migrated to the cloud, it may simply be a matter of making all the data accessible and usable for analytics by connecting it to the cloud.

"Without high quality, organized data, the only thing you will get from AI is the ability to make mistakes with more confidence than ever before."

– Judson Althoff, Chief Commercial Officer, Microsoft

World-class businesses need to architect their systems to deliver a reliable, singular view of data that is ready to feed their AI models. If they want to realize their data-driven ambitions, they need to recognize that investment will be needed to achieve the results they're looking for. Building structured, AI-ready data management architecture will give organizations the capacity and flexibility needed to collect, store, analyze and respond to the sum total of their data and allow them to elevate their use of analytics, moving from descriptive "What happened?" analytics, to predictive "What might happen next?" insights, to prescriptive "What should we do now?" decisions.

If architected correctly, businesses will be able to start making enquiries of data in situ, rather than expending manual effort by going outside to source and create a suitable dataset before preparing answers to data questions from executives. This will build trust with leadership by providing timely insights.

The Data & AI Maturity Model

Where does your organization stand?

True AI readiness requires a high level of maturity within five key areas: economics, data practices, technology, people, and security and governance. Assessing your business against this model will help you measure your current position on the path to AI mastery—and identify opportunities for growth and impactful action.

	Economics	Data Practices	Technology	People	Security & Governance
1 No plan	Use cases for AI and business value are undefined. There is no comprehensive understanding of the potential impact of AI to deliver better business outcomes.	Unable to apply AI use cases and responsibilities for data quality and data management have not been established. AI use cases are not operationalized due to low quality data and lack of data governance.	Internal data siloes are preventing AI use cases from leveraging company data and delivering insights. There is no single source of trusted or accessible data, or catalog of technology gaps including roadmap for data platforms.	Unable to apply AI use cases and responsibilities for data quality and data management have not been established. AI use cases are not operationalized due to low quality data and lack of data governance.	Data and AI governance or compliance concerns are not documented, and policies are not well understood.
2 Assess & plan	Functional AI use cases mapped against established data with a prioritized roadmap in order of impact, including projected business benefit and ROI.	Data responsibilities have been documented with the necessary steps to support the planned AI use cases. Data community and org has been mapped, identification of data responsibilities understood with a planned structure of centralized data and AI team.	Required data and AI technologies are selected. A roadmap for the data platform has been delivered with data sources and architecture mapped to enable AI use cases. Service level agreements (SLAs) for data quality, availability and data governance tooling identified.	Data responsibilities have been documented with the necessary steps to support the planned AI use cases. Data community and org has been mapped, identification of data responsibilities understood with a planned structure of centralized data and AI team.	Data and AI governance and roll out plan in place including organization structure, responsibility and processes for managing governance during projects. Data and AI compliance policies documented and distributed to key stakeholders.
3 Rolling out	Initial AI prototype use cases and PoCs are complete and measurable business value has been ascertained. A plan and prioritization for production use cases are agreed with key stakeholders.	Centralized data and AI team established. This team is actively supporting the wider data community in establishing best practices. Active focus on supporting and improving production data quality and readiness.	AI uses cases are identified and PoCs have begun to utilize production data. Selected data platform and AI tools in production. Data is being ingested with live governance tools.	Centralized data and AI team established. This team is actively supporting the wider data community in establishing best practices. Active focus on supporting and improving production data quality and readiness.	Data and AI related compliance policies applied in production. Governance has been established - patterns and practices for managing security and compliance including data access controls in place.
4 Seeing success	In production AI use cases are providing business value and beginning to show measurable ROI. Board level business cases defined and approved for greater scale and potential incremental investment.	Data and AI community are skilled in mature data management and require minimal support from the centralized data team. High quality data is feeding production AI use cases. Data and AI community are experimenting, exploring, and nominating new AI use cases.	AI use cases supported in production. Data platform contains highly trusted, accessible, and understandable data - SLAs are being met consistently.	Data and AI community are skilled in mature data management and require minimal support from the centralized data team. High quality data is feeding production AI use cases. Data and AI community are experimenting, exploring, and nominating new AI use cases.	Data governance tooling and data quality automation is in production with mature access controls for AI usage. High SLAs for data quality, security, and availability.
5 Business as usual	AI is continuously making measurable business impact at scale and a pipeline of new AI use cases is identified and approved.	Data and AI is a first-class consideration in any new process or business project. AI is being used to improve products, efficiency, customer experience, and decision making. Highly automated with less reliance on centralized data and AI team to oversee day-to-day operations.	Data platform matured. Custom business models and algorithms in use. Data quality and availability SLAs are high, enabling organization to scale AI use cases.	AI is adopted business-wide with backing from senior leadership. AI skills permeate the organization and are considered a core capability. Data and AI is considered in all projects and change initiatives.	Confidence in the integrity and governance of AI usage across the organization, with board-level visibility. Cyber teams use AI to detect sophisticated nation-state and targeted professional attacks through behavioral anomalies.

By keeping data skills limited and siloed, organizations are breeding distrust in data.

Empower your people

If data skills are lacking, data and analytics capabilities are often siloed in one area of the business, disconnected from other departments. In addition to slow decision making, organizational structures built around centralized data gatekeepers risk a failure to provide operational and useful data for AI use cases. It also breeds distrust, with excluded employees not feeling part of a broader strategy, and therefore less likely to meaningfully engage with data. The same is true among leaders, who often view data analysis as something to leave to certain experts on the team, but don't fundamentally engage with or trust the results.

Businesses need to look at new approaches to harness new data, analytics skills and AI skills, with clear governance in place to build trust and maintain security. This should be invested in as an organization-wide endeavor—for example, an AI Center of Excellence (CoE) with a mandate from the very top and controlled but democratized access, whether through training or rolling out new tools to lower the skills barrier to entry.

As also recommended in "The AI Adoption Blueprint," your AI CoE should function as a permanent operational and governing body that guides all aspects of your AI program. Internal members can be both full-time technology, operations, data and security leaders with daily responsibilities for AI adoption, implementation and management, and part-time leaders from across the organization—Legal, HR, Finance, Board members and AI project owners within business units—who have a vested interest in your AI program and need both visibility and input into the process.

And, while cost concerns are always top of mind, balancing internal staff with external specialized partners can help you achieve the literacy and skill level your business needs.

As you integrate these disparate groups into a centralized function, adopting a common set of processes is essential. Shared approaches to project management, technical decisions, project owner onboarding, AI and data science training, risk/security decisions, organizational change management and training, financial governance, operational services and governance, and vendor management will help to ensure alignment and enable velocity.

Prioritize security and governance

Organizations are increasingly turning to AI to bolster their defense against sophisticated threats. One notable advancement in AI applications is its integration within cyber teams, where it serves as a powerful ally in detecting and mitigating complex attacks. By leveraging AI-driven algorithms to analyze behavioral anomalies, cyber teams can swiftly identify and respond to potential threats, enhancing overall security posture.

Moreover, organizations are implementing automated controls to mitigate the risk of accidental misuse of approved AI tools. These controls not only enhance operational efficiency but also serve as a proactive measure to ensure compliance with regulatory standards and internal data policies. By enforcing strict access controls and establishing comprehensive identity management protocols, organizations can automate data privacy measures, safeguarding sensitive information and mitigating compliance risks.

In line with regulatory requirements and internal governance frameworks, organizations are establishing clear, acceptable use policies for AI tools. These policies outline usage guidelines and restrict access to only those tools that have undergone rigorous review by internal compliance committees. A whitelist of approved tools, along with any exceptions, should be published to provide transparency and ensure alignment with organizational objectives. (See also, "Leveraging your brand as you dive into the technological unknown," The Maven Report, Spring 2023.)

However, it is imperative to acknowledge that many will still face challenges in achieving comprehensive security and compliance measures. In instances where no centralized view of employee usage exists and acceptable use policies are undefined, organizations may be exposed to heightened risks of data breaches and regulatory non-compliance. As such, there is a pressing need for organizations to prioritize the establishment of robust security protocols and compliance frameworks to mitigate potential threats effectively as they adopt AI.

The integration of AI in security and compliance processes represents a significant milestone in organizational maturity. By leveraging AI-driven solutions, organizations can enhance threat detection capabilities, streamline compliance efforts and fortify defenses against emerging cyber threats. Moving forward, it is essential for organizations to continue investing in AI technologies and refining their security and compliance strategies to adapt to evolving threat landscapes and regulatory requirements.

Reaching AI mastery with a holistic and evolutionary approach

In our ever-evolving digital world, AI excellence is on the path to becoming a business imperative, and achieving it demands a comprehensive approach that addresses economics, data practices, technology, people, security and governance. Understanding and deliberately evolving your organizational maturity in each of these areas will empower you to harness the full potential of AI, fueling innovation, efficiency and competitive advantage in today's data-driven landscape, and transforming your operations, enhancing decision-making and enabling sustainable success.

Navigating the digital continuum in state government

Jim Weaver
North Carolina Department of Information, Technology Secretary and State Chief Information Officer

How a people-centric approach can drive digital inclusivity, innovation and growth

As U.S. state and local governments continue to prioritize digital transformation, they face unique challenges in enhancing services, streamlining internal processes, and improving the lives of all their citizens. Here in North Carolina, state government is taking proactive steps toward these goals through our strategic blueprint for digital transformation.

At the heart of this blueprint is the concept of a digital continuum that encompasses all aspects of government operations, from internal processes to constituent-facing services. In adopting this holistic perspective, the state acknowledges that internet connectivity alone cannot bridge the gaps that exist today. It requires a people-centric approach that also considers affordability, access to devices and digital literacy, and online content that is accessible and inclusive.

What is the digital continuum?

Unlike the before-and-after binary of a "digital divide," the digital continuum is a vision where government digital technology efforts continually adapt to the evolving needs of all people, ensuring no one is left behind. That means changing how we work to close the gap between those who benefit from the internet and those who struggle to do so.

The digital continuum calls for greater access to connected, user-friendly technologies. It prioritizes digital literacy and ongoing support systems to ensure everyone can participate in the digital world—including people of all backgrounds, communities, ages and economic groups. In North Carolina, internet access is the starting point, not the end, of bringing the benefits of the internet to all our people.

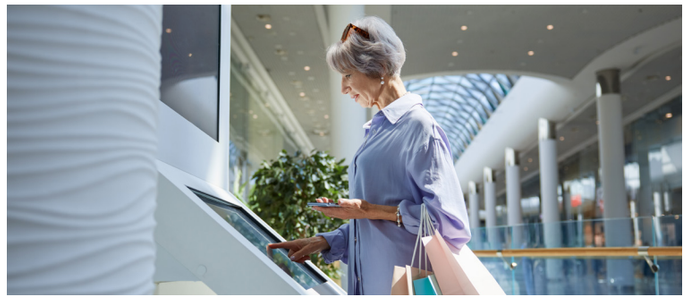
For the people we serve, the digital continuum means fewer disparities in digital access and competence, promoting inclusivity and empowering individuals with diverse backgrounds and needs. It means providing everyone with the tools and skills necessary to use digital services that improve their daily lives. For businesses, especially those in local economies, the digital continuum represents an opportunity to thrive in digital marketplaces—a first for many companies that have been marginalized by a lack of access to digital resources. Bridging disparities means businesses can cater to wider audiences, provide more inclusive and accessible services, enhance customer experiences and foster economic growth.

In essence, the digital continuum addresses both the tangible and intangible barriers to digital accessibility—an approach that benefits all stakeholders.

Advancing accessibility with updated systems

New, secure cloud-computing technologies can help strengthen the digital continuum and advance digital accessibility and inclusivity. But adopting them often involves transitioning from legacy, on-premise systems that are deeply integrated into existing operations. Legacy modernization can be difficult due to the complexity and the critical functions legacy systems perform, while moving to cloud infrastructure requires careful planning and execution to maintain service continuity and data integrity. Security is also a concern; shifting to the cloud must include strong measures to protect sensitive data and comply with data protection laws.

Fortunately, it's often possible, even preferable, to keep some workloads on legacy systems where it makes sense. This can minimize the expense, disruption and risk of a full cloud migration while achieving the same benefits.



Internet connectivity alone cannot bridge the gaps that exist today. It requires a people-centric approach that considers a full range of digital tools and strategies.

That said, the benefits of cloud computing are significant. Cloud platforms offer better scalability, efficiency and agility, helping public institutions meet changing digital needs more quickly and effectively. The cloud also supports the digital continuum with more accessible and dependable digital services.

Recommendations for adopting your own people-centric approach

A true people-centric approach accounts for the diverse needs of everyone. By prioritizing accessibility, ease of use and security, it reflects a commitment to equitable access to digital services. In North Carolina, our strategy focuses on extending connectivity to underserved areas, expanding digital literacy through partnerships with local, trusted community organizations and ensuring our people have consistent access to digital devices and accessible online services. Recognizing that internet access is just the starting point, our plan goes further to tackle individual communities' barriers to digital literacy as discovered during our work in 2023 to collect feedback from thousands of individuals and organizations across the state. It also moves to protect people's identities and data privacy in the long-term.

Here are my recommendations for getting started with your own digital transformation strategy:

Engage your communities as you expand broadband connectivity

To ensure the success of broadband expansion efforts, actively involve communities in the planning and implementation stages. This approach enables the identification of specific needs and preferences, which can vary significantly between different areas, especially contrasting rural versus urban settings. Engaging communities from the outset fosters a sense of ownership and ensures that the infrastructure developed meets the actual needs of those it aims to serve.

One standout initiative here in North Carolina is the state's investment in broadband expansion to a variety of underserved areas, which elevates the baseline for internet access across both rural and urban landscapes.

This effort focuses not only on the physical infrastructure needed for high-speed internet but also on the affordability and availability of these services, access to appropriate devices and digital skills training, ensuring that these barriers do not prevent people from accessing the digital world.

Leverage public-private partnerships for digital literacy

Strengthening digital literacy should not fall solely on public institutions. Instead, work to forge partnerships with private enterprises like nonprofits, community anchor institutions and other state digital inclusion partners. These collaborations can bring in additional resources, expertise and innovation, making digital literacy programs more dynamic and responsive to technological advancements. Private sector involvement can also help scale these initiatives, reaching a wider audience more effectively.

By partnering with local government and libraries, community centers, schools and universities, and non-profits with community trust, North Carolina aims to equip residents with the skills they need to navigate digital environments successfully. That means accessing digital government services, finding and acting on employment opportunities online and participating in the digital economy. We are also working to expand vocational training in IT, helping to prepare a digital workforce that does not depend solely on four-year degrees.

Prioritize user-friendly design in digital services

When enhancing digital services, prioritizing user-friendly design is both a legal requirement, in compliance with the ADA Standards for Accessible Design, and crucial for true inclusion. This means not only making interfaces intuitive for all users, including those with disabilities, but also making sure that information is easily accessible and understandable.

By focusing on the user experience, the state can increase the adoption and effective use of digital services, ensuring that investments in these areas deliver the greatest value.

North Carolina works to enhance the user experience of our digital services, making them more intuitive and accessible. The state also prioritizes maintaining human interactions within digital services, particularly in such sensitive areas as human services and public health. Redesigning government websites and digital platforms with a focus on user-friendliness and inclusivity helps to ensure that individuals with disabilities, as well as those who lack technology proficiency, can access and benefit from these services.

Create a robust framework for cybersecurity and privacy

Adopt a comprehensive approach to cybersecurity and privacy, which includes regular audits, updating best practices, and educating the public and employees about potential risks and safeguards. A robust framework protects sensitive data and builds trust with the public, assuring them that their information is secure. It also enables the state to be proactive rather than reactive in the face of evolving cyber threats.

In North Carolina, we manage a delicate balance between using data to improve services and safeguarding people's data privacy. By adopting privacy-by-design principles, the state ensures that all digital initiatives are built with the protection of personal information at their core, fostering a trust-based relationship. Managing citizen identities is complex, especially as the number of services and citizens using them increases. North Carolina faces added complexities given the many out-of-state service people who live on and around our military bases. The state is navigating these challenges by developing secure, yet flexible, systems for digital identity management.

These systems aim to respect individual privacy as they streamline access to government services, recognizing the importance of user-friendly interfaces that accommodate citizens with diverse needs. New, more sophisticated cybersecurity efforts also protect sensitive information while ensuring digital services stay resilient against future types of attacks.

Invest in cloud computing training for public sector employees

If your state does make a transition to the cloud, invest in targeted cloud training programs for public sector employees. This will equip them with the necessary skills to manage and utilize cloud-based systems effectively, ensuring that the transition to cloud computing enhances service delivery without disrupting ongoing operations. Training should be continuous, adapting to new developments and technologies, to keep the workforce at the forefront of public sector innovation.

Adopting privacy-by-design principles ensures that all digital initiatives are built with the protection of personal information at their core, fostering a trust-based relationship.

A final note about progress

The pace of your digital transformation is likely to vary. Sometimes it will be slow, measured in inches. At other times, you'll make giant leaps forward. It's essential to embrace each of these moments as a victory, no matter its size. If you're moving your people, processes and technology in the right direction, each one is a win.

The ESG key to unlocking Millennial and Gen Z loyalty

Robin Monical
Vice President Talent Acquisition, Ensono

Generations raised on principles of environmental sustainability and ethical governance want employers who share their values—and are turning away from those who don't.

Read about the future of the global workforce, and chances are you'll encounter two themes: changing demographics and a looming skills gap.

First, this group's age demographics are shifting rapidly. Millennials and Gen Z currently make up 38 percent of the global workforce, a figure that's expected to rise to 58 percent by 2030.[1] Second, studies predict that due to a combination of retiring Baby Boomers, aging populations and rapid technological advancements like AI, the world is looking at a talent shortage of roughly 85 million people by 2030.[2] In this landscape, highly skilled Millennial and Gen Z employees become a valuable and sought after talent pool. Organizations must attract, engage, retain and upskill this cohort if they hope to future-proof themselves against the skills shortage and growing wave of retirements. To do that, they need to appeal to their values more so than with any other generation in the workforce.

Environmental, Social and Governance (ESG) is one such area where these generations place value. Millennials and Gen Z care deeply about their organization's impact on the world around them. Because of that, companies need to find ways to truly meet their ESG obligations and ensure they are clearly communicating this commitment—and its impact—to existing and potential employees.

Let's explore the symbiotic relationship between robust ESG initiatives and the recruitment and retention of Millennial and Gen Z employees. As you'll discover, ESG is not just an exercise in altruism, but a strategic imperative for sustainable business success.

Understanding Millennial and Gen Z values

ESG is more than mere corporate responsibility to appease investors or meet regulatory obligations. It has emerged as a pivotal factor in attracting and retaining the best Millennial and Gen Z talent. To understand why, you need to understand their values as a whole. Generally, they do not have an overly optimistic view of the future. According to a recent survey of Millennial and Gen Z workers from Deloitte:[3]

- Most think the economy will get worse
- Most are concerned about the high cost of living
- Most are concerned about climate change

That list isn't exhaustive, but it gives a snapshot into the mindset of this cohort. They're extremely socially minded and feel an obligation to help improve a future they see as bleak. And, most importantly, they want to focus their time and energy on companies who share this commitment.

Employees who feel their employers make a positive impact in the world are 11 times more likely to stay, and 14 times more likely to say they enjoy coming to work.

According to the Society of Human Resource Management (SHRM), ESG initiatives are considered important to 41 percent of all American workers. However, that number jumps to 55 percent for Millennials and 46 percent for Gen Z, highlighting the elevated level of importance for this younger age group.[4] The environment, specifically, was overwhelmingly reported as the top ESG priority in SHRM's survey. 54 percent of respondents said it was most important to them, followed by social issues at 24 percent. Deloitte's research agrees, reporting that 60 percent of Millennials and Gen Z say they're most anxious about the environment.

But this concern goes beyond anxiety—it directly impacts the jobs that this age group accepts and retains. According to Deloitte, 50 percent research an organization's environmental impact and policies before accepting a job. Even more telling is that one in six say they've already changed jobs or sectors due to climate concerns, and one in four plan to do so in the future.

[1] "How prepared are employers for Generation Z?" PwC.com.

[2] Franzino, Michael and Alan Guarino, "The $8.5 Trillion Talent Shortage," KornFerry.com.

[3] 2023 Gen Z and Millennial Survey, Deloitte.com.

[4] Gurchiek, Kathy, "Survey: ESG Strategies Rank High with Gen Z, Millennials," SHRM.org, March 2023.

Clearly, ESG directly impacts Millennial and Gen Z recruitment and retention. So how are companies responding? According to SHRM, 51 percent of surveyed U.S.-based executives ranked ESG initiatives as being very important. 75 percent of those same respondents acknowledge that ESG initiatives have a positive and direct impact on employee engagement, which is directly tied to retention.

So, companies agree that ESG is important and is good business. That's why 99 percent of the S&P 500 publicly report their ESG information.[5] But, while having and reporting on ESG initiatives is important, that alone misses out on one key factor: Millennials and Gen Z want to have an active hand in advancing ESG goals. While companies have made progress on DEI and work/life balance programs since the COVID-19 pandemic, Deloitte's survey reports that many fewer respondents feel they can influence their organization's social impact and sustainability, relative to other areas of business such as products and services or personal development and training.

This means that, for many organizations, actively getting their younger employees involved with driving social impact and sustainability programs is a major area of potential growth. This is one secret behind successfully recruiting and retaining Millennial and Gen Z talent.

ESG's role in talent attraction and retention

Giving Millennials and Gen Z the opportunity to drive change through ESG—particularly in relation to environmental and sustainability initiatives—has the potential to make or break recruitment and retention efforts. Consider these stats from Deloitte, and the importance of ESG to their loyalty and productivity:

- 37 percent of Millennials and 44 percent of Gen Z say they've rejected assignments due to ethical concerns.
- 34 percent of Millennials and 39 percent of Gen Z have turned down employers that did not align with their values.

[5] S&P 500 ESG Reporting and Assurance Analysis, TheCAQ.com, June 2023.

Not having an ESG initiative, and employees lacking the ability to drive ESG, are both major risk factors for attracting and retaining young talent. Conversely, the SHRM survey found that 86 percent of workers at organizations with ESG-related goals are proud to work for their employers. They say their jobs are meaningful and they want to stay with their organization long-term. In other words, active and impactful ESG means stronger employee engagement and retention.

"Employees engaged in ESG initiatives feel a sense of purpose that transcends their day-to-day tasks," explains Tony Bond, Chief Diversity and Innovation Officer at Great Place to Work. This sense of purpose contributes to an overall bump in employee experience and engagement—two factors that have a direct line to employee retention. His organization's research found that employees who feel their employers make a positive impact in the world are 11 times more likely to stay with their organizations for the long haul, and 14 times more likely to say they enjoy coming to work.[6]

Employee experience, in turn, breeds a strong company culture that's built on shared ESG goals and aspirations. That culture, when packaged and promoted through employer branding initiatives, becomes a compelling narrative that can be used to attract and hire top talent in the Millennial and Gen Z cohort.

The importance of an authentic narrative around ESG initiatives and culture cannot be overstated. IBM research found that 67 percent of survey respondents were more willing to apply to jobs with environmentally sustainable companies.[7] Authenticity is the operative word here. Companies need to prove they're environmentally sustainable via transparent ESG filings and other public-facing messaging.

> **"Employees engaged in ESG initiatives feel a sense of purpose that transcends their day-to-day tasks"**
>
> **– Tony Bond, Chief Diversity and Innovation Officer, Great Place to Work**

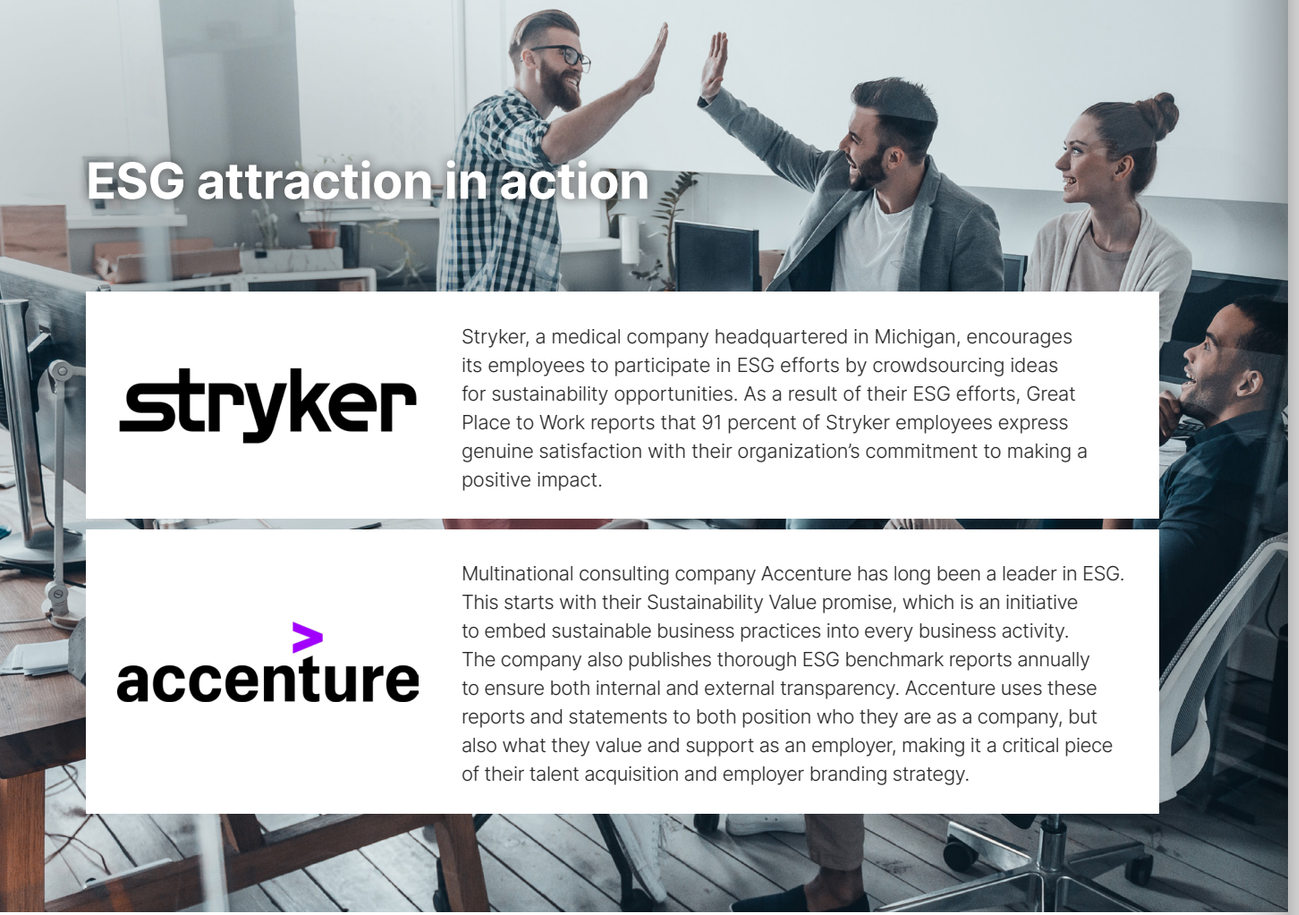
According to Deloitte, Millennial and Gen Z workers say they actively consider a company's sustainability claims and certifications to ensure that their marketing messaging matches their actions. A disconnect is seen as "greenwashing," which is a major turnoff for these workers. But if companies are genuine in their ESG efforts and give Millennial and Gen Z workers space to make a direct impact, these job seekers are willing to put their money where their mouths are when applying for jobs. SHRM found that if companies meet the above threshold:

- 39 percent of Millennials and 34 percent of Gen Z would consider a pay cut
- 55 percent of Millennials and 53 percent of Gen Z would relocate
- 41 percent of Millennials and 40 percent of Gen Z would accept a job with fewer benefits
- 43 percent of Millennials and 45 percent of Gen Z would accept a job with less work/life balance

These data points highlight the importance of these initiatives, relative to other variables that determine whether or not a candidate accepts a job offer.

[6] Hastwell, Claire, "Workplace ESG: How Environmental, Social, and Governance Factors Impact Employee Experience," GreatPlaceToWork.com, December 2023.

[7] "Balancing sustainability and profitability," IBM Institute for Business Value, April 2022.



ESG attraction in action

Stryker, a medical company headquartered in Michigan, encourages its employees to participate in ESG efforts by crowdsourcing ideas for sustainability opportunities. As a result of their ESG efforts, Great Place to Work reports that 91 percent of Stryker employees express genuine satisfaction with their organization's commitment to making a positive impact.

Multinational consulting company Accenture has long been a leader in ESG. This starts with their Sustainability Value promise, which is an initiative to embed sustainable business practices into every business activity. The company also publishes thorough ESG benchmark reports annually to ensure both internal and external transparency. Accenture uses these reports and statements to both position who they are as a company, but also what they value and support as an employer, making it a critical piece of their talent acquisition and employer branding strategy.

Strategies for integrating ESG into corporate culture

Authenticity, transparency and empowerment are the three words that should be at the forefront of any ESG strategy. ESG needs to stem from a genuine desire to make a difference in the world. It needs to be transparent and honest through internal and external reports and communications. And it needs to include and empower participants from all levels of the organization.

True ESG—the kind that Millennials and Gen Z gravitate toward—goes beyond simple compliance and uses the organization's collective resources to drive targeted and significant change, with goals like:

Reducing waste and pollution

- Increasing energy efficiency
- Reducing or combating climate change
- Ensuring human rights throughout all company processes
- Improving employee health and safety
- Providing training and education programs
- Ensuring board diversity
- Following ethical protocols
- Addressing executive compensation

Individually, each of the above goals relates to specific programs and initiatives that cumulatively make up the company's ESG efforts. Companies don't have to do it all, but they should be serious about driving meaningful impact from the initiatives that they do focus on. Ideally, these priority initiatives will stem from both leadership and grassroots proposals from employees throughout the organization. To foster this company-wide, grassroots effort, companies need to:

Set a clear vision – Be clear and specific about what the company is trying to achieve, by when, and what the desired impact is.

Get commitments – Secure buy-in and support from the board, senior leadership and key stakeholders who will drive the initiative.

Benchmark, measure and report – Establish a starting benchmark, specify success metrics and transparently report on progress and impact internally and externally.

Gather feedback – Create feedback channels to gather opinions and ideas from across the organization, both to improve existing ESG efforts and to identify new possibilities.

Communicate impact – Share success internally and externally, repackaging that narrative for prospects, investors and potential candidates.

Creating and promoting an authentic, transparent and empowered ESG program means an ongoing initiative to track, evaluate and actively improve key success metrics over time. Millennial and Gen Z employees don't expect perfection, but they do expect effort. The steps outlined here are one way to show existing employees and candidates that your company takes ESG as seriously as they do.

Millennial and Gen Z employees don't expect perfection, but they do expect effort.

To move forward, look inward

What are you doing right now to further ESG at your company? What channels are you leveraging to communicate these efforts to your employees and candidates? Use that assessment as your benchmark. Work with stakeholders across the company to identify your first areas of focus and improvement, and commit to a regular cadence of goal setting, execution, evaluation and refinement.

By committing to authentic ESG efforts, your organization will be set up for positive performance outcomes across all facets of measurement and proactively address the global workforce shortage, brought on by the retiring baby boomers, by attracting the next generations of talent.

How a move to the cloud can help deliver against ESG targets

The pressure is on in my company to align our data center operations with our broader ESG targets. How can transitioning to cloud infrastructure contribute to our sustainability goals?

– Anonymous, VA

Steve Veitch
Director, Solution Architecture, Ensono

The cloud can deliver a wide range of benefits for any business: increased flexibility, low cost, low risk opportunities to flex demand over time, and both financial and sustainable economies of a scale. When it comes to your ESG targets, a move to the cloud can alleviate the pressure of meeting regulatory standards and provide assurance of long-term innovation in sustainable solutions.

There are four overarching ways you can leverage a move to the cloud to directly deliver against ESG targets and combat the impact of higher energy costs for your business, whether the carbon footprint of your on-premises technology is known or not.

Take advantage of out-of-the-box carbon reductions

The carbon emissions of hyperscale cloud services will almost certainly become a top criterion in cloud purchase decisions, as the overarching ESG benefit of cloud computing is that it, quite simply, reduces the amount of energy your IT systems consume. It is estimated that the average cloud data center uses 50 percent less electricity than on-premises hosting.

The big three are already shouting about their carbon emission credentials. Microsoft stated that Microsoft Cloud is as much as 98 percent more carbon efficient than on-premises data centers, with a power usage effectiveness (PUE) of 1.185 in EMEA. PUE determines the energy efficiency of a data center and the closer the measure is to 1.0, the greater the overall efficiency—the data center industry average is 1.8 and alongside water usage effectiveness (WUE). These measures will help data centers—and the businesses that use them—track progress on the road to net-zero. Cloud providers are lowering their PUE and WUE through:

Virtualization – Using virtual machines that can run their own workloads, reducing energy consumption and releasing floor space.

Sustainable cooling systems – Using natural cooling techniques such as heat exchangers rather than power-hungry refrigeration-based systems.

Maintaining hardware – Maintaining hardware and replacing equipment when it falls below set levels of performance not only means processes run at maximum efficiency but are also more sustainable.

Energy efficient lighting – Although energy-hungry data center lighting makes up a small proportion of the power consumption, switching to LEDs across lighting systems can help both reduce consumption and limit extraneous heat production.

UPS usage – An uninterrupted power supply (UPS) that stores power can boost efficiency or reduce energy usage across systems.

Cloud providers have taken massive strides in the efficiency of their hardware over the past decade. However, scientists[1] warn that we will ultimately reach a tipping point when most organizations have moved to the cloud and the energy demands will start to rise again, so the source of that energy becomes even more important.

Leverage renewable energy investment

The pressure is on data centers to find new sources of energy or offset their energy usage against investment in renewables. The EU Green Deal states that "data centers can and should be carbon neutral by 2030." The industry has responded with a commitment to tackle energy, resource and water use at their European data centers, aiming to power them solely by renewable energy by 2030. Microsoft has gone one step further, pledging a 100 percent renewable energy supply by 2025. In the U.S., the New Energy Act of 2021 covers a spectrum of energy efficiency initiatives, some of which specifically target the data center industry, but all of which will require significant investment.

While moving away from fossil fuel-sourced energy completely is still in the works, the industry has made strides towards net-zero through reducing demand, purchasing wind and solar generated power and renewable energy credits (RECs), and offsetting carbon usage. Investment in renewables is most widely evident through Power Purchase Agreements (PPAs) where large tech firms agree to buy renewable energy from a project not yet online, for a set price and a set number of years, usually from 10 to 20 years.

[1] Lawrence Berkeley National Laboratory, "Data centers continue to proliferate while their energy usage plateaus," Science Daily, June 2016

Reap the economic and social value of dematerialization

By shifting to a cloud-based system, you will be able to rely less on hardware and physical machines and contribute to dematerialization. Although literally meaning the use of less materials, this process of consuming fewer resources while delivering increased value is considered a crucial strategy for advancing industrial ecology at a societal level.

The replacement of high-carbon products with new, virtual equivalents—such as moving from physical, on-premises data centers to cloud-based systems—can improve both productivity and profitability, as well as sustainability. According to a 2021 Ericsson IndustryLab report, 60 percent of decision-makers agreed that cloud infrastructure was among the top three key contributors to the dematerialization already underway in their businesses.[2] Nearly half agreed that improved productivity and profitability were key benefits of dematerialization and around 40 percent said the same for sustainability.

Gain efficiencies from large-scale innovation

Cloud providers have been ironing out inefficiencies in the hardware and software running in their data centers. They run virtual machines on their servers to limit downtime, install custom cooling systems, automate wherever possible, and so on. As noted, this consistent pursuit of efficiency has helped the data center industry keep its energy needs stable over the past decade.

It also means that when companies move their data from in-house servers to the cloud, they will almost certainly end up reducing their energy consumption. Using cloud providers makes it easier for most businesses to reap the benefits from large scale investment in technologies as well as meet corporate need to be environmentally conscious and risk averse. The power of the larger players to seek out and develop new solutions have emerged as a blueprint for a "green data center" with innovations such as renewable power procurement models (such as RECs and PPAs), waste recycling, and use of AI, ML and IoT to forecast and automate energy use and distribution.

Whatever the challenges faced, it is beyond doubt that moving to the cloud offers an accessible, low-risk route to meeting ESG targets for many organizations. The potential for long-term sustainability, opportunities for extensibility and resilience, and reduction in risk responsibility makes the cloud worthy of serious consideration in your digital strategy.

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[2] "The dematerialization path to profitability and sustainability," Ericsson & IndustryLab, February 2021.

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